FOREWORD

This manual contains on-vehicle service and diagnosis for the Mazda MX-5. For proper repair and maintenance, a thorough familiarization with this manual is important, and it should always be kept in a handy place for quick and easy reference.

All the contents of this manual, including drawings and specifications, are the latest available at the time of printing. As modifications affecting repair or maintenance occur, relevant information supplementary to this volume will be made available at Mazda dealers. This manual should be kept up -to-date.

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WARNING

Servicing a vehicle can be dangerous. If you have not received service-related training, the risks of injury, property damage, and failure of servicing increase. The recommended servicing procedures for the vehicle in this workshop manual were developed with Mazda-trained technicians in mind. This manual may be useful to non-Mazda trained technicians, but a technician with our service-related training and experience will be at less risk when performing service operations. However, all users of this manual are expected to at least know general safety procedures.

This manual contains "Warnings" and "Cautions" applicable to risks not normally encountered in a general technician's experience. They should be followed to reduce the risk of injury and the risk that improper service or repair may damage the vehicle or render it unsafe.It is also important to understand that the "Warnings" and "Cautions" are not exhaustive. It is impossible to warn of all the hazardous consequences that might result from failure to follow the procedures. The procedures recommended and described in this manual are effective methods of performing service and repair. Some require tools specifically designed for a specific purpose. Persons using procedures and tools which are not recommended by Mazda Motor Corporation must satisfy themselves thoroughly that neither personal safety nor safety of the vehicle will be jeopardized.

The contents of this manual, including drawings and specifications, are the latest available at the time of printing, and Mazda Motor Corporation reserves the right to change the vehicle designs and alter the contents of this manual without notice and without incurring obligation.

Parts should be replaced with genuine Mazda replacement parts orw h parts which match the quality of genuine Mazda replacement parts. Persons using replacement parts of lesser quality than that of genuine Mazda replacement parts must satisfy themselves thoroughly that neither personal safety nor safety of the vehicle will be jeopardized.
Mazda Motor Corporation is not responsible for any problems which may arise from the use of this manual. The cause of such problems includes but is not limited to insufficient service-related training, use of improper tools, use of replacement parts of lesser quality than that of genuine Mazda replacement parts, or not being aware of any revision of this manual.

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SOUTHERN AFRICA

Mazda MX-5 Workshop Manual

APPLICATION:
This manual is applicable to vehicles beginning with the Vehicle Identification Numbers (VIN), and related materials shown on the following page.

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VEHICLE IDENTIFICATION NUMBERS (VIN)

European (L.H.D.) specs.
JMZ BK12F5*# 500001—
JMZ BK12F6*# 500001—
JMZ BK12R6*# 500001—
JMZ BK12Y2*# 500001—
JMZ BK12Z2*# 500001—
JMZ BK12Z5*# 500001—
JMZ BK1462*# 500001—
JMZ BK14F5*# 500001—
JMZ BK14F6*# 500001—
JMZ BK14J2*# 500001—
JMZ BK14L6*# 500001—
JMZ BK14R6*# 500001—
JMZ BK14Y2*# 500001—
JMZ BK14Z2*# 500001—
JMZ BK14Z5*# 500001—

U.K. specs.
JMZ BK12F60# 500001—
JMZ BK12Y20# 500001—
JMZ BK12Z20# 500001—
JMZ BK12Z50# 500001—
JMZ BK14620# 500001—
JMZ BK14F60# 500001—
JMZ BK14J20# 500001—
JMZ BK14L60# 500001—
JMZ BK14R60# 500001—
JMZ BK14Y20# 500001—
JMZ BK14Z20# 500001—
JMZ BK14Z50# 500001—

Australian specs.
JM0 BK103200 300001—
JM0 BK10F200 300001—

General (L.H.D.) specs.
JM7 BK226**# 300001—
JM7 BK22F**# 300001—
JM7 BK246**# 300001—
JM7 BK24F**# 300001—
JM7 BK326**# 300001—
JM7 BK32F**# 300001—
JM7 BK346**# 300001—
JM7 BK34F**# 300001—
JM7 BK426**# 300001—
JM7 BK42F**# 300001—
JM7 BK446**# 300001—
JM7 BK44F**# 300001—

General (R.H.D.) specs.
JM6 BK1062*0 300001—
JM6 BK10F2*0 300001—
JM6 BK10Y2*0 300001—

GENERAL INFORMATION

00
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GENERAL INFORMATION

VEHICLE IDENTIFICATION NUMBER (VIN) CODE

id000000100200

European (L.H.D. U.K.) specs.

amxzzw0000102

VEHICLE IDENTIFICATION NUMBER (VIN)

id000000100300

European (L.H.D. U.K.) specs.
JMZ NC18820# 200001—
JMZ NC18F20# 200001—
JMZ NC18F60# 200001—
JMZ NC18F80# 200001—

HOW TO USE THIS MANUAL

id000000800100

Range of Topics

- This manual contains procedures for performing all required service operations. The procedures are divided into the following five basic operations:
  - — Removal/Installation
  - — Disassembly/Assembly
  - — Replacement
  - — Inspection
  - — Adjustment
- Simple operations which can be performed easily just by looking at the vehicle (i.e., removal/installation of parts, jacking, vehicle lifting, cleaning of parts, and visual inspection) have been omitted.

Service Procedure
Inspection, adjustment

- Inspection and adjustment procedures are divided into steps. Important points regarding the location and contents of the procedures are explained in detail and shown in the illustrations.

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GENERAL INFORMATION

Repair procedure

1. Most repair operations begin with an overview illustration. It identifies the components, shows how the parts fit together, and describes visual part inspection. However, only removal/installation procedures that need to be performed methodically have written instructions.
2. Expendable parts, tightening torques, and symbols for oil, grease, and sealant are shown in the overview illustration. In addition, symbols indicating parts requiring the use of special service tools or equivalent are also shown.
3. Procedure steps are numbered and the part that is the main point of that procedure is shown in the illustration with the corresponding number. Occasionally, there are important points or additional information concerning a procedure. Refer to this information when servicing the related part.

1	Split pin
2	Nut
3	Lower trailing link ball joint (See 02-14-5 Lower Trailing Link Ball Joint Removal Note)
4	Bolt
5	Lower trailing link
6	Dust boot (lower trailing link)

7	Split pin
8	Nut
9	Upper trailing link ball joint (See 02-14-5 Upper Trailing Link Ball Joint Removal Note)
10	Nut
11	Upper trailing link
12	Dust boot (upper trailing link)

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GENERAL INFORMATION

Symbols

- There are eight symbols indicating oil, grease, fluids, sealant, and the use of **SST or equivalent. use. These symbols show application points or use of these materials during service.**

Symbol	Meaning	Kind
OIL	Apply oil	New appropriate engine oil or gear oil
BRAKE FLUID	Apply brake fluid	New appropriate brake fluid
ATF	Apply automatic transaxle/ transmission fluid	New appropriate automatic transaxle/ transmission fluid
GREASE	Apply grease	Appropriate grease
SEALANT	Apply sealant	Appropriate sealant
P	Apply petroleum jelly	Appropriate petroleum jelly
R	Replace part	O-ring, gasket, etc.
SST	Use SST or equivalent	Appropriate tools

Advisory Messages

- You will find several **Warnings, Cautions, Notes, Specifications and Upper and Lower Limits in this manual.**

Warning

- A Warning indicates a situation in which serious injury or death could result if the warning is ignored.

Caution

- A Caution indicates a situation in which damage to the vehicle or parts could result if the caution is ignored.

Note

- A Note provides added information that will help you to complete a particular procedure.

Specification

- The values indicate the allowable range when performing inspections or adjustments.

Upper and lower limits

- The values indicate the upper and lower limits that must not be exceeded when performing inspections or adjustments.

GENERAL INFORMATION

Troubleshooting Procedure
Basic flow of troubleshooting

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DTC troubleshooting flow (on-board diagnostic)
- Diagnostic trouble codes (DTCs) are important hints for repairing malfunctions that are difficult to simulate. Perform the specific DTC diagnostic inspection to quickly and accurately diagnose the malfunction.
- The on-board diagnostic function is used during inspection. When a DTC is shown specifying the cause of a malfunction, continue the diagnostic inspection according to the items indicated by the on-board diagnostic function.

Diagnostic index
- The diagnostic index lists the symptoms of specific malfunctions. Select the symptoms related or most closely relating to the malfunction.

Quick diagnosis chart (If mentioned)
- The quick diagnosis chart lists diagnosis and inspection procedures to be performed specifically relating to the cause of the malfunction.

Symptom troubleshooting
- Symptom troubleshooting quickly determines the location of the malfunction according to symptom type.

GENERAL INFORMATION

Procedures for Use
Using the basic inspection (section 05)

- Perform the basic inspection procedure before symptom troubleshooting.
- Perform each step in the order shown.
- The reference column lists the location of the detailed procedure for each basic inspection.
- Although inspections and adjustments are performed according to the reference column procedures, if the cause of the malfunction is discovered during basic inspection, continue the procedures as indicated in the action column.

SHOWS INSPECTION ORDER

SHOWS ITEM NAMES FOR DETAILED PROCEDURES

SHOW POINTS REQUIRING ATTENTION BASED ON INSPECTION RESULTS

REFERENCE COLUMN

BASIC INSPECTION

STEP	INSPECTION		ACTION
1	Perform the mechanical system test. (See 05-13-3 MECHANICAL SYSTEM TEST.) Is mechanical system normal?	Yes	Go to the next step.
		No	Repair or replace any malfunctioning parts according to the inspection result.
2	Turn the ignition switch to the ON position. When the selector lever is moved, does the selector illumination indicate synchronized position to the lever location? Also, when other ranges are selected from N or P during idling, does the vehicle move within 1—2 s?	Yes	Go to next step.
		No	Inspect the selector lever and TR switch. Repair or replace malfunctioning parts. (See 05-14-5 SELECTOR LEVER INSPECTION.) (See 05-13-10 TRANSMISSION RANGE (TR) SWITCH INSPECTION.) If the selector lever and TR switch are normal, go to the next step.
3	Inspect the ATF color condition. (See 05-13-8 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION.) Are ATF color and odor normal?	Yes	Go to the next step.
		No	Repair or replace any malfunctioning parts according to the inspection result. Flush ATX and cooler line as necessary.
4	Perform the line pressure test. (See 05-13-3 Line Pressure Test.) Is the line pressure normal?	Yes	Go to the next step.
		No	Repair or replace any malfunctioning parts according to the inspection result.
5	Perform the stall test. (See 05-13-4 Stall Speed Test.) Is the stall speed normal?	Yes	Go to the next step.
		No	Repair or replace any malfunctioning parts according to the inspection result.
	Inspect the voltage at the following TCM terminals. (See 05-13-29 TCM INSPECTION.) • Terminal 2J (TFT sensor) • Terminals 1D, 2B, 2C, 2E (TR switch) • Terminal 2G (turbine sensor) • Terminal 2D (down switch) • Terminal 2I (up switch) • Terminal 1E (M range switch) • Terminal 1W (steering shift switch) Is the voltage normal?	Yes	Go to the next step.
		No	Repair or replace any malfunctioning parts according to the inspection result.

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GENERAL INFORMATION

Using the DTC troubleshooting flow

- DTC troubleshooting flow shows diagnostic procedures, inspection methods, and proper action to take for each DTC.

DETECTION CONDITION describes the condition under which the DTC is detected.

TROUBLE CONDITION

DTC P0103

DTC PO103	MAF circuit high input
DETECTION CONDITION	PCM monitors input voltage from TP sensor after ignition key is turned on. If input voltage at PCM terminal 68 is above 8.25 V, PCM determines that TP circuit has malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction during first drive cycle. Therefore, PENDING CODE is not available. • FREEZE FRAME DATE is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• MAF sensor malfunction • Connector or terminal malfunction • Open circuit in wiring between MAF sensor terminal D and PCM terminal 36 • Open circuit in MAF sensor ground circuit

POSSIBLE CAUSE describes possible point(s) of malfunction

Indicates the circuit to be inspected (01 and 05 section)

Indicates the inspection step No. to be performed (01 and 05 section)

Indicates the connector related to the inspection

STEP shows the order of troubleshooting

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Are related Service Bulletins and/or on-line repair information available?	Yes	Perform repair or diagnosis according to available repair information. If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS IS CONCERN INTERMITTENT OR CONSTANT** • Connect diagnostic tool to DLC-2. • Start engine. • Access MAF V PID using diagnostic tool. • Is MAF V PID within 0.2 - 8.3 V?	Yes	Intermittent concern is existing. Go to INTERMITTENT CONCERNS TROUBLESHOOTING procedure. (See 01-03-33 INTERMITTENT CONCERN TROUBLESHOOTING)
		No	Go to next step.
4	**INSPECT POOR CONNECTION OF MAF SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect MAF sensor connector. • Check for poor connection (damaged, pulled-out terminals, corrosion etc.). • Are there any malfunctions?	Yes	Repair or replace terminals, then go to Step 8.

ACTION describes the appropriate action to be taken according to the result (Yes/No) of the INSPECTION.

INSPECTION describes the method to quickly determine the malfunctioning part(s).

Reference item(s) to perform ACTION.

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GENERAL INFORMATION

Using the diagnostic index

- Malfunction symptoms are listed in the diagnostic index under symptom troubleshooting.
- The exact malfunction symptoms can be selected by following the index.

No.	TROUBLESHOOTING ITEM		DESCRIPTION	Page
1	Melting of main or other fuses		—	(See 01-03-6 MELT NO.1 MAIN OR OTHER FUSE)
2	MIL comes on		MIL is illuminated incorrectly.	(See 01-03-7 NO.2 MIL COMES ON)
3	Will not crank		Starter does not work.	(See 01-03-8 NO. 3 WILL NOT CRANK)
4	Hard start/long crank/erratic start/erratic crank		Starter cranks engine at normal speed but engine requires excessive cranking time before starting.	(See 01-03-9 NO. 4 HARD START/ LONG CRANK/ERRATIC CRANK)
5	Engine stalls.	After start/at idle	Engine stops unexpectedly at idle and/or after start.	(See 01-03-11 NO. 5 ENGINE-STALLS AFTER START/AT IDLE)
6	Cranks normally but will not start		Starter cranks engine at normal speed but engine will not run.	(See 01-03-15 NO.6 CRANKS NORMALLY BUT WILL NOT START)
7	Slow return to idle		Engine takes more time than normal to return to idle speed.	(See 01-03-19 NO. 7 SLOW RERUN TO IDLE)
8	Engine runs rough/rotling		Engine speed fluctuates between specified idle speed and lower speed and engine shakes excessively.	(See 01-03-20 NO. 8 ENGINE RUNS ROUGH/ROLLING IDLE)
9	Fast idle/runs on		Engine speed continues at fast idle after warm-up. Engine runs after ignition key is turned to OFF.	(See 01-03-23 NO. 9 FAST IDLE/RUNS ON)
10	Low idle/stalls during deceleration		Engine stops unexpectedly at beginning of deceleration or recovery from deceleration.	(See 01-03-24 NO. 10 LOW IDLE/ STALLS DURING DECELERATION)

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GENERAL INFORMATION

Using the quick diagnosis chart

- The chart lists the relation between the symptom and the cause of the malfunction.
- The chart is effective in quickly narrowing down the relation between symptom and cause of the malfunction. It also specifies a range of common causes when multiple malfunction symptoms occur.
- The appropriate diagnostic inspection relating to a malfunction cause as specified by the symptoms can be selected by looking down the diagnostic inspection column of the chart.

② PARTS WHICH MAY BE THE CAUSE OF PROBLEMS

SYMPTOM QUICK DIAGNOSTIC CHART

PART WHICH MAY BE THE SYMPTOM

① CHOOSE THE ACTUALSYMPTOM

	Troubleshooting item		Starter motor malfunction (Mechanical or electrical)	Starter circuit including ignition switch open	Improper engine oil level	Low or dead battery	Charging system malfunction	Improper engine compression	Improper valve timing	Hydrolocked engine	Improper engine oil viscosity	Improper dipstick	Base engine malfunction	Drive plate or flywheel seized	Improper tension or damaged drive belts	Improper engine coolant level	Water and anti-freeze mixture improperly	Cooling system malfunction (Radiator, hoses, overflow system, thermostat, etc.)	Cooling fan system malfunction	Engine or transaxle mounts improperly installed	Cooling fan or condenser fan seat improperly	Accelerator cable free play mis-adjustment	Fuel quality
1	Melts of main or other fuse																						
2	MIL comes on																						
3	Will not crank		x	x		x	x			x				x									
4	Hard to start/long crank/erratic start/erratic crank																						x
5	Engine stalls	After start/at idle						x	x	x													x
6	Cranks normally but will not start							x	x	x													x
7	Slow return to idle																		x				
8	Engine runs rough/rolling idle							x	x														x
9	Fast idle/runs on																					x	
10	Low idle/stalls during deceleration																						
11	Engine stalls/quits	Acceleration/cruise						x	x														x
	Engine runs rough	Acceleration/cruise						x	x														x
	Misses	Acceleration/cruise						x	x														x
	Buck/jerk	Acceleration/cruise/ deceleration						x	x														x
	Hesitation/stumble	Acceleration						x	x														x
	Surges	Acceleration/cruise						x	x														x
12	Lack/loss of power	Acceleration/cruise						x	x														x
13	Knocking/pinging	Acceleration/cruise						x										x					
14	Poor fuel economy							x	x							x		x	x				x
15	Emissions compliance							x	x				x					x					
16	High oil consumption/leakage										x	x	x										
17	Cooling system concerns	Overheating													x	x	x	x	x				
18	Cooling system concerns	Runs cold																x	x				
19	Exhaust smoke												x					x					
20	Fuel odor (in engine compartment)																						
21	Engine noise				x								x		x								
22	Vibration concerns (engine)														x					x	x		
23	A/C does not work sufficiently																						
24	A/C always on/ A/C compressor runs continuously																						
25	A/C does not cut off under wide open throttle conditions																						
26	Exhaust sulphur smell																						x
27	Fuel refill concerns																						
28	Fuel filling shut off issues																						
29	Intermittent concerns					x																	
30	Constant voltage																						
31	Spark plug condition							x			x		x				x						x
32	Automatic transaxle concerns	Upshift/downshift/ engagement	(See 05-01 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESOOTING)																				

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GENERAL INFORMATION

Using the symptom troubleshooting

- Symptom troubleshooting shows diagnostic procedures, inspection methods, and proper action to be taken for each trouble symptom.

DESCRIPTION describes what kind of TROUBLE SYMPTOM

TROUBLE SYMPTOM

14	Engine flares up or slips when upshifting or down shifting
DESCRIPTION	• When accelerator pedal is depressed for driveway, engine speed increase but vehicle speed increase slowly. • When accelerator is depressed while driving, engine speed increases but vehicle not.
POSSIBLE CAUSE	• There is clutch slip because clutch is stuck or line pressure is low. — Clutch stuck, slippage (forward clutch, 3-4 clutch, 2-4 brake band, one-way clutch 1, one-way clutch 2) • Line pressure low • Malfunction or mis-adjustment of TP sensor • Malfunction of VSS • Malfunction of input/turbine speed sensor • Malfunction of sensor ground • Malfunction of shift solenoid A, B or C • Malfunction of TCC solenoid valve • Malfunction of body ground • Malfunction of throttle cable • Malfunction of throttle valve body — Poor operating of mechanical pressure • Selector lever position disparity • TR switch position disparity **Note** • Before following troubleshooting steps, make sure that Automatic Transaxle On-board Diagnostic and Automatic Transaxle Basic Inspection are conducted.

POSSIBLE CAUSE describes possible point of malfunction

STEP shows the order of troubleshooting.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is line pressure okay?	Yes	Go to next step.
		No	Repair or replace any defective parts according to inspection results.
2	• Is shift point okay? (See 05-17-5 ROAD TEST)	Yes	Go to next step
		No	Go to symptom troubleshooting No.9 "Abnormal shift".
3	• Stop engine and turn ignition switch on. • Connect diagnostic tool to DLC-2. • Simulate SHIFT A, SHIFT B and SHIFT C PIDs for ON. • Is operating sound of shift solenoids heard?	Yes	• Overhaul control valve body and repair or replace any defective parts. (See ATX Workshop Manual GF4A-EL (1666-1A-99F)) • If problem remains, replace or overhaul transaxle and repair or replace defective parts. (See 05-17-15 AUTOMATIC TRANSAXLE REMOVEVAL/INSTALLATION)
		No	• Inspect for bend, damage, corrosion or loose connection if shift solenoid A, B, or C terminal on ATX. • Inspect for shift solenoid mechanical stuck. (See 05-17-14 Inspection of Operation) • If shift solenoids are okay, inspect for open or short circuit between PCM connector terminal A, B or C.
4	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis. — If vehicle is repaired, troubleshooting completed. — If vehicle is not repaired or additional diagnostic information is not available, replace or reprogram PCM.		

Reference item(s) for additional information to perform INSPECTION.

INSPECTION describes the method to quickly determine the malfunctioning part(s).

ACTION describes the appropriate action to be taken according to the result (Yes/No) of the INSPECTION.

How to perform ACTION is described in the relative material shown.

Reference item(s) to perform ACTION.

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UNITS

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Electrical current	A (ampere)
Electric power	W (watt)
Electric resistance	ohm
Electric voltage	V (volt)
Length	mm (millimeter)
	in (inch)
Negative pressure	kPa (kilo pascal)
	mmHg (millimeters of mercury)
	inHg (inches of mercury)

GENERAL INFORMATION

Positive pressure	kPa (kilo pascal)
	kgf/cm^2 (kilogram force per square centimeter)
	psi (pounds per square inch)
Torque	N·m (Newton meter)
	kgf·m (kilogram force meter)
	kgf·cm (kilogram force centimeter)
	ft·lbf (foot pound force)
	in·lbf (inch pound force)
Volume	L (liter)
	US qt (U.S. quart)
	Imp qt (Imperial quart)
	ml (milliliter)
	cc (cubic centimeter)
	cu in (cubic inch)
	fl oz (fluid ounce)
Weight	g (gram)
	oz (ounce)

Conversion to SI Units (Système International d'Unités)

- All numerical values in this manual are based on SI units. Numbers shown in conventional units are converted from these values.

Rounding Off

- Converted values are rounded off to the same number of places as the SI unit value. For example, if the SI unit value is 17.2 and the value after conversion is 37.84, the converted value will be rounded off to 37.8.

Upper and Lower Limits

- When the data indicates upper and lower limits, the converted values are rounded down if the SI unit value is an upper limit, and rounded up if the SI unit value is a lower limit. Therefore, converted values for the same SI unit value may differ after conversion. For example, consider 2.7 kgf/cm^2 in the following specifications:

  210—260 kPa {2.1—2.7 kgf/cm^2, 30—38 psi}
  270—310 kPa {2.7—3.2 kgf/cm^2, 39—45 psi}

- The actual converted values for 2.7 kgf/cm^2 are 265 kPa and 38.4 psi. In the first specification, 2.7 is used as an upper limit, so the converted values are rounded down to 260 and 38. In the second specification, 2.7 is used as a lower limit, so the converted values are rounded up to 270 and 39.

SERVICE CAUTIONS

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Injury/damage Prevention Precautions

- Depending on the vehicle, the cooling fan may operate suddenly even when the ignition switch is turned off. Therefore, keep hands and tools away from the cooling fan even if the cooling fan is not operating to prevent injury to personnel or damage to the cooling fan. Always disconnect the negative battery cable when servicing the cooling fan or parts near the cooling fan.

Protection of the Vehicle

- Always be sure to cover fenders, seats and floor areas before starting work.

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GENERAL INFORMATION

Preparation of Tools and Measuring Equipment

- Be sure that all necessary tools and measuring equipment are available before starting any work.

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Special Service Tools

- Use special service tools or the equivalent when they are required.

amxzzw0000005

Malfunction Diagnosis System

- Use the Mazda modular diagnostic system (M-MDS) or equivalent for malfunction diagnosis.

Disconnection of the Negative Battery Cable

- When working with the negative battery cable disconnected, wait for 1 min or more to allow the back up power supply of the SAS control module to deplete its stored power after the cable is disconnected.
- If the negative battery cable is disconnected, the clock and audio memory settings will be erased therefore record the clock and audio settings prior to disconnecting and reset them after reconnecting.

Warning

- **When the negative battery cable is disconnected, the initialization setting of the steering angle sensor is cleared. Therefore, perform the initialization procedure after connecting the negative battery cable.**
  (See 04-15-11 STEERING ANGLE SIGNAL INITIALIZATION PROCEDURE.)

Oil Leakage Inspection

- Use either of the following procedures to identify the type of oil that is leaking:

Using UV light (black light)

1. Remove any oil on the engine or transaxle/transmission.

   Note

   - Referring to the fluorescent dye instruction manual, mix the specified amount of dye into the engine oil or ATF (or transaxle/transmission oil).

2. Pour the fluorescent dye into the engine oil or ATF (or transaxle/transmission oil).
3. Allow the engine to run for 30 min.
4. Inspect for dye leakage by irradiating with UV light (black light), and identify the type of oil that is leaking.
5. If no dye leakage is found, allow the engine to run for another 30 min. or drive the vehicle then reinspect.
6. Find where the oil is leaking from, then make necessary repairs.

   Note

   - To determine whether it is necessary to replace the oil after adding the fluorescent dye, refer to the fluorescent dye instruction manual.

GENERAL INFORMATION

Not using UV light (black light)

1. Gather some of the leaking oil using an absorbent white tissue.
2. Take samples of engine oil and ATF (or transaxle/transmission oil), both from the dipstick, and place them next to the leaked oil already on the tissue.
3. Compare the appearance and smell, and identify the type of oil that is leaking.
4. Remove any oil on the engine or transaxle/ transmission.
5. Allow the engine to run for 30 min.
6. Check the area where the oil is leaking, then make necessary repairs.

amxzzw0000005

Removal of Parts

- While correcting a problem, also try to determine its cause. Begin work only after first learning which parts and sub-components must be removed and disassembled for replacement or repair. After removing the part, plug all holes and ports to prevent foreign material from entering.

amxzzw0000005

Disassembly

- If the disassembly procedure is complex, requiring many parts to be disassembled, all parts should be marked in a place that will not affect their performance or external appearance, and identified so that reassembly can be performed easily and efficiently.

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Inspection During Removal, Disassembly

- When removed, each part should be carefully inspected for malfunction, deformation, damage and other problems.

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GENERAL INFORMATION

Arrangement of Parts

- All disassembled parts should be carefully arranged for reassembly.
- Be sure to separate or otherwise identify the parts to be replaced from those that will be reused.

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Cleaning of Parts

- All parts to be reused should be carefully and thoroughly cleaned in the appropriate method.

  Warning
  - **Using compressed air can cause dirt and other particles to fly out causing injury to the eyes. Wear protective eye wear whenever using compressed air.**

amxzzw0000006

Reassembly

- Standard values, such as torques and certain adjustments, must be strictly observed in the reassembly of all parts.
- If removed, these parts should be replaced with new ones:
  - — Oil seals
  - — Gaskets
  - — O-rings
  - — Lock washers
  - — Cotter pins
  - — Nylon nuts
- Depending on location:
  - — Sealant and gaskets, or both, should be applied to specified locations. When sealant is applied, parts should be installed before sealant hardens to prevent leakage.
  - — Oil should be applied to the moving components of parts.
  - — Specified oil or grease should be applied at the prescribed locations (such as oil seals) before reassembly.

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Adjustment

- Use suitable gauges and testers when making adjustments.

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GENERAL INFORMATION

Rubber Parts and Tubing

- Prevent gasoline or oil from getting on rubber parts or tubing.

amxzzw0000172

Hose Clamps

- When reinstalling, position the hose clamp in the original location on the hose and squeeze the clamp lightly with large pliers to ensure a good fit.

amxzzw0000006

Torque Formulas

- When using a torque wrench-**SST** or equivalent combination, the specified torque must be recalculated due to the extra length that the **SST** or equivalent adds to the torque wrench. Recalculate the torque by using the following formulas. Choose the formula that applies to you.

Torque Unit	Formula
N·m	N·m × [L/(L+A)]
kgf·m	kgf·m × [L/(L+A)]
kgf·cm	kgf·cm × [L/(L+A)]
ft·lbf	ft·lbf × [L/(L+A)]
in·lbf	in·lbf × [L/(L+A)]

amxzzw0000006

A : The length of the **SST** past the torque wrench drive.
L : The length of the torque wrench.

Vise

- When using a vise, put protective plates in the jaws of the vise to prevent damage to parts.

amxzzw0000006

GENERAL INFORMATION

Dynamometer

- When inspecting and servicing the power train on the dynamometer or speedometer tester, pay attention to the following:
  —Place a fan, preferably a vehicle-speed proportional type, in front of the vehicle.
  —Make sure the vehicle is in a facility with an exhaust gas ventilation system.
  —Since the rear bumper might deform from the heat, cool the rear with a fan. (Surface of the bumper must be below **70°C {158°F}**.)
  —Keep the area around the vehicle uncluttered so that heat does not build up.
  —Watch the water temperature gauge and do not overheat the engine.
  —Avoid added load to the engine and maintain normal driving conditions as much as possible.

Note

- When only the front or rear wheels are rotated on a chassis dynamometer or equivalent, the ABS/DSC HU/CM determines that there is a malfunction in the ABS/DSC and illuminates the following lights:
  —Vehicles with ABS
    - ABS warning light
    - Brake system warning light
  —Vehicles with DSC
    - ABS warning light
    - Brake system warning light
    - DSC indicator light
- If the above lights are illuminated, dismount the vehicle from the chassis dynamometer and turn the ignition switch to the LOCK position. Then, turn the ignition switch back to the ON position, run the vehicle at 10 km/h or more and verify that the warning lights go out. In this case, a DTC will be stored in the memory. Clear the DTC from the memory by following the memory clearing procedure [ABS]/[DSC] in the on-board diagnostic system. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].), (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)

SST

- Some global **SST** or equivalent are used as **SSTs** necessary for engine repair. Note that these **SSTs** are marked with global **SST** numbers.
- Note that a global **SST** number is written together with a corresponding Mazda **SST** number as shown below.

Example (SERVICE TOOLS)

amxzzw0000006

Example (Except SERVICE TOOLS)

amxzzw0000007

GENERAL INFORMATION

INSTALLATION OF RADIO SYSTEM

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The control module and control unit have been designed with sufficient attention to radio wave disturbances from the outside. However, observe the following precautions when installing the radio set to the vehicle to prevent adverse effects on the control module and control unit.

- Install the radio set and its antenna as far away as possible from the control module and control unit.
- The antenna feeder and power cable generate radio waves, therefore, keep them **100 mm {3.94 in} or more** from the control module, control unit, and wiring harness. If the antenna feeder and power cable cross over the wiring harness, place them perpendicular to the wiring harness.
- Do not install a high output radio set.
- Do not use the control module and control unit power source for the radio set. In addition, do not use the cigar lighter and accessory socket power source.
- Do not attach the antenna feeder or wiring harness of the radio set to the wiring harness, fuel pipe, or brake tube of the vehicle.
- Do not install any radio set-related devices in the area where the air bag module deploys to prevent a secondary accident if the air bag were to deploy.

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- After installing the radio set, perform a test transmission with the engine idling to verify that it does not affect engine control.

GENERAL INFORMATION

ELECTRICAL SYSTEM

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Electrical Parts

Battery cable

- Before disconnecting connectors or removing electrical parts, disconnect the negative battery cable.

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Wiring Harness

- To remove the wiring harness from the clip in the engine room, pry up the hook of the clip using a flathead screwdriver.

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Caution

- **Do not remove the wiring harness protective tape. Otherwise, the wires could rub against the body, which could result in water penetration and electrical shorting.**

amxzzw0000172

Connectors

Disconnecting connectors

- When disconnecting a connector, grasp the connectors, not the wires.

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GENERAL INFORMATION

- Connectors can be disconnected by pressing or pulling the lock lever as shown.

amxzzw0000173

Locking connector

- When locking connectors, listen for a click indicating they are securely locked.

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Inspection

- When a tester is used to inspect for continuity or measuring voltage, insert the tester probe from the wiring harness side.

amxzzw0000173

- Inspect the terminals of waterproof connectors from the connector side since they cannot be accessed from the wiring harness side.

  Caution

  - **To prevent damage to the terminal, wrap a thin wire around the tester probe before inserting into terminal.**

amxzzw0000173

GENERAL INFORMATION

Terminals
Inspection

- Pull lightly on individual wires to verify that they are secured in the terminal.

amxzzw0000173

Replacement

- Use the appropriate tools to remove a terminal as shown. When installing a terminal, be sure to insert it until it locks securely.
- Insert a thin piece of metal from the terminal side of the connector and with the terminal locking tab pressed down, pull the terminal out from the connector.

amxzzw0000173

Sensors, Switches, and Relays

- Handle sensors, switches, and relays carefully. Do not drop them or strike them against other objects.

amxzzw0000173

Wiring Harness
Wiring color codes

- Two-color wires are indicated by a two-color code symbol.
- The first letter indicates the base color of the wire and the second is the color of the stripe.

CODE	COLOR	CODE	COLOR
B	Black	O	Orange
BR	Brown	P	Pink
G	Green	R	Red
GY	Gray	V	Violet
L	Blue	W	White
LB	Light Blue	Y	Yellow
LG	Light Green		

amxzzw0000173

GENERAL INFORMATION

Fuse
Replacement

- When replacing a fuse, be sure to replace it with one of the same capacity. If a fuse malfunctions again, the circuit probably has a short and the wiring should be inspected.
- Be sure the negative battery terminal is disconnected before replacing a main fuse.

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- When replacing a pullout fuse, use the fuse puller.

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Viewing orientation for Connectors

- The viewing orientation for connectors is indicated with a symbol.
- The figures showing the viewing orientation are the same as those used in Wiring Diagrams.
- The viewing orientation are shown in the following three ways:

Part-side connector

The viewing orientation for part-side connectors is from the terminal side.

* : Part names are shown only when there are multiple connector drawings.

amxzzw0000174

GENERAL INFORMATION

Vehicle harness-side connector
The viewing orientation for vehicle wiring harness-side connectors is from the wiring harness side.

* : Part names are shown only when there are multiple connector drawings.

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Other
When it is necessary to show the terminal side of the vehicle wiring harness-side connectors, such as the following connectors, the viewing orientation is from the terminal side.

- Main fuse block and the main fuse block relays
- Data link connector
- Check connector
- Relay box

amxzzw0000174

Electrical Troubleshooting Tools
Jumper wire

Caution
- **Do not connect a jumper wire from the power source line to a body ground. This may cause burning or other damage to wiring harnesses or electronic components.**

- A jumper wire is used to create a temporary circuit. Connect the jumper wire between the terminals of a circuit to bypass a switch.

amxzzw0000174

GENERAL INFORMATION

Voltmeter

- The DC voltmeter is used to measure circuit voltage. A voltmeter with a range of **15 V or more** is used by connecting the positive (+) probe (red lead wire) to the point where voltage will be measured and the negative (-) probe (black lead wire) to a body ground.

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Ohmmeter

Caution

- **Do not connect the ohmmeter to any circuit where voltage is applied. This will damage the ohmmeter.**

- The ohmmeter is used to measure the resistance between two points in a circuit and to inspect for continuity and short circuits.

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Precautions Before Welding

A vehicle has various electrical parts. To protect the parts from excessive current generated when welding, be sure to perform the following procedure.

1. Turn the ignition switch to the LOCK position.
2. Disconnect the battery cables.

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3. Securely connect the welding machine ground near the welding area.
4. Cover the peripheral parts of the welding area to protect them from weld spatter.

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GENERAL INFORMATION

JACKING POSITIONS

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Warning
- **Improperly jacking a vehicle is dangerous. The vehicle can slip off the jack and cause serious injury. Use only the correct front and rear jacking points and block the wheels.**

- Use safety stands to support the vehicle after it has been lifted.

Note
- To prevent obstruction between the jack body and front bumper when the jack body is inserted, use a low-floor type jack.

Front
- Near the center of the front crossmember.

Rear
- At the center of the rear differential.

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GENERAL INFORMATION

VEHICLE LIFT (2 SUPPORTS) AND SAFETY STAND (RIGID RACK) POSITION

id000000801500

Vehicle Lift Positions, Safety Stand Positions
Front and rear

Warning
- **Lifting a vehicle that is not stabilized is dangerous. The vehicle can slip off the lift and cause serious injury and/or vehicle damage. Make sure that the vehicle is on the lift horizontally by adjusting the height of the support at the end of the arm of the lift.**

Caution
- **For vehicles with side step molding, be careful not to damage the side step molding by hitting it with auto-lift arms or a safety stand.**

- Both sides of the vehicle, on side sills

amxzzw0000170

TOWING

id000000001000

- Proper lifting and towing are necessary to prevent damage to the vehicle. Government and local laws must be followed.
- A towed vehicle usually should have its drive wheels (rear wheels) off the ground. If excessive damage or other conditions prevent this, use wheel dollies.

amxzzw0000201

GENERAL INFORMATION

Caution
- **Do not tow the vehicle pointed forward with driving wheels on the ground. This may cause internal damage to the transmission.**

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Caution
- **Do not tow with sling-type equipment. This could damage your vehicle. Use wheel-lift or flatbed equipment.**

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- If towing service is not available in an emergency, the vehicle may be towed with all four wheels on the ground using the towing hook at the front of the vehicle.
  Only tow the vehicle on paved surfaces for short distances at low speeds.

Caution
- **Follow these instructions when towing the vehicle with all wheels on the ground.**
  1. **Shift to neutral (MT), or the N position (AT).**
  2. **Turn the ignition switch to the ACC position to prevent the steering from locking up.**
  3. **Release the parking brake.**
- **Remember that power assist for the brakes and steering will not be available when the engine is not running.**

Towing Hooks

Caution
- **The towing eyelet should be used in an emergency (to get the vehicle out of a ditch or a snow bank, for example).**
- **When using the towing eyelets, always pull the cable or chain in a straight direction with respect to the eyelet. Apply no sideways force.**

Note
- When towing with chain or cable, wrap the chain or cable with a soft cloth near the bumper to prevent damage to the bumper.

1. Remove the towing eyelet from the trunk.
2. Wrap a screwdriver or similar tool with a soft cloth to prevent damage to the painted bumper and open the cap located on the front bumper.

Caution
- **Do not use excessive force as it may damage the cap or scratch the painted bumper surface.**
- **The rear bumper cover cannot be removed completely. Attempting to forcefully remove the rear bumper cover could result in it being damaged.**

Note
- Remove the front bumper cover completely and store it so as not to lose it.

GENERAL INFORMATION

Front

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Rear

3. Securely install the towing eyelet using the screwdriver or similar tool.

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Front

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GENERAL INFORMATION

Rear

4. Hook the towing rope to the towing eyelet.

Caution

- **If the towing eyelet is not securely tightened, it may loosen or disengage from the bumper when towing the vehicle. Make sure that the towing eyelet is securely tightened to the bumper.**

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Front

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Rear

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GENERAL INFORMATION

TIEDOWN HOOK

id000000800700

amxzzw0000169

IDENTIFICATION NUMBER LOCATIONS

id000000000900

Vehicle Identification Number (VIN)
European (L.H.D.), General (L.H.D.), General (R.H.D.)(except South Africa) specs.

amxzzw0000202

GENERAL INFORMATION

U.K., General (R.H.D.)(South Africa) specs.

am6zzw0000387

Engine Identification Number

amxzzw0000000

NEW STANDARDS

id000000801400

- Following is a comparison of the previous standard and the new standard.

New Standard		Previous Standard		Remark
Abbreviation	Name	Abbreviation	Name	
AP	Accelerator Pedal	—	Accelerator Pedal	
APP	Accelerator Pedal Position	—	Accelerator Pedal Position	
ACL	Air Cleaner	—	Air Cleaner	
A/C	Air Conditioning	—	Air Conditioning	
A/F sensor	Air Fuel Ratio Sensor	—	—	
BARO	Barometric Pressure	—	Atmospheric Pressure	
B+	Battery Positive Voltage	V_B	Battery Voltage	
—	Brake Switch	—	Stoplight Switch	
—	Calibration Resistor	—	Corrected Resistance	#6
CMP sensor	Camshaft Position Sensor	—	Crank Angle Sensor	
LOAD	Calculated Load Voltage	—	—	
CAC	Charge Air Cooler	—	Intercooler	
CLS	Closed Loop System	—	Feedback System	
CTP	Closed Throttle Position	—	Fully Closed	
CPP	Clutch Pedal Position	—	Clutch Position	
CIS	Continuous Fuel Injection System	EGI	Electronic Gasoline Injection System	
CS sensor	Control Sleeve Sensor	CSP sensor	Control Sleeve Position Sensor	#6
CKP sensor	Crankshaft Position Sensor	—	Crank Angle Sensor 2	
DLC	Data Link Connector	—	Diagnosis Connector	
DTM	Diagnostic Test Mode	—	Test Mode	#1
DTC	Diagnostic Trouble Code(s)	—	Service Code(s)	
DI	Distributor Ignition	—	Spark Ignition	
DLI	Distributorless Ignition	—	Direct Ignition	
EI	Electronic Ignition	—	Electronic Spark Ignition	#2
ECT	Engine Coolant Temperature	—	Water Thermo	

GENERAL INFORMATION

New Standard		Previous Standard		Remark
Abbreviation	Name	Abbreviation	Name	
EM	Engine Modification	—	Engine Modification	
—	Engine Speed Input Signal	—	Engine RPM Signal	
EVAP	Evaporative Emission	—	Evaporative Emission	
EGR	Exhaust Gas Recirculation	—	Exhaust Gas Recirculation	
FC	Fan Control	—	Fan Control	
FF	Flexible Fuel	—	Flexible Fuel	
4GR	Fourth Gear	—	Overdrive	
—	Fuel Pump Relay	—	Circuit Opening Relay	#3
FSO solenoid	Fuel Shut Off Solenoid	FCV	Fuel Cut Valve	#6
GEN	Generator	—	Alternator	
GND	Ground	—	Ground/Earth	
HO2S	Heated Oxygen Sensor	—	Oxygen Sensor	With heater
IAC	Idle Air Control	—	Idle Speed Control	
—	IDM Relay	—	Spill Valve Relay	#6
—	Incorrect Gear Ratio	—	—	
—	Injection Pump	FIP	Fuel Injection Pump	#6
—	Input/Turbine Speed Sensor	—	Pulse Generator	
IAT	Intake Air Temperature	—	Intake Air Thermo	
KS	Knock Sensor	—	Knock Sensor	
MIL	Malfunction Indicator Lamp	—	Malfunction Indicator Light	
MAP	Manifold Absolute Pressure	—	Intake Air Pressure	
MAF	Mass Air Flow	—	Mass Air Flow	
MAF sensor	Mass Air Flow Sensor	—	Airflow Sensor	
MFL	Multiport Fuel Injection	—	Multiport Fuel Injection	
OBD	On-Board Diagnostic	—	Diagnosis/Self Diagnosis	
OL	Open Loop	—	Open Loop	
—	Output Speed Sensor	—	Vehicle Speed Sensor 1	
OC	Oxidation Catalytic Converter	—	Catalytic Converter	
O2S	Oxygen Sensor	—	Oxygen Sensor	
PNP	Park/Neutral Position	—	Park/Neutral Range	
PID	Parameter Identification	—	Parameter Identification	
—	PCM Control Relay	—	Main Relay	#6
PSP	Power Steering Pressure	—	Power Steering Pressure	
PCM	Powertrain Control Module	ECU	Engine Control Unit	#4
—	Pressure Control Solenoid	—	Line Pressure Solenoid Valve	
PAIR	Pulsed Secondary Air Injection	—	Secondary Air Injection System	Pulsed injection
—	Pump Speed Sensor	—	NE Sensor	#6
RAM	Random Access Memory	—	—	
AIR	Secondary Air Injection	—	Secondary Air Injection System	Injection with air pump
SAPV	Secondary Air Pulse Valve	—	Reed Valve	
SFI	Sequential Multipoint Fuel Injection	—	Sequential Fuel Injection	
—	Shift Solenoid A	—	1–2 Shift Solenoid Valve	
		—	Shift A Solenoid Valve	
—	Shift Solenoid B	—	2–3 Shift Solenoid Valve	
		—	Shift B Solenoid Valve	
—	Shift Solenoid C	—	3–4 Shift Solenoid Valve	
3GR	Third Gear	—	3rd Gear	
TWC	Three Way Catalytic Converter	—	Catalytic Converter	
TB	Throttle Body	—	Throttle Body	
TP	Throttle Position	—	—	

GENERAL INFORMATION

New Standard		Previous Standard		Remark
Abbreviation	Name	Abbreviation	Name	
EM	Engine Modification	—	Engine Modification	
—	Engine Speed Input Signal	—	Engine RPM Signal	
EVAP	Evaporative Emission	—	Evaporative Emission	
EGR	Exhaust Gas Recirculation	—	Exhaust Gas Recirculation	
FC	Fan Control	—	Fan Control	
FF	Flexible Fuel	—	Flexible Fuel	
4GR	Fourth Gear	—	Overdrive	
—	Fuel Pump Relay	—	Circuit Opening Relay	#3
FSO solenoid	Fuel Shut Off Solenoid	FCV	Fuel Cut Valve	#6
GEN	Generator	—	Alternator	
GND	Ground	—	Ground/Earth	
HO2S	Heated Oxygen Sensor	—	Oxygen Sensor	With heater
IAC	Idle Air Control	—	Idle Speed Control	
—	IDM Relay	—	Spill Valve Relay	#6
—	Incorrect Gear Ratio	—	—	
—	Injection Pump	FIP	Fuel Injection Pump	#6
—	Input/Turbine Speed Sensor	—	Pulse Generator	
IAT	Intake Air Temperature	—	Intake Air Thermo	
KS	Knock Sensor	—	Knock Sensor	
MIL	Malfunction Indicator Lamp	—	Malfunction Indicator Light	
MAP	Manifold Absolute Pressure	—	Intake Air Pressure	
MAF	Mass Air Flow	—	Mass Air Flow	
MAF sensor	Mass Air Flow Sensor	—	Airflow Sensor	
MFL	Multiport Fuel Injection	—	Multiport Fuel Injection	
OBD	On-Board Diagnostic	—	Diagnosis/Self Diagnosis	
OL	Open Loop	—	Open Loop	
—	Output Speed Sensor	—	Vehicle Speed Sensor 1	
OC	Oxidation Catalytic Converter	—	Catalytic Converter	
O2S	Oxygen Sensor	—	Oxygen Sensor	
PNP	Park/Neutral Position	—	Park/Neutral Range	
PID	Parameter Identification	—	Parameter Identification	
—	PCM Control Relay	—	Main Relay	#6
PSP	Power Steering Pressure	—	Power Steering Pressure	
PCM	Powertrain Control Module	ECU	Engine Control Unit	#4
—	Pressure Control Solenoid	—	Line Pressure Solenoid Valve	
PAIR	Pulsed Secondary Air Injection	—	Secondary Air Injection System	Pulsed injection
—	Pump Speed Sensor	—	NE Sensor	#6
RAM	Random Access Memory	—	—	
AIR	Secondary Air Injection	—	Secondary Air Injection System	Injection with air pump
SAPV	Secondary Air Pulse Valve	—	Reed Valve	
SFI	Sequential Multipoint Fuel Injection	—	Sequential Fuel Injection	
—	Shift Solenoid A	—	1–2 Shift Solenoid Valve	
		—	Shift A Solenoid Valve	
—	Shift Solenoid B	—	2–3 Shift Solenoid Valve	
		—	Shift B Solenoid Valve	
—	Shift Solenoid C	—	3–4 Shift Solenoid Valve	
3GR	Third Gear	—	3rd Gear	
TWC	Three Way Catalytic Converter	—	Catalytic Converter	
TB	Throttle Body	—	Throttle Body	
TP	Throttle Position	—	—	

GENERAL INFORMATION

New Standard		Previous Standard		Remark
Abbreviation	Name	Abbreviation	Name	
EM	Engine Modification	—	Engine Modification	
—	Engine Speed Input Signal	—	Engine RPM Signal	
EVAP	Evaporative Emission	—	Evaporative Emission	
EGR	Exhaust Gas Recirculation	—	Exhaust Gas Recirculation	
FC	Fan Control	—	Fan Control	
FF	Flexible Fuel	—	Flexible Fuel	
4GR	Fourth Gear	—	Overdrive	
—	Fuel Pump Relay	—	Circuit Opening Relay	#3
FSO solenoid	Fuel Shut Off Solenoid	FCV	Fuel Cut Valve	#6
GEN	Generator	—	Alternator	
GND	Ground	—	Ground/Earth	
HO2S	Heated Oxygen Sensor	—	Oxygen Sensor	With heater
IAC	Idle Air Control	—	Idle Speed Control	
—	IDM Relay	—	Spill Valve Relay	#6
—	Incorrect Gear Ratio	—	—	
—	Injection Pump	FIP	Fuel Injection Pump	#6
—	Input/Turbine Speed Sensor	—	Pulse Generator	
IAT	Intake Air Temperature	—	Intake Air Thermo	
KS	Knock Sensor	—	Knock Sensor	
MIL	Malfunction Indicator Lamp	—	Malfunction Indicator Light	
MAP	Manifold Absolute Pressure	—	Intake Air Pressure	
MAF	Mass Air Flow	—	Mass Air Flow	
MAF sensor	Mass Air Flow Sensor	—	Airflow Sensor	
MFL	Multiport Fuel Injection	—	Multiport Fuel Injection	
OBD	On-Board Diagnostic	—	Diagnosis/Self Diagnosis	
OL	Open Loop	—	Open Loop	
—	Output Speed Sensor	—	Vehicle Speed Sensor 1	
OC	Oxidation Catalytic Converter	—	Catalytic Converter	
O2S	Oxygen Sensor	—	Oxygen Sensor	
PNP	Park/Neutral Position	—	Park/Neutral Range	
PID	Parameter Identification	—	Parameter Identification	
—	PCM Control Relay	—	Main Relay	#6
PSP	Power Steering Pressure	—	Power Steering Pressure	
PCM	Powertrain Control Module	ECU	Engine Control Unit	#4
—	Pressure Control Solenoid	—	Line Pressure Solenoid Valve	
PAIR	Pulsed Secondary Air Injection	—	Secondary Air Injection System	Pulsed injection
—	Pump Speed Sensor	—	NE Sensor	#6
RAM	Random Access Memory	—	—	
AIR	Secondary Air Injection	—	Secondary Air Injection System	Injection with air pump
SAPV	Secondary Air Pulse Valve	—	Reed Valve	
SFI	Sequential Multipoint Fuel Injection	—	Sequential Fuel Injection	
—	Shift Solenoid A	—	1–2 Shift Solenoid Valve	
		—	Shift A Solenoid Valve	
—	Shift Solenoid B	—	2–3 Shift Solenoid Valve	
		—	Shift B Solenoid Valve	
—	Shift Solenoid C	—	3–4 Shift Solenoid Valve	
3GR	Third Gear	—	3rd Gear	
TWC	Three Way Catalytic Converter	—	Catalytic Converter	
TB	Throttle Body	—	Throttle Body	
TP	Throttle Position	—	—	

GENERAL INFORMATION

New Standard		Previous Standard		Remark
Abbreviation	Name	Abbreviation	Name	
EM	Engine Modification	—	Engine Modification	
—	Engine Speed Input Signal	—	Engine RPM Signal	
EVAP	Evaporative Emission	—	Evaporative Emission	
EGR	Exhaust Gas Recirculation	—	Exhaust Gas Recirculation	
FC	Fan Control	—	Fan Control	
FF	Flexible Fuel	—	Flexible Fuel	
4GR	Fourth Gear	—	Overdrive	
—	Fuel Pump Relay	—	Circuit Opening Relay	#3
FSO solenoid	Fuel Shut Off Solenoid	FCV	Fuel Cut Valve	#6
GEN	Generator	—	Alternator	
GND	Ground	—	Ground/Earth	
HO2S	Heated Oxygen Sensor	—	Oxygen Sensor	With heater
IAC	Idle Air Control	—	Idle Speed Control	
—	IDM Relay	—	Spill Valve Relay	#6
—	Incorrect Gear Ratio	—	—	
—	Injection Pump	FIP	Fuel Injection Pump	#6
—	Input/Turbine Speed Sensor	—	Pulse Generator	
IAT	Intake Air Temperature	—	Intake Air Thermo	
KS	Knock Sensor	—	Knock Sensor	
MIL	Malfunction Indicator Lamp	—	Malfunction Indicator Light	
MAP	Manifold Absolute Pressure	—	Intake Air Pressure	
MAF	Mass Air Flow	—	Mass Air Flow	
MAF sensor	Mass Air Flow Sensor	—	Airflow Sensor	
MFL	Multiport Fuel Injection	—	Multiport Fuel Injection	
OBD	On-Board Diagnostic	—	Diagnosis/Self Diagnosis	
OL	Open Loop	—	Open Loop	
—	Output Speed Sensor	—	Vehicle Speed Sensor 1	
OC	Oxidation Catalytic Converter	—	Catalytic Converter	
O2S	Oxygen Sensor	—	Oxygen Sensor	
PNP	Park/Neutral Position	—	Park/Neutral Range	
PID	Parameter Identification	—	Parameter Identification	
—	PCM Control Relay	—	Main Relay	#6
PSP	Power Steering Pressure	—	Power Steering Pressure	
PCM	Powertrain Control Module	ECU	Engine Control Unit	#4
—	Pressure Control Solenoid	—	Line Pressure Solenoid Valve	
PAIR	Pulsed Secondary Air Injection	—	Secondary Air Injection System	Pulsed injection
—	Pump Speed Sensor	—	NE Sensor	#6
RAM	Random Access Memory	—	—	
AIR	Secondary Air Injection	—	Secondary Air Injection System	Injection with air pump
SAPV	Secondary Air Pulse Valve	—	Reed Valve	
SFI	Sequential Multipoint Fuel Injection	—	Sequential Fuel Injection	
—	Shift Solenoid A	—	1–2 Shift Solenoid Valve	
		—	Shift A Solenoid Valve	
—	Shift Solenoid B	—	2–3 Shift Solenoid Valve	
		—	Shift B Solenoid Valve	
—	Shift Solenoid C	—	3–4 Shift Solenoid Valve	
3GR	Third Gear	—	3rd Gear	
TWC	Three Way Catalytic Converter	—	Catalytic Converter	
TB	Throttle Body	—	Throttle Body	
TP	Throttle Position	—	—	

GENERAL INFORMATION

New Standard		Previous Standard		Remark
Abbreviation	Name	Abbreviation	Name	
TP sensor	Throttle Position Sensor	—	Throttle Sensor	
TCV	Timer Control Valve	TCV	Timing Control Valve	#6
TCC	Torque Converter Clutch	—	Lockup Position	
TCM	Transmission (Transaxle) Control Module	—	EC-AT Control Unit	
—	Transmission (Transaxle) Fluid Temperature Sensor	—	ATF Thermosensor	
TR	Transmission (Transaxle) Range	—	Inhibitor Position	
TC	Turbocharger	—	Turbocharger	
VSS	Vehicle Speed Sensor	—	Vehicle Speed Sensor	
VR	Voltage Regulator	—	IC Regulator	
VAF sensor	Volume Air Flow Sensor	—	Air Flow Sensor	
WUTWC	Warm Up Three Way Catalytic Converter	—	Catalytic Converter	#5
WOT	Wide Open Throttle	—	Fully Open	

#1: Diagnostic trouble codes depend on the diagnostic test mode
#2: Controlled by the PCM
#3: In some models, there is a fuel pump relay that controls pump speed. That relay is now called the fuel pump relay (speed).
#4: Device that controls engine and powertrain
#5: Directly connected to exhaust manifold
#6: Part name of diesel engine

ABBREVIATIONS

id000000010100

ABS	Antilock Brake System
ACC	Accessories
ALC	Auto Level Control
AT	Automatic Transmission
ATF	Automatic Transmission Fluid
BTDC	Before Top Dead Center
CAN	Controller Area Network
CCM	Comprehensive Component Monitor
CM	Control Module
DC	Drive Cycle
DEF	Defroster
DSC	Dynamic Stability Control
EBD	Electronic Brakeforce Distribution
EEPROM	Electrically Erasable Programmable Read Only Memory
E/L	Electric Load
EX	Exhaust
FFD	Freeze Frame Data
HF/TEL	Hands-Free Telephone
HI	High
HU	Hydraulic Unit
IDS	Integrated Diagnostic Software
IG	Ignition
IN	Intake
INT	Intermittent
KOEO	Key On Engine Off
KOER	Key Off Engine Running
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LF	Left Front

GENERAL INFORMATION

LH	Left Hand
L.H.D.	Left Hand Drive
LO	Low
LR	Left Rear
LSD	Limited Slip Differential
M	Motor
MAX	Maximum
MT	Manual Transmission
OCV	Oil Control Valve
PCV	Positive Crankcase Ventilation
PDS	Portable Diagnostic Software
PID	Parameter Identification
POWER MOS FET	Power Metal Oxide Semiconductor Field Effect Transistor
P/S	Power Steering
PTC	Positive Temperature Coefficient
P/W	Power Window
RAM	Random Access Memory
REC	Recirculate
RF	Right Front
RH	Right Hand
R.H.D.	Right Hand Drive
ROM	Read Only Memory
RR	Right Rear
SAS	Sophisticated Air Bag Sensor
SST	Special Service Tool
SW	Switch
TCS	Traction Control System
TDC	Top Dead Center
TFT	Transmission Fluid Temperature
TNS	Tail Number Side Lights
TPMS	Tire Pressure Monitoring System
W/M	Workshop Manual
1GR	First Gear
2GR	Second Gear
3GR	Third Gear
4GR	Fourth Gear
5GR	Fifth Gear
6GR	Sixth Gear

PRE-DELIVERY INSPECTION

id000000801100

Pre-Delivery Inspection Table
Exterior
INSPECT and **ADJUST**, if necessary, the following part to specification:
❏Glass, exterior bright metal and paint for damage
❏Convertible top for damage
❏Power retractable hardtop for damage
❏Wheel lug nuts
❏All weatherstrips for damage or detachment
❏Operation of bonnet release and lock
❏Operation of trunk lid and fuel-filler lid
❏Door operation and alignment
❏Headlight aiming
TRUNK ROOM
❏Inspect operation of trunk lid internal release
INSTALL the following part:
❏Wheel caps (if equipped)
❏Mast antenna (if equipped)

GENERAL INFORMATION

Under bonnet—engine off
INSPECT and **ADJUST**, if necessary, the following part to specification:
❑Fuel, engine coolant, and hydraulic lines, fittings, connections, and components for leaks
❑Engine oil level
❑Power steering fluid level
❑Brake and clutch master cylinder fluid level
❑Washer tank fluid level
❑Automatic transmission fluid level
❑Radiator coolant level and specific gravity
❑Tightness of battery terminals

Interior
INSPECT the operations of the following part:
❑Seat controls (slide and recline)
❑Seat belts and warning system
❑Air bag system using warning light
❑Cruise control system (if equipped)
❑Ignition switch and steering lock
❑Starter interlock (if equipped)
❑Power door lock
❑Door locks
❑All lights including warning, and indicator lights
❑Horn, wipers, and washers
❑Wiper blades performance
❑Audio system
❑Power windows (if equipped)
❑Heater, defroster, and air conditioner at various mode selections (if equipped)
INSPECT the following part:
❑Presence of spare fuse
❑Upholstery and interior finish
INSPECT and **ADJUST**, if necessary, the following part:
❑Pedal height and free play of brake and clutch pedal
❑Parking brake

Under bonnet—engine running at operating temperature
INSPECT the following part:
❑Automatic transmission fluid level

On hoist
INSPECT the following part:
❑Underside fuel, coolant and hydraulic lines, fittings, connections, and components for leaks
❑Tires for cuts or bruises
❑Steering linkage, suspension, exhaust system, and all underside hardware for looseness or damage
❑Manual transmission oil level
❑Differential oil level

Road test
INSPECT the following part:
❑Brake operation
❑Clutch operation
❑Steering control
❑Emergency locking retractors and automatic locking retractors
❑Cruise control system (if equipped)
❑Operation of meters and gauges, squeaks, rattles, and unusual noises

After road test
INSPECT for necessary owner information materials, tools, and spare tire in vehicle
The following part must be completed just before delivery to your customer.
❑Load test battery and charge if necessary (Load test result: Volts)
❑Adjust tire pressure to specification
❑Clean outside of vehicle
❑Install fuses for accessories
❑Remove seat and cabin carpet protective covers
❑Vacuum inside of vehicle
❑Inspect installation of option parts with invoice

GENERAL INFORMATION

SCHEDULED MAINTENANCE

id000000801200

Scheduled Maintenance Table for Europe (L.H.D., U.K.)

Maintenance Interval		Number of months or kilometers (miles), whichever comes first								
	Months	**12**	**24**	**36**	**48**	**60**	**72**	**84**	**96**	**108**
	×1000 km	**20**	**40**	**60**	**80**	**100**	**120**	**140**	**160**	**180**
	×1000 miles	**12.5**	**25**	**37.5**	**50**	**62.5**	**75**	**87.5**	**100**	**112.5**
Engine valve clearance		Audibly inspect every 120,000 km (75,000 miles), if noisy, adjust								
Engine oil *1		R	R	R	R	R	R	R	R	R
Engine oil filter *1		R	R	R	R	R	R	R	R	R
Drive belts *2				I			I			I
Cooling system			I		I		I		I	
Engine coolant	FL22 type *3	Replace every 200,000 km (125,000 miles) or 11 years								
	Others	Replace at first 100,000 km (62,500 miles) or 4 years; after that, every 2 years								
Air cleaner element *4		C	C	R	C	C	R	C	C	R
Fuel lines and hoses			I		I		I		I	
Spark plugs *5		Replace every 100,000 km (62,500 miles)								
Evaporative system (if installed)				I			I			I
Battery electrolyte level and specific gravity		I	I	I	I	I	I	I	I	I
Brake lines, hoses and connections		I	I	I	I	I	I	I	I	I
Brake fluid *6			R		R		R		R	
Parking brake		I	I	I	I	I	I	I	I	I
Disc brakes		I	I	I	I	I	I	I	I	I
Power steering fluid, lines, hoses and connections		I	I	I	I	I	I	I	I	I
Steering operation and linkages			I		I		I		I	
Manual transmission oil						R				
Rear differential oil					R				R	
Front and rear suspension, ball joints and wheel bearing axial play			I		I		I		I	
Drive shaft dust boots			I		I		I		I	
Exhaust system and heat shields		Inspect every 80,000 km (50,000 miles) or 5 years								
Bolts and nuts on chassis and body			T		T		T		T	
Body condition (for rust, corrosion and perforation)		Inspect annually								
Tires (with inflation pressure adjustment)		I	I	I	I	I	I	I	I	I
Flat tire repair kit (if installed) *7		Inspect annually								

Chart symbols:
I: Inspect: Inspect and clean, repair, adjust, fill up, or replace if necessary.
R: Replace
C: Clean
T: Tighten

Remarks:
Emission control and related systems

- The ignition and fuel systems are highly important to the emission control system and to efficient engine operation.
  All inspections and adjustments must be made by an expert repairer, we recommend an Authorized Mazda Repairer.
- After the prescribed period, continue to follow the described maintenance at the recommended intervals.
- Refer below for a description of items marked* in the maintenance chart.
  *1: If the vehicle is operated primarily under any of the following conditions, replace the engine oil and oil filter at every 10,000 km (6,250 miles) or shorter.
  a. Driving in dusty conditions
  b. Extended periods of idling or low speed operation
  c. Driving for long period in cold temperatures or driving regularly at short distance only
  d. Driving in extremely hot conditions
  e. Driving in mountainous conditions continually

GENERAL INFORMATION

*2: Also inspect and adjust the power steering and air conditioner drive belts, if installed.
If the vehicle is operated primarily under any of the following conditions, inspect the drive belts at every 20,000 km (12,500 miles) or 12 months.
a. Driving in dusty conditions
b. Extended periods of idling or low speed operation
c. Driving for long period in cold temperatures or driving regularly at short distance only
d. Driving in extremely hot conditions
e. Driving in mountainous conditions continually
*3: Use FL22 type coolant in vehicles with the inscription “FL22” on the radiator cap itself or the surrounding area. Use FL22 when replacing the coolant.
*4: If the vehicle is operated in very dusty or sandy areas, clean and if necessary, replace the air cleaner element more often than the recommended intervals.
*5: In the countries below, inspect the spark plugs at every 20,000 km (12,500 miles) or 12 months before replacing them at the said interval.
Croatia, Macedonia, Bosnia and Herzegovina, Serbia, Montenegro, Bulgaria, Romania
*6: If the brakes are used extensively (for example, continuous hard driving or mountain driving) or if the vehicle is operated in extremely humid climates, replace the brake fluid annually.
*7: Check the tire repair fluid expiration date every year when performing the periodic maintenance. Replace the tire repair fluid bottle with new one before the expiration date.

Scheduled Maintenance Table for Israel

Maintenance Interval		Number of months or kilometers (miles), whichever comes first											
	Months	**12**	**24**	**36**	**48**	**60**	**72**	**84**	**96**	**108**	**120**	**132**	**144**
	×1000 km	**15**	**30**	**45**	**60**	**75**	**90**	**105**	**120**	**135**	**150**	**165**	**180**
	×1000 miles	**9.4**	**18.8**	**28.1**	**37.5**	**46.9**	**56.3**	**65.6**	**75.0**	**84.4**	**93.8**	**103.1**	**112.5**
Engine valve clearance		Audibly inspect every 120,000 km (75,000 miles), if noisy, adjust											
Engine oil *1		R	R	R	R	R	R	R	R	R	R	R	R
Engine oil filter *1		R	R	R	R	R	R	R	R	R	R	R	R
Drive belts *2		I	I	I	I	I	I	I	I	I	I	I	I
Cooling system			I		I		I		I		I		I
Engine coolant	FL22 type *3	Replace every 195,000 km (121,900 miles) or 10 years											
	Others	Replace at first 90,000 km (56,300 miles) or 4 years; after that, every 2 years											
Air cleaner element *4		C	C	C	R	C	C	C	R	C	C	C	R
Fuel filter		Replace every 105,000 km (65,600 miles)											
Fuel lines and hoses			I		I		I		I		I		I
Spark plugs		Replace every 90,000 km (56,300 miles) or 3 years											
Evaporative system (if installed)					I				I				I
Battery electrolyte level and specific gravity		I	I	I	I	I	I	I	I	I	I	I	I
Brake lines, hoses and connections		I	I	I	I	I	I	I	I	I	I	I	I
Brake fluid *5		I	R	I	R	I	R	I	R	I	R	I	R
Parking brake		I	I	I	I	I	I	I	I	I	I	I	I
Power brake unit (Brake booster) and hoses		I	I	I	I	I	I	I	I	I	I	I	I
Disc brakes		I	I	I	I	I	I	I	I	I	I	I	I
Power steering fluid, lines, hoses and connections		I	I	I	I	I	I	I	I	I	I	I	I
Steering operation and linkages			I		I		I		I		I		I
Manual transmission oil							R						R
Rear differential oil						R					R		
Front and rear suspension, ball joints and wheel bearing axial play		I	I	I	I	I	I	I	I	I	I	I	I
Drive shaft dust boots				I			I			I			I
Exhaust system and heat shields		Inspect every 75,000 km (46,900 miles)											
Bolts and nuts on chassis and body		T	T	T	T	T	T	T	T	T	T	T	T
Body condition (for rust, corrosion and perforation)		Inspect annually											
Tires (with inflation pressure adjustment)		I	I	I	I	I	I	I	I	I	I	I	I
Flat tire repair kit (if installed) *6		Inspect annually											

GENERAL INFORMATION

Chart symbols:
I: Inspect: Inspect and clean, repair, adjust, fill up, or replace if necessary.
R: Replace
C: Clean
T: Tighten

Remarks:
Emission control and related systems

- The ignition and fuel systems are highly important to the emission control system and to efficient engine operation.
  All inspections and adjustments must be made by an expert repairer, we recommend an Authorized Mazda Repairer.
- After the prescribed period, continue to follow the described maintenance at the recommended intervals.
- Refer below for a description of items marked* in the maintenance chart.

*1: If the vehicle is operated primarily under any of the following conditions, replace the engine oil and oil filter at every 10,000 km (6,250 miles) or shorter.
a. Driving in dusty conditions
b. Extended periods of idling or low speed operation
c. Driving for long period in cold temperatures or driving regularly at short distance only
d. Driving in extremely hot conditions
e. Driving in mountainous conditions continually

*2: Also inspect and adjust the power steering and air conditioner drive belts, if installed.
If the vehicle is operated primarily under any of the following conditions, inspect the drive belts at every 10,000 km (6,250 miles) or shorter.
a. Driving in dusty conditions
b. Extended periods of idling or low speed operation
c. Driving for long period in cold temperatures or driving regularly at short distance only
d. Driving in extremely hot conditions
e. Driving in mountainous conditions continually

*3: Use FL22 type coolant in vehicles with the inscription “FL22” on the radiator cap itself or the surrounding area. Use FL22 when replacing the coolant.

*4: If the vehicle is operated in very dusty or sandy areas, clean and if necessary, replace the air cleaner element more often than the recommended intervals.

*5: If the brakes are used extensively (for example, continuous hard driving or mountain driving) or if the vehicle is operated in extremely humid climates, replace the brake fluid annually.

*6: Check the tire repair fluid expiration date every year when performing the periodic maintenance. Replace the tire repair fluid bottle with new one before the expiration date.

Scheduled Maintenance Table for Russia

Maintenance Interval		Number of months or kilometers (miles), whichever comes first											
	Months	**12**	**24**	**36**	**48**	**60**	**72**	**84**	**96**	**108**	**120**	**132**	**144**
	×1000 km	**15**	**30**	**45**	**60**	**75**	**90**	**105**	**120**	**135**	**150**	**165**	**180**
	×1000 miles	**9**	**18**	**27**	**36**	**45**	**54**	**63**	**72**	**81**	**90**	**99**	**108**
Engine valve clearance		Audibly inspect every 45,000 km (27,000 miles) or 3 years, if noisy, adjust											
Engine oil *1		R	R	R	R	R	R	R	R	R	R	R	R
Engine oil filter *1		R	R	R	R	R	R	R	R	R	R	R	R
Drive belts *2		I	I	I	I	I	I	I	I	I	I	I	I
Cooling system			I		I		I		I		I		I
Engine coolant	FL22 type *3	Replace every 195,000 km (117,000 miles) or 11 years											
	Others	Replace at first 90,000 km (54,000 miles) or 4 years; after that, every 2 years											
Air cleaner element *4		C	C	R	C	C	R	C	C	R	C	C	R
Fuel filter		Replace every 60,000 km (36,000 miles)											
Fuel lines and hoses			I		I		I		I		I		I
Spark plugs		I	I	I	I	R	I	I	I	I	R	I	I
Evaporative system (if installed)					I				I				I
Battery electrolyte level and specific gravity		I	I	I	I	I	I	I	I	I	I	I	I
Brake lines, hoses and connections		I	I	I	I	I	I	I	I	I	I	I	I
Brake fluid *5			R		R		R		R		R		R
Parking brake		I	I	I	I	I	I	I	I	I	I	I	I

GENERAL INFORMATION

Maintenance Interval	Number of months or kilometers (miles), whichever comes first												
	Months	**12**	**24**	**36**	**48**	**60**	**72**	**84**	**96**	**108**	**120**	**132**	**144**
	×1000 km	**15**	**30**	**45**	**60**	**75**	**90**	**105**	**120**	**135**	**150**	**165**	**180**
	×1000 miles	**9**	**18**	**27**	**36**	**45**	**54**	**63**	**72**	**81**	**90**	**99**	**108**
Disc brakes		I	I	I	I	I	I	I	I	I	I	I	I
Power steering fluid, lines, hoses and connections		I	I	I	I	I	I	I	I	I	I	I	I
Steering operation and linkages		I	I	I	I	I	I	I	I	I	I	I	I
Manual transmission oil		I	I	I	I	R	I	I	I	I	R	I	I
Rear differential oil						R					R		
Front and rear suspension, ball joints and wheel bearing axial play		I	I	I	I	I	I	I	I	I	I	I	I
Drive shaft dust boots		I	I	I	I	I	I	I	I	I	I	I	I
Exhaust system and heat shields		I	I	I	I	I	I	I	I	I	I	I	I
Bolts and nuts on chassis and body			T		T		T		T		T		T
Hinges and catches			L		L		L		L		L		L
All electrical system		I	I	I	I	I	I	I	I	I	I	I	I
Body condition (for rust, corrosion and perforation)		Inspect annually											
Tires (with inflation pressure adjustment)		I	I	I	I	I	I	I	I	I	I	I	I
Flat tire repair kit (if installed) *6		Inspect annually											

Chart symbols:
I: Inspect: Inspect and clean, repair, adjust, fill up, or replace if necessary
R: Replace
C: Clean
T: Tighten
L: Lubricate

Remarks:
Emission control and related systems

- The ignition and fuel systems are highly important to the emission control system and to efficient engine operation.
  All inspections and adjustments must be made by an expert repairer, we recommend an Authorized Mazda Repairer.
- After the prescribed period, continue to follow the described maintenance at the recommended intervals.
- Refer below for a description of items marked* in the maintenance chart.

*1: If the vehicle is operated primarily under any of the following conditions, replace the engine oil and oil filter at every 7,500 km (4,500 miles) or 6 months.
a. Driving in dusty conditions
b. Extended periods of idling or low speed operation
c. Driving for long period in cold temperatures or driving regularly at short distance only
d. Driving in extremely hot conditions
e. Driving in mountainous conditions continually

*2: Also inspect and adjust the power steering and air conditioner drive belts, if installed.
If the vehicle is operated primarily under any of the following conditions, inspect the drive belts at every 7,500 km (4,500 miles) or 6 months.
a. Driving in dusty conditions
b. Extended periods of idling or low speed operation
c. Driving for long period in cold temperatures or driving regularly at short distance only
d. Driving in extremely hot conditions
e. Driving in mountainous conditions continually

*3: Use FL22 type coolant in vehicles with the inscription “FL22” on the radiator cap itself or the surrounding area. Use FL22 when replacing the coolant.

*4: If the vehicle is operated in very dusty or sandy areas, clean the air cleaner element at every 7,500 km (4,500 miles) or 6 months.

*5: If the brakes are used extensively (for example, continuous hard driving or mountain driving) or if the vehicle is operated in extremely humid climates, replace the brake fluid annually.

*6: Check the tire repair fluid expiration date every year when performing the periodic maintenance. Replace the tire repair fluid bottle with new one before the expiration date.

GENERAL INFORMATION

Scheduled Maintenance Table for General (L.H.D., R.H.D.)

Maintenance Interval		Number of months or kilometers (miles), whichever comes first															
	Months	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96
	×1000 km	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	×1000 miles	6.25	12.5	18.75	25	31.25	37.5	43.75	50	56.25	62.5	68.75	75	81.25	87.5	93.75	100
Engine valve clearance		Audibly inspect every 120,000 km (75,000 miles), if noisy, adjust															
Engine oil *1		R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Engine oil filter *1		R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Drive belts *2		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Cooling system			I		I		I		I		I		I		I		I
Engine coolant	FL22 type *3										R						
	Others	Replace every 2 years															
Air cleaner element *4			C		C		R		C		C		R		C		C
Fuel filter		Replace every 60,000 km (37,500 miles)															
Fuel lines and hoses			I		I		I		I		I		I		I		I
Spark plugs		Replace every 100,000 km (62,500 miles)															
Evaporative system (if installed)			I		I		I		I		I		I		I		I
Battery electrolyte level and specific gravity *5			I		I		I		I		I		I		I		I
Brake lines, hoses and connections			I		I		I		I		I		I		I		I
Brake fluid *6		I	I	I	R	I	I	I	R	I	I	I	R	I	I	I	R
Parking brake		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Power brake unit (Brake booster) and hoses			I		I		I		I		I		I		I		I
Disc brakes		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Power steering fluid, lines, hoses and connections		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Steering operation and linkages			I		I		I		I		I		I		I		I
Manual transmission oil											R						
Rear differential oil									R								R
Front and rear suspension, ball joints and wheel bearing axial play			I		I		I		I		I		I		I		I
Drive shaft dust boots					I				I				I				I
Exhaust system and heat shields		Inspect every 80,000 km (50,000 miles)															
Bolts and nuts on chassis and body			T		T		T		T		T		T		T		T
Body condition (for rust, corrosion and perforation)		Inspect annually															
Tire rotation		Rotate every 10,000 km (6,250 miles)															
Tires (including spare tire) (with inflation pressure adjustment)		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Flat tire repair kit (if installed) *7		Inspect annually															

Chart symbols:
I: Inspect: Inspect and clean, repair, adjust, fill up, or replace if necessary.
R: Replace
C: Clean
T: Tighten

GENERAL INFORMATION

Remarks:
Emission control and related systems

- The ignition and fuel systems are highly important to the emission control system and to efficient engine operation.
  All inspections and adjustments must be made by an expert repairer, we recommend an Authorized Mazda Repairer.
- After the prescribed period, continue to follow the described maintenance at the recommended intervals.
- Refer below for a description of items marked* in the maintenance chart.
  *1: If the vehicle is operated primarily under any of the following conditions, replace the engine oil and oil filter more often than the recommended intervals.
    a. Driving in dusty conditions
    b. Extended periods of idling or low speed operation
    c. Driving for long period in cold temperatures or driving regularly at short distance only
    d. Driving in extremely hot conditions
    e. Driving in mountainous conditions continually
  *2: Also inspect and adjust the power steering and air conditioner drive belts, if installed.
  If the vehicle is operated primarily under any of the following conditions, inspect the drive belts more often than the recommended intervals.
    a. Driving in dusty conditions
    b. Extended periods of idling or low speed operation
    c. Driving for long period in cold temperatures or driving regularly at short distance only
    d. Driving in extremely hot conditions
    e. Driving in mountainous conditions continually
  *3: Use FL22 type coolant in vehicles with the inscription “FL22” on the radiator cap itself or the surrounding area. Use FL22 when replacing the coolant.
  *4: If the vehicle is operated in very dusty or sandy areas, clean and if necessary, replace the air cleaner element more often than the recommended intervals.
  *5: If the vehicle is operated in extremely heat and extremely cold areas, inspect the battery electrolyte level and specific gravity at every 10,000 km (6,250 miles) or 6 months.
  *6: If the brakes are used extensively (for example, continuous hard driving or mountain driving) or if the vehicle is operated in extremely humid climates, replace the brake fluid annually.
  *7: Check the tire repair fluid expiration date every year when performing the periodic maintenance. Replace the tire repair fluid bottle with new one before the expiration date.

Scheduled Maintenance Service (Specific Work Required)

- The specific work required for each maintenance item is listed in the following table. (Please refer to the section applicable to the model serviced.)

Maintenance Item	Specific Work Required
ENGINE	
Engine valve clearance	Inspect engine vale clearance.
Engine timing belt	Replace engine timing belt.
Engine timing belt auto tensioner	Replace engine timing belt auto tensioner.
Drive belts	Inspect for wear, cracks, fraying and tension.
Engine oil	Replace engine oil and inspect for leakage.
Engine oil filter	Replace engine oil filter and inspect for leakage.
COOLING SYSTEM	
Cooling system (Including coolant level adjustment)	Check engine coolant level and quality, and inspect for leakage.
Radiator cap	Inspect radiator cap.
Engine coolant	Replace engine coolant.
FUEL SYSTEM	
Idle speed	Check engine idle rpm.
Idle mixture	Inspect the CO and HC concentrations (see W/M).
Choke system	Check system operation.
Air cleaner element	Inspect dirt, oil and damage. Clean air cleaner element (by blowing air). Replace air cleaner element.
Fuel filter	Replace fuel filter.
Fuel injection pump inlet filter	Clean fuel injection pump inlet filter.
Fuel lines and hoses Fuel lines, hoses and connections	Inspect for cracks, leakage and loose connection.

GENERAL INFORMATION

Maintenance Item	Specific Work Required
Fuel injection system	Update to injection amount correction with WDS (see W/M). Update to injection amount correction with M-MDS (see W/M).
Fuel system (Drain water)	Drain water in fuel system.
Diesel particulate filter	Replace diesel particulate filter.
Fuel additive for diesel particulate filter	Fill up fuel additive.
IGNITION SYSTEM	
Initial ignition timing	Check initial ignition timing.
Spark plugs	Inspect for wear, damage, carbon, plug gap and high-tension lead condition. Replace spark plugs.
Ignition cables condition/security	Inspect for damage, condition and connection.
EMISSION CONTROL SYSTEM	
Evaporative system Evaporative emission control system	Check system operation (see W/M), vapor lines, vacuum fitting hoses and connection.
Crankcase emission control system	Check system operation (see W/M), PCV valve, blow-by lines, vacuum fitting hoses and connection.
E.G.R system	Check system operation (see W/M), vacuum fitting hoses and connection. MZR-CD (RF turbo) engine: Update to MAF correction for E.G.R control with WDS (see W/M). MZR-CD (RF turbo) engine: Update to MAF correction for E.G.R control with M-MDS (see W/M).
Air intake system	Update to MAF correction (see W/M).
Throttle positioner system	Check the diaphragm and system operation, vacuum fitting hoses and connection.
Dash pot	Check system operation.
ELECTRICAL SYSTEM	
Battery electrolyte level and specific gravity	Check battery electrolyte level and specific gravity.
Battery condition	Check battery for corroded or loose connections and cracks.
Battery	Check battery for leakage and corrosion.
All electrical system Lighting system and windshield wipers and washer	Check function of lighting system, windshield wiper (including wiper blade condition), washer and power windows.
Head light alignment	Check head light alignment.
CHASSIS AND BODY	
Brake and clutch pedals Brake pedals	Check pedal height and free play.
Brake fluid	Check brake fluid level and for leakage. Replace brake fluid.
Clutch fluid	Check Clutch fluid level and for leakage.
Brake lines, hoses and connections	Inspect for cracks, damage, chafing, corrosion, scars, swelling and fluid leakage.
Parking brake	Check parking lever stroke.
Power brake unit and hoses Power brake unit (Brake booster) and hoses	Check vacuum lines, connections, and check valve for improper attachment, air tightness, cracks chafing and deterioration.
Disc brakes	Inspect caliper for correct operation and fluid leakage, brake pads for wear. Check disc plate condition and thickness. Test for judder and noise.
Drum brakes	Inspect brake drum for wear and scratches: brake lining for wear, peeling and cracks; wheel cylinder for fluid leakage. Test for judder and noise.
Manual steering gear oil	Check manual gear oil level.
Power steering fluid, lines, hoses and connections Power steering fluid and lines	Check power steering fluid level and lines for improper attachment, leakage, cracks, damage, loose connections, chafing and deterioration.
Steering operation and gear housing Steering linkages tie rod ends and arms Steering operation and linkages	Check that the steering wheel has the specified play. Be sure to check for changes, such as excessive play, hard steering or strange noises. Check gear housing and boots for looseness, damage and grease/gear oil leakage. Check ball joint, dust cover and other components for looseness, wear, damage and grease leakage.
Front and rear suspension and ball joints Front suspension ball joints Front and rear suspension, ball joints and wheel bearing axial play	Inspect for grease leakage, crack, damage and looseness. Inspect for grease leakage, crack, damage, looseness and wheel bearing play/noise.
Wheel bearing axial play	Inspect for wheel bearing play/noise.

GENERAL INFORMATION

Maintenance Item	Specific Work Required
Manual transmission/transaxle oil	Check manual transmission/transaxle oil level and for leakage. Replace manual transmission/transaxle oil.
Automatic transmission/transaxle fluid level	Check automatic transmission/transaxle fluid level.
Automatic transmission/transaxle fluid	Replace automatic transmission/transaxle fluid.
Front and rear differential oil Front differential oil Front axle oil Rear differential oil Rear axle oil	Check front and rear differential oil level and inspect for leakage. Replace front and rear differential oil.
Transfer oil	Check transfer oil level inspect for leakage. Replace transfer oil
Front and rear wheel bearing grease Front wheel bearing grease	Remove wheel bearing and replace wheel bearing grease.
Wheel bearing axial play Wheel bearing axial play (rear) and lateral play (front)	Inspect wheel bearing play and noise.
Propeller shaft joints Front propeller shaft joints Rear propeller shaft joints	Lubricate propeller shaft joints.
Drive shaft dust boots	Inspect for grease leakage, crack, damage and looseness.
Wheel nuts	Tighten wheel nuts.
Bolts and nuts on chassis and body Bolts and nuts on seats	Tighten bolts and nuts fastening suspension components, members and seat frames.
Body condition (for rust, corrosion and perforation)	Inspect body surface for paint damage, rust, corrosion and perforation.
Exhaust system and heat shields Exhaust pipe connections	Inspect for damage, corrosion, looseness of connections and gas leakage.
Tire rotation	Rotate tires.
Tires (Including spare tire)(with inflation pressure adjustment)	Check air pressure and inspect tires for tread wear, damage, cracks; and wheels for damage and corrosion.
Flat tire repair kit	Check tire repair fluid expiration date.
Hinges and catches	Lubricate hinges and catches of doors, trunk lid and hood.
Underside of vehicle	Inspect underside of vehicle (floor pans, frames, fuel lines, around exhaust system etc.) for damage and corrosion.
Road test	Check brake operation/clutch operation/steering control/operation of meters and gauges/squeaks, rattles, or unusual noises/engine general performance/ emergency locking retractors.
Diagnostic trouble code by WDS Diagnostic trouble code by M-MDS	Check diagnostic trouble code with WDS (see W/M). Check diagnostic trouble code with M-MDS (see W/M).
M-MDS check of Vehicle Management and Safety Systems	Check the items below with M-MDS (see W/M). (1) Retrieve All CMDTCs (2) PCM function test (except Tribute and diesel engine models) (3) PCM Input/Output Data Monitor (except Tribute and diesel engine models) (4) Adviser Comment (except Tribute and diesel engine models)
AIR CONDITIONER SYSTEM	
Cabin air filter	Replace cabin air filter.

ENGINE

01
SECTION

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ON-BOARD DIAGNOSTIC [L8, LF]

ON-BOARD DIAGNOSTIC WIRING DIAGRAM [L8, LF]

id0102b1800100

amxzzn00000547

ON-BOARD DIAGNOSTIC [L8, LF]

amxzzn00000548

ON-BOARD DIAGNOSTIC [L8, LF]

MONITORING SYSTEM AND CONTROL SYSTEM DEVICE RELATIONSHIP CHART [L8, LF]

id0102b1800200

x: Applicable

Component	A/F sensor, HO2S	A/F sensor heater, HO2S heater monitor	Catalyst monitor	Misfire monitor	Fuel system monitor	Engine cooling system
Input						
Battery		x		x		
Ignition switch	x	x				
A/C switch, refrigerant pressure switch (high, low pressure)						x
TP sensor	x		x	x	x	
ECT sensor	x	x	x	x	x	x
IAT sensor	x		x		x	x
MAF sensor	x	x	x	x	x	x
A/F sensor	x	x	x		x	
HO2S	x	x			x	
Fuel gauge sender unit						
BARO sensor	x					
MAP sensor						
CMP sensor				x		
CKP sensor	x	x	x	x	x	x
Output						
Fuel injector					x	
A/F sensor heater		x				
HO2S heater		x				
Purge solenoid valve	x		x		x	
MIL	x	x	x	x	x	x
DLC-2	x	x	x	x	x	x

OBD PENDING TROUBLE CODE [L8, LF]

id0102b1816200

- These appear when a problem is detected in a monitored system. The code for a failed system is stored in the PCM memory in the first drive cycle. This code is called the pending code. If the PCM judges that the system returned to normal or the problem was mistakenly detected, and deletes the pending code. If the problem is found in a second drive cycle too, the PCM judges that the system has failed, and the DTC is stored.

OBD FREEZE FRAME DATA [L8, LF]

id0102b1815900

- This is the technical data which indicates the engine condition at the time of the first malfunction. This data will remain in the memory even if another emission-related DTC is stored, with the exception of Fuel system or Misfire DTCs. Once FREEZE FRAME DATA for Fuel system or Misfire DTC is stored, it will overwrite any previous data and the freeze frame will not be overwritten again.

OBD ON-BOARD SYSTEM READINESS TEST [L8, LF]

id0102b1816000

- This shows the OBD systems operating status. If any monitor function is incomplete, M-MDS will identify which monitor function has not been completed. The Fuel system, Misfire and CCM are continuous monitoring-type functions. The A/F sensor, HO2S and Catalyst will be monitored under drive cycles. The OBD diagnostic system is initialized by performing the DTC cancellation procedure or disconnecting the negative battery cable.

ON-BOARD DIAGNOSTIC [L8, LF]

OBD READ/CLEAR DIAGNOSTIC TEST RESULTS [L8, LF]

id0102b1828300

- This retrieves all stored DTCs in the PCM and clears the on-board readiness test results, FREEZE FRAME DATA, DTC and pending trouble code.

OBD PARAMETER IDENTIFICATION (PID) ACCESS [L8, LF]

id0102b1816100

- The PID mode allows access to certain data values, analog and digital inputs and outputs, calculated values and system status information. Since the PID values for output devices are the PCM internal data values, inspect each device to identify which output devices are malfunctioning.

ON-BOARD DIAGNOSTIC TEST [L8, LF]

id0102b1801000

DTC Reading Procedure

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select the “Toolbox” tab.
     2. Select “Self Test”.
     3. Select “Modules”.
     4. Select “PCM”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “PCM”.
     3. Select “Self Test”.
3. Then, select the “Retrieve CMDTCs” and perform procedures according to directions on the M-MDS screen.
4. Verify the DTC according to the directions on the M-MDS screen.
   - If any DTCs are displayed, perform troubleshooting according to the corresponding DTC inspection.
5. After completion of repairs, clear all DTCs stored in the PCM, while referring to “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].)

amxzzw0000060

Pending Trouble Code Access Procedure

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select the “Toolbox” tab.
     2. Select “Self Test”.
     3. Select “Modules”.
     4. Select “PCM”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “PCM”.
     3. Select “Self Test”.
3. Then, select the “Retrieve CMDTCs” and perform procedures according to directions on the M-MDS screen.
4. Retrieve the pending trouble codes according to the directions on the M-MDS screen.

amxzzw0000060

Freeze Frame PID Data Access Procedure

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select the “Toolbox” tab.
     2. Select “Self Test”.
     3. Select “Modules”.
     4. Select “PCM”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “PCM”.
     3. Select “Self Test”.

amxzzw0000060

ON-BOARD DIAGNOSTIC [L8, LF]

3. Then, select the “Retrieve CMDTCs” and perform procedures according to directions on the M-MDS screen.
4. Retrieve the freeze frame PID data according to the directions on the M-MDS screen.

Note
- Freeze frame data appears at the top of the help screen when the displayed DTC is selected.
- The freeze frame data consists of data for vehicle and engine control system operation conditions when malfunctions in the engine control system are detected and stored in the PCM.
- There are modes 2 and 12 in the freeze frame data.

Freeze frame data (mode 2)
- Freeze frame data is stored at the instant the malfunction indicator lamp illuminates, and only a part of the DTC data is stored.
- For the freeze frame data, if there are several malfunctions in the engine control system, the data for the malfunction which occurred initially is stored. Thereafter, if a misfire or fuel injection control malfunction occurs, data from the misfire or fuel injection control malfunction is written over the initially stored data. However, if the initially stored freeze frame data is a misfire or fuel injection control malfunction, it is not overwritten.

Freeze frame data (mode 12)
- The data for DTCs currently detected is stored.
- The DTC recording timing differs depending on the number of DTC drive cycles.
  —For a DTC with a drive cycle number 1, only the malfunction determination data is recorded.
  —For a DTC with a drive cycle number 2, both the malfunction determination and undetermined data is recorded.

Freeze frame data table (mode2, mode12) table

Note
- Refer to PID monitor table for confirm the engine control system operation status while the PCM does not store the DTC. (See 01-40-9 PCM INSPECTION [L8, LF])
- Freeze frame data items are not displayed, according to detected DTC.

Freeze frame data item	Definition	Unit	Corresponding PID data monitor item	Description
FUELSYS1	Fuel system status	Open Loop/ Closed Loop/OL-Drive/OL-Fault/CL-Fault	FUELSYS	Fuel system status: Open Loop: Fuel injection control out of feedback control condition Closed Loop: Fuel injection control in feedback (closed loop) control OL-Drive: Fuel injection control stops temporary and controls open loop OL-Fault: Fuel injection control in open loop control due to system malfunction CL-Fault: Fuel injection controlled by other normal sensors due to system malfunction
LOAD	Engine load	%	—	Ratio of current intake air amount to wide-open throttle engine operation intake air amount
ECT	Engine coolant temperature	°C	ECT	Engine coolant temperature
SFT1	Short term fuel trim	%	SHRTFT1	Amount of fuel feedback correction
LFT1	Long term fuel trim	%	LONGFT1	Amount of fuel learning correction
MAP	Manifold absolute pressure	kPa	MAP	Manifold absolute pressure
RPM	Engine speed	RPM	RPM	Engine speed
VS	Vehicle speed	KPH	VSS	Vehicle speed input from ABS/DSC HU/CM
SPARKADV	Ignition timing	°	SPARKADV	No.1 cylinder ignition spark advanced value
IAT	Intake air temperature	°C	IAT	Intake air temperature
MAF	Mass airflow	g/sec	MAF	Mass airflow of intake-air
TP	Throttle valve position No.1	%	TP1	TP sensor No.1 value
RUNTM	Time from engine start	hh:mm:ss	—	Time from engine start
EGRPCT	Target EGR valve position	%	SEGRP_DSD	Target EGR valve position

ON-BOARD DIAGNOSTIC [L8, LF]

Freeze frame data item	Definition	Unit	Corresponding PID data monitor item	Description
EVAPPCT	Purge solenoid valve controlled value	%	EVAPCP	Purge solenoid valve control signal duty value
WARMUPS	Number of warm-up cycles after DTC cleared	—	—	Number of warm-up cycle after all stored DTCs cleared
CLRDIST	Mileage after DTC cleared	Km	—	Mileage after all stored DTCs cleared
BARO	Barometric pressure	kPa	BARO	Barometric pressure
CATTEMP11	Estimated catalytic converter temperature	°C	CATT11_DSD	Estimated catalytic converter temperature calculated by engine operating condition
VPWR	Module supply voltage	V	VPWR	PCM power supply voltage
ALV	Engine load	%	LOAD	Ratio of current intake-air amount and cylinder value
EQ_RAT	Target equivalence ratio (lambda)	—	EQ_RAT11_DSD	Ratio of consumed air amount based on engine operation and theoretical air amount
TP_REL	Relative throttle position	%	TP REL	Throttle valve opening angle
TP_B	Throttle valve position No.2	%	TP2	TP sensor No.2 value
APP_D	Accelerator pedal position No.1	%	APP1	APP sensor No.1 value
APP_E	Accelerator pedal position No.2	%	APP2	APP sensor No.2 value
TAC_PCT	Target throttle valve position	%	ETC_DSD	Target throttle valve position for drive-wire control

On-Board System Readiness Tests Access Procedure

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select the “Toolbox” tab.
     2. Select “Powertrain”.
     3. Select “OBD Test Modes”.
     4. Select “Mode 1 Powertrain Data”.
   - When using the PDS (Pocket PC)
     1. Select “OBD II Modes”.
     2. Select “Mode 1 Powertrain Data”.
3. Then, select the “***SUP” and “***EVAL” PIDs in the PID selection screen.
4. Monitor those PIDs and check it system monitor is completed.

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ON-BOARD DIAGNOSTIC [L8, LF]

PID/DATA Monitor and Record Procedure

Note

- The PID/DATA MONITOR function monitors the calculated value of the input/output signals in the PCM. Therefore, an output device malfunction is not directly indicated as a malfunction of the monitored value for the output device. If a monitored value of an output device is out of specification, inspect the monitored value of the input device related to the output control.

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select the “Toolbox” tab.
     2. Select “Data Logger”.
     3. Select “Modules”.
     4. Select “PCM”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “PCM”.
     3. Select “Data Logger”.
3. Select the PID from the PID table.
4. Verify the PID data according to the directions on the screen.

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Diagnostic Monitoring Test Results Access Procedure

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select the “Toolbox” tab.
     2. Select “Powertrain”.
     3. Select “OBD Test Modes”.
     4. Select “Mode 6 On-Board Test Results”.
   - When using the PDS (Pocket PC)
     1. Select “OBD II Modes”.
     2. Select “Mode 6 On-Board Test Results”.
3. Verify the diagnostic monitoring test result according to the directions on the screen.

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Simulation Function Procedure

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select the “Toolbox” tab.
     2. Select “Data Logger”.
     3. Select “Modules”.
     4. Select “PCM”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “PCM”.
     3. Select “Data Logger”.
3. Select the simulation items from the PID table.
4. Perform the simulation function, inspect the operations for each parts.
   - If there is no operation sound from the relay, motor, and solenoid after the simulation function inspection is performed, it is possible that there is an open or short circuit in the wiring harness, relay, motor or solenoid, or sticking and operation malfunction.

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ON-BOARD DIAGNOSTIC [L8, LF]

AFTER REPAIR PROCEDURE [L8, LF]

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1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select the “Toolbox” tab.
     2. Select “Self Test”.
     3. Select “Modules”.
     4. Select “PCM”.
     5. Select “Retrieve CMDTCs”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “PCM”.
     3. Select “Self Test”.
     4. Select “Retrieve CMDTCs”.
3. Verify the DTC according to the directions on the M-MDS screen.
4. Press the clear button on the DTC screen to clear the DTC.
5. Verify that no DTCs are displayed.

KOEO/KOER SELF TEST [L8, LF]

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Note
- Perform a KOER self test while idling.

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1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select the “Toolbox” tab.
     2. Select “Self Test”.
     3. Select “Modules”.
     4. Select “PCM”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “PCM”.
     3. Select “Self Test”.
3. Then, select the “KOEO On Demand Self Test” or “KOER On Demand Self Test” and perform procedures according to directions on the M-MDS screen.
4. Verify the DTC according to the directions on the M-MDS screen.
   - If any DTCs are displayed, perform troubleshooting according to the corresponding DTC inspection.
5. After completion of repairs, clear all DTCs stored in the PCM, while referring to “AFTER REPAIR PROCEDURE“. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].)

OBD DRIVE MODE [L8, LF]

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- Performing the Drive Mode inspects the OBD system for proper operation. The Drive Mode must be performed to ensure that no additional DTCs are present.
- During Drive Mode, the following systems are inspected:
  — A/F sensor
  — HO2S
  — A/F sensor heater
  — HO2S heater
  — TWC

Caution
- **While performing the Drive Mode, always operate the vehicle in a safe and lawful manner.**
- **When the M-MDS is used to observe or monitor system conditions while driving, be sure to have another technician with you, or record the data in the M-MDS using the PID/DATA MONITOR AND RECORD function and inspect later.**

Note
- Vehicle speed and engine speed detected by the PCM may differ from that indicated by the speedometer and tachometer. Use the M-MDS to monitor vehicle speed.

ON-BOARD DIAGNOSTIC [L8, LF]

- If the OBD system inspection is not completed during the Drive Mode, the following causes are considered:
  — The OBD system detects the malfunction.
  — The Drive Mode procedure is not completed correctly.
- Disconnecting the battery will reset the memory. Do not disconnect the battery during and after Drive Mode.
- The M-MDS can be used at anytime through the course of Drive Mode to monitor the completion condition. Monitoring can be done by viewing the ON-BOARD SYSTEM READINESS menu.

Mode 01 (PCM Adaptive Memory Production Drive Mode)

Note
- The PCM adaptive memory condition can be confirmed with RFCFLAG PID.
- If the RFCFLAG PID is ON, the PCM adaptive memory procedure drive mode is not necessary, because the PCM already has adaptive memory.
- If the RFCFLAG PID is OFF, the PCM adaptive memory procedure drive should be performed before A/F sensor heater, HO2S heater, A/F sensor, HO2S, and TWC repair verification drive mode.

1. Start the engine and warm it up completely.
2. Verify the following conditions and correct if necessary:
   - All accessory loads (A/C, headlights, blower fan, rear window defroster) are off.
3. Perform no load racing at the engine speed shown in the graph, then idle the engine for more than **60 s** after the cooling fan has stopped. If possible, monitor RPM PID for engine speed during this procedure.
4. Turn ignition switch off then to the ON position again.
5. Access the RFCFLAG PID to confirm the PCM adaptive memory conditions. If the RFCFLAG PID is ON, the PCM adaptive memory procedure drive is completed.
6. If the RFCFLAG PID is still OFF, go back to Step 1.

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Mode 03 (A/F Sensor Heater, HO2S Heater, A/F Sensor, HO2S and TWC Repair Verification Drive Mode)

1. Access the RFCFLAG PID to confirm PCM adaptive memory condition. If RFCFLAG PID is OFF, perform the PCM adaptive memory procedure drive first.
2. If RFCFLAG PID is ON, start the engine and warm it up completely.
3. Verify all accessory loads (A/C, headlights, blower fan, rear window defroster) are off.
4. Drive the vehicle as shown in the graph. The driving conditions before driving at constant speed are not specified.
5. Stop the vehicle and access ON BOARD SYSTEM READINESS menu of GENERIC OBD FUNCTION to verify the OBD monitoring status.
   - If completed, the OBD monitoring status items change from non-completed to completed.
   - If not completed, turn the ignition switch off then repeat from Step 4.
6. Access DIAGNOSTIC MONITORING TEST RESULTS menu of GENERIC OBD FUNCTIONS to verify the monitor results.
   - If detected values are not within the specification, repair has not been completed.
7. Verify no DTCs are available.

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ON-BOARD DIAGNOSTIC [L8, LF]

DTC TABLE [L8, LF]

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×: Applicable
—: Not applicable

DTC No.	Condition	MIL	Generator warning light	DC	Monitor item	Self test type*1	Memory function	Page
B1342	PCM malfunction	OFF	OFF	—	—	C, O	×	(See 01-02-17 DTC B1342 [L8, LF].)
P0011*2	CMP timing over-advanced	ON	OFF	1	CCM	C, R	×	(See 01-02-17 DTC P0011 [L8, LF].)
P0012*2	CMP timing over-retarded	ON	OFF	2	CCM	C, R	×	(See 01-02-19 DTC P0012 [L8, LF].)
P0030	A/F sensor heater control circuit problem	ON	OFF	2	A/F sensor heater, HO2S heater	C, O, R	×	(See 01-02-20 DTC P0030 [L8, LF].)
P0031	A/F sensor heater circuit low input	ON	OFF	2	A/F sensor heater, HO2S heater	C, O, R	×	(See 01-02-22 DTC P0031 [L8, LF].)
P0032	A/F sensor heater circuit high input	ON	OFF	2	A/F sensor heater, HO2S heater	C, O, R	×	(See 01-02-24 DTC P0032 [L8, LF].)
P0037	HO2S heater circuit low input	ON	OFF	2	A/F sensor heater, HO2S heater	C, O, R	×	(See 01-02-26 DTC P0037 [L8, LF].)
P0038	HO2S heater circuit high input	ON	OFF	2	A/F sensor heater, HO2S heater	C, O, R	×	(See 01-02-28 DTC P0038 [L8, LF].)
P0069	Manifold absolute pressure/ atmospheric pressure correlation	ON	OFF	2	CCM	C	×	(See 01-02-29 DTC P0069 [L8, LF].)
P0101	MAF sensor circuit range/ performance problem	ON	OFF	2	CCM	C	×	(See 01-02-31 DTC P0101 [L8, LF].)
P0102	MAF sensor circuit low input	ON	OFF	1	CCM	C, O, R	×	(See 01-02-33 DTC P0102 [L8, LF].)
P0103	MAF sensor circuit high input	ON	OFF	1	CCM	C, O, R	×	(See 01-02-35 DTC P0103 [L8, LF].)
P0107	MAP sensor circuit low input	ON	OFF	1	CCM	C, O, R	×	(See 01-02-37 DTC P0107 [L8, LF].)
P0108	MAP sensor circuit high input	ON	OFF	1	CCM	C, O, R	×	(See 01-02-40 DTC P0108 [L8, LF].)
P0111	IAT sensor circuit range/ performance problem	ON	OFF	2	CCM	C	×	(See 01-02-42 DTC P0111 [L8, LF].)
P0112	IAT sensor circuit low input	ON	ON	1	CCM	C, O, R	×	(See 01-02-43 DTC P0112 [L8, LF].)
P0113	IAT sensor circuit high input	ON	ON	1	CCM	C, O, R	×	(See 01-02-45 DTC P0113 [L8, LF].)
P0117	ECT sensor circuit low input	ON	OFF	1	Engine cooling system	C, O, R	×	(See 01-02-47 DTC P0117 [L8, LF].)
P0118	ECT sensor circuit high input	ON	OFF	1	Engine cooling system	C, O, R	×	(See 01-02-49 DTC P0118 [L8, LF].)

ON-BOARD DIAGNOSTIC [L8, LF]

DTC No.	Condition	MIL	Generator warning light	DC	Monitor item	Self test type*1	Memory function	Page
P0122	TP sensor No.1 circuit low input	ON	OFF	1	CCM	C, O, R	×	(See 01-02-51 DTC P0122 [L8, LF].)
P0123	TP sensor No.1 circuit high input	ON	OFF	1	CCM	C, O, R	×	(See 01-02-53 DTC P0123 [L8, LF].)
P0125	Excessive time to enter closed loop fuel control	ON	OFF	2	Engine cooling system	C	×	(See 01-02-55 DTC P0125 [L8, LF].)
P0130	A/F sensor circuit problem	ON	OFF	2	A/F sensor, HO2S	C, O, R	×	(See 01-02-57 DTC P0130 [L8, LF].)
P0131	A/F sensor circuit low input	ON	OFF	2	A/F sensor, HO2S	C, O, R	×	(See 01-02-59 DTC P0131 [L8, LF].)
P0132	A/F sensor circuit high input	ON	OFF	2	A/F sensor, HO2S	C, O, R	×	(See 01-02-61 DTC P0132 [L8, LF].)
P0133	A/F sensor circuit problem	ON	OFF	2	A/F sensor, HO2S	C	×	(See 01-02-63 DTC P0133 [L8, LF].)
P0134	A/F sensor no activity detected	ON	OFF	2	A/F sensor, HO2S	C, R	×	(See 01-02-66 DTC P0134 [L8, LF].)
P0138	HO2S circuit high input	ON	OFF	2	A/F sensor, HO2S	C, O, R	×	(See 01-02-69 DTC P0138 [L8, LF].)
P0140	HO2S no activity detected	ON	OFF	2	A/F sensor, HO2S	C, R	×	(See 01-02-71 DTC P0140 [L8, LF].)
P0222	TP sensor No.2 circuit low input	ON	OFF	1	CCM	C, O, R	×	(See 01-02-74 DTC P0222 [L8, LF].)
P0223	TP sensor No.2 circuit high input	ON	OFF	1	CCM	C, O, R	×	(See 01-02-76 DTC P0223 [L8, LF].)
P0300	Random misfire detected	Flash /ON	OFF	1 or 2	Misfire	C, R	×	(See 01-02-78 DTC P0300 [L8, LF].)
P0301	Cylinder No.1 misfire detected	Flash /ON	OFF	1 or 2	Misfire	C, R	×	(See 01-02-82 DTC P0301, P0302, P0303, P0304 [L8, LF].)
P0302	Cylinder No.2 misfire detected	Flash /ON	OFF	1 or 2	Misfire	C, R	×	
P0303	Cylinder No.3 misfire detected	Flash /ON	OFF	1 or 2	Misfire	C, R	×	
P0304	Cylinder No.4 misfire detected	Flash /ON	OFF	1 or 2	Misfire	C, R	×	
P0327	KS circuit low input	ON	OFF	1	CCM	C, O, R	×	(See 01-02-85 DTC P0327 [L8, LF].)
P0328	KS circuit high input	ON	OFF	1	CCM	C, O, R	×	(See 01-02-87 DTC P0328 [L8, LF].)
P0335	CKP sensor circuit problem	ON	OFF	1	CCM	C	×	(See 01-02-89 DTC P0335 [L8, LF].)
P0340	CMP sensor circuit problem	ON	OFF	1	CCM	C	×	(See 01-02-92 DTC P0340 [L8, LF].)
P0403	EGR valve (stepping motor) circuit problem	ON	OFF	2	CCM	C, O, R	×	(See 01-02-95 DTC P0403 [L8, LF].)

ON-BOARD DIAGNOSTIC [L8, LF]

DTC No.	Condition	MIL	Generator warning light	DC	Monitor item	Self test type*1	Memory function	Page
P0421*6	Warm up catalyst system efficiency below threshold	ON	OFF	2	Catalyst	C	×	(See 01-02-98 DTC P0421 [L8, LF].)
P0443	Purge solenoid valve circuit problem	ON	OFF	2	CCM	C, O, R	×	(See 01-02-100 DTC P0443 [L8, LF].)
P0480	Cooling fan relay No.1 control circuit malfunction	OFF	OFF	1	Other	C, O, R	×	(See 01-02-102 DTC P0480 [L8, LF].)
P0481	Cooling fan relay No.2 control circuit malfunction	OFF	OFF	1	Other	C, O, R	×	(See 01-02-104 DTC P0481 [L8, LF].)
P0482	Cooling fan relay No.3 control circuit malfunction	OFF	OFF	1	Other	C, O, R	×	(See 01-02-106 DTC P0482 [L8, LF].)
P0500	VSS circuit problem	ON	OFF	2	CCM	C	×	(See 01-02-108 DTC P0500 [L8, LF].)
P0505*8	Idle speed control system problem	OFF	OFF	—	—	R	—	(See 01-02-109 DTC P0505 [L8, LF].)
P0506	Idle speed control system RPM lower than expected	ON	OFF	2	CCM	C	×	(See 01-02-111 DTC P0506 [L8, LF].)
P0507	Idle speed control system RPM higher than expected	ON	OFF	2	CCM	C	×	(See 01-02-113 DTC P0507 [L8, LF].)
P0550	PSP switch circuit malfunction	ON	OFF	2	CCM	C	×	(See 01-02-115 DTC P0550 [L8, LF].)
P0564*5	Cruise control switch circuit malfunction	OFF	OFF	1	Other	C	×	(See 01-02-117 DTC P0564 [L8, LF].)
P0571*5	Brake switch circuit problem	OFF	OFF	1	Other	C	×	(See 01-02-119 DTC P0571 [L8, LF].)
P0601	PCM memory check sum error	ON	OFF	1	CCM	C, O, R	×	(See 01-02-121 DTC P0601 [L8, LF].)
P0602	PCM programming error	ON	OFF	1	CCM	C, O, R	×	(See 01-02-122 DTC P0602 [L8, LF].)
P0604	PCM random access memory (RAM) error	ON	OFF	1	CCM	C, O, R	×	(See 01-02-123 DTC P0604 [L8, LF].)
P0606	PCM processor error	ON	OFF	1	CCM	C, O, R	×	(See 01-02-124 DTC P0606 [L8, LF].)
P0610	PCM vehicle options error	ON	OFF	1	CCM	C, O, R	×	(See 01-02-125 DTC P0610 [L8, LF].)
P0638	Throttle valve actuator control circuit range/performance problem	ON	OFF	1	CCM	C	×	(See 01-02-126 DTC P0638 [L8, LF].)
P0661	Variable intake air solenoid valve circuit low input	OFF	OFF	1	Other	C, O, R	×	(See 01-02-127 DTC P0661 [L8, LF].)
P0662	Variable intake air solenoid valve circuit high input	OFF	OFF	1	Other	C, O, R	×	(See 01-02-129 DTC P0662 [L8, LF].)

ON-BOARD DIAGNOSTIC [L8, LF]

DTC No.	Condition	MIL	Generator warning light	DC	Monitor item	Self test type*1	Memory function	Page
P0703	Brake switch input circuit problem	ON	OFF	2	CCM	C	×	(See 01-02-131 DTC P0703 [L8, LF].)
P0704*3	CPP switch input circuit problem	ON	OFF	2	CCM	C	×	(See 01-02-133 DTC P0704 [L8, LF].)
P0850*3	Neutral switch input circuit problem	ON	OFF	2	CCM	C	×	(See 01-02-136 DTC P0850 [L8, LF].)
P1260	Immobilizer system problem	OFF	OFF	1	Other	C, O	×	(See 01-02-139 DTC P1260 [L8, LF].)
P2006	Variable tumble shutter valve stuck closed	ON	OFF	2	CCM	C, R	×	(See 01-02-140 DTC P2006 [L8, LF].)
P2009*4	Variable tumble solenoid valve circuit low input	ON	OFF	2	CCM	C, O, R	×	(See 01-02-143 DTC P2009 [L8, LF].)
P2010*4	Variable tumble solenoid valve circuit high input	ON	OFF	2	CCM	C, O, R	×	(See 01-02-145 DTC P2010 [L8, LF].)
P2088*2	OCV circuit low input	ON	OFF	1	CCM	C, O, R	×	(See 01-02-147 DTC P2088 [L8, LF].)
P2089*2	OCV circuit high input	ON	OFF	1	CCM	C, O, R	×	(See 01-02-149 DTC P2089 [L8, LF].)
P2096	Target A/F feedback system too lean	ON	OFF	2	Fuel system	C	×	(See 01-02-151 DTC P2096 [L8, LF].)
P2097	Target A/F feedback system too rich	ON	OFF	2	Fuel system	C	×	(See 01-02-155 DTC P2097 [L8, LF].)
P2101	Throttle valve actuator circuit range/performance problem	ON	OFF	1	CCM	C, R	×	(See 01-02-158 DTC P2101 [L8, LF].)
P2107	Throttle valve actuator control module processor error	ON	OFF	1	CCM	C, R	×	(See 01-02-162 DTC P2107 [L8, LF].)
P2108	Throttle valve actuator control module performance error	ON	OFF	1	CCM	C, R	×	(See 01-02-163 DTC P2108 [L8, LF].)
P2109	TP sensor minimum stop range/ performance problem	ON	OFF	1	CCM	C, R	×	(See 01-02-164 DTC P2109 [L8, LF].)
P2112	Throttle valve actuator control system range/performance problem	ON	OFF	1	CCM	C, R	×	(See 01-02-165 DTC P2112 [L8, LF].)
P2119	Throttle valve actuator control throttle body range/performance problem	ON	OFF	2	CCM	C, R	×	(See 01-02-166 DTC P2119 [L8, LF].)
P2122	APP sensor No.1 circuit low input	ON	OFF	1	CCM	C, O, R	×	(See 01-02-167 DTC P2122 [L8, LF].)
P2123	APP sensor No.1 circuit high input	ON	OFF	1	CCM	C, O, R	×	(See 01-02-169 DTC P2123 [L8, LF].)
P2127	APP sensor No.2 circuit low input	ON	OFF	1	CCM	C, O, R	×	(See 01-02-171 DTC P2127 [L8, LF].)

ON-BOARD DIAGNOSTIC [L8, LF]

DTC No.	Condition	MIL	Generator warning light	DC	Monitor item	Self test type*1	Memory function	Page
P2128	APP sensor No.2 circuit high input	ON	OFF	1	CCM	C, O, R	×	(See 01-02-173 DTC P2128 [L8, LF].)
P2135	TP sensor No.1/No.2 voltage correlation problem	ON	OFF	1	CCM	C, O, R	×	(See 01-02-176 DTC P2135 [L8, LF].)
P2138	APP sensor No.1/No.2 voltage correlation problem	ON	OFF	1	CCM	C, O, R	×	(See 01-02-177 DTC P2138 [L8, LF].)
P2177	Fuel system too lean at off idle	ON	OFF	2	Fuel system	C, R	×	(See 01-02-178 DTC P2177 [L8, LF].)
P2178	Fuel system too rich at off idle	ON	OFF	2	Fuel system	C, R	×	(See 01-02-181 DTC P2178 [L8, LF].)
P2187	Fuel system too lean at idle	ON	OFF	2	Fuel system	C, R	×	(See 01-02-185 DTC P2187 [L8, LF].)
P2188	Fuel system too rich at idle	ON	OFF	2	Fuel system	C, R	×	(See 01-02-189 DTC P2188 [L8, LF].)
P2195	A/F sensor signal stuck lean	ON	OFF	2	A/F sensor, HO2S	C	×	(See 01-02-192 DTC P2195 [L8, LF].)
P2196	A/F sensor signal stuck rich	ON	OFF	2	A/F sensor, HO2S	C	×	(See 01-02-195 DTC P2196 [L8, LF].)
P2228	BARO sensor circuit low input	ON	OFF	1	CCM	C, O, R	×	(See 01-02-197 DTC P2228 [L8, LF].)
P2229	BARO sensor circuit high input	ON	OFF	1	CCM	C, O, R	×	(See 01-02-198 DTC P2229 [L8, LF].)
P2502	Charging system voltage problem	OFF	ON	1	Other	C, R	×	(See 01-02-199 DTC P2502 [L8, LF].)
P2503	Charging system voltage low input	OFF	ON	1	Other	C, R	×	(See 01-02-201 DTC P2503 [L8, LF].)
P2504	Charging system voltage high input	OFF	ON	1	Other	C, R	×	(See 01-02-203 DTC P2504 [L8, LF].)
P2507	PCM B+ voltage low input	ON	OFF	1	CCM	C, O, R	×	(See 01-02-205 DTC P2507 [L8, LF].)
U0073	CAN system communication error	(See 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].) (See 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)						
U0101*7	Communication error to TCM	(See 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].) (See 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)						
U0121	Communication error to ABS HU/CM or DSC HU/CM	(See 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].) (See 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)						
U0155	Communication error to instrument cluster	(See 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].) (See 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)						

*1 : C: CMDTC self test, O: KOEO self test, R: KOER self test

ON-BOARD DIAGNOSTIC [L8, LF]

*2 : With variable valve timing mechanism
*3 : MT
*4 : With variable tumble system
*5 : With cruise control system
*6 : Except for Saudi Arabia specs.
*7 : AT
*8 : KOER self test only

DTC B1342 [L8, LF]

id0102b1815700

DTC B1342	PCM malfunction
DETECTION CONDITION	• Malfunction in the PCM internal circuit. **Diagnostic support note** • The MIL does not illuminate. • FREEZE FRAME DATA (Mode 2/Mode 12) is not available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• PCM internal malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
2	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOEO self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
3	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

DTC P0011 [L8, LF]

id0102b1801600

DTC P0011	CMP timing over-advanced
DETECTION CONDITION	• The actual valve timing is over-advanced by **15** ° from the target valve timing for specified period when the OCV is controlled in the maximum valve timing retard condition. **MONITORING CONDITIONS** — Engine coolant temperature: **above 63 °C {145.4 °F}** **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• OCV malfunction (spool valve in OCV is stuck in advanced position) • Stopper pin mechanism malfunction • Variable valve timing actuator malfunction (stuck in advanced position) • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT OCV** • Remove the OCV. (See 01-10-17 OIL CONTROL VALVE (OCV) REMOVAL/INSTALLATION [L8, LF].) • Inspect the position of the spool valve in the OCV. (See 01-10-16 OIL CONTROL VALVE (OCV) INSPECTION [L8, LF].) • Is the spool valve located at the valve advanced position?	Yes	Replace the OCV, then go to Step 6. (See 01-10-17 OIL CONTROL VALVE (OCV) REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
4	**INSPECT STOPPER PIN MECHANISM** • Remove the timing chain. (See 01-10-19 TIMING CHAIN REMOVAL/INSTALLATION [L8, LF].) • Inspect the stopper pin. (See 01-10-15 VARIABLE VALVE TIMING ACTUATOR INSPECTION [LF].) • Is there any malfunction?	Yes	Replace the variable valve timing actuator, then go to Step 6. (See 01-10-15 VARIABLE VALVE TIMING ACTUATOR REMOVAL/INSTALLATION [LF].)
		No	Go to the next step.
5	**INSPECT ROTOR POSITION** • Remove the variable valve timing actuator. (See 01-10-15 VARIABLE VALVE TIMING ACTUATOR REMOVAL/INSTALLATION [LF].) • Is the rotor at the maximum valve timing advanced position?	Yes	Replace the variable valve timing actuator, go to the next step. (See 01-10-15 VARIABLE VALVE TIMING ACTUATOR REMOVAL/INSTALLATION [LF].)
		No	Variable valve timing mechanism is normal. **Note** • This DTC is detected as an intermittent concern. • An intermittent concern might be removed using the cleaning mode of the variable valve timing control function. • Go to the next step.
6	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Turn the ignition switch off. • Start the engine and warm it up completely. • Perform the KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0012 [L8, LF]

id0102b1801700

DTC P0012	CMP timing over-retarded
DETECTION CONDITION	• The actual valve timing is over-retarded by **10** ° from the target valve timing for specified period when the OCV system control is within the feedback range. **MONITORING CONDITIONS** — Engine coolant temperature: **above 63 °C {145.4 °F}** **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Low engine oil pressure • Loose timing chain or improper valve timing due to timing chain slippage • OCV malfunction (spool valve in the OCV is stuck in retard position) • The following oil runners are clogged or have leakage: — Between the oil pressure switch and the OCV — Between the OCV and the variable valve timing actuator — In the variable valve timing actuator • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off, then to the ON position. • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P2088 or P2089 also present?	Yes	Go to the appropriate DTC troubleshooting. (See 01-02-147 DTC P2088 [L8, LF].) (See 01-02-149 DTC P2089 [L8, LF].)
		No	Go to the next step.
4	**VERIFY ENGINE OIL PRESSURE** • Start the engine. • Does the oil pressure warning light illuminate?	Yes	Inspect the engine oil pressure. (See 01-11-3 OIL PRESSURE INSPECTION [L8, LF].) Repair or replace the malfunctioning part according to the inspection results, then go to Step 8.
		No	Go to the next step.
5	**VERIFY TIMING CHAIN INSTALLATION** • Stop the engine. • Remove the timing chain cover. (See 01-10-19 TIMING CHAIN REMOVAL/INSTALLATION [L8, LF].) • Is the camshaft timing mark at the correct point?	Yes	Go to the next step.
		No	Reinstall the timing chain, then go to Step 8. (See 01-10-19 TIMING CHAIN REMOVAL/INSTALLATION [L8, LF].)
6	**INSPECT OCV FOR MALFUNCTION** • Stop the engine. • Remove the OCV. (See 01-10-17 OIL CONTROL VALVE (OCV) REMOVAL/INSTALLATION [L8, LF].) • Inspect the position of the spool valve in the OCV. (See 01-10-16 OIL CONTROL VALVE (OCV) INSPECTION [L8, LF].) • Is the spool valve located at the valve retard position?	Yes	Replace the OCV, then go to Step 8. (See 01-10-17 OIL CONTROL VALVE (OCV) REMOVAL/INSTALLATION [L8, LF].)
		No	Variable valve timing mechanism is normal. **Note** • This DTC is detected as an intermittent concern. • An intermittent concern might be removed using the cleaning mode of the variable valve timing control function. • Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
7	**INSPECT ENGINE OIL RUNNER** • Inspect the following engine oil runners for clogging or leakage. — Between oil pressure switch and OCV — Between OCV and variable valve timing actuator — In variable valve timing actuator • Is there any clogging or leakage?	Yes	Repair or replace the suspected runner, then go to the next step.
		No	Variable valve timing mechanism is normal. **Note** • This DTC is detected as an intermittent concern. • An intermittent concern might be removed using the cleaning mode of the variable valve timing control function. • Go to the next step.
8	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Turn the ignition switch off. • Start the engine and warm it up completely. • Perform the KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

DTC P0030 [L8, LF]

id0102b1801900

DTC P0030	A/F sensor heater control circuit problem
DETECTION CONDITION	• The PCM monitors the A/F sensor impedance when under the A/F sensor heater control for **410 s**. If the impedance is **more than 44 ohms**, the PCM determines that there is a A/F sensor heater control circuit problem. **Diagnostic support note** • This is an intermittent monitor (A/F sensor heater, HO2S heater). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• A/F sensor connector or terminals malfunction • A/F sensor heater malfunction • PCM connector or terminals malfunction • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (A/F sensor heater, HO2S heater related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off, then to the ON position (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P0031 or P0032 also present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-22 DTC P0031 [L8, LF].) (See 01-02-24 DTC P0032 [L8, LF].)
		No	Go to the next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA (MODE 2)** • Perform the Freeze Frame PID Data Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P0030 on FREEZE FRAME DATA (Mode 2)?	Yes	Go to the next step.
		No	Go to the DTC troubleshooting on FREEZE FRAME DATA (Mode 2). (See 01-02-12 DTC TABLE [L8, LF].)
5	**INSPECT A/F SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the A/F sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 8.
		No	Go to the next step.
6	**INSPECT A/F SENSOR HEATER** • Inspect the A/F sensor heater. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the A/F sensor, then go to Step 8. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
7	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to the next step.
		No	Go to the next step.
8	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0031 [L8, LF]

id0102b1802000

DTC P0031	A/F sensor heater circuit low input
DETECTION CONDITION	• If the input voltage to the A/F sensor heater drive terminal in the PCM is low for **1 s or more** even though the A/F sensor is duty-controlled at **under 90%** by the PCM. **Diagnostic support note** • This is a continuous monitor (A/F sensor heater, HO2S heater). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• A/F sensor connector or terminals malfunction • Open circuit or short to ground in wiring harness between ignition relay and A/F sensor terminal C — Short to ground in wiring harness between ignition relay and A/F sensor terminal C — ENGINE 15 A fuse malfunction — Open circuit in wiring harness between ignition relay and A/F sensor terminal C • A/F sensor heater malfunction • PCM connector or terminals malfunction • Short to ground in wiring harness between A/F sensor terminal D and PCM terminal 2BG • Open circuit in wiring harness between A/F sensor terminal D and PCM terminal 2BG • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (A/F sensor heater, HO2S heater related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT A/F SENSOR CONNECTOR AND TERMINALS** • Disconnect the A/F sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
4	**INSPECT A/F SENSOR HEATER CIRCUIT FOR OPEN CIRCUIT OR SHORT TO GROUND** • A/F sensor connector is disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage at A/F sensor terminal C (wiring harness-side). • Is the voltage **B+**?	Yes	Go to the next step.
		No	Inspect the ENGINE 15 A fuse. If the fuse is melt: • Repair or replace the wiring harness for a possible short to ground, then replace the fuse. If the fuse is deterioration: • Replace the fuse. If the fuse is normal: • Repair or replace the wiring harness for a possible open circuit. Go to Step 9.
5	**INSPECT A/F SENSOR HEATER** • Turn the ignition switch off. • Inspect the A/F sensor heater. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the A/F sensor, then go to Step 9. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
6	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
7	**INSPECT A/F SENSOR HEATER CIRCUIT FOR SHORT TO GROUND** • A/F sensor and PCM connectors are disconnected. • Inspect for continuity between A/F sensor terminal D (wiring harness-side) and body ground. • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground, then go to Step 9.
		No	Go to the next step.
8	**INSPECT A/F SENSOR HEATER CIRCUIT FOR OPEN CIRCUIT** • A/F sensor and PCM connectors are disconnected. • Inspect for continuity between A/F sensor terminal D (wiring harness-side) and PCM terminal 2BG (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to the next step.
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0032 [L8, LF]

id0102b1802100

DTC P0032	A/F sensor heater circuit high input
DETECTION CONDITION	• If the input voltage to the A/F sensor heater drive terminal in the PCM is high for **1 s or more** even though the A/F sensor is duty-controlled at **10% or more** by the PCM. **Diagnostic support note** • This is a continuous monitor (A/F sensor heater, HO2S heater). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• A/F sensor connector or terminals malfunction • A/F sensor heater malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between A/F sensor terminal D and PCM terminal 2BG • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (A/F sensor heater, HO2S heater related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT A/F SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the A/F sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 7.
		No	Go to the next step.
4	**INSPECT A/F SENSOR HEATER** • Inspect the A/F sensor heater. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the A/F sensor, then go to Step 7. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
5	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 7.
		No	Go to the next step.
6	**INSPECT A/F SENSOR HEATER CIRCUIT FOR SHORT TO POWER SUPPLY** • A/F sensor and PCM connectors are disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between A/F sensor terminal D (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to the next step.
		No	Go to the next step.
7	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0037 [L8, LF]

id0102b1802200

DTC P0037	HO2S heater circuit low input
DETECTION CONDITION	• If the input voltage to the HO2S heater drive terminal in the PCM is low for **0.5 s or more** even though the HO2S is duty-controlled at **under 90%** by the PCM. **Diagnostic support note** • This is a continuous monitor (A/F sensor heater, HO2S heater). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• HO2S connector or terminals malfunction • Open circuit or short to ground in wiring harness between ignition relay and HO2S terminal A — Short to ground in wiring harness between ignition relay and HO2S terminal A — ENGINE 15 A fuse malfunction — Open circuit in wiring harness between ignition relay and HO2S terminal A • HO2S heater malfunction • PCM connector or terminals malfunction • Short to ground in wiring harness between HO2S terminal E and PCM terminal 2BE • Open circuit in wiring harness between HO2S terminal E and PCM terminal 2BE • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (A/F sensor heater, HO2S heater related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT HO2S CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the HO2S connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
4	**INSPECT HO2S HEATER CIRCUIT FOR OPEN CIRCUIT OR SHORT TO GROUND** • HO2S connector is disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage at HO2S terminal A (wiring harness-side). • Is the voltage **B+**?	Yes	Go to the next step.
		No	Inspect the ENGINE 15 A fuse. If the fuse is melt: • Repair or replace the wiring harness for a possible short to ground, then replace the fuse. If the fuse is deterioration: • Replace the fuse. If the fuse is normal: • Repair or replace the wiring harness for a possible open circuit. Go to Step 9.
5	**INSPECT HO2S HEATER** • Turn the ignition switch off. • Inspect the HO2S heater. (See 01-40-31 HEATED OXYGEN SENSOR (HO2S) INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the HO2S, then go to Step 9. (See 01-40-30 HEATED OXYGEN SENSOR (HO2S) REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
6	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
7	**INSPECT HO2S HEATER CIRCUIT FOR SHORT TO GROUND** • HO2S and PCM connectors are disconnected. • Inspect for continuity between HO2S terminal E (wiring harness-side) and body ground. • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground, then go to Step 9.
		No	Go to the next step.
8	**INSPECT HO2S HEATER CIRCUIT FOR OPEN CIRCUIT** • HO2S and PCM connectors are disconnected. • Inspect for continuity between HO2S terminal E (wiring harness-side) and PCM terminal 2BE (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to the next step.
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0038 [L8, LF]

id0102b1802300

DTC P0038	HO2S heater circuit high input
DETECTION CONDITION	• If the input voltage to the HO2S heater drive terminal in the PCM is high for **0.5 s or more** even though the HO2S is duty-controlled at **10% or more** by the PCM. **Diagnostic support note** • This is a continuous monitor (A/F sensor heater, HO2S heater). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• HO2S connector or terminals malfunction • HO2S heater malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between HO2S terminal E and PCM terminal 2BE • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (A/F sensor heater, HO2S heater related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT HO2S CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the HO2S connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 7.
		No	Go to the next step.
4	**INSPECT HO2S HEATER** • Inspect the HO2S heater. (See 01-40-31 HEATED OXYGEN SENSOR (HO2S) INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the HO2S, then go to Step 7. (See 01-40-30 HEATED OXYGEN SENSOR (HO2S) REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
5	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 7.
		No	Go to the next step.
6	**INSPECT HO2S HEATER CIRCUIT FOR SHORT TO POWER SUPPLY** • HO2S and PCM connectors are disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between HO2S terminal E (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to the next step.
		No	Go to the next step.
7	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

DTC P0069 [L8, LF]

id0102b1802400

DTC P0069	Manifold absolute pressure/atmospheric pressure correlation
DETECTION CONDITION	• The PCM monitors differences between intake manifold vacuum and atmospheric pressure. If the difference is **below –12 kPa {–90 mmHg, –3.5 inHg}** or **above 12 kPa {90 mmHg, 3.5 inHg}** when the following conditions are met, the PCM determines that there is a MAP sensor performance problem. **MONITORING CONDITIONS** — **12—15 s** from when ignition switch is turned off — Intake air temperature: **above -10°C {14°F}** — Engine coolant temperature: **above 70°C {158°F}** **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• MAP sensor malfunction or substandard performance • BARO sensor malfunction or substandard performance • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED STORED DTCS** • Turn the ignition switch to off then start the engine. • Perform the DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P0107, P0108, P2228 or P2229 also present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-37 DTC P0107 [L8, LF].) (See 01-02-40 DTC P0108 [L8, LF].) (See 01-02-197 DTC P2228 [L8, LF].) (See 01-02-198 DTC P2229 [L8, LF].)
		No	Go to the next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA (MODE 2)** • Perform the Freeze Frame PID Data Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P0069 on the FREEZE FRAME DATA (Mode 2)?	Yes	Go to the next step.
		No	Go to the DTC troubleshooting on FREEZE FRAME DATA (Mode 2). (See 01-02-12 DTC TABLE [L8, LF].)
5	**INSPECT MAP SENSOR** • Inspect MAP sensor. (See 01-40-28 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the MAP sensor, then go to step 7. (See 01-40-27 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
6	**INSPECT BARO SENSOR** • Inspect the BARO sensor. (See 01-40-28 BAROMETRIC PRESSURE (BARO) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
7	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn the ignition switch to the ON position (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0101 [L8, LF]

id0102b1803100

DTC P0101	MAF sensor circuit range/performance problem
DETECTION CONDITION	• The PCM monitors mass intake air flow amount when the engine is running. —If the mass intake air flow amount is **above 44 l/s** for **5 s** and the engine speed is **below 2,000 rpm** with the engine running, the PCM determines that the detected mass intake air flow amount is too high. —If the mass intake air flow amount is **below 2—43 l/s** (the value depends on engine speed) for **5 s** and the engine speed is **above 1,000 rpm** with the engine running and the throttle opening angle **above 50%**, the PCM determines that detected the mass intake air flow amount is too low. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• MAF/IAT sensor connector or terminals malfunction • PCM connector or terminals malfunction • MAF sensor malfunction —Electrical corrosion in MAF RETURN circuit —Voltage drops in ground circuit • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS** • Connect the M-MDS to the DLC-2. • Start the engine. • Perform the PID/DATA Monitor and Record Procedure and access the following PIDs: (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) — ECT — MAF — TP — RPM • Warm-up the engine until the ECT PID is **above –200 °C {–392 °F}**. • Idle the engine for **5 s or more**. **Caution** • **While driving, always operate the vehicle in a safe and lawful manner.** • Drive the vehicle under the following two conditions: **Condition 1** — TP PID: **50—87.5%** — RPM PID: **above 500 rpm** — 4th gear (MT), D range (AT) **Condition 2** — TP PID: **above 80%** — RPM PID: **below 2,000 rpm** — Gear in • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. • Perform the “INTERMITTENT CONCERN TROUBLESHOOTING”. (See 01-03-69 INTERMITTENT CONCERN TROUBLESHOOTING [L8, LF])

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
4	**INSPECT MAF/IAT SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch to off. • Disconnect MAF/IAT sensor connector. • Inspect for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 7.
		No	Go to the next step.
5	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/pulled-out pins, corrosion.). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 7.
		No	Go to the next step.
6	**INSPECT MAF SENSOR** • Reconnect MAF/IAT sensor and PCM connectors. • Inspect the MAF sensor. (See 01-40-27 MASS AIR FLOW (MAF) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the MAF/IAT sensor, then go to the next step. (See 01-40-26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
7	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to connect all disconnected connectors. • Turn the ignition switch to ON position (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine. • Warm-up the engine until the ECT PID is **above –200 °C {–392 °F}**. • Idle the engine for **5 s or more**. **Caution** • **While performing the Drive Mode, always operate the vehicle in a safe and lawful manner.** • Drive the vehicle under the following two conditions: **Condition 1** — TP PID: **50—87.5%** — RPM PID: **above 500 rpm** — 4th gear (MT), D range (AT) **Condition 2** — TP PID: **above 80%** — RPM PID: **below 2,000 rpm** — Gear in • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the PENDING CODE for this the DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0102 [L8, LF]

id0102b1803200

DTC P0102	MAF sensor circuit low input
DETECTION CONDITION	• The PCM monitors input voltage from the MAF sensor when the engine running. If the input voltage is **below 0.21 V**, the PCM determines that the MAF circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• MAF/IAT sensor connector or terminals malfunction • Open circuit or short to ground in wiring harness between main relay and MAF/IAT sensor terminal A — Short to ground in wiring harness between main relay and MAF/IAT sensor terminal A — EGI COMP2 10 A fuse malfunction — Open circuit in wiring harness between main relay and MAF/IAT sensor terminal A • Short to ground in wiring harness between MAF/IAT sensor terminal C and PCM terminal 1AK • PCM connector or terminals malfunction • Open circuit in wiring harness between MAF/IAT sensor terminal C and PCM terminal 1AK • MAF sensor signal circuit and ground circuit are shorted to each other • MAF sensor malfunction • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT MAF/IAT SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the MAF/IAT sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 10.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
4	**INSPECT MAF SENSOR POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT OR SHORT TO GROUND** • MAF/IAT sensor connector is disconnected. • Turn the ignition switch to the ON position. (engine off) • Measure the voltage between MAF/IAT sensor terminal A (wiring harness-side) and body ground. • Is the voltage **B+**?	Yes	Go to the next step.
		No	Inspect the EGI COMP2 10 A fuse. If the fuse is melt: • Repair or replace the wiring harness for a possible short to ground, then replace the fuse. If the fuse is deterioration: • Replace the fuse. If the fuse is normal: • Repair or replace the wiring harness for a possible open circuit. Go to Step 10.
5	**INSPECT MAF SENSOR SIGNAL CIRCUIT FOR SHORT TO GROUND** • MAF/IAT sensor connector is disconnected. • Turn the ignition switch off. • Inspect for continuity between MAF/IAT sensor terminal C (wiring harness-side) and body ground. • Is there continuity?	Yes	If the short to ground circuit could be detected: • Repair or replace the wiring harness for a possible short to ground. If the short to ground circuit could not be detected: • Replace the PCM (short to ground in PCM internal circuit). (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) Go to Step 10.
		No	Go to the next step.
6	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 10.
		No	Go to the next step.
7	**INSPECT MAF SENSOR SIGNAL CIRCUIT FOR OPEN CIRCUIT** • MAF/IAT sensor and PCM connectors are disconnected. • Inspect for continuity between MAF/IAT sensor terminal C (wiring harness-side) and PCM terminal 1AK (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 10.
8	**INSPECT MAF SENSOR SIGNAL AND GROUND CIRCUITS FOR SHORT TO EACH OTHER** • MAF/IAT sensor and PCM connectors are disconnected. • Inspect for continuity between MAF/IAT sensor terminal C and B (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible short to each other, then go to Step 10.
9	**INSPECT MAF SENSOR** • Reconnect the MAF/IAT sensor connector. • Inspect the MAF sensor. (See 01-40-27 MASS AIR FLOW (MAF) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the MAF/IAT sensor, then go to the next step. (See 01-40-26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0103 [L8, LF]

id0102b1803300

DTC P0103	MAF sensor circuit high input
DETECTION CONDITION	• The PCM monitors the input voltage from the MAF sensor when the engine running. If the input voltage is **above 4.9 V**, the PCM determines that the MAF circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• MAF/IAT sensor connector or terminals malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between MAF/IAT sensor terminal C and PCM terminal 1AK • Open circuit in wiring harness between MAF/IAT sensor terminal B and PCM terminal 1P • MAF sensor malfunction • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT MAF/IAT SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the MAF/IAT sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 8.
		No	Go to the next step.
4	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 8.
		No	Go to the next step.
5	**INSPECT MAF SENSOR SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY** • PCM connector is disconnected. • Disconnect the MAF/IAT sensor connector. • Turn the ignition switch to the ON position. (engine off) • Measure the voltage between MAF/IAT sensor terminal C (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a short to power supply, then go to Step 8.
		No	Go to the next step.
6	**INSPECT MAF SENSOR GROUND CIRCUIT FOR OPEN CIRCUIT** • MAF/IAT sensor and PCM connectors are disconnected. • Turn the ignition switch off. • Inspect for continuity between MAF/IAT sensor terminal B (wiring harness-side) and body ground. • Is there continuity?	Yes	Repair or replace the wiring harness for a short to ground, then go to Step 8.
		No	Go to the next step.
7	**INSPECT MAF SENSOR** • Reconnect the MAF/IAT sensor connector. • Inspect the MAF sensor. (See 01-40-27 MASS AIR FLOW (MAF) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the MAF/IAT sensor, then go to the next step. (See 01-40-26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
8	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0107 [L8, LF]

id0102b1803400

DTC P0107	MAP sensor circuit low input
DETECTION CONDITION	• The PCM monitors the input voltage from the MAP sensor when intake air temperature is **above –10 °C {14 °F}**. If the input voltage is **below 0.1 V**, the PCM determines that the MAP sensor circuit has a malfunction. **MONITORING CONDITIONS** — Calculated load: **13—32 %** **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• MAP sensor connector or terminals malfunction • MAP sensor malfunction • Short to ground in wiring harness between MAP sensor terminal C and PCM terminal 2AU • PCM connector or terminals malfunction • Open circuit in wiring harness between MAP sensor terminal C and PCM terminal 2AU • MAP sensor signal circuit and ground circuit are shorted to each other • Short to ground in wiring harness between MAP sensor terminal D and PCM terminal 2AG • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY MAP PID WHEN MAP SENSOR CONNECTOR IS DISCONNECTED** • Connect the M-MDS to the DLC-2. • Perform the PID/DATA Monitor and Record Procedure and access the MAP PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Disconnect the MAP sensor connector. • Is the voltage **above 4.9 V**?	Yes	Go to the next step.
		No	Go to Step 9.
4	**INSPECT POWER SUPPLY CIRCUIT VOLTAGE AT MAP SENSOR CONNECTOR** • MAP sensor connector is disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between MAP sensor terminal C (wiring harness-side) and body ground. • Is the voltage **within 4.5—5.5 V?**	Yes	Go to the next step.
		No	Go to Step 6.
5	**INSPECT MAP SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 13.
		No	Replace the MAP sensor, then go to Step 13. (See 01-40-27 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
6	**INSPECT MAP SENSOR POWER SUPPLY CIRCUIT FOR SHORT TO GROUND** • MAP sensor connector is disconnected. • Turn the ignition switch off. • Inspect for continuity between MAP sensor terminal C (wiring harness-side) and body ground. • Is there continuity?	Yes	If the short to ground circuit could be detected: • Repair or replace the wiring harness for a possible short to ground. If the short to ground circuit could not be detected: • Replace the PCM (short to ground in PCM internal circuit). (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) Go to Step 13.
		No	Go to the next step.
7	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 13.
		No	Go to the next step.
8	**INSPECT MAP SENSOR POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT** • MAP sensor and PCM connectors are disconnected. • Inspect for continuity between MAP sensor terminal C (wiring harness-side) and PCM terminal 2AU (wiring harness-side). • Is there continuity?	Yes	Go to Step 13.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 13.
9	**INSPECT MAP SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the MAP sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 13.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
10	**INSPECT MAP SENSOR SIGNAL CIRCUIT FOR SHORT TO GROUND** • MAP sensor is disconnected. • Inspect for continuity between MAP sensor terminal D (wiring harness-side) and body ground. • Is there continuity?	Yes	If the short to ground circuit could be detected: • Repair or replace the wiring harness for a possible short to ground. If the short to ground circuit could not be detected: • Replace the PCM (short to ground in PCM internal circuit). (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) Go to Step 13.
		No	Go to the next step.
11	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 13.
		No	Go to the next step.
12	**INSPECT MAP SENSOR SIGNAL AND GROUND CIRCUIT FOR SHORT TO EACH OTHER** • MAP sensor and PCM connectors are disconnected. • Inspect for continuity between MAP sensor terminals D and A (wiring harness-side). • Is there continuity?	Yes	Repair or replace the suspected wiring harness, then go to the next step.
		No	Go to the next step.
13	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn the ignition switch to the ON position. (engine off) • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
14	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0108 [L8, LF]

id0102b1803500

DTC P0108	MAP sensor circuit high input
DETECTION CONDITION	• The PCM monitors the input voltage from the MAP sensor when intake air temperature is **above –10 °C {14 °F}**. If input the voltage is **above 4.92 V**, the PCM determines that the MAP sensor circuit has a malfunction. **MONITORING CONDITIONS** — Calculated load: **13—32%** **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• MAP sensor connector or terminals malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between MAP sensor terminal D and PCM terminal 2AG • MAP sensor power supply circuit and signal circuit are shorted to each other • Open circuit in wiring harness between the following terminals: — MAP sensor terminal D and PCM terminal 2AG — MAP sensor terminal A and PCM terminal 2AV • MAP sensor malfunction • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT MAP SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the MAP sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
4	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection at terminals (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
5	**INSPECT MAP SENSOR SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY** • MAP sensor and PCM connectors are disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between the MAP sensor terminal D (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 9.
		No	Go to the next step.
6	**INSPECT MAP SENSOR POWER SUPPLY AND SIGNAL CIRCUIT FOR SHORT TO EACH OTHER** • MAP sensor and PCM connectors are disconnected. • Turn the ignition switch off. • Inspect for continuity between MAP sensor terminal D and C (wiring harness-side). • Is there continuity?	Yes	Repair or replace the suspected wiring harness, then go to Step 9.
		No	Go to the next step.
7	**INSPECT MAP SENSOR CIRCUIT FOR OPEN CIRCUIT** • MAP sensor and PCM connectors are disconnected. • Inspect for continuity between the following terminals (wiring harness-side): —MAP sensor terminal D and PCM terminal 2AG —MAP sensor terminal A and PCM terminal 2AV • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 9.
8	**INSPECT MAP SENSOR** • Reconnect the MAP sensor connector. • Inspect the MAP sensor. (See 01-40-28 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the MAP sensor, then go to the next step. (See 01-40-27 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn the ignition switch to the ON position (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0111 [L8, LF]

id0102b1803600

DTC P0111	IAT sensor circuit range/performance problem
DETECTION CONDITION	• If the intake air temperature is higher than the engine coolant temperature by **40 °C {72 °F} for 60 s** with key on, the PCM determines that there is a IAT sensor performance problem. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• MAF/IAT sensor connector or terminals malfunction • IAT sensor malfunction • PCM connector or terminals malfunction • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT MAF/IAT SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the MAF/IAT sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 6.
		No	Go to the next step.
4	**INSPECT IAT SENSOR** • Inspect the IAT sensor. (See 01-40-27 INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the MAF/IAT sensor, then go to Step 6. (See 01-40-26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
5	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to the next step.
		No	Go to the next step.
6	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine under the FREEZE FRAME DATA (Mode 12) condition. • Perform the DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0112 [L8, LF]

id0102b1803700

DTC P0112	IAT sensor circuit low input
DETECTION CONDITION	• The PCM monitors the IAT sensor signal. If the PCM detects that the IAT sensor voltage is **below 0.16 V**, the PCM determines that the IAT sensor circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• MAF/IAT sensor connector or terminals malfunction • IAT sensor malfunction • Short to ground in wiring harness between MAF/IAT sensor terminal D and PCM terminal 1AT • PCM connector or terminals malfunction • IAT sensor signal circuit and ground circuit are shorted to each other • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT MAF/IAT SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the MAF/IAT sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 8.
		No	Go to the next step.
4	**CLASSIFY IAT SENSOR MALFUNCTION OR WIRING HARNESS MALFUNCTION** • Reconnect the MAF/IAT sensor connector. • Connect the M-MDS to the DLC-2. • Perform the PID/DATA Monitor and Record Procedure and access the IAT PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Verify the IAT PID value when disconnecting the MAF/IAT sensor connector. • Does the IAT value change?	Yes	Replace the MAF/IAT sensor, then go to Step 8. (See 01-40-26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
5	**INSPECT IAT SENSOR SIGNAL CIRCUIT FOR SHORT TO GROUND** • MAF/IAT sensor connector is disconnected. • Turn the ignition switch off. • Inspect for continuity between MAF/IAT sensor terminal D (wiring harness-side) and body ground. • Is there continuity?	Yes	If the short to ground circuit could be detected: • Repair or replace the wiring harness for a possible short to ground. If the short to ground circuit could not be detected: • Replace the PCM (short to ground in PCM internal circuit). (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) Go to Step 8.
		No	Go to the next step.
6	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 8.
		No	Go to the next step.
7	**INSPECT IAT SENSOR SIGNAL AND GROUND CIRCUITS FOR SHORT TO EACH OTHER** • MAF/IAT sensor and PCM connectors are disconnected. • Inspect for continuity between MAF/IAT sensor terminals D and E (wiring harness-side). • Is there continuity?	Yes	Repair or replace the suspected wiring harness, then go to the next step.
		No	Go to the next step.
8	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0113 [L8, LF]

id0102b1803800

DTC P0113	IAT sensor circuit high input
DETECTION CONDITION	• The PCM monitors the IAT sensor signal. If the PCM detects that the IAT sensor voltage is **above 4.84 V**, the PCM determines that IAT sensor circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• MAF/IAT sensor connector or terminals malfunction • PCM connector or terminals malfunction • IAT sensor malfunction • Short to power supply in wiring harness between MAF/IAT sensor terminal D and PCM terminal 1AT • Open circuit in wiring harness between the following terminals: — MAF/IAT sensor terminal D and PCM terminal 1AT — MAF/IAT sensor terminal E and PCM terminal 1AR • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT MAF/IAT SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the MAF/IAT sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the replace the wiring terminal, then go to Step 8.
		No	Go to the next step.
4	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the replace the wiring terminal, then go to Step 8.
		No	Go to the next step.
5	**CLASSIFY IAT SENSOR MALFUNCTION OR WIRING HARNESS MALFUNCTION** • Reconnect the PCM connector. • Connect the M-MDS to the DLC-2. • Perform the PID/DATA Monitor and Record Procedure and access the IAT PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Connect a jumper wire between MAF/IAT sensor terminals D and E (wiring harness-side). • Verify the IAT PID value. • Is the voltage **below 4.84 V**?	Yes	Replace the MAF/IAT sensor, then go to Step 8. (See 01-40-27 INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [L8, LF].)
		No	Go to the next step.
6	**INSPECT IAT SENSOR SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY** • MAF/IAT sensor connector is disconnected. • Turn the ignition switch off. • Disconnect the PCM connector. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between MAF/IAT sensor terminal D (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 8.
		No	Go to the next step.
7	**INSPECT IAT SENSOR CIRCUIT FOR OPEN CIRCUIT** • MAF/IAT sensor and PCM connectors are disconnected. • Inspect for continuity between the following terminals (wiring harness-side): — MAF/IAT sensor terminal D and PCM terminal 1AT — MAF/IAT sensor terminal E and PCM terminal 1AR • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
8	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

DTC P0117 [L8, LF]

id0102b1804000

DTC P0117	ECT sensor circuit low input
DETECTION CONDITION	• The PCM monitors the ECT sensor signal. If the PCM detects the ECT sensor voltage **below 0.2 V**, the PCM determines that the ECT sensor circuit has malfunction. **Diagnostic support note** • This is a continuous monitor (engine cooling system). • The MIL illuminates if the PCM detects the above malfunction condition during first drive cycle. • PENDING CODE is available if the PCM detects the above malfunction condition. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Engine overheating (Cooling system malfunction) • ECT sensor connector or terminals malfunction • ECT sensor malfunction • Short to ground in wiring harness between ECT sensor terminal A and PCM terminal 2AH • PCM connector or terminals malfunction • ECT sensor signal circuit and ground circuit are shorted to each other • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (engine cooling system related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY ENGINE CONDITION** • Is the engine overheating?	Yes	Perform the symptom troubleshooting “NO.17 COOLING SYSTEM CONCERNS-OVERHEATING”. (See 01-03-53 NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [L8, LF].)
		No	Go to the next step.
4	**INSPECT ECT SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the ECT sensor connector. • Inspect for poor connection (such as damaged/pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
5	**CLASSIFY ECT SENSOR MALFUNCTION OR WIRING HARNESS MALFUNCTION** • Reconnect the ECT sensor connector. • Connect the M-MDS to the DLC-2. • Perform the PID/DATA Monitor and Record Procedure and access the ECT PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Verify the ECT value when disconnecting ECT sensor connector. • Does the ECT value change?	Yes	Replace the ECT sensor, then go to Step 9. (See 01-40-25 ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
6	**INSPECT ECT SENSOR SIGNAL CIRCUIT FOR SHORT TO GROUND** • ECT sensor connector is disconnected. • Inspect for continuity between ECT sensor terminal A (wiring harness-side) and body ground. • Is there continuity?	Yes	If the short to ground circuit could be detected: • Repair or replace the wiring harness for a possible short to ground. If the short to ground circuit could not be detected: • Replace the PCM (short to ground in PCM internal circuit). (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) Go to Step 9.
		No	Go to the next step.
7	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
8	**INSPECT ECT SENSOR SIGNAL AND GROUND CIRCUITS FOR SHORT TO EACH OTHER** • ECT sensor and PCM connectors are disconnected. • Inspect for continuity between ECT sensor terminal A and B (wiring harness-side). • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short, then go to the next step.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

DTC P0118 [L8, LF]

id0102b1804100

DTC P0118	ECT sensor circuit high input
DETECTION CONDITION	• The PCM monitors the ECT sensor signal. If the PCM detects the ECT sensor voltage is **above 4.58 V**, the PCM determines that the ECT sensor circuit has malfunction. **Diagnostic support note** • This is a continuous monitor (engine cooling system). • The MIL illuminates if the PCM detects the above malfunction condition during first drive cycle. • PENDING CODE is available if the PCM detects the above malfunction condition. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• ECT sensor connector or terminals malfunction • ECT sensor malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between ECT sensor terminal A and PCM terminal 2AH • Open circuit in wiring harness between the following terminals: — ECT sensor terminal A and PCM terminal 2AH — ECT sensor terminal B and PCM terminal 2AY • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (engine cooling system related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT ECT SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the ECT sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 8.
		No	Go to the next step.
4	**CLASSIFY ECT SENSOR MALFUNCTION OR WIRING HARNESS MALFUNCTION** • ECT sensor connector is disconnected. • Connect the M-MDS to the DLC-2. • Perform the PID/DATA Monitor and Record Procedure and access the ECT PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Connect a jumper wire between ECT sensor terminals A and B. • Is the voltage **4.58 V or below**?	Yes	Replace the ECT sensor, then go to Step 8. (See 01-40-25 ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
5	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 8.
		No	Go to the next step.
6	**INSPECT ECT SENSOR SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY** • ECT sensor and PCM connectors are disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between ECT sensor terminal A (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 8.
		No	Go to the next step.
7	**INSPECT ECT SENSOR CIRCUIT FOR OPEN CIRCUIT** • ECT sensor and PCM connectors are disconnected. • Turn the ignition switch off. • Inspect the continuity between the following terminals (wiring harness-side): — ECT sensor terminal A and PCM terminal 2AH — ECT sensor terminal B and PCM terminal 2AY • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
8	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

DTC P0122 [L8, LF]

id0102b1804200

DTC P0122	TP sensor No.1 circuit low input
DETECTION CONDITION	• If the PCM detects that the TP sensor No.1 voltage is **below 0.1 V** while the engine is running, the PCM determines that the TP sensor No.1 circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction conditions during first drive cycles. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Throttle body connector or terminals malfunction • Short to ground in wiring harness between the following terminals: — Throttle body terminal E and PCM terminal 2AO — Throttle body terminal F and PCM terminal 2AK • PCM connector or terminals malfunction • TP sensor No.1 malfunction • TP sensor No.1 signal circuit and ground circuit are shorted to each other • Open circuit in wiring harness between throttle body terminal E and PCM terminal 2AO • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT THROTTLE BODY CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the throttle body connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
4	**VERIFY TP SENSOR NO.1 SIGNAL CIRCUIT FOR SHORT TO GROUND** • Throttle body connector is disconnected. • Inspect for continuity between the following terminals (wiring harness-side) and body ground: — Throttle body terminal E — Throttle body terminal F • Is there continuity?	Yes	If the short to ground circuit could be detected: • Repair or replace the wiring harness for a possible short to ground. If the short to ground circuit could not be detected: • Replace the PCM (short to ground in PCM internal circuit). (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) Go to Step 9.
		No	Go to the next step.
5	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
6	**CLASSIFY TP SENSOR NO.1 OR WIRING HARNESS MALFUNCTION** • Reconnect the PCM connector. • Connect the M-MDS. • Perform the PID/DATA Monitor and Record Procedure and access the TP1 PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Connect a jumper wire between throttle body terminals E and F (wiring harness-side). • Is the voltage **above 4.9 V**?	Yes	Replace the throttle body, then go to Step 9. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
7	**VERIFY TP SENSOR NO.1 SIGNAL AND GROUND CIRCUIT FOR SHORT TO EACH OTHER** • Throttle body connectors is disconnected. • Turn the ignition switch off. • Disconnect the PCM connector. • Inspect for continuity between throttle body terminal F and C (wiring harness-side). • Is there continuity?	Yes	Repair or replace the suspected wiring harness, then go to Step 9.
		No	Go to the next step.
8	**VERIFY TP SENSOR NO.1 SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Throttle body and PCM connectors are disconnected. • Inspect for continuity between throttle body terminal E (wiring harness-side) and PCM terminal 2AO (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn the ignition switch to the ON position (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

DTC P0123 [L8, LF]

id0102b1804300

DTC P0123	TP sensor No.1 circuit high input
DETECTION CONDITION	• If the PCM detects the TP sensor No.1 voltage is to be **above 4.9 V** after turn the ignition switch to the ON position, the PCM determines that TP sensor No.1 circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during first drive cycles. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Throttle body connector or terminals malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between throttle body terminal F and PCM terminal 2AK • TP sensor No.1 power supply circuit and signal circuit are shorted to each other • Open circuit in wiring harness between the following terminals: — Throttle body terminal F and PCM terminal 2AK — Throttle body terminal C and PCM terminal 2AP • TP sensor No.1 malfunction • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT THROTTLE BODY CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the throttle body connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
4	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
5	**INSPECT TP SENSOR NO.1 SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY** • PCM connector is disconnected. • Disconnect the throttle body connector. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between throttle body terminal F (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 9.
		No	Go to the next step.
6	**VERIFY TP SENSOR NO.1 POWER SUPPLY AND SIGNAL CIRCUIT FOR SHORT TO EACH OTHER** • Throttle body and PCM connectors are disconnected. • Turn the ignition switch off. • Inspect for continuity between throttle body terminals E and F (wiring harness-side). • Is there continuity?	Yes	Repair or replace the suspected wiring harness, then go to Step 9.
		No	Go to the next step.
7	**INSPECT TP SENSOR NO.1 CIRCUIT FOR OPEN CIRCUIT** • Throttle body and PCM connectors are disconnected. • Inspect for continuity between the following terminals (wiring harness-side): — Throttle body terminal F and PCM terminal 2AK — Throttle body terminal C and PCM terminal 2AP • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 9.
8	**INSPECT TP SENSOR NO.1** • Reconnect the throttle body connector. • Inspect the TP sensor No.1. (See 01-40-28 THROTTLE POSITION (TP) SENSOR INSPECTION [L8, LF]) • Is there any malfunction?	Yes	Replace the throttle body, then go to the next step. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn the ignition switch to the ON position (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

DTC P0125 [L8, LF]

id0102b1804400

DTC P0125	Excessive time to enter closed loop fuel control
DETECTION CONDITION	• The PCM monitors the ECT sensor signal after engine is started while the engine is cold. If the engine coolant temperature does not reach the expected temperature for specified period, the PCM determines that it has taken an excessive amount of time for the engine coolant temperature to reach the temperature necessary to start closed-loop fuel control. **Diagnostic support note** • This is a continuous monitor (engine cooling system). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• ECT sensor connector or terminals malfunction (poor connection) • PCM connector or terminals malfunction (poor connection) • ECT sensor malfunction • Thermostat malfunction (stuck open) • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (engine cooling system related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS** • Start the engine and warm it up completely. • Perform the PID/DATA Monitor and Record Procedure and access the ECT PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the ECT PID **above 60 °C {140 °F}**?	Yes	Intermittent concern exists. • Perform the "INTERMITTENT CONCERN TROUBLESHOOTING". (See 01-03-69 INTERMITTENT CONCERN TROUBLESHOOTING [L8, LF].)
		No	Go to the next step.
4	**INSPECT ECT SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the ECT sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 8.
		No	Go to the next step.
5	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 8.
		No	Go to the next step.
6	**INSPECT ECT SENSOR** • Inspect the ECT sensor. (See 01-40-26 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the ECT sensor, then go to Step 8. (See 01-40-25 ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
7	**INSPECT THERMOSTAT** • Inspect the thermostat. (See 01-12-9 THERMOSTAT INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the thermostat, then go to the next step. (See 01-12-9 THERMOSTAT REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
8	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Turn the ignition switch to the ON position (engine off). • Perform the PID/DATA Monitor and Record Procedure and access the ECT PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Wait until the ECT PID **below 8 °C {46 °F}**. • Start the engine and warm it up completely. • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Perform the "AFTER REPAIR PROCEDURE". (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0130 [L8, LF]

id0102b1829500

DTC P0130	A/F sensor circuit problem
DETECTION CONDITION	• The PCM monitors the A/F sensor impedance when under the A/F sensor heater control. If the impedance is **more than 500 ohms**, the PCM determines that there is a A/F sensor circuit problem. **Diagnostic support note** • This is a continuous monitor (A/F sensor, HO2S). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• A/F sensor connector or terminals malfunction • PCM connector or terminals malfunction • Open circuit in wiring harness between the following terminals: — A/F sensor terminal A and PCM terminal 2AD — A/F sensor terminal B and PCM terminal 2Z • A/F sensor malfunction • PCM malfunction

A/F SENSOR WIRING HARNESS-SIDE CONNECTOR

PCM WIRING HARNESS-SIDE CONNECTOR

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (A/F sensor, HO2S related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT A/F SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the A/F sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 7.
		No	Go to the next step.
4	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 7.
		No	Go to the next step.
5	**INSPECT A/F SENSOR CIRCUIT FOR OPEN CIRCUIT** • A/F sensor and PCM connectors are disconnected. • Inspect for continuity between the following terminals (wiring harness-side): — A/F sensor terminal A and PCM terminal 2AD — A/F sensor terminal B and PCM terminal 2Z • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 7.
6	**INSPECT A/F SENSOR** • Reconnect the A/F sensor and PCM connectors. • Inspect the A/F sensor. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the A/F sensor, then go to the next step. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
7	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0131 [L8, LF]

id0102b1804600

DTC P0131	A/F sensor circuit low input
DETECTION CONDITION	• The PCM monitors the input voltage from the A/F sensor and the A/F sensor output current when the engine is running. If the input voltage is **less than 1.8 V** or the output current is **less than –5 mA**, the PCM determines that the A/F sensor circuit voltage is low. **Diagnostic support note** • This is a continuous monitor (A/F sensor, HO2S). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• A/F sensor connector or terminals malfunction • Short to ground in wiring harness between the following terminals: — A/F sensor terminal A and PCM terminal 2AD — A/F sensor terminal B and PCM terminal 2Z • PCM connector or terminals malfunction • A/F sensor malfunction • PCM malfunction

A/F SENSOR WIRING HARNESS-SIDE CONNECTOR

PCM WIRING HARNESS-SIDE CONNECTOR

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (A/F sensor, HO2S related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off, then to the ON position (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Are any DTCs present?	Yes	Go to the appropriate DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA (MODE 2)** • Perform the Freeze Frame PID Data Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P0131 on FREEZE FRAME DATA (Mode 2)?	Yes	Go to the next step.
		No	Go to the DTC troubleshooting on FREEZE FRAME DATA (Mode 2). (See 01-02-12 DTC TABLE [L8, LF].)
5	**INSPECT A/F SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the A/F sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
6	**INSPECT A/F SENSOR CIRCUIT FOR SHORT TO GROUND** • A/F sensor connector is disconnected. • Inspect for continuity between the following terminals (wiring harness-side) and body ground: — A/F sensor terminal A — A/F sensor terminal B • Is there continuity?	Yes	If the short to ground circuit could be detected: • Repair or replace the wiring harness for a possible short to ground. If the short to ground circuit could not be detected: • Replace the PCM (short to ground in PCM internal circuit). (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) Go to Step 9.
		No	Go to the next step.
7	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
8	**INSPECT A/F SENSOR** • Reconnect the A/F sensor and PCM connectors. • Inspect the A/F sensor. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the A/F sensor, then go to the next step. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

DTC P0132 [L8, LF]

id0102b1804700

DTC P0132	A/F sensor circuit high input
DETECTION CONDITION	• The PCM monitors the input voltage from the A/F sensor and the A/F sensor output current when the engine is running. If the input voltage is **more than 3.8 V** or the output current is **more than 5 mA**, the PCM determines that the A/F sensor circuit voltage is high. **Diagnostic support note** • This is a continuous monitor (A/F sensor, HO2S). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• A/F sensor connector or terminals malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between the following terminals: — A/F sensor terminal A and PCM terminal 2AD — A/F sensor terminal B and PCM terminal 2Z • A/F sensor malfunction • PCM malfunction

A/F SENSOR WIRING HARNESS-SIDE CONNECTOR

PCM WIRING HARNESS-SIDE CONNECTOR

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (A/F sensor, HO2S related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off, then to the ON position (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA (MODE 2)** • Perform the Freeze Frame PID Data Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P0132 on FREEZE FRAME DATA (Mode 2)?	Yes	Go to the next step.
		No	Go to the DTC troubleshooting on FREEZE FRAME DATA (Mode 2). (See 01-02-12 DTC TABLE [L8, LF].)
5	**INSPECT A/F SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the A/F sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
6	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
7	**INSPECT A/F SENSOR CIRCUIT FOR SHORT TO POWER SUPPLY** • A/F sensor and PCM connectors are disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between the following terminals (wiring harness-side) and body ground: — A/F sensor terminal A — A/F sensor terminal B • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 9.
		No	Go to the next step.
8	**INSPECT A/F SENSOR** • Reconnect the A/F sensor and PCM connectors. • Inspect the A/F sensor. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the A/F sensor, then go to the next step. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

DTC P0133 [L8, LF]

id0102b1804800

DTC P0133	A/F sensor circuit problem
DETECTION CONDITION	• The PCM monitors the A/F sensor current slow response while A/F fluctuation being provided when the following monitoring conditions are met. If the average value of slow response and/or delayed response is more than specified value, the PCM determines the A/F sensor has a deterioration. **MONITORING CONDITIONS** — Drive Mode 03 (A/F sensor heater, HO2S heater, A/F sensor, HO2S and TWC Repair Verification) — Following conditions are met: • Engine speed: **1,750—3,500 rpm** • Charging efficiency: **19—63%** (at engine speed **2,500 rpm**) • Engine coolant temperature: **above 60 °C {140 °F}** • A/F sensor heater monitor is completed. • Fuel system loop status is closed loop fuel control. **Diagnostic support note** • This is an intermittent monitor (A/F sensor, HO2S). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• A/F sensor connector or terminals malfunction • A/F sensor malfunction — A/F sensor looseness • Exhaust system leakage • Fuel supply system malfunction or improper fuel line malfunction — Pressure regulator (built-in fuel pump unit) malfunction — Clogged or restricted fuel filter (built-in fuel pump unit) — Fuel leakage in fuel line between fuel distribution pipe and fuel pump • Purge system malfunction — Purge solenoid valve malfunction — Improper connection purge solenoid hose • Engine malfunction — Engine coolant leakage — Insufficient compression • A/F sensor deterioration • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (A/F sensor, HO2S related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off, then to the ON position (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P0443 also present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-100 DTC P0443 [L8, LF].)
		No	Go to the next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA (MODE 2)** • Perform the Freeze Frame PID Data Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P0133 on FREEZE FRAME DATA (Mode 2)?	Yes	Go to the next step.
		No	Go to the DTC troubleshooting on FREEZE FRAME DATA (Mode 2). (See 01-02-12 DTC TABLE [L8, LF].)
5	**INSPECT A/F SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the A/F sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 16.
		No	Go to the next step.
6	**INSPECT INSTALLATION OF A/F SENSOR** • Inspect if the A/F sensor is loosely installed. • Is the A/F sensor installed securely?	Yes	Go to the next step.
		No	Retighten the A/F sensor, then go to Step 16.
7	**INSPECT GAS LEAKAGE FROM EXHAUST SYSTEM** • Visually inspect if there is any gas leakage is found between the exhaust manifold and A/F sensor. • Is there gas leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 16. (See 01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
8	**INSPECT LONG TERM FUEL TRIM** • Perform the Freeze Frame PID Data Access Procedure and access the LONGFT1 PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Compare it with the FREEZE FRAME DATA (Mode 2) recorded at Step 1. • Is it below the FREEZE FRAME DATA (Mode 2) value?	Yes	The engine is driven under rich condition. • Go to the next step.
		No	The engine is driven under lean condition. • Go to Step 10.
9	**INSPECT FUEL LINE PRESSURE (EXCESSIVE FUEL LINE PRESSURE)** • Turn the ignition switch off. • Inspect the fuel line pressure while the engine running. (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].) • Is the fuel line pressure normal?	Yes	Go to Step 12.
		No	Inspect the fuel pump maximum pressure, and fuel return pipe for clogging. (See 01-14-14 FUEL PUMP UNIT INSPECTION [L8, LF].) If there is any problem: • Repair or replace the malfunctioning part according to the inspection results. If all items above are normal: • Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) Go to Step 16.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
10	**INSPECT FUEL LINE PRESSURE (LOW FUEL LINE PRESSURE)** • Turn the ignition switch off. • Inspect the fuel line pressure while the engine running. (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].) • Is the fuel line pressure normal?	Yes	Go to Step 12.
		No	Go to the next step.
11	**INSPECT FUEL LINE FROM FUEL PUMP TO FUEL DISTRIBUTOR** • Visually inspect the fuel line for any leakage. • Is there fuel leakage?	Yes	Replace the fuel line, then go to Step 16.
		No	Inspect the fuel filters for the foreign material or stain inside the fuel filter (low-pressure side). If foreign material or stain is found inside the fuel filter (low-pressure side): • Clean the fuel tank and fuel filter. If normal: • Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) Go to Step 16.
12	**INSPECT PURGE SOLENOID VALVE AND VACUUM HOSE** • Inspect the purge solenoid valve and vacuum hose connection. (See 01-16-8 PURGE SOLENOID VALVE INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 16. (See 01-16-7 PURGE SOLENOID VALVE REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
13	**INSPECT SEALING OF ENGINE COOLANT PASSAGE** • Perform the “ENGINE COOLANT LEAKAGE INSPECTION”. (See 01-12-5 ENGINE COOLANT LEAKAGE INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 16.
		No	Go to the next step.
14	**INSPECT ENGINE COMPRESSION** • Inspect engine compression. (See 01-10-18 COMPRESSION INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Perform the engine overhaul for repairs, then go to Step 16.
		No	Go to the next step.
15	**INSPECT A/F SENSOR** • Inspect the A/F sensor. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the A/F sensor, then go to the next step. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
16	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn the ignition switch to the ON position. (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the Drive Mode 03 (A/F sensor heater, HO2S heater, A/F sensor, HO2S and TWC Repair Verification). (See 01-02-10 OBD DRIVE MODE [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
17	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0134 [L8, LF]

id0102b1804900

DTC P0134	A/F sensor no activity detected
DETECTION CONDITION	• The PCM monitors the A/F sensor element impedance when the following conditions are met. If the A/F sensor element impedance is **80 ohms or more**, the PCM determines that A/F sensor is not activated. **MONITORING CONDITIONS** — Drive Mode 03 (A/F sensor heater, HO2S heater, A/F sensor, HO2S and TWC Repair Verification) — Following conditions are met • Time from engine start: **above 30 s** (ECT when engine start is **20 °C {68 °F}**) **Diagnostic support note** • This is an intermittent monitor (A/F sensor, HO2S). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• A/F sensor looseness • A/F sensor connector or terminals malfunction • A/F sensor heater malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between A/F sensor terminal A and PCM terminal 2AD • Open circuit in wiring harness between A/F sensor terminal A and PCM terminal 2AD • A/F sensor malfunction • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (A/F sensor, HO2S related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** **Note** • If the fuel monitor DTC, DTC P0132 is retrieved, ignore it until P0134 is fixed. • Turn the ignition switch off, then to the ON position (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA (MODE 2)** • Perform the Freeze Frame PID Data Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P0134 on FREEZE FRAME DATA (Mode 2)?	Yes	Go to the next step.
		No	Go to the DTC troubleshooting on FREEZE FRAME DATA (Mode 2). (See 01-02-12 DTC TABLE [L8, LF].)
5	**INSPECT INSTALLATION OF A/F SENSOR** • Inspect if the A/F sensor is loosely installed. • Is the sensor installed securely?	Yes	Go to the next step.
		No	Retighten the A/F sensor, then go to Step 12.
6	**INSPECT A/F SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the A/F sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 12.
		No	Go to the next step.
7	**INSPECT A/F SENSOR HEATER** • Inspect the A/F sensor heater. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the A/F sensor, then go to Step 12. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
8	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 12.
		No	Go to the next step.
9	**INSPECT A/F SENSOR SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY CIRCUIT** • Reconnect the A/F sensor and PCM connectors. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between A/F sensor terminal A (wiring harness-side) and body ground. • Is the voltage **above 3.22 V**?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 12.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
10	**INSPECT A/F SENSOR SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Turn the ignition switch off. • Disconnect the A/F sensor and PCM connectors. • Inspect for continuity between A/F sensor terminal A (wiring harness-side) and PCM terminal 2AD (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 12.
11	**INSPECT A/F SENSOR** • Inspect the A/F sensor. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the A/F sensor, then go to the next step. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
12	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn the ignition switch to the ON position (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
13	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0138 [L8, LF]

id0102b1805100

DTC P0138	HO2S circuit high input
DETECTION CONDITION	• The PCM monitors input voltage from HO2S. If the input voltage from the HO2S is **above 1.2 V** for **0.8 s**, the PCM determines that circuit input is high. **Diagnostic support note** • This is a continuous monitor (A/F sensor, HO2S). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• HO2S connector or terminals malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between HO2S terminal A and PCM terminal 2Q • HO2S malfunction • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (A/F sensor, HO2S related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off, then to the ON position. (engine off) • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA (MODE 2)** • Perform the Freeze Frame PID Data Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P0138 on FREEZE FRAME DATA (Mode 2)?	Yes	Go to the next step.
		No	Go to the DTC troubleshooting on FREEZE FRAME DATA (Mode 2). (See 01-02-12 DTC TABLE [L8, LF].)
5	**INSPECT HO2S CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the HO2S connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
6	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
7	**INSPECT HO2S SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY** • HO2S and PCM connectors are disconnected. • Turn the ignition switch to the ON position. (engine off) • Measure the voltage between HO2S terminal A (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 9.
		No	Go to the next step.
8	**INSPECT HO2S** • Turn the ignition switch off. • Reconnect the HO2S and PCM connectors. • Inspect the HO2S. (See 01-40-31 HEATED OXYGEN SENSOR (HO2S) INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace sensor, then go to the next step. (See 01-40-30 HEATED OXYGEN SENSOR (HO2S) REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn the ignition switch to the ON position. (engine off) • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0140 [L8, LF]

id0102b1805300

DTC P0140	HO2S no activity detected
DETECTION CONDITION	• The PCM monitors the input voltage from the HO2S when the following conditions are met. Under the following monitoring conditions, if the input voltage from the HO2S does not even **exceed 0.55 V** though the short term fuel trim is controlled up to **20.5%** for **9.6 s**, the PCM determines that sensor circuit is not activated. **MONITORING CONDITIONS** — Drive Mode 03 (A/F sensor heater, HO2S heater, A/F sensor, HO2S and TWC Repair Verification) — Following conditions are met for **above 20.8 s**: • Engine speed: **above 1,500 rpm** • Engine coolant temperature: **above 70 °C {158 °F}** **Diagnostic support note** • This is an intermittent monitor (A/F sensor, HO2S). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• HO2S looseness • Leakage exhaust system • HO2S connector or terminals malfunction • HO2S heater malfunction • PCM connector or terminals malfunction • Short to ground in wiring harness between HO2S terminal A and PCM terminal 2Q • Open circuit in wiring harness between HO2S terminal A and PCM terminal 2Q • Engine malfunction — Engine coolant leakage — Insufficient compression • HO2S deterioration • PCM malfunction

HO2S WIRING HARNESS-SIDE CONNECTOR

PCM WIRING HARNESS-SIDE CONNECTOR

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (A/F sensor, HO2S related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** **Note** • If the fuel monitor DTC, DTC P0132 is retrieved, ignore it until P0140 is fixed. • Turn the ignition switch off, then to the ON position. (engine off) • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA (MODE 2)** • Perform the Freeze Frame PID Data Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P0140 on FREEZE FRAME DATA (Mode 2)?	Yes	Go to the next step.
		No	Go to the DTC troubleshooting on FREEZE FRAME DATA (Mode 2). (See 01-02-12 DTC TABLE [L8, LF].)
5	**INSPECT INSTALLATION OF HO2S** • Inspect if the HO2S is loosely installed. • Is the sensor installed securely?	Yes	Go to the next step.
		No	Retighten the HO2S, then go to Step 15.
6	**INSPECT GAS LEAKAGE FROM EXHAUST SYSTEM** • Visually inspect if any gas leakage is found between exhaust pipe and HO2S. • Is there gas leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 15.
		No	Go to the next step.
7	**INSPECT HO2S CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the HO2S connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 15.
		No	Go to the next step.
8	**INSPECT HO2S HEATER** • Inspect the HO2S heater. (See 01-40-31 HEATED OXYGEN SENSOR (HO2S) INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the HO2S, then go to Step 15. (See 01-40-30 HEATED OXYGEN SENSOR (HO2S) REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
9	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 15.
		No	Go to the next step.
10	**INSPECT HO2S SIGNAL CIRCUIT FOR SHORT TO GROUND** • HO2S and PCM connectors are disconnected. • Inspect for continuity between HO2S terminal A (wiring harness-side) and body ground. • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground, then go to Step 15.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
11	**INSPECT HO2S SIGNAL CIRCUIT FOR OPEN CIRCUIT** • HO2S and PCM connectors are disconnected. • Inspect for continuity between HO2S terminal A (wiring harness-side) and PCM terminal 2Q. • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 15.
12	**INSPECT SEALING OF ENGINE COOLANT PASSAGE** • Reconnect the HO2S and PCM connectors. **Warning** • **Removing the radiator cap when the radiator is hot is dangerous. Scalding coolant and steam may shoot out and cause serious injury.** • **When removing the radiator cap, wrap a thick cloth around and turn it slowly.** • Remove the radiator cap. • Perform procedure to bleed air from the engine coolant, then run the engine at idle. • Is there any small bubble, which makes the engine coolant white at filling opening? **Note** • Large bubbles are normal since they are remaining air coming out from the engine coolant passage.	Yes	Air gets in from poor sealing on head gasket or other areas between combustion chamber and engine coolant passage. Repair or replace the malfunctioning part according to the inspection results, then go to Step 15.
		No	Go to the next step.
13	**INSPECT ENGINE COMPRESSION** • Inspect the engine compression. (See 01-10-18 COMPRESSION INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Perform the engine overhaul for repairs, then go to Step 15.
		No	Go to the next step.
14	**INSPECT HO2S** • Inspect the HO2S. (See 01-40-31 HEATED OXYGEN SENSOR (HO2S) INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the HO2S, then go to the next step. (See 01-40-30 HEATED OXYGEN SENSOR (HO2S) REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
15	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn the ignition switch to the ON position. (engine off) • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
16	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0222 [L8, LF]

id0102b1806000

DTC P0222	TP sensor No.2 circuit low input
DETECTION CONDITION	• If the PCM detects TP sensor No.2 voltage is to be **below 0.1 V** after turn the ignition switch to the ON position, the PCM determines that TP sensor No.2 circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Throttle body connector or terminals malfunction • Short to ground in wiring harness between the following terminals: — Throttle body terminal E and PCM terminal 2AO — Throttle body terminal D and PCM terminal 2AL • PCM connector or terminals malfunction • TP sensor No.2 malfunction • TP sensor No.2 signal circuit and ground circuit are shorted to each other • Open circuit in wiring harness between the following terminals: — Throttle body terminal E and PCM terminal 2AO — Throttle body terminal D and PCM terminal 2AL • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT THROTTLE BODY CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the throttle body connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
4	**VERIFY TP SENSOR NO.2 SIGNAL CIRCUIT FOR SHORT TO GROUND** • Throttle body connector is disconnected. • Inspect for continuity between the following terminals (wiring harness-side) and body ground: — Throttle body terminal E — Throttle body terminal D • Is there continuity?	Yes	If the short to ground circuit could be detected: • Repair or replace the wiring harness for a possible short to ground. If the short to ground circuit could not be detected: • Replace the PCM (short to ground in PCM internal circuit). (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) Go to Step 9.
		No	Go to the next step.
5	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
6	**CLASSIFY TP SENSOR NO.2 OR WIRING HARNESS MALFUNCTION** • Reconnect the PCM connector. • Connect the M-MDS. • Perform the PID/DATA Monitor and Record Procedure and access the TP2 PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Connect a jumper wire between throttle body terminals E and D (wiring harness-side). • Is the voltage **above 4.9 V**?	Yes	Go to the next step.
		No	Replace the throttle body, then go to Step 9. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
7	**VERIFY TP SENSOR NO.2 SIGNAL AND GROUND CIRCUIT FOR SHORT TO EACH OTHER** • Throttle body connector is disconnected. • Disconnect the PCM connector. • Turn the ignition switch off. • Inspect for continuity between throttle body terminal D and C (wiring harness-side). • Is there continuity?	Yes	Repair or replace the suspected wiring harness, then go to Step 9.
		No	Go to the next step.
8	**VERIFY TP SENSOR NO.2 SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Throttle body and PCM connectors are disconnected. • Inspect for continuity between the following terminals (wiring harness-side): — Throttle body terminal E and PCM terminal 2AO — Throttle body terminal D and PCM terminal 2AK • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to the next step.
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn the ignition switch to the ON position (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0223 [L8, LF]

id0102b1806100

DTC P0223	TP sensor No.2 circuit high input
DETECTION CONDITION	• If the PCM detects the TP sensor No.2 voltage is to be **above 4.9 V** after the ignition switch to the ON position, the PCM determines that the TP circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. • PENDING CODE is available if the PCM detects the above malfunction condition. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Throttle body connector or terminals malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between throttle body terminal D and PCM terminal 2AL • TP sensor No.2 power supply circuit and signal circuit are shorted to each other • Open circuit in wiring harness between throttle body terminal C and PCM terminal 2AP • TP sensor No.2 malfunction • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT THROTTLE BODY CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the throttle body connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
4	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
5	**INSPECT TP SENSOR NO.2 SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY** • PCM connector is disconnected. • Disconnect the throttle body connector. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between throttle body terminal D (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 9.
		No	Go to the next step.
6	**VERIFY TP SENSOR NO.2 POWER SUPPLY AND SIGNAL CIRCUIT FOR SHORT TO EACH OTHER** • Throttle body and PCM connectors are disconnected. • Turn the ignition switch off. • Inspect for continuity between throttle body terminals E and D (wiring harness-side). • Is there continuity?	Yes	Repair or replace the suspected wiring harness, then go to Step 9.
		No	Go to the next step.
7	**INSPECT TP SENSOR NO.2 CIRCUIT FOR OPEN CIRCUIT** • Throttle body and PCM connectors are disconnected. • Inspect for continuity between throttle body terminal C (wiring harness-side) and PCM terminal 2AP terminals (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 9.
8	**INSPECT TP SENSOR NO.2** • Reconnect the throttle body connector. • Inspect the TP sensor No.2. (See 01-40-28 THROTTLE POSITION (TP) SENSOR INSPECTION [L8, LF]) • Is there any malfunction?	Yes	Replace the throttle body, then go to the next step. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn the ignition switch to the ON position (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0300 [L8, LF]

id0102b1806500

DTC P0300	Random misfire detected
DETECTION CONDITION	• The PCM monitors the CKP sensor input signal interval time. The PCM calculates change of interval time for each cylinder. If change of interval time exceeds preprogrammed criteria, the PCM detects misfire in the corresponding cylinder. While the engine is running, the PCM counts number of misfires that occurred at **200 crankshaft revolutions** and **1,000 crankshaft revolutions** and calculates misfire ratio for each crankshaft revolution. If the ratio exceeds the preprogrammed criteria, the PCM determines that a misfire, which can damage catalytic converter or affect emission performance, has occurred. **Diagnostic support note** • This is a continuous monitor (misfire). • The MIL illuminates if the PCM detects the misfire which affects emission performance in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • The MIL flashes if the PCM detects the misfire which can damage the catalytic converter during the first drive cycle. • PENDING CODE is available if the PCM detects the misfire which affects emission performance during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Erratic signal to PCM — APP sensor signal malfunction — ECT sensor signal malfunction — IAT sensor signal malfunction — MAF sensor signal malfunction — CKP sensor signal malfunction — TP sensor signal malfunction — VSS signal malfunction • CMP sensor malfunction • CKP sensor looseness • Ignition system malfunction — Ignition coil related wiring harness malfunction — Ignition coil malfunction — Spark plug malfunction • MAF sensor contamination • Excess air suction in intake air system (between MAF sensor and intake manifold) — Vacuum hose damaged — Pipe malfunction • Fuel supply system malfunction or improper fuel line pressure — Fuel pressure regulator (built-in fuel pump unit) malfunction — Fuel leakage in fuel line — Fuel line clogged — Fuel filter clogged — Fuel pump unit malfunction — Fuel runout • Insufficient compression • Improper operation of variable valve timing control system • Improper operation of purge solenoid valve • Improper operation of EGR valve • Engine coolant leakage • Improper operation of PCV valve • Poor quality fuel • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (misfire related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off then to the ON position (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
4	**VERIFY CURRENT INPUT SIGNAL STATUS** • Perform the PID/DATA Monitor and Record Procedure and access the following PIDs. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) — APP1 — APP2 — ECT — IAT — MAF — RPM — TP REL — VSS • Is there any signal that is far out of specification when the ignition switch is turned to the ON position and the engine idles? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 20.
		No	Go to the next step.
5	**VERIFY CURRENT INPUT SIGNAL STATUS UNDER FREEZE FRAME DATA (MODE 2) CONDITION** • Perform the PID/DATA Monitor and Record Procedure and access the same PIDs as in Step 4 under the FREEZE FRAME DATA (Mode 2) condition. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is there any signal which causes drastic changes?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 20.
		No	Go to the next step.
6	**INSPECT CMP SENSOR** • Inspect the CMP sensor. (See 01-40-34 CAMSHAFT POSITION (CMP) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Inspect the installation condition and damages on timing chain and gears. If there is a malfunction: • Repair or replace the malfunctioning part according to the inspection results. If it is normal: • Replace the CMP sensor. (See 01-40-33 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [L8, LF].) Go to Step 20.
		No	Go to the next step.
7	**INSPECT INSTALLATION OF CKP SENSOR** • Inspect if the CKP sensor is loosely installed. • Is the sensor installed securely?	Yes	Go to the next step.
		No	Retighten the CKP sensor, then go to Step 20.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
8	**INSPECT IGNITION COIL AND RELATED WIRING HARNESS** • Inspect the ignition coil and related wiring harness condition (intermittent open or short) for all cylinders. • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 20.
		No	Go to the next step.
9	**INSPECT IGNITION SYSTEM OPERATION** • Perform the Spark Test. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Is strong blue spark visible at each cylinder?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 20.
10	**INSPECT MAF PID** • Start the engine. • Perform the PID/DATA Monitor and Record Procedure and access the MAF PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Race the engine and verify that the MAF PID changes quickly according to change in the engine speed. • Is the MAF PID response normal?	Yes	Go to Step 12.
		No	Go to the next step.
11	**INSPECT EXCESSIVE AIR SUCTION IN INTAKE AIR SYSTEM** • Inspect for air leakage between the following: — MAF sensor and throttle body — Throttle body and intake manifold **Note** • Engine speed may change when rust penetrating agent is stayed on the air suction area. • Is there air leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 20.
		No	Replace the MAF sensor, then go to Step 20. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
12	**INSPECT FUEL LINE PRESSURE** • Inspect the fuel line pressure. (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].) • Is the fuel line pressure normal?	Yes	Go to Step 14.
		No	If the fuel line pressure is too low: • Go to the next step. If the fuel line pressure is excess high: • Replace the fuel pump unit, then go to Step 20. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
13	**INSPECT FUEL LINE FROM FUEL PUMP TO FUEL DISTRIBUTOR** • Visually inspect the fuel line for fuel leakage. • Is there fuel leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 20.
		No	Inspect fuel filters for the foreign materials or stain inside fuel filter (low-pressure side). Perform the following actions according to the inspection results: • If the foreign materials or stain is found inside fuel filter (low-pressure side): — Clean the fuel tank and filter (low-pressure side). • If normal: — Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) Go to Step 20.
14	**INSPECT ENGINE COMPRESSION** • Inspect the engine compression. (See 01-10-18 COMPRESSION INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Perform the engine overhaul for repairs, then go to Step 20.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
15	**INSPECT VARIABLE VALVE TIMING CONTROL SYSTEM OPERATION** • Perform the Variable Valve Timing Control System Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Does the variable valve timing control system work properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 20.
16	**INSPECT PURGE SOLENOID VALVE OPERATION** • Turn the ignition switch off. • Connect the vacuum pump to purge solenoid valve and apply vacuum to solenoid. • Verify that the solenoid holds vacuum. • Turn the ignition switch to the ON position (engine off). • Perform the Simulation Function Procedure and access the EVAPCP PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Set the duty value to **100%** for EVAPCP PID. • Apply vacuum while turning solenoid from OFF to ON and simulating the EVAPCP PID with **100%** duty value. • Verify that solenoid releases vacuum while solenoid is turned ON. • Is the purge solenoid valve operation normal?	Yes	Go to the next step.
		No	Replace the purge solenoid valve, then go to Step 20. (See 01-16-7 PURGE SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].)
17	**INSPECT EGR VALVE OPERATION** • Remove the EGR valve. (See 01-16-9 EGR VALVE REMOVAL/INSTALLATION [L8, LF].) • Visually inspect the EGR valve for stuck to open. • Is the EGR valve stuck to open?	Yes	Repair or replace the EGR valve, then go to Step 20. (See 01-16-9 EGR VALVE REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
18	**INSPECT SEALING OF ENGINE COOLANT PASSAGE** • Perform the “ENGINE COOLANT LEAKAGE INSPECTION.” (See 01-12-5 ENGINE COOLANT LEAKAGE INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 20.
		No	Go to the next step.
19	**INSPECT PCV VALVE OPERATION** • Turn the ignition switch off. • Inspect the PCV valve. (See 01-16-12 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION [L8, LF].) • Is the PCV valve operation normal?	Yes	Go to the next step.
		No	Replace the PCV valve, then go to the next step.
20	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn the ignition switch to the ON position (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
21	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0301, P0302, P0303, P0304 [L8, LF]

id0102b1806600

DTC P0301	**Cylinder No.1 misfire detected**
DTC P0302	**Cylinder No.2 misfire detected**
DTC P0303	**Cylinder No.3 misfire detected**
DTC P0304	**Cylinder No.4 misfire detected**
DETECTION CONDITION	• The PCM monitors the CKP sensor input signal interval time. The PCM calculates the change of interval time for each cylinder. If the change of interval time exceeds the preprogrammed criteria, the PCM detects a misfire in the corresponding cylinder. While the engine is running, the PCM counts number of misfires that occurred at **200 crankshaft revolutions** and **1,000 crankshaft revolutions** and calculates misfire ratio for each crankshaft revolution. If the ratio exceeds the preprogrammed criteria, the PCM determines that a misfire, which can damage catalytic converter or affect emission performance, has occurred. **Diagnostic support note** • This is a continuous monitor (Misfire). • The MIL illuminates if the PCM detects the misfire which affects emission performance in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • The MIL flashes if the PCM detects the misfire which can damage the catalytic converter during the first drive cycle. • PENDING CODE is available if the PCM detects the misfire which affects emission performance during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Erratic signal to PCM — APP sensor signal malfunction — ECT sensor signal malfunction — IAT sensor signal malfunction — MAF sensor signal malfunction — CKP sensor signal malfunction — TP sensor signal malfunction — VSS signal malfunction • Ignition system malfunction — Ignition coil related wiring harness malfunction — Ignition coil malfunction — Spark plug malfunction • Air suction in intake air system (between dynamic chamber and cylinder head) • Fuel injector related wiring harness malfunction • Engine malfunction — Engine coolant leakage — Insufficient compression • Improper operation of fuel injector • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (misfire related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off then to the ON position (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
4	**VERIFY CURRENT INPUT SIGNAL STATUS** • Perform the PID/DATA Monitor and Record Procedure and access the following PIDs. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) — APP1 — APP2 — ECT — IAT — MAF — RPM — TP REL — VSS • Is there any signal that is far out of specification when the ignition switch is turned to the ON position and the engine idles? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 14.
		No	Go to the next step.
5	**VERIFY CURRENT INPUT SIGNAL STATUS UNDER FREEZE FRAME DATA (MODE 2) CONDITION** • Perform the PID/DATA Monitor and Record Procedure and access the same PIDs as in Step 4 under the FREEZE FRAME DATA (Mode 2) condition. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is there any signal which causes drastic changes?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 14.
		No	Go to the next step.
6	**INSPECT SPARK PLUG CONDITION** • Turn the ignition switch off. • Remove the spark plug from suspected cylinder. (See 01-18-3 SPARK PLUG REMOVAL/INSTALLATION [L8, LF].) • Inspect the spark plug for the following condition: — Cracks — Excess wear — Gap — Wet • Is there any malfunction?	Yes	If the spark plug is wet: • Fuel flooding is suspected. If the spark plug has a cracks excessive wear or improper gap: • Replace the suspected spark plug. (See 01-18-3 SPARK PLUG REMOVAL/INSTALLATION [L8, LF].) Go to Step 14.
		No	Go to the next step.
7	**INSPECT IGNITION COIL AND RELATED WIRING HARNESS** • Inspect the ignition coil and related wiring harness condition (intermittent open or short) for all cylinders. • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 14.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
8	**INSPECT IGNITION SYSTEM OPERATION** • Perform the Spark Test. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Is strong blue spark visible at each cylinder?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 14.
9	**INSPECT AIR SUCTION IN INTAKE AIR SYSTEM** • Inspect for air leakage at the following: — Around connection of dynamic chamber and intake manifold — Around connection of intake manifold and cylinder head **Note** • Engine speed may change when rust penetrating agent is stayed on the air suction area. • Is there air leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 14.
		No	Go to the next step.
10	**INSPECT FUEL INJECTOR RELATED WIRING HARNESS** • Remove the intake air system parts. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].) • Disconnect the fuel injector connector on suspected cylinder. • Connect the NOID LIGHT to fuel injector terminals. • Inspect the dim of light during cranking. • Does not light illuminate?	Yes	Go to the next step.
		No	Inspect the fuel injector related wiring harness. Repair or replace the suspected wiring harness, if necessary. Go to Step 14.
11	**INSPECT SEALING OF ENGINE COOLANT PASSAGE** • Perform the “ENGINE COOLANT LEAKAGE INSPECTION.” (See 01-12-5 ENGINE COOLANT LEAKAGE INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 14.
		No	Go to the next step.
12	**INSPECT ENGINE COMPRESSION** • Inspect the engine compression. (See 01-10-18 COMPRESSION INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Perform the engine overhaul for repairs, then go to Step 14.
		No	Go to the next step.
13	**INSPECT FUEL INJECTOR OPERATION** • Remove the fuel injector from suspected cylinder. (See 01-14-18 FUEL INJECTOR REMOVAL/ INSTALLATION [L8, LF].) • Switch the fuel injector with the fuel injector on other cylinder. • Start the engine and idle it. • Is the misfire DTC for cylinder which has a suspected fuel injector?	Yes	Replace the injector, then go to the next step. (See 01-14-18 FUEL INJECTOR REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
14	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Start the engine. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
15	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0327 [L8, LF]

id0102b1806700

DTC P0327	KS circuit low input
DETECTION CONDITION	• The PCM monitors input signal from the KS when the engine is running. If the input voltage is **below 0.01 V** the PCM determines that the KS circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• KS connector or terminals malfunction • KS malfunction • Short to ground in wiring harness between the following terminal: — KS terminal A and PCM terminal 2U — KS terminal B and PCM terminal 2V • PCM connector or terminals malfunction • KS power supply circuit and ground circuit are shorted to each other • Open circuit in wiring harness between the following terminal: — KS terminal A and PCM terminal 2U — KS terminal B and PCM terminal 2V • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT KS CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the KS connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
4	**INSPECT KS** • Inspect the KS. (See 01-40-34 KNOCK SENSOR (KS) INSPECTION [L8, LF]) • Is there any malfunction?	Yes	Replace the KS, then go to Step 9. (See 01-40-34 KNOCK SENSOR (KS) REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
5	**INSPECT KS CIRCUIT FOR SHORT TO GROUND** • KS connector is disconnected. • Inspect for continuity between the following terminals (wiring harness-side) and body ground: — KS terminal A — KS terminal B • Is there continuity?	Yes	If the short to ground circuit could be detected: • Repair or replace the wiring harness for a possible short to ground. If the short to ground circuit could not be detected: • Replace the PCM (short to ground in PCM internal circuit). (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) Go to Step 9.
		No	Go to the next step.
6	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
7	**VERIFY KS POWER SUPPLY AND GROUND CIRCUIT FOR SHORT TO EACH OTHER** • KS and PCM connectors are disconnected. • Inspect for continuity between KS terminals A and B (wiring harness-side). • Is there continuity?	Yes	Repair or replace the suspected wiring harness, then go to Step 9.
		No	Go to the next step.
8	**INSPECT KS CIRCUIT FOR OPEN CIRCUIT** • KS and PCM connectors are disconnected. • Inspect for continuity between the following terminals (wiring harness-side): — KS terminal A and PCM terminal 2U — KS terminal B and PCM terminal 2V • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to the next step.
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0328 [L8, LF]

id0102b1806800

DTC P0328	KS circuit high input
DETECTION CONDITION	• The PCM monitors the input signal from the KS when the engine is running. If the input voltage is **above 4.58 V** the PCM determines that KS circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction conditions during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• KS connector or terminals malfunction • KS malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between the following terminals: — KS terminal A and PCM terminal 2U — KS terminal B and PCM terminal 2V • KS power supply circuit and ground circuit are shorted to each other • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT KS CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the KS connector. • Inspect for poor connection at terminals (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 8.
		No	Go to the next step.
4	**INSPECT KS** • Inspect the KS. (See 01-40-34 KNOCK SENSOR (KS) INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the KS, then go to Step 8. (See 01-40-34 KNOCK SENSOR (KS) REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
5	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection at terminals (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 8.
		No	Go to the next step.
6	**INSPECT KS CIRCUIT FOR SHORT TO POWER SUPPLY** • KS and PCM connectors are disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between the following terminals (wiring harness-side) and body ground: — KS terminal A — KS terminal B • Is there any voltage?	Yes	Repair or replace wiring harness for a possible short to power supply, then go to Step 8.
		No	Go to the next step.
7	**INSPECT KS POWER SUPPLY AND GROUND CIRCUIT FOR SHORT TO EACH OTHER** • KS and PCM connectors are disconnected. • Turn the ignition switch off. • Inspect for continuity between KS terminals A and B (wiring harness-side). • Is there continuity?	Yes	Repair or replace wiring harness for a possible short to each other, then go to the next step.
		No	Go to the next step.
8	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to connect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0335 [L8, LF]

id0102b1806900

DTC P0335	CKP sensor circuit problem
DETECTION CONDITION	• If the PCM does not receive the input voltage from the CKP sensor for **4.2 s** while the MAF is **1.95 g/s {0.25 lb/min} or above**, the PCM determines that the CKP sensor circuit has a malfunction. • If a malfunction is detected in the input pulse pattern from the CKP sensor. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• CKP sensor connector or terminals malfunction • Short to ground in wiring harness between the following terminals: — CKP sensor terminal C and PCM terminal 2AQ — CKP sensor terminal B and PCM terminal 2W • PCM connector or terminals malfunction • Short to power supply in wiring harness between the following terminals: — CKP sensor terminal C and PCM terminal 2AQ — CKP sensor terminal B and PCM terminal 2W • CKP sensor circuits are shorted to each other • Open circuit in wiring harness between the following terminals: — CKP sensor terminal B and PCM terminal 2W — CKP sensor terminal A and PCM terminal 2AB • CKP sensor malfunction — CKP sensor pulse wheel malfunction • PCM malfunction

CKP SENSOR WIRING HARNESS-SIDE CONNECTOR

PCM WIRING HARNESS-SIDE CONNECTOR

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT CKP SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the CKP sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 11.
		No	Go to the next step.
4	**VERIFY CKP SENSOR VOLTAGE** • Connect the voltmeter between the CKP sensor terminals C and B (sensor-side). • Inspect the voltage in the AC range while cranking the engine. • Is there any voltage?	Yes	Go to the next step.
		No	Go to step 10.
5	**INSPECT CKP SENSOR CIRCUIT FOR SHORT TO GROUND** • CKP sensor connector is disconnected. • Inspect for continuity between the following terminals (wiring harness-side) and body ground: — CKP sensor terminal C — CKP sensor terminal B • Is there continuity?	Yes	If the short to ground circuit could be detected: • Repair or replace the wiring harness for a possible short to ground. If the short to ground circuit could not be detected: • Replace the PCM (short to ground in PCM internal circuit). (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) Go to Step 11.
		No	Go to the next step.
6	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 11.
		No	Go to the next step.
7	**INSPECT CKP SENSOR CIRCUIT FOR SHORT TO POWER SUPPLY** • CKP sensor and PCM connectors are disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between the following terminals (wiring harness-side) and body ground: — CKP sensor terminal C — CKP sensor terminal B • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 11.
		No	Go to the next step.
8	**INSPECT CKP SENSOR CIRCUITS FOR SHORT TO EACH OTHER** • CKP sensor and PCM connectors are disconnected. • Inspect for continuity between CKP sensor terminals C, B and A (wiring harness-side). • Is there continuity?	Yes	Repair or replace the suspected wiring harness, then go to Step 11.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
9	**INSPECT CKP SENSOR CIRCUIT FOR OPEN CIRCUIT** • CKP sensor and PCM connectors are disconnected. • Inspect for continuity between the following terminals (wiring harness-side): — CKP sensor terminal B and PCM terminal 2W — CKP sensor terminal A and PCM terminal 2AB • Is there continuity?	Yes	Go to Step 11.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 11.
10	**INSPECT CKP SENSOR** • Turn the ignition switch off. • Reconnect the CKP sensor connector. • Inspect the CKP sensor. (See 01-40-33 CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Inspect the CKP sensor pulse wheel for damage. Repair or replace the malfunctioning part according to the inspection results, then go to the next step. (See 01-40-31 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
11	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn the ignition switch to the ON position (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the PID/DATA Monitor and Record Procedure and access the MAF PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) **Note** • The MAF PID should indicate **1.95 g/s {0.25 lb/min} or above** during this test. • Perform the DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0340 [L8, LF]

id0102b1807000

DTC P0340	CMP sensor circuit problem
DETECTION CONDITION	• The PCM monitors the input voltage from the CMP sensor when the engine is running. If the PCM does not receive the input voltage from the CMP sensor while the PCM receives the input signal from the CKP sensor, the PCM determines that the CMP sensor circuit has a malfunction. • If a malfunction is detected in the input pulse pattern from the CMP sensor. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• CMP sensor connector or terminals malfunction • Short to ground in wiring harness between the following terminals: — CMP sensor terminal C and PCM terminal 2AM — CMP sensor terminal B and PCM terminal 2S • PCM connector or terminals malfunction • Short to power supply in wiring harness between CMP sensor terminal B and PCM terminal 2S • CMP sensor circuits are shorted to each other • Open circuit in wiring harness between the following terminals: — CMP sensor terminal C and PCM terminal 2AM — CMP sensor terminal B and PCM terminal 2S — CMP sensor terminal A and PCM terminal 2P • CMP sensor malfunction — CMP sensor pulse wheel malfunction • CMP sensor looseness • Valve timing mechanism misinstallation — Timing chain misinstallation — Loose camshaft sprocket lock bolt — Loose crankshaft pulley lock bolt • Loose timing chain or improper valve timing • PCM malfunction

CMP SENSOR WIRING HARNESS-SIDE CONNECTOR

PCM WIRING HARNESS-SIDE CONNECTOR

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT CMP SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the CMP sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 15.
		No	Go to the next step.
4	**VERIFY CMP SENSOR VOLTAGE** • Connect a voltmeter between CMP sensor terminals C and B (sensor-side). • Inspect the voltage in AC range while cranking the engine. • Is there any voltage?	Yes	Go to the next step.
		No	Go to step 10.
5	**INSPECT CMP SENSOR CIRCUIT FOR SHORT TO GROUND** • CMP sensor connector is disconnected. • Inspect for continuity between the following terminals (wiring harness-side) and body ground: — CMP sensor terminal C — CMP sensor terminal B • Is there continuity?	Yes	If the short to ground circuit could be detected: • Repair or replace the wiring harness for a possible short to ground. If the short to ground circuit could not be detected: • Replace the PCM (short to ground in PCM internal circuit). (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) Go to Step 15.
		No	Go to the next step.
6	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 15.
		No	Go to the next step.
7	**INSPECT CMP SENSOR CIRCUIT FOR SHORT TO POWER SUPPLY** • CMP sensor and PCM connectors are disconnected. • Turn ignition switch to the ON position (engine off). • Measure the voltage between CMP sensor terminal B (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 15.
		No	Go to the next step.
8	**INSPECT CMP SENSOR CIRCUITS FOR SHORT TO EACH OTHER** • CMP sensor and PCM connectors are disconnected. • Turn the ignition switch off. • Inspect for continuity between CMP sensor terminals C, B and A (wiring harness-side). • Is there continuity?	Yes	Repair or replace the suspected wiring harness, then go to Step 15.
		No	Go to the next step.
9	**INSPECT CMP SENSOR CIRCUIT FOR OPEN CIRCUIT** • CMP sensor and PCM connectors are disconnected. • Inspect for continuity between the following terminals (wiring harness-side): — CMP sensor terminal C and PCM terminal 2AM — CMP sensor terminal B and PCM terminal 2S — CMP sensor terminal A and PCM terminal 2P • Is there continuity?	Yes	Go to Step 11.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 15.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
10	**INSPECT CMP SENSOR** • Turn the ignition switch off. • Inspect the CMP sensor. (See 01-40-34 CAMSHAFT POSITION (CMP) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the CMP sensor and go to Step 15. (See 01-40-33 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to Step 15.
11	**INSPECT INSTALLATION OF CMP SENSOR** • Inspect if the CMP sensor is loosely installed • Is the CMP sensor installed correctly?	Yes	Go to the next step.
		No	Retighten the CMP sensor, then go to Step 15.
12	**VERIFY VALVE TIMING MECHANISM INSTALLATION** • Verify the valve timing mechanism installation for the following parts: — Timing chain misinstallation — Loose camshaft sprocket lock bolt — Loose crankshaft pulley lock bolt • Is the valve timing mechanism installed correctly?	Yes	Go to the next step.
		No	Reinstall the following parts, then go to Step 15. • Timing chain • Camshaft sprocket • Crankshaft pulley
13	**INSPECT STOPPER PIN MECHANISM** • Remove the timing chain. (See 01-10-19 TIMING CHAIN REMOVAL/INSTALLATION [L8, LF].) • Inspect the stopper pin. (See 01-10-15 VARIABLE VALVE TIMING ACTUATOR INSPECTION [LF].) • Is the stopper pin mechanism normal?	Yes	Go to the next step.
		No	Replace the variable valve timing actuator, then go to Step 15. (See 01-10-15 VARIABLE VALVE TIMING ACTUATOR REMOVAL/INSTALLATION [LF].)
14	**INSPECT ROTOR POSITION** • Remove the variable valve timing actuator. (See 01-10-15 VARIABLE VALVE TIMING ACTUATOR REMOVAL/INSTALLATION [LF].) • Is the rotor at the maximum valve timing advanced position?	Yes	Replace the variable valve timing actuator, then go to the next step. (See 01-10-15 VARIABLE VALVE TIMING ACTUATOR REMOVAL/INSTALLATION [LF].)
		No	Variable valve timing mechanism is normal. **Note** • This DTC is detected as an intermittent concern. • The intermittent concern might be removed by cleaning the variable valve timing mode control function. Go to the next step.
15	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition switch to the ON position (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the PID/DATA Monitor and Record Procedure and access the MAF PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) **Note** • The MAF PID should indicate **1.95 g/s {0.25 lb/min} or above** during this test. • Perform the DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
16	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0403 [L8, LF]

id0102b1807100

DTC P0403	EGR valve (stepping motor) circuit problem
DETECTION CONDITION	• The PCM monitors the EGR valve control signal voltage and current. If the following conditions are met, the PCM determines that there is a EGR control circuit problem. — The PCM turns the EGR valve off, but the voltage of the EGR valve control signal remains low. — The PCM turns the EGR valve on, but the current of the EGR valve control signal remains high. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction conditions in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• EGR valve connector or terminals malfunction • Open circuit or short to ground in wiring harness between the main relay and EGR valve — Short to ground in wiring harness between main relay and EGR valve terminal C — Short to ground in wiring harness between main relay and EGR valve terminal D — EGI COMP1 10 A fuse malfunction — Open circuit in wiring harness between main relay and EGR valve terminal C — Open circuit in wiring harness between main relay and EGR valve terminal D • EGR valve malfunction • PCM connector or terminals malfunction • Short to ground in wiring harness between the following terminals: — EGR valve terminal E and PCM terminal 2K — EGR valve terminal A and PCM terminal 2G — EGR valve terminal B and PCM terminal 2L — EGR valve terminal F and PCM terminal 2H • Short to power supply in wiring harness between the following terminals: — EGR valve terminal E and PCM terminal 2K — EGR valve terminal A and PCM terminal 2G — EGR valve terminal B and PCM terminal 2L — EGR valve terminal F and PCM terminal 2H • Open circuit in wiring harness between the following terminals: — EGR valve terminal E and PCM terminal 2K — EGR valve terminal A and PCM terminal 2G — EGR valve terminal B and PCM terminal 2L — EGR valve terminal F and PCM terminal 2H • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0403	EGR valve (stepping motor) circuit problem

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT EGR VALVE CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the EGR valve connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 10.
		No	Go to the next step.
4	**INSPECT EGR VALVE POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT OR SHORT TO GROUND** • EGR valve connector is disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between the following terminals (wiring harness-side) and body ground: — EGR valve terminal C — EGR valve terminal D • Is the voltage **B+**?	Yes	Go to the next step.
		No	Inspect the EGI COMP1 10 A fuse. If the fuse is melt: • Repair or replace the wiring harness for a possible short to ground, then replace the fuse. If the fuse is deterioration: • Replace the fuse. If the fuse is normal: • Repair or replace the wiring harness for a possible open circuit. Go to Step 10.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
5	**INSPECT EGR VALVE** • Turn the ignition switch off. • Reconnect the EGR valve connector. • Inspect the EGR valve. (See 01-16-10 EGR VALVE INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the EGR valve, then go to Step 10. (See 01-16-9 EGR VALVE REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
6	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 10.
		No	Go to the next step.
7	**INSPECT EGR VALVE CIRCUIT FOR SHORT TO GROUND** • PCM connector is disconnected. • Disconnect the EGR valve connector. • Inspect for continuity between the following terminals (wiring harness-side) and body ground: — EGR valve terminal E — EGR valve terminal A — EGR valve terminal B — EGR valve terminal F • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground, then go to Step 10.
		No	Go to the next step.
8	**INSPECT EGR VALVE CIRCUIT FOR SHORT TO POWER SUPPLY** • EGR valve and PCM connectors are disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between the following terminals (wiring harness-side) and body ground: — EGR valve terminal E — EGR valve terminal A — EGR valve terminal B — EGR valve terminal F • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 10.
		No	Go to the next step.
9	**INSPECT EGR VALVE CIRCUIT FOR OPEN CIRCUIT** • EGR valve and PCM connectors are disconnected. • Turn the ignition switch off. • Inspect for continuity between the following terminals (wiring harness-side): — EGR valve terminal E and PCM terminal 2K — EGR valve terminal A and PCM terminal 2G — EGR valve terminal B and PCM terminal 2L — EGR valve terminal F and PCM terminal 2H • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to the next step.
10	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0421 [L8, LF]

id0102b1807300

DTC P0421	Warm up catalyst system efficiency below threshold
DETECTION CONDITION	• The PCM compares number of A/F sensor and HO2S inversions for a predetermined time. The PCM monitors number of inversions rear side performs while front side inverts for a specified number of times when the following monitoring conditions are met, the PCM detects inversion ratio. If inversion ratio is below threshold, the PCM determines that catalyst has deteriorated. **MONITORING CONDITIONS** — Calculated TWC temperature: **more than 400 °C {752 °F}** — Engine speed: **1,500—3,000 rpm** (AT)/**3,500 rpm** (MT) — LOAD: **15—48%** (at engine speed **2,000 rpm**) **Diagnostic support note** • This is an intermittent monitor (catalyst). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Exhaust gas leakage • A/F sensor looseness • HO2S looseness • TWC deterioration or malfunction • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (catalyst related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off, then to the ON position (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
4	**INSPECT EXHAUST SYSTEM FOR EXHAUST GAS LEAKAGE** • Visually inspect the exhaust gas leakage in the exhaust system. • Is there exhaust gas leakage?	Yes	Repair or replace the malfunctioning part, then go to Step 8. (See 01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
5	**INSPECT INSTALLATION OF A/F SENSOR** • Inspect if the A/F sensor is loosely installed. • Is the A/F sensor installed securely?	Yes	Go to the next step.
		No	Retighten the A/F sensor, then go to Step 8. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
6	**INSPECT INSTALLATION OF HO2S** • Inspect if the HO2S is loosely installed. • Is the HO2S installed securely?	Yes	Go to the next step.
		No	Retighten the HO2S, then go to Step 8. (See 01-40-30 HEATED OXYGEN SENSOR (HO2S) REMOVAL/INSTALLATION [L8, LF].)
7	**INSPECT TWC** • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Turn the ignition switch off then to the ON position. • Inspect the TWC. (See 01-15-1 EXHAUST SYSTEM INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the TWC, then go to the next step. (See 01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
		No	Replace the A/F sensor and HO2S, then go to the next step. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].) (See 01-40-30 HEATED OXYGEN SENSOR (HO2S) REMOVAL/INSTALLATION [L8, LF].)
8	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn the ignition switch to the ON position (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the Drive Mode 03 (A/F sensor heater, HO2S heater, A/F sensor, HO2S and TWC Repair Verification). (See 01-02-10 OBD DRIVE MODE [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0443 [L8, LF]

id0102b1807600

DTC P0443	Purge solenoid valve circuit problem
DETECTION CONDITION	• The PCM monitors the purge solenoid valve control signal voltage and current. If the following conditions are met, the PCM determines that there is a purge solenoid valve control circuit problem. — The PCM turns the purge solenoid valve off, but the voltage of the purge solenoid valve control signal remains low. — The PCM turns the purge solenoid valve on, but the current of the purge solenoid valve control signal remains high. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Purge solenoid valve connector or terminals malfunction • Open circuit or short to ground in wiring harness between main relay and purge solenoid valve terminal B — Short to ground in wiring harness between main relay and purge solenoid valve terminal B — EGI COMP1 10 A fuse malfunction — Open circuit in wiring harness between main relay and purge solenoid valve terminal B • Purge solenoid valve malfunction • PCM connector or terminals malfunction • Short to ground in wiring harness between purge solenoid valve terminal A and PCM terminal 2C • Short to power supply in wiring harness between purge solenoid valve terminal A and PCM terminal 2C • Open circuit in wiring harness between purge solenoid valve terminal A and PCM terminal 2C • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT PURGE SOLENOID VALVE CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the purge solenoid valve connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 10.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
4	**INSPECT PURGE SOLENOID VALVE POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT OR SHORT TO GROUND** • Purge solenoid valve connector is disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between purge solenoid valve terminal B (wiring harness-side) and body ground. • Is the voltage **B+**?	Yes	Go to the next step.
		No	Inspect the EGI COMP1 10 A fuse. If the fuse is melt: • Repair or replace the wiring harness for a possible short to ground, then replace the fuse. If the fuse is deterioration: • Replace the fuse. If the fuse is normal: • Repair or replace the wiring harness for a possible open circuit. Go to Step 10.
5	**INSPECT PURGE SOLENOID VALVE** • Turn the ignition switch off. • Inspect the purge solenoid valve. (See 01-16-8 PURGE SOLENOID VALVE INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the purge solenoid valve, then go to Step 10. (See 01-16-7 PURGE SOLENOID VALVE REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
6	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 10.
		No	Go to the next step.
7	**INSPECT PURGE SOLENOID VALVE CONTROL CIRCUIT FOR SHORT TO GROUND** • Purge solenoid valve and PCM connectors are disconnected. • Inspect for continuity between purge solenoid valve terminal A (wiring harness-side) and body ground. • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground, then go to Step 10.
		No	Go to the next step.
8	**INSPECT PURGE SOLENOID VALVE CONTROL CIRCUIT FOR SHORT TO POWER SUPPLY** • Purge solenoid valve and PCM connectors are disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between purge solenoid valve terminal A (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 10.
		No	Go to the next step.
9	**INSPECT PURGE SOLENOID VALVE CONTROL CIRCUIT FOR OPEN CIRCUIT** • Purge solenoid valve and PCM connectors are disconnected. • Turn the ignition switch off. • Inspect for continuity between purge solenoid valve terminal A (wiring harness-side) and PCM terminal 2C (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to the next step.
10	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0480 [L8, LF]

id0102b1807400

DTC P0480	Cooling fan relay No.1 control circuit malfunction
DETECTION CONDITION	• The PCM monitors the cooling fan relay No.1 control signal voltage and current. If the following conditions are met, the PCM determines that there is the cooling fan relay No.1 control circuit problem. — The PCM turns the cooling fan relay No.1 off, but the voltage of the cooling fan relay No.1 control signal remains low. — The PCM turns the cooling fan relay No.1 on, but the current of the cooling fan relay No.1 control signal remains high. **Diagnostic support note** • This is a continuous monitor (other). • The MIL does not illuminate. • PENDING CODE is available if the PCM detects the above malfunction condition. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Open circuit or short to ground in wiring harness between battery positive terminal and cooling fan relay No.1 terminal E — Short to ground in wiring harness between battery positive terminal and cooling fan relay No.1 terminal E — FAN 7.5 A fuse malfunction — Open circuit in wiring harness between battery positive terminal and cooling fan relay No.1 terminal E • Cooling fan relay No.1 malfunction • PCM connector or terminals malfunction • Short to ground in wiring harness between cooling fan relay No.1 terminal A and PCM terminal 1M • Short to power supply between cooling fan relay No.1 terminal A and PCM terminal 1M • Open circuit in wiring harness between cooling fan relay No.1 terminal A and PCM terminal 1M • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (other related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
3	**INSPECT COOLING FAN RELAY NO.1 POWER CIRCUIT FOR OPEN CIRCUIT OR SHORT TO GROUND** • Turn the ignition switch off. • Remove the cooling fan relay No.1. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between cooling fan relay No.1 terminal E (wiring harness-side) and body ground. • Is the voltage **B+**?	Yes	Go to the next step.
		No	Inspect the FAN 7.5 A fuse. If the fuse is melt: • Repair or replace the wiring harness for a possible short to ground, then replace the fuse. If the fuse is deterioration: • Replace the fuse. If the fuse is normal: • Repair or replace the wiring harness for a possible open circuit. Go to Step 9.
4	**INSPECT COOLING FAN RELAY NO.1** • Turn the ignition switch off. • Inspect the cooling fan relay No.1. (See 09-21-6 RELAY INSPECTION.) • Is there any malfunction?	Yes	Replace the cooling fan relay No.1, then go to Step 9.
		No	Go to the next step.
5	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
6	**INSPECT COOLING FAN RELAY NO.1 CONTROL CIRCUIT FOR SHORT TO GROUND** • Cooling fan relay No.1 is removed and PCM connector is disconnected. • Inspect for continuity between cooling fan relay No.1 terminal A (wiring harness-side) and body ground. • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground, then go to Step 9.
		No	Go to the next step.
7	**INSPECT COOLING FAN RELAY NO.1 CONTROL CIRCUIT FOR SHORT TO POWER SUPPLY** • Cooling fan relay No.1 is removed and PCM connector is disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between cooling fan relay No.1 terminal A (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 9.
		No	Go to the next step.
8	**INSPECT COOLING FAN RELAY NO.1 CONTROL CIRCUIT FOR OPEN CIRCUIT** • Cooling fan relay No.1 is removed and PCM connector is disconnected. • Turn the ignition switch off. • Inspect for continuity between cooling fan relay No.1 terminal A (wiring harness-side) and PCM terminal 1M (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to the next step.
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0481 [L8, LF]

id0102b1815200

DTC P0481	Cooling fan relay No.2 control circuit malfunction
DETECTION CONDITION	• The PCM monitors the cooling fan relay No.2 control signal voltage and current. If the following conditions are met, the PCM determines that there is the cooling fan relay No.2 control circuit problem. — The PCM turns the cooling fan relay No.2 off, but the voltage of the cooling fan relay No.2 control signal remains low. — The PCM turns the cooling fan relay No.2 on, but the current of the cooling fan relay No.2 control signal remains high. **Diagnostic support note** • This is a continuous monitor (other). • The MIL does not illuminate. • PENDING CODE is available if the PCM detects the above malfunction condition. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Open circuit or short to ground in wiring harness between battery positive terminal and cooling fan relay No.2 terminal E — Short to ground in wiring harness between battery positive terminal and cooling fan relay No.2 terminal E — FAN 7.5 A fuse malfunction — Open circuit in wiring harness between battery positive terminal and cooling fan relay No.2 terminal E • Cooling fan relay No.2 malfunction • PCM connector or terminals malfunction • Short to ground in wiring harness between cooling fan relay No.2 terminal A and PCM terminal 1N • Short to power supply between cooling fan relay No.2 terminal A and PCM terminal 1N • Open circuit in wiring harness between cooling fan relay No.2 terminal A and PCM terminal 1N • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (other related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
3	**INSPECT COOLING FAN RELAY NO.2 POWER CIRCUIT FOR OPEN CIRCUIT OR SHORT TO GROUND** • Turn the ignition switch off. • Remove the cooling fan relay No.2. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between cooling fan relay No.2 terminal E (wiring harness-side) and body ground. • Is the voltage **B+**?	Yes	Go to the next step.
		No	Inspect the FAN 7.5 A fuse. If the fuse is melt: • Repair or replace the wiring harness for a possible short to ground, then replace the fuse. If the fuse is deterioration: • Replace the fuse. If the fuse is normal: • Repair or replace the wiring harness for a possible open circuit. Go to Step 9.
4	**INSPECT COOLING FAN RELAY NO.2** • Turn the ignition switch off. • Inspect the cooling fan relay No.2. (See 09-21-6 RELAY INSPECTION.) • Is there any malfunction?	Yes	Replace the cooling fan relay No.2, then go to Step 9.
		No	Go to the next step.
5	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
6	**INSPECT COOLING FAN RELAY NO.2 CONTROL CIRCUIT FOR SHORT TO GROUND** • Cooling fan relay No.2 is removed and PCM connector is disconnected. • Inspect for continuity between cooling fan relay No.2 terminal A (wiring harness-side) and body ground. • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground, then go to Step 9.
		No	Go to the next step.
7	**INSPECT COOLING FAN RELAY NO.2 CONTROL CIRCUIT FOR SHORT TO POWER SUPPLY** • Cooling fan relay No.2 is removed and PCM connector is disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between cooling fan relay No.2 terminal A (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 9.
		No	Go to the next step.
8	**INSPECT COOLING FAN RELAY NO.2 CONTROL CIRCUIT FOR OPEN CIRCUIT** • Cooling fan relay No.2 is removed and PCM connector is disconnected. • Turn the ignition switch off. • Inspect for continuity between cooling fan relay No.2 terminal A (wiring harness-side) and PCM terminal 1N (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to the next step.
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0482 [L8, LF]

id0102b1807800

DTC P0482	Cooling fan relay No.3 control circuit malfunction
DETECTION CONDITION	• The PCM monitors the cooling fan relay No.3 control signal voltage and current. If the following conditions are met, the PCM determines that there is the cooling fan relay No.3 control circuit problem. — The PCM turns the cooling fan relay No.3 off, but the voltage of the cooling fan relay No.3 control signal remains low. — The PCM turns the cooling fan relay No.3 on, but the current of the cooling fan relay No.3 control signal remains high. **Diagnostic support note** • This is a continuous monitor (other). • The MIL does not illuminate. • PENDING CODE is available if the PCM detects the above malfunction condition. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Open circuit or short to ground in wiring harness between battery positive terminal and cooling fan relay No.3 terminal E — Short to ground in wiring harness between battery positive terminal and cooling fan relay No.3 terminal E — FAN 7.5 A fuse malfunction — Open circuit in wiring harness between battery positive terminal and cooling fan relay No.3 terminal E • Cooling fan relay No.3 malfunction • PCM connector or terminals malfunction • Short to ground in wiring harness between cooling fan relay No.3 terminal A and PCM terminal 1R • Short to power supply between cooling fan relay No.3 terminal A and PCM terminal 1R • Open circuit in wiring harness between cooling fan relay No.3 terminal A and PCM terminal 1R • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (other related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
3	**INSPECT COOLING FAN RELAY NO.3 POWER CIRCUIT FOR OPEN CIRCUIT OR SHORT TO GROUND** • Turn the ignition switch off. • Remove the cooling fan relay No.3. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between cooling fan relay No.3 terminal E (wiring harness-side) and body ground. • Is the voltage **B+**?	Yes	Go to the next step.
		No	Inspect the FAN 7.5 A fuse. If the fuse is melt: • Repair or replace the wiring harness for a possible short to ground, then replace the fuse. If the fuse is deterioration: • Replace the fuse. If the fuse is normal: • Repair or replace the wiring harness for a possible open circuit. Go to Step 9.
4	**INSPECT COOLING FAN RELAY NO.3** • Turn the ignition switch off. • Inspect the cooling fan relay No.3. (See 09-21-6 RELAY INSPECTION.) • Is there any malfunction?	Yes	Replace the cooling fan relay No.3, then go to Step 9.
		No	Go to the next step.
5	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
6	**INSPECT COOLING FAN RELAY NO.3 CONTROL CIRCUIT FOR SHORT TO GROUND** • Cooling fan relay No.3 is removed and PCM connector is disconnected. • Inspect for continuity between cooling fan relay No.3 terminal A (wiring harness-side) and body ground. • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground, then go to Step 9.
		No	Go to the next step.
7	**INSPECT COOLING FAN RELAY NO.3 CONTROL CIRCUIT FOR SHORT TO POWER SUPPLY** • Cooling fan relay No.3 is removed and PCM connector is disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between cooling fan relay No.3 terminal A (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 9.
		No	Go to the next step.
8	**INSPECT COOLING FAN RELAY NO.3 CONTROL CIRCUIT FOR OPEN CIRCUIT** • Cooling fan relay No.3 is removed and PCM connector is disconnected. • Turn the ignition switch off. • Inspect for continuity between cooling fan relay No.3 terminal A (wiring harness-side) and PCM terminal 1R (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to the next step.
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0500 [L8, LF]

id0102b1808400

DTC P0500	VSS circuit problem
DETECTION CONDITION	• If an error in the wheel speed signal from the ABS HU/CM or DSC HU/CM is detected by CAN when the following conditions are met: — Neutral switch and clutch pedal position switch: OFF (MT) — Load: **above 40%** — Engine speed: above **2,000 rpm** — Brake switch: OFF — Shift lever position: P, N, R position (AT) **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• ABS HU/CM or DSC HU/CM malfunction — Front ABS wheel-speed sensor malfunction — Connector or terminals malfunction • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY STORED DTC IN ABS HU/CM OR DSC HU/CM** • Turn the ignition switch to the ON position (engine off). • Perform the Reading DTCs Procedure for ABS HU/CM or DSC HU/CM. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	Go to the next step.
4	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Turn the ignition switch to the ON position (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Drive the vehicle under the following conditions for **18 s**: — Engine speed: **above 2,000 rpm** — Gear: Gear is in other than NEUTRAL — Load: **above 40%** • Perform the Pending Trouble Code Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
5	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0505 [L8, LF]

id0102b1808500

DTC P0505	Idle speed control system problem
DETECTION CONDITION	• The PCM cannot control idle speed toward target idle speed while the KOER self test. **Diagnostic support note** • The MIL does not illuminate. • FREEZE FRAME DATA (Mode 2/Mode 12) is not available. • The DTC is not stored in the PCM memory.
POSSIBLE CAUSE	• Drive-by-wire control system malfunction • A/C relay control circuit malfunction • Generator control circuit malfunction • Air cleaner element clogged • Air intake passage clogged • Low engine compression (Over capacity of blow-by gas) • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
2	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off then to the ON position. (engine off) • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P0506, P0507, P0638, P2101, P2107, P2108, P2109, P2112 or P2119 also present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
3	**INSPECT ELECTRONIC THROTTLE CONTROL SYSTEM OPERATION** • Perform the Electronic Throttle Control System Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Does the electronic throttle control system work properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 9.
4	**INSPECT A/C MAGNETIC CLUTCH OPERATION** **Note** • The following test should be performed for the A/C. Go to the next step for vehicles without A/C. • Turn the fan switch off. • Is the magnetic clutch still on?	Yes	Perform the symptom troubleshooting “NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY”. (See 01-03-62 NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [L8, LF].)
		No	Go to the next step.
5	**INSPECT GENERATOR CONTROL CIRCUIT MALFUNCTION** • Apply the electrical load. • Is the engine speed increased?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible short to power supply in generator control circuit, then go to Step 9.
6	**INSPECT AIR CLEANER ELEMENT** • Remove the air cleaner element with the engine running. • Is the engine speed increased?	Yes	Clean or replace the air cleaner element, then go to Step 9. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
7	**INSPECT THROTTLE BODY PASSAGE** • Visually inspect the throttle body passage. • Is the throttle body passage clogged?	Yes	Clean or replace the throttle body passage, then go to Step 9.
		No	Go to the next step.
8	**INSPECT ENGINE COMPRESSION** • Inspect the engine compression. (See 01-10-18 COMPRESSION INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Perform the engine overhaul for repairs, then go to the next step.
		No	Go to the next step.
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0506 [L8, LF]

id0102b1808600

DTC P0506	Idle speed control system RPM lower than expected
DETECTION CONDITION	• The actual idle speed is lower than expected by **100 rpm** for **14 s**, when the brake pedal is depressed (brake switch is on) and steering wheel is held straight ahead (PSP switch is off). **Note** • If the atmospheric pressure is **less than 72.3 kPa {542 mmHg, 21.3inHg}** or intake air temperature is **below –10 °C {14 °F}**, the PCM cancels diagnosis of DTC P0506. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction conditions in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• A/C relay control circuit malfunction • Electronic throttle control system malfunction • Purge solenoid valve malfunction • Air cleaner element clogged • Air intake passage clogged • Low engine compression (over capacity of blow-by gas) • Generator malfunction • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off, then to the ON position (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Are any DTC present?	Yes	Go to the appropriate DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
4	**INSPECT A/C MAGNET CLUTCH OPERATION** **Note** • The following test should be performed for the A/C. Go to the next step for vehicles without A/C. • Turn the fan switch off. • Is the magnet clutch still on?	Yes	Perform the “NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY”. (See 01-03-62 NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [L8, LF].)
		No	Go to the next step.
5	**INSPECT ELECTRONIC THROTTLE CONTROL SYSTEM** • Switch the ignition to off. • Inspect the following parts: — APP sensor (See 01-40-29 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION [L8, LF].) — TP sensor (See 01-40-28 THROTTLE POSITION (TP) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the malfunctioning parts according to the inspection results, then go to Step 11. (See 01-13-20 ACCELERATOR PEDAL REMOVAL/ INSTALLATION [L8, LF].) (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
6	**INSPECT PURGE SOLENOID VALVE** • Inspect the purge solenoid valve. (See 01-16-8 PURGE SOLENOID VALVE INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the purge solenoid valve, then go to Step 11. (See 01-16-7 PURGE SOLENOID VALVE REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
7	**INSPECT AIR CLEANER ELEMENT** • Remove the air cleaner element with the engine running. • Is the engine speed increased?	Yes	Replace the air cleaner element, then go to Step 11. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
8	**INSPECT THROTTLE BODY PASSAGE** • Visually inspect the throttle body passage. • Is the throttle body passage clogged?	Yes	Clean or replace the throttle body passage, then go to Step 11.
		No	Go to the next step.
9	**INSPECT ENGINE COMPRESSION** • Inspect the engine compression. (See 01-10-18 COMPRESSION INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Perform the engine overhaul for repairs, then go to Step 11.
		No	Go to the next step.
10	**INSPECT GENERATOR** • Inspect the generator. (See 01-17-6 GENERATOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the generator, then go to the next step. (See 01-17-5 GENERATOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
11	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Start the engine and warm it up completely. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Depress the brake pedal for **14 s or more**. • Perform the Pending Trouble Code Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTC present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

DTC P0507 [L8, LF]

id0102b1808700

DTC P0507	Idle speed control system RPM higher than expected
DETECTION CONDITION	• The actual idle speed is higher than expected by **200 rpm** for **14 s**, when the brake pedal is depressed (brake switch is on) and steering wheel is held straight ahead (PSP switch is off). **Note** • If the atmospheric pressure is **less than 72.3 kPa {542 mmHg, 21.3inHg}** or intake air temperature is **below –10 °C {14 °F}**, the PCM cancels diagnosis of DTC P0507. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction conditions in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Vacuum hose misconnection • Electronic throttle control system malfunction • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off, then to the ON position (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Are any DTCs present?	Yes	Go to the appropriate DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
4	**INSPECT VACUUM HOSE CONNECTION** • Visually inspect the vacuum hoses connection. • Are the vacuum hoses connecting accurately?	Yes	Go to the next step.
		No	Reconnect the vacuum hose accurately, then go to Step 6.
5	**INSPECT ELECTRONIC THROTTLE CONTROL SYSTEM** • Switch the ignition to off. • Inspect the following parts: — APP sensor (See 01-40-29 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION [L8, LF].) — TP sensor (See 01-40-28 THROTTLE POSITION (TP) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the malfunctioning parts according to the inspection results, then go to the next step. (See 01-13-20 ACCELERATOR PEDAL REMOVAL/ INSTALLATION [L8, LF].) (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
6	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Start the engine and warm it up completely. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Depress the brake pedal for **14 s or more**. • Perform the Pending Trouble Code Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0550 [L8, LF]

id0102b1808800

DTC P0550	PSP switch circuit malfunction
DETECTION CONDITION	• The PCM monitors the PSP switch signal. If the input voltage is low voltage (switch stays on) for **1 min** when the VSS is **above 60.0 km/h {37.4 mph}** and the ECT is **above 60 °C {140 °F}**, the PCM determines that the PSP switch circuit has malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• PSP switch connector or terminals malfunction • PSP switch malfunction • Short to ground in wiring harness between PSP switch terminal A and PCM terminal 2T • PCM connector or terminals malfunction • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT PSP SWITCH CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the PSP connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 7.
		No	Go to the next step.
4	**INSPECT PSP SWITCH** • Inspect the PSP switch. (See 01-40-24 POWER STEERING PRESSURE (PSP) SWITCH INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the PSP switch, then go to Step 7. (See 06-14-21 POWER STEERING OIL PUMP DISASSEMBLY/ASSEMBLY.)
		No	Go to the next step.
5	**INSPECT PSP SWITCH SIGNAL CIRCUIT FOR SHORT TO GROUND** • PSP switch connector is disconnected. • Turn the ignition switch off. • Inspect for continuity between PSP switch terminal (harness-side) A and body ground. • Is there continuity?	Yes	If the short to ground circuit could be detected: • Repair or replace the wiring harness for a possible short to ground. If the short to ground circuit could not be detected: • Replace the PCM (short to ground in PCM internal circuit). (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) Go to Step 7.
		No	Go to the next step.
6	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to the next step.
		No	Go to the next step.
7	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Start the engine and warm it up completely. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Drive the vehicle **above 60.0 km/h {37.3 mph}** for **1 min**. • Perform the PID/DATA Monitor and Record Procedure and access the ECT PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Verify that the ECT PID **above 60 °C {140 °F}**. • Perform the Pending Trouble Code Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0564 [L8, LF]

id0102b1808900

DTC P0564	Cruise control switch circuit malfunction
DETECTION CONDITION	• The PCM monitors the cruise control switch signal. If the PCM detects that any one of following switches (ON OFF, CANCEL, SET/-, RES/+) remains on for **2 min**, the PCM determines that the cruise control switch circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (other). • The MIL does not illuminate. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Clock spring connector or terminals (PCM-side/cruise control switch-side) malfunction • Clock spring malfunction • Short to ground in wiring harness clock spring connector (PCM-side) terminal B and PCM terminal 1AQ • PCM connector or terminals malfunction • Short to power supply in wiring harness clock spring connector (PCM-side) terminal B and PCM terminal 1AQ • Cruise control switch malfunction • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (other related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
3	**INSPECT CLOCK SPRING CONNECTOR AND TERMINALS (PCM-SIDE/CRUISE CONTROL SWITCH-SIDE)** • Turn the ignition switch off. • Disconnect the clock spring connector (PCM-side/cruise control switch-side). • Inspect for poor connection (such as damaged, pulled-out terminals, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
4	**INSPECT CLOCK SPRING** • Inspect the clock spring. (See 08-10-13 CLOCK SPRING INSPECTION.) • Is there any malfunction?	Yes	Replace the clock spring, then go to Step 9. (See 08-10-10 CLOCK SPRING REMOVAL/INSTALLATION.)
		No	Go to the next step.
5	**INSPECT CRUISE CONTROL SWITCH SIGNAL CIRCUIT FOR SHORT TO GROUND** • Clock spring connector is disconnected. • Inspect for continuity between clock spring connector (PCM-side) terminal B (wiring harness-side) and body ground. • Is there continuity?	Yes	If the short to ground circuit could be detected: • Repair or replace the wiring harness for a possible short to ground. If the short to ground circuit could not be detected: • Replace the PCM (short to ground in PCM internal circuit). (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) Go to Step 9.
		No	Go to the next step.
6	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged, pulled-out terminals, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
7	**INSPECT CRUISE CONTROL SWITCH SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY** • Clock spring and PCM connectors are disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between clock spring connector (PCM-side) terminal B (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 9.
		No	Go to the next step.
8	**INSPECT CRUISE CONTROL SWITCH OPERATION** • Inspect the cruise control switch. (See 01-20-1 CRUISE CONTROL SWITCH INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the cruise control switch, then go to the next step. (See 09-20-21 AUDIO CONTROL SWITCH REMOVAL/INSTALLATION.)
		No	Go to the next step.
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Drive the vehicle with cruise control **2 min or more**. • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0571 [L8, LF]

id0102b1809000

DTC P0571	Brake switch circuit problem
DETECTION CONDITION	• The PCM monitors changes in input voltage for brake switch No.1 and No.2. If the PCM detects that both brake switches No.1 and No.2 remain on or off for **15 s**, it determines that the brake switch circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (other). • The MIL does not illuminate. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	**Note** • Inspect the brake switch with it installed to the brake pedal, otherwise the brake switch may not operate normally. If the brake switch is removed from the brake pedal, replace the brake switch with a new one. • Brake switch connector or terminals malfunction • Open circuit in wiring harness between brake switch terminal C and body ground • Open circuit or short to ground in wiring harness between battery positive terminal and brake switch terminal B — Short to ground in wiring harness between battery positive terminal and brake switch terminal B — STOP 10 A fuse malfunction — Open circuit in wiring harness between battery positive terminal and brake switch terminal B • Short to ground in wiring harness between the following terminals: — Brake switch terminal D and PCM terminal 1AB — Brake switch terminal A and PCM terminal 1AF • PCM connector or terminals malfunction • Short to power supply in wiring harness between brake switch terminal D and PCM terminal 1AB • Open circuit in wiring harness between the following terminals: — Brake switch terminal D and PCM terminal 1AB — Brake switch terminal A and PCM terminal 1AF • Brake switch malfunction • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (other related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT BRAKE SWITCH CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect brake switch connector. • Inspect for poor connection (such as damaged, pull-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 10.
		No	Go to the next step.
4	**INSPECT BRAKE SWITCH NO.2 GROUND CIRCUIT FOR OPEN CIRCUIT** • Brake switch connector is disconnected. • Inspect for continuity between brake switch terminal C (wiring harness-side) and body ground. • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 10.
5	**INSPECT BRAKE SWITCH NO.1 POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT OR SHORT TO GROUND** • Brake switch connector is disconnected. • Turn the ignition switch to the ON position. • Measure the voltage between brake switch terminal B (wiring harness-side) and body ground. • Is the voltage **B+**?	Yes	Go to the next step.
		No	Inspect the STOP 10 A fuse. • If the fuse is melt: — Repair or replace the wiring harness for a possible short to ground. — Replace the fuse. • If the fuse is deterioration: — Replace the fuse. • If the fuse is normal: — Repair or replace the wiring harness for a possible open circuit. Go to Step 10.
6	**INSPECT BRAKE SWITCH NO.1 AND NO.2 SIGNAL CIRCUIT FOR SHORT TO GROUND** • Brake switch connector is disconnected. • Turn the ignition switch off. • Inspect for continuity between the following terminal (wiring harness-side) and body ground: — Brake switch terminal D — Brake switch terminal A • Is there continuity?	Yes	If the short to ground circuit could be detected: • Repair or replace the wiring harness for a possible short to ground. If the short to ground circuit could not be detected: • Replace the PCM (short to ground in PCM internal circuit). (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) Go to Step 10.
		No	Go to the next step.
7	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect PCM connector. • Inspect for poor connection (such as damaged, pull-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 10.
		No	Go to the next step.
8	**INSPECT BRAKE SWITCH NO.1 SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY** • Brake switch and PCM connectors are disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between PCM terminal 1AB (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 10.
		No	Go to the next step.
9	**INSPECT BRAKE SWITCH NO.1 AND NO.2 SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Brake switch and PCM connectors are disconnected. • Turn the ignition switch off. • Inspect for continuity between the following terminals (wiring harness-side): — Brake switch terminal D and PCM terminal 1AB — Brake switch terminal A and PCM terminal 1AF • Is there continuity?	Yes	Replace the brake switch, then go to the next step. (See 04-11-5 BRAKE PEDAL REMOVAL/INSTALLATION.)
		No	Repair or replace the wiring harness for a possible open circuit, then go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
10	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Turn the ignition switch to the ON position (engine off). • Depress and release the brake pedal **more than 5 times**. • Perform the DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

DTC P0601 [L8, LF]

id0102b1809100

DTC P0601	PCM memory check sum error
DETECTION CONDITION	• The PCM internal memory check sum error. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• PCM internal memory malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0602 [L8, LF]

id0102b1809200

DTC P0602	PCM programming error
DETECTION CONDITION	• No configuration data in the PCM. **Note** • If the “PCM CONFIGURATION” is successful, the PCM stores DTC P0602 and illuminates the MIL (system is normal). Clear the DTC P0602 using the M-MDS after the “PCM CONFIGURATION”. • The MIL goes out after three drive cycles with no failure. (The DTCs remains in PCM.) **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Configuration has not been completed • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY PCM CONFIGURATION HAS BEEN PERFORMED** • Perform the “PCM CONFIGURATION”. (See 01-40-23 PCM CONFIGURATION [L8, LF].) • Turn the ignition switch to the ON position (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Perform the “PCM CONFIGURATION” again, then go to the next step. (See 01-40-23 PCM CONFIGURATION [L8, LF].)
		No	Go to Step 5.
4	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Turn the ignition switch to the ON position (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
5	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0604 [L8, LF]

id0102b1809300

DTC P0604	PCM random access memory (RAM) error
DETECTION CONDITION	• The PCM internal RAM malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• PCM internal RAM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0606 [L8, LF]

id0102b1809400

DTC P0606	PCM processor error
DETECTION CONDITION	• The PCM internal CPU malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• PCM internal CPU malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0610 [L8, LF]

id0102b1809600

DTC P0610	PCM vehicle options error
DETECTION CONDITION	• The PCM data configuration error. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in PCM memory.
POSSIBLE CAUSE	• Configuration procedure has not been completed • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY PCM CONFIGURATION HAS BEEN PERFORMED** • Perform the “PCM CONFIGURATION”. (See 01-40-23 PCM CONFIGURATION [L8, LF].) • Turn the ignition switch to the ON position (engine off). • Start the engine and warm it up completely. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Perform the “PCM CONFIGURATION” again, then go to the next step. (See 01-40-23 PCM CONFIGURATION [L8, LF].)
		No	Go to Step 5.
4	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Turn the ignition switch to the ON position (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
5	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0638 [L8, LF]

id0102b1809800

DTC P0638	Throttle valve actuator control circuit range/performance problem
DETECTION CONDITION	• The PCM compares the actual TP with the target TP when the engine is running. If the difference is more than the specification, the PCM determines that there is a throttle valve actuator control circuit range/performance problem. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Throttle valve actuator malfunction — Throttle valve malfunction • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off, then to the ON position (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
4	**INSPECT THROTTLE VALVE ACTUATOR** • Inspect the throttle valve actuator. (See 01-13-12 THROTTLE BODY INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the throttle body, then go to the next step. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
5	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
6	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0661 [L8, LF]

id0102b1821700

DTC P0661	Variable intake air solenoid valve circuit low input
DETECTION CONDITION	• The PCM monitors the variable intake air solenoid valve control signal. If the PCM turns variable intake air solenoid valve off but voltage at PCM terminal still remains low, the PCM determines that variable intake air solenoid valve circuit has malfunction. **Diagnostic support note** • This is a continuous monitor (other). • The MIL does not illuminate. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Variable intake air solenoid valve connector or terminals malfunction • Open circuit or short to ground in wiring harness between main relay and variable intake air solenoid valve terminal A — Short to ground in wiring harness between main relay and variable intake air solenoid valve terminal A — EGI COMP1 10 A fuse malfunction — Open circuit in wiring harness between main relay and variable intake air solenoid valve terminal A • Variable intake air solenoid valve malfunction • PCM connector or terminals malfunction • Short to ground in wiring harness between variable intake air solenoid valve terminal B and PCM terminal 2J • Open circuit in wiring harness between variable intake air solenoid valve terminal B and PCM terminal 2J • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (other related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT VARIABLE INTAKE AIR SOLENOID VALVE CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the variable intake air solenoid valve connector. • Inspect for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
4	**INSPECT VARIABLE INTAKE AIR SOLENOID VALVE POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT OR SHORT TO GROUND** • Variable intake air solenoid valve connector is disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between variable intake air solenoid valve terminal A (wiring harness-side) and body ground. • Is the voltage **B+**?	Yes	Go to the next step.
		No	Inspect the EGI COMP1 10 A fuse. If the fuse is melt: • Repair or replace the wiring harness for a possible short to ground, then replace the fuse. If the fuse is deterioration: • Replace the fuse. If the fuse is normal: • Repair or replace the wiring harness for a possible open circuit. Go to Step 9.
5	**INSPECT VARIABLE INTAKE AIR SOLENOID VALVE** • Turn the ignition switch off. • Inspect the variable intake air solenoid valve. (See 01-13-13 VARIABLE INTAKE AIR SOLENOID VALVE INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the variable intake air solenoid valve, then go to Step 9. (See 01-13-12 VARIABLE INTAKE AIR SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
6	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
7	**INSPECT VARIABLE INTAKE AIR SOLENOID VALVE CONTROL CIRCUIT FOR SHORT TO GROUND** • Variable intake air solenoid valve and PCM connectors are disconnected. • Inspect for continuity between variable intake air solenoid valve terminal B (wiring harness-side) and body ground. • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground, then go to Step 9.
		No	Go to the next step.
8	**INSPECT VARIABLE INTAKE AIR SOLENOID VALVE CONTROL CIRCUIT FOR OPEN CIRCUIT** • Variable intake air solenoid valve and PCM connectors are disconnected. • Inspect for continuity between variable intake air solenoid valve terminal B (wiring harness-side) and PCM terminal 2J (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for open circuit, then go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn the ignition switch to the ON position (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

DTC P0662 [L8, LF]

id0102b1821800

DTC P0662	Variable intake air solenoid valve circuit high input
DETECTION CONDITION	• The PCM monitors the variable intake air solenoid valve control signal at PCM terminal. If the PCM turns variable intake air solenoid valve on but voltage at PCM terminal still remains high, the PCM determines that the variable intake air solenoid valve circuit has malfunction. **Diagnostic support note** • This is a continuous monitor (other). • The MIL does not illuminate. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Variable intake air solenoid valve connector or terminals malfunction • Variable intake air solenoid valve malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between variable intake air solenoid valve terminal B and PCM terminal 2J • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (other related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT VARIABLE INTAKE AIR SOLENOID VALVE CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the variable intake air solenoid valve connector. • Inspect for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 7.
		No	Go to the next step.
4	**INSPECT VARIABLE INTAKE AIR SOLENOID VALVE MALFUNCTION** • Inspect the variable intake air solenoid valve. (See 01-13-13 VARIABLE INTAKE AIR SOLENOID VALVE INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the variable intake air solenoid valve, then go to Step 7. (See 01-13-12 VARIABLE INTAKE AIR SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
5	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection. (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 7.
		No	Go to the next step.
6	**INSPECT VARIABLE INTAKE AIR SOLENOID VALVE CONTROL CIRCUIT SHORT TO POWER SUPPLY** • Variable intake air solenoid valve and PCM connectors are disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between variable intake air solenoid valve terminal B (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to the next step.
		No	Go to the next step.
7	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn the ignition switch to the ON position (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0703 [L8, LF]

id0102b1809900

DTC P0703	Brake switch input circuit problem
DETECTION CONDITION	• The PCM monitors changes in input voltage from the brake switch No.1. If the input signal does not change while alternately accelerating and decelerating **8 times**, the PCM determines that the brake switch No.1 circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	**Note** • Inspect the brake switch with it installed to the brake pedal, otherwise the brake switch may not operate normally. If the brake switch is removed from the brake pedal, replace the brake switch with a new one. • Brake switch connector or terminals malfunction • Open circuit or short to ground in wiring harness between battery positive terminal and brake switch terminal B — Short to ground in wiring harness between battery positive terminal and brake switch terminal B — STOP 10 A fuse malfunction — Open circuit in wiring harness between battery positive terminal and brake switch terminal B • Short to ground in wiring harness between brake switch terminal D and PCM terminal 1AB • PCM connector or terminals malfunction • Short to power supply in wiring harness between brake switch terminal D and PCM terminal 1AB • Open circuit in wiring harness between brake switch terminal D and PCM terminal 1AB • Brake switch No.1 malfunction • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT BRAKE SWITCH CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the brake switch connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
4	**INSPECT BRAKE SWITCH NO.1 POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT OR SHORT TO GROUND** • Brake switch connector is disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between brake switch terminal B (wiring harness-side) and body ground. • Is the voltage **B+**?	Yes	Go to the next step.
		No	Inspect the STOP 10 A fuse. • If the fuse is melt: — Repair or replace the wiring harness for a possible short to ground. — Replace the fuse. • If the fuse is deterioration: — Replace the fuse. • If the fuse is normal: — Repair or replace the wiring harness for a possible open circuit. Go to Step 9.
5	**INSPECT BRAKE SWITCH NO.1 SIGNAL CIRCUIT FOR SHORT TO GROUND** • Brake switch connector is disconnected. • Turn the ignition switch off. • Inspect for continuity between brake switch terminal D (wiring harness-side) and body ground. • Is there continuity?	Yes	If the short to ground circuit could be detected: • Repair or replace the wiring harness for a possible short to ground. If the short to ground circuit could not be detected: • Replace the PCM (short to ground in PCM internal circuit). (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) Go to Step 9.
		No	Go to the next step.
6	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
7	**INSPECT BRAKE SWITCH NO.1 SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY** • Brake switch and PCM connectors are disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between brake switch terminal D (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 9.
		No	Go to the next step.
8	**INSPECT BRAKE SWITCH NO.1 SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Brake switch and PCM connectors are disconnected. • Turn the ignition switch off. • Inspect for continuity between brake switch terminal D (wiring harness-side) and PCM terminal 1AB (wiring harness-side). • Is there continuity?	Yes	Replace the brake switch, then go to the next step. (See 04-11-5 BRAKE PEDAL REMOVAL/INSTALLATION.)
		No	Repair or replace the wiring harness for a possible open circuit, then go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Drive the vehicle **30 km/h {18.6 mph} or more**. • Depress and release the brake pedal **more than 8 times** while driving vehicle. • Perform the Pending Trouble Code Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

DTC P0704 [L8, LF]

id0102b1810000

DTC P0704	CPP switch input circuit problem
DETECTION CONDITION	• The PCM monitors changes in input voltage from the CPP switch. If the PCM does not detect the voltage changes while the vehicle runs with vehicle speed **above 30 km/h {19 mph}** and stops **8 times** alternately, the PCM determines that the CPP switch circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• CPP switch connector or terminals malfunction • CPP switch malfunction • Short to ground in wiring harness between CPP switch terminal B and PCM terminal 1D • PCM connector or terminals malfunction • Open circuit in wiring harness between CPP switch terminal D and body ground • Open circuit in wiring harness between CPP switch terminal B and PCM terminal 1D • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY WHETHER MALFUNCTION IS OPEN CIRCUIT OR SHORT TO GROUND** • Connect the M-MDS to the DLC-2. • Perform the PID/DATA Monitor and Record Procedure and access the CPP PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Verify the CPP PID during operating the clutch pedal. • Is the PID normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to Step 13.
		No	If the CPP PID is always On: • Go to the next step. If the CPP PID is always Off: • Go to Step 8.
4	**INSPECT CPP SWITCH CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the CPP switch connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 13.
		No	Go to the next step.
5	**INSPECT CPP SWITCH** • Inspect the CPP switch. (See 01-40-24 CLUTCH PEDAL POSITION (CPP) SWITCH INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the CPP switch, then go to Step 13. (See 05-10-5 CLUTCH PEDAL REMOVAL/ INSTALLATION.)
		No	Go to the next step.
6	**INSPECT CPP SWITCH SIGNAL CIRCUIT FOR SHORT TO GROUND** • CPP switch connector is disconnected. • Inspect for continuity between CPP switch terminal B (wiring harness-side) and body ground. • Is there continuity?	Yes	If the short to ground circuit could be detected: • Repair or replace the wiring harness for a possible short to ground. If the short to ground circuit could not be detected: • Replace the PCM (short to ground in PCM internal circuit). (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) Go to Step 13.
		No	Go to the next step.
7	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 13.
		No	Go to Step 13.
8	**INSPECT CPP SWITCH CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the CPP switch connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 13.
		No	Go to the next step.
9	**INSPECT CPP SWITCH GROUND CIRCUIT FOR OPEN CIRCUIT** • CPP switch connector is disconnected. • Inspect for continuity between CPP switch terminal D (wiring harness-side) and body ground. • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 13.
10	**INSPECT CPP SWITCH** • Inspect the CPP switch. (See 01-40-24 CLUTCH PEDAL POSITION (CPP) SWITCH INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the CPP switch, then go to Step 13. (See 05-10-5 CLUTCH PEDAL REMOVAL/ INSTALLATION.)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
11	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 13.
		No	Go to the next step.
12	**INSPECT CPP SWITCH SIGNAL CIRCUIT FOR OPEN CIRCUIT** • CPP switch and PCM connectors are disconnected. • Inspect for continuity between CPP switch terminal B (wiring harness-side) and PCM terminal 1D (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to the next step.
13	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Start the engine and warm it up completely. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Operate the clutch pedal while the vehicle runs and stops **8 times** alternately. • Perform the Pending Trouble Code Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
14	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P0850 [L8, LF]

id0102b1810100

DTC P0850	Neutral switch input circuit problem
DETECTION CONDITION	• The PCM monitors changes in input voltage from the neutral switch. If the PCM does not detect the voltage changes while driving the vehicle at a vehicle speed **above 30 km/h {19 mph}** and clutch pedal turns press and depress **10 times** repeatedly, the PCM determines that the neutral switch circuit has a malfunction **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Neutral switch connector or terminals malfunction • Neutral switch malfunction • Short to ground in wiring harness between neutral switch terminal 2A and PCM terminal 1X • PCM connector or terminals malfunction • Open circuit in wiring harness between neutral switch terminal 1A and body ground • Open circuit in wiring harness between neutral switch terminal 2A and PCM terminal 1X • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY WHETHER MALFUNCTION IS OPEN CIRCUIT OR SHORT TO GROUND** • Connect the M-MDS to the DLC-2. • Perform the PID/DATA Monitor and Record Procedure and access the CPP/PNP PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Verify the CPP/PNP PID during operating the gear. • Is the PID normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to Step 13.
		No	If the CPP/PNP PID is always Drive: • Go to the next step. If the CPP/PNP PID is always Neural: • Go to Step 8.
4	**INSPECT NEUTRAL SWITCH CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the neutral switch connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 13.
		No	Go to the next step.
5	**INSPECT NEUTRAL SWITCH** • Inspect the neutral switch. (See 01-40-24 NEUTRAL SWITCH INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the neutral switch, then go to Step 13. (See 05-11A-2 NEUTRAL SWITCH REMOVAL/ INSTALLATION [M15M-D].) (See 05-11B-2 NEUTRAL SWITCH REMOVAL/ INSTALLATION [P66M-D].)
		No	Go to the next step.
6	**INSPECT NEUTRAL SWITCH SIGNAL CIRCUIT FOR SHORT TO GROUND** • Neutral switch connector is disconnected. • Inspect for continuity between neutral switch terminal 2A (wiring harness-side) and body ground. • Is there continuity?	Yes	If the short to ground circuit could be detected: • Repair or replace the wiring harness for a possible short to ground. If the short to ground circuit could not be detected: • Replace the PCM (short to ground in PCM internal circuit). (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) Go to Step 13.
		No	Go to the next step.
7	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 13.
		No	Go to Step 13.
8	**INSPECT NEUTRAL SWITCH CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the neutral switch connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 13.
		No	Go to the next step.
9	**INSPECT NEUTRAL SWITCH GROUND CIRCUIT FOR OPEN CIRCUIT** • Neutral switch connector is disconnected. • Inspect for continuity between neutral switch terminal 1A (wiring harness-side) and body ground. • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 13.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
10	**INSPECT NEUTRAL SWITCH** • Inspect the neutral switch. (See 01-40-24 NEUTRAL SWITCH INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the neutral switch, then go to Step 13. (See 05-11A-2 NEUTRAL SWITCH REMOVAL/ INSTALLATION [M15M-D].) (See 05-11B-2 NEUTRAL SWITCH REMOVAL/ INSTALLATION [P66M-D].)
		No	Go to the next step.
11	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 13.
		No	Go to the next step.
12	**INSPECT NEUTRAL SWITCH SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Neutral switch and PCM connectors are disconnected. • Inspect for continuity between neutral switch terminal 2A (wiring harness-side) and PCM terminal 1X (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to the next step.
13	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Start the engine and warm it up completely. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Drive the vehicle **above 30 km/h {19 mph}** and stop the vehicle. • Depress and release the clutch pedal **more than 10 times** during drive cycle. • Perform the Pending Trouble Code Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
14	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P1260 [L8, LF]

id0102b1815600

DTC P1260	Immobilizer system problem
DETECTION CONDITION	• The instrument cluster detects an immobilizer system malfunction. **Diagnostic support note** • This is a continuous monitor (other). • The MIL does not illuminate. • FREEZE FRAME DATA (Mode 2/Mode 12) is not available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Immobilizer system malfunction • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
2	**VERIFY STORED DTC IN INSTRUMENT CLUSTER** • Turn the ignition switch to the ON position (engine off). • Confirm the immobilizer system DTC. (See 09-02A-3 DTC INSPECTION [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 09-02A-4 DTC TABLE [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].)
		No	Go to the next step.
3	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOEO self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2006 [L8, LF]

id0102b1810300

DTC P2006	Variable tumble shutter valve stuck closed
DETECTION CONDITION	• The PCM monitors mass the variable tumble shutter valve position using the variable tumble position sensor. If the PCM turns the variable tumble solenoid valve off but the variable tumble position still remain close for **5 s** (the variable tumble position sensor on), the PCM determines that the variable tumble shutter valve has been stuck closed. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Variable tumble solenoid valve connector or terminals malfunction • Variable tumble solenoid valve malfunction • Variable tumble shutter valve actuator malfunction (stuck closed) • PCM connector or terminals malfunction • Short to ground in wiring harness between variable tumble solenoid valve terminal B and PCM terminal 2I • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Drive the vehicle under the following conditions: — Engine coolant temperature: **above 70 °C {158 °F}** — Engine speed: **below 3,500 rpm** — Throttle opening angle is below as followings: • Engine speed—**below 1,500 rpm**: **above 35%** • Engine speed—**between 1,500—2,500 rpm**: **between 25—35%** • Engine speed—**above 2,500 rpm**: **below 25%** • Perform the Pending Trouble Code Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. • Perform the “INTERMITTENT CONCERN TROUBLESHOOTING”. (See 01-03-69 INTERMITTENT CONCERN TROUBLESHOOTING [L8, LF].)
4	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off, then ON position (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC except P0117:00, P0118:00, P0122:00, P0123:00 and P0335:00 present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
5	**INSPECT VARIABLE TUMBLE SOLENOID VALVE CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the variable tumble solenoid valve connector. • Inspect for poor connection (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 10.
		No	Go to the next step.
6	**INSPECT VARIABLE TUMBLE SOLENOID VALVE** • Inspect the variable tumble solenoid valve. (See 01-13-17 VARIABLE TUMBLE SOLENOID VALVE INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the variable tumble solenoid valve, then go to Step 10. (See 01-13-16 VARIABLE TUMBLE SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
7	**INSPECT VARIABLE TUMBLE SHUTTER VALVE ACTUATOR** • Inspect the variable tumble shutter valve actuator. (See 01-13-19 VARIABLE TUMBLE SHUTTER VALVE ACTUATOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the variable tumble shutter valve actuator, then go to Step 10. (See 01-13-17 VARIABLE TUMBLE SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
8	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection. (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 10.
		No	Go to the next step.
9	**INSPECT VARIABLE TUMBLE SOLENOID VALVE CONTROL CIRCUIT FOR SHORT TO GROUND** • Variable tumble solenoid valve and PCM connectors are disconnected. • Inspect for continuity between variable tumble solenoid valve terminal B (wiring harness-side) and body ground. • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground, then go to the next step.
		No	Go to the next step.
10	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Drive the vehicle under the following conditions: — Engine coolant temperature: **above 70 °C {158 °F}** — Engine speed: **below 3,500 rpm** — Throttle opening angle is below as followings: • Engine speed—**below 1,500 rpm**: **above 35%** • Engine speed—**between 1,500—2,500 rpm**: **between 25—35%** • Engine speed—**above 2,500 rpm**: **below 25%** • Perform the Pending Trouble Code Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2009 [L8, LF]

id0102b1810400

DTC P2009	Variable tumble solenoid valve circuit low input
DETECTION CONDITION	• The PCM monitors the variable tumble solenoid valve control signal. If the PCM turns variable tumble solenoid valve off but voltage at PCM terminal still remains low, the PCM determines that variable tumble solenoid valve circuit has malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Variable tumble solenoid valve connector or terminals malfunction • Open circuit or short to ground in the wiring harness between main relay and variable tumble solenoid valve terminal A — Short to ground in the wiring harness between main relay and variable tumble solenoid valve terminal A — EGI COMP1 10 A fuse malfunction — Open circuit in the wiring harness between main relay and variable tumble solenoid valve terminal A • Variable tumble solenoid valve malfunction • PCM connector or terminals malfunction • Short to ground in the wiring harness between variable tumble solenoid valve terminal B and PCM terminal 2I • Open circuit in the wiring harness between variable tumble solenoid valve terminal B and PCM terminal 2I • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT VARIABLE TUMBLE SOLENOID VALVE CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the variable tumble solenoid valve connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
4	**INSPECT VARIABLE TUMBLE SOLENOID VALVE POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT OR SHORT TO GROUND** • Variable tumble solenoid valve connector is disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between variable tumble solenoid valve terminal A (wiring harness-side) and body ground. • Is the voltage **B+**?	Yes	Go to the next step.
		No	Inspect the EGI COMP1 10 A fuse. If the fuse is melt: • Repair or replace the wiring harness for a possible short to ground, then replace the fuse. If the fuse is deterioration: • Replace the fuse. If the fuse is normal: • Repair or replace the wiring harness for a possible open circuit. Go to Step 9.
5	**INSPECT VARIABLE TUMBLE SOLENOID VALVE** • Turn the ignition switch off. • Inspect the variable tumble solenoid valve. (See 01-13-17 VARIABLE TUMBLE SOLENOID VALVE INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the variable tumble solenoid valve, then go to Step 9. (See 01-13-16 VARIABLE TUMBLE SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
6	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection. (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
7	**INSPECT VARIABLE TUMBLE SOLENOID VALVE CONTROL CIRCUIT FOR SHORT TO GROUND** • Variable tumble solenoid valve and PCM connectors are disconnected. • Inspect for continuity between variable tumble solenoid valve terminal B (wiring harness-side) and body ground. • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground, then go to Step 9.
		No	Go to the next step.
8	**INSPECT VARIABLE TUMBLE SOLENOID VALVE CONTROL CIRCUIT FOR OPEN CIRCUIT** • Variable tumble solenoid valve and PCM connectors are disconnected. • Inspect for continuity between variable tumble solenoid valve terminal B (wiring harness-side) and PCM terminal 2I (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

DTC P2010 [L8, LF]

id0102b1810500

DTC P2010	Variable tumble solenoid valve circuit high input
DETECTION CONDITION	• The PCM monitors the variable tumble solenoid valve control signal at PCM terminal. If the PCM turns variable tumble solenoid valve on but voltage at PCM terminal still remains high, the PCM determines that the variable tumble solenoid valve circuit has malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Variable tumble solenoid valve connector or terminals • Variable tumble solenoid valve malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between variable tumble solenoid valve terminal B and PCM terminal 2I • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT VARIABLE TUMBLE SOLENOID VALVE CONNECTOR OR TERMINALS** • Turn the ignition switch off. • Disconnect the variable tumble solenoid valve connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 7.
		No	Go to the next step.
4	**INSPECT VARIABLE TUMBLE SOLENOID VALVE** • Inspect the variable tumble solenoid valve. (See 01-13-17 VARIABLE TUMBLE SOLENOID VALVE INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the variable tumble solenoid valve, then go to Step 7. (See 01-13-16 VARIABLE TUMBLE SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
5	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 7.
		No	Go to the next step.
6	**INSPECT VARIABLE TUMBLE SOLENOID VALVE CONTROL CIRCUIT FOR SHORT TO POWER SUPPLY** • Variable tumble solenoid valve and PCM connectors are disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between variable tumble solenoid valve terminal B (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to the next step.
		No	Go to the next step.
7	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2088 [L8, LF]

id0102b1810600

DTC P2088	OCV circuit low input
DETECTION CONDITION	• The PCM monitors the OCV voltage. If the PCM detects the OCV control voltage (calculated from the OCV) is below the threshold voltage (calculated from the battery positive voltage), the PCM determines that the OCV circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• OCV connector or terminals malfunction • Open circuit or short to ground in wiring between main relay and OCV terminal B — Short to ground in wiring between main relay and OCV terminal B — EGI COMP1 10 A fuse malfunction — Open circuit in wiring between main relay and OCV terminal B • OCV malfunction • PCM connector or terminals malfunction • Short to ground in wiring between OCV terminal A and PCM terminal 2E • Open circuit in wiring between OCV terminal A and PCM terminal 2E • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT OCV CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the OCV connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
4	**INSPECT OCV POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT OR SHORT TO GROUND** • OCV connector is disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between OCV terminal B (wiring harness-side) and body ground. • Is the voltage **B+**?	Yes	Go to the next step.
		No	Inspect the EGI COMP1 10 A fuse. If the fuse is melt: • Repair or replace the wiring harness for a possible short to ground, then replace the fuse. If the fuse is deterioration: • Replace the fuse. If the fuse is normal: • Repair or replace the wiring harness for a possible open circuit. Go to Step 9.
5	**INSPECT OCV** • Turn the ignition switch off. • Inspect the OCV. (See 01-10-16 OIL CONTROL VALVE (OCV) INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the OCV, then go to Step 9. (See 01-10-17 OIL CONTROL VALVE (OCV) REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
6	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
7	**INSPECT OCV CONTROL CIRCUIT FOR SHORT TO GROUND** • OCV and PCM connectors are disconnected. • Inspect for continuity between OCV terminal A (wiring harness-side) and body ground. • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground, then go to Step 9.
		No	Go to the next step.
8	**INSPECT OCV CONTROL CIRCUIT FOR OPEN CIRCUIT** • OCV and PCM connectors are disconnected. • Inspect for continuity between OCV terminal A (wiring harness-side) and PCM terminal 2E (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to the next step.
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2089 [L8, LF]

id0102b1810700

DTC P2089	OCV circuit high input
DETECTION CONDITION	• The PCM monitors the OCV voltage. If the PCM detects that the OCV control voltage (calculated from the OCV) is above the threshold voltage (calculated from battery positive voltage), the PCM determines that the OCV circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• OCV connector or terminals malfunction • OCV malfunction • PCM connector or terminals malfunction • Short to power supply in wiring between OCV terminal A and PCM terminal 2E • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT OCV CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the OCV connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 7.
		No	Go to the next step.
4	**INSPECT OCV** • Inspect the OCV. (See 01-10-16 OIL CONTROL VALVE (OCV) INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the OCV, then go to Step 7. (See 01-10-17 OIL CONTROL VALVE (OCV) REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
5	**INSPECT PCM CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 7.
		No	Go to the next step.
6	**INSPECT OCV CONTROL CIRCUIT FOR SHORT TO POWER SUPPLY** • OCV and PCM connectors are disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between PCM terminal 2E (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to the next step.
		No	Go to the next step.
7	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2096 [L8, LF]

id0102b1810800

DTC P2096	Target A/F feedback system too lean
DETECTION CONDITION	• The PCM monitors the target A/F fuel trim when under the target A/F feedback control. If the fuel trim is more than the specification, the PCM determines that the target A/F feedback system is too lean. **Diagnostic support note** • This is a continuous monitor (fuel system). • The MIL illuminates if the PCM detects the above malfunctioning condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• HO2S malfunction — Leakage exhaust gas — HO2S malfunction • IAT sensor malfunction • Erratic signal to PCM — ECT sensor signal malfunction — MAF sensor signal malfunction — TP sensor signal malfunction — VSS signal malfunction • A/F sensor malfunction — Leakage exhaust gas — A/F sensor malfunction • MAF sensor malfunction • Air suction in intake air system • Improper operation of fuel injector • Fuel supply system malfunction or improper fuel line pressure — Leakage fuel — Insufficient fuel line pressure — Fuel pump unit malfunction • Improper operation of ignition system — Ignition coil related wiring harness malfunction — Ignition coil malfunction — Spark plug malfunction • Insufficient engine compression • ECT sensor malfunction • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (fuel system related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off then to the ON position (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P2177 or P2187 also present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-178 DTC P2177 [L8, LF].) (See 01-02-185 DTC P2187 [L8, LF].)
		No	Go to the next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA (MODE 2)** • Perform the Freeze Frame PID Data Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P2096 on FREEZE FRAME DATA (Mode 2)?	Yes	Go to the next step.
		No	Go to the DTC troubleshooting on FREEZE FRAME DATA (Mode 2). (See 01-02-12 DTC TABLE [L8, LF].)
5	**INSPECT HO2S** • Inspect the HO2S. (See 01-40-31 HEATED OXYGEN SENSOR (HO2S) INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Go to the next step.
		No	Go to Step 7.
6	**INSPECT EXHAUST GAS LEAKAGE** • Visually inspect for the exhaust gas leakage between TWC and HO2S. • Is there gas leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
		No	Replace the HO2S, then go to Step 21. (See 01-40-30 HEATED OXYGEN SENSOR (HO2S) REMOVAL/INSTALLATION [L8, LF].)
7	**INSPECT IAT SENSOR** • Inspect the IAT sensor. (See 01-40-27 INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the MAF/IAT sensor, then go to Step 21. (See 01-40-26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
8	**VERIFY CURRENT INPUT SIGNAL STATUS** • Connect the M-MDS to the DLC-2. • Perform the PID/DATA Monitor and Record Procedure and access the following PIDs. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) — ECT — MAF — TP REL — VSS • Are the PIDs normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
9	**VERIFY CURRENT INPUT SIGNAL STATUS UNDER FREEZE FRAME DATA (MODE 2) CONDITION** • Connect the M-MDS to the DLC-2. • Perform the PID/DATA Monitor and Record Procedure and access the same PIDs as in Step 4 under the FREEZE FRAME DATA (Mode 2) condition. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Are the PIDs normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
10	**INSPECT A/F SENSOR** • Inspect the A/F sensor. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Go to the next step.
		No	Go to Step 12.
11	**INSPECT EXHAUST GAS LEAKAGE** • Visually inspect for the exhaust gas leakage between exhaust manifold and A/F sensor. • Is there gas leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
		No	Replace the A/F sensor, then go to Step 21. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
12	**VERIFY CURRENT INPUT SIGNAL STATUS OF MAF SENSOR** • Connect the M-MDS to the DLC-2. • Start the engine. • Perform the PID/DATA Monitor and Record Procedure and access the MAF PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Verify that the MAF PID changes quickly according to engine speed. • Is the PID normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to Step 14.
		No	Go to the next step.
13	**INSPECT INTAKE AIR SYSTEM FOR EXCESSIVE AIR SUCTION** • Visually inspect the hose in intake air system for looseness, cracks or damages. • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
		No	Replace the MAF/IAT sensor, then go to Step 21. (See 01-40-26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/ INSTALLATION [L8, LF].)
14	**INSPECT FUEL INJECTOR OPERATION** • Perform the Fuel Injector Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
		No	Go to the next step.
15	**INSPECT FUEL LINE PRESSURE** • Perform the “FUEL LINE PRESSURE INSPECTION”. (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Go to the next step.
		No	Go to Step 17.
16	**INSPECT FUEL SYSTEM FOR FUEL LEAKAGE** • Visually inspect the fuel leakage in the fuel system. • Is there fuel leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
		No	Inspect the fuel filters for the foreign material or stain inside the fuel filter (low-pressure side). If the foreign material or stain is found inside the fuel filter (low-pressure side): • Clean the fuel tank and fuel filter. If normal: • Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) Go to Step 21.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
17	**INSPECT IGNITION COIL AND RELATED WIRING HARNESS** • Inspect the ignition coil and related wiring harness condition (intermittent open or short circuit) for all cylinders. • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
		No	Go to the next step.
18	**INSPECT IGNITION SYSTEM OPERATION** • Perform the Spark Test. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Is strong blue spark visible at each cylinder?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
19	**INSPECT ENGINE COMPRESSION** • Inspect the engine compression. (See 01-10-18 COMPRESSION INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Perform engine overhaul for repairs, then go to Step 21.
		No	Go to the next step.
20	**INSPECT ECT SENSOR** • Inspect the ECT sensor. (See 01-40-26 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the ECT sensor, then go to the next step. (See 01-40-25 ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
21	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the Drive Mode 03 (A/F sensor heater, HO2S heater, A/F sensor, HO2S and TWC Repair Verification). (See 01-02-10 OBD DRIVE MODE [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
22	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2097 [L8, LF]

id0102b1810900

DTC P2097	Target A/F feedback system too rich
DETECTION CONDITION	• The PCM monitors the target A/F fuel trim when under the target A/F feedback control. If the fuel trim is less than specification, the PCM determines that the target A/F feedback system is too rich. **Diagnostic support note** • This is a continuous monitor (fuel system). • The MIL illuminates if the PCM detects the above malfunctioning condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction conditions during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• HO2S malfunction — Leakage exhaust gas — HO2S malfunction • IAT sensor malfunction • Erratic signal to PCM — ECT sensor signal malfunction — MAF sensor signal malfunction — TP sensor signal malfunction — VSS signal malfunction • A/F sensor malfunction — Leakage exhaust gas — A/F sensor malfunction • Improper operation of fuel injector • Excessive fuel line pressure — Pressure regulator (built-in fuel pump unit) malfunction — Fuel pump unit malfunction • Purge system malfunction — Purge solenoid valve improper operation — Purge solenoid valve malfunction (stuck open) — Purge solenoid valve related wiring harness malfunction • Improper operation of ignition system — Ignition coil related wiring harness malfunction — Ignition coil malfunction — Spark plug malfunction • Insufficient engine compression • ECT sensor malfunction • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (fuel system related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off, then to the ON position (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P2178 or P2188 also present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-181 DTC P2178 [L8, LF].) (See 01-02-189 DTC P2188 [L8, LF].)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA (MODE 2)** • Perform the Freeze Frame PID Data Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P2097 on FREEZE FRAME DATA (Mode 2)?	Yes	Go to the next step.
		No	Go to the DTC troubleshooting on FREEZE FRAME DATA (Mode 2). (See 01-02-12 DTC TABLE [L8, LF].)
5	**INSPECT HO2S** • Inspect the HO2S. (See 01-40-31 HEATED OXYGEN SENSOR (HO2S) INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Go to the next step.
		No	Go to Step 7.
6	**INSPECT EXHAUST GAS LEAKAGE** • Visually inspect for the exhaust gas leakage between TWC and HO2S. • Is there gas leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 20.
		No	Replace the HO2S, then go to Step 20. (See 01-40-30 HEATED OXYGEN SENSOR (HO2S) REMOVAL/INSTALLATION [L8, LF].)
7	**INSPECT IAT SENSOR** • Inspect the IAT sensor. (See 01-40-27 INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the MAF/IAT sensor, then go to Step 20. (See 01-40-26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
8	**VERIFY CURRENT INPUT SIGNAL STATUS** • Connect the M-MDS to the DLC-2. • Perform the PID/DATA Monitor and Record Procedure and access the following PIDs. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) — ECT — MAF — TP REL — VSS • Are the PIDs normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 20.
9	**VERIFY CURRENT INPUT SIGNAL STATUS UNDER FREEZE FRAME DATA (MODE 2) CONDITION** • Connect the M-MDS to the DLC-2. • Perform the PID/DATA Monitor and Record Procedure and access the same PIDs as in Step 4 under the FREEZE FRAME DATA (Mode 2) condition. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Are the PIDs normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 20.
10	**INSPECT A/F SENSOR** • Inspect the A/F sensor. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Go to the next step.
		No	Go to Step 12.
11	**INSPECT EXHAUST GAS LEAKAGE** • Visually inspect for the exhaust gas leakage between exhaust manifold and A/F sensor. • Is there gas leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 20.
		No	Replace the A/F sensor, then go to Step 20. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
12	**INSPECT FUEL INJECTOR OPERATION** • Perform the Fuel Injector Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 20.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
13	**INSPECT FUEL LINE PRESSURE** • Perform the "FUEL LINE PRESSURE INSPECTION". (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the fuel pump unit, then go to Step 20. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
14	**INSPECT LONG TERM FUEL TRIM** • Connect the M-MDS to the DLC-2. • Perform the PID/DATA Monitor and Record Procedure and access the LONGFT1 PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Compare the LONGFT1 PID with recorded FREEZE FRAME DATA (Mode 2) at Step 1. • Is the LONGFT1 PID above FREEZE FRAME DATA (Mode 2)?	Yes	Go to the next step.
		No	Go to Step 16.
15	**INSPECT PURGE SOLENOID VALVE OPERATION** • Perform the Purge Control System Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 20.
		No	Go to the next step.
16	**INSPECT IGNITION COIL AND RELATED WIRING HARNESS** • Inspect the ignition coil and related wiring harness condition (intermittent open or short circuit) for all cylinders. • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 20.
		No	Go to the next step.
17	**INSPECT IGNITION SYSTEM OPERATION** • Perform the Spark Test. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Is strong blue spark visible at each cylinder?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 20.
18	**INSPECT ENGINE COMPRESSION** • Inspect the engine compression. (See 01-10-18 COMPRESSION INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Perform engine overhaul for repairs, then go to Step 20.
		No	Go to the next step.
19	**INSPECT ECT SENSOR** • Inspect the ECT sensor. (See 01-40-26 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the ECT sensor, then go to the next step. (See 01-40-25 ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
20	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the Drive Mode 03 (A/F sensor heater, HO2S heater, A/F sensor, HO2S and TWC Repair Verification). (See 01-02-10 OBD DRIVE MODE [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
21	**VERIFY AFTER REPAIR PROCEDURE** • Perform the "AFTER REPAIR PROCEDURE". (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2101 [L8, LF]

id0102b1811100

DTC P2101	Throttle valve actuator circuit range/performance problem
DETECTION CONDITION	• The PCM monitors the input voltage from the drive-by-wire relay when the PCM turns the drive-by-wire relay on. If the input voltage is **less than 5.0 V**, the PCM determines that the drive-by-wire relay control circuit voltage is low. • The PCM monitors the input voltage from the drive-by-wire relay when the PCM turns the drive-by-wire relay off. If the input voltage is **more than 5.0 V** the PCM determines that the drive-by-wire relay control circuit voltage is high. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction conditions during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Main relay and/or drive-by-wire relay malfunction • PCM connector or terminals malfunction • Main relay related fuse malfunction • Main relay related wiring harness malfunction • Drive-by-wire relay related wiring harness malfunction • Throttle body connector or terminals malfunction • TP sensor No.1/No.2 related wiring harness malfunction • TP sensor No.1/No.2 malfunction • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off, then to the ON position (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Are any DTCs present?	Yes	Go to the appropriate DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA (MODE 2)** • Perform the Freeze Frame PID Data Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P2101 on FREEZE FRAME DATA (Mode 2)?	Yes	Go to the next step.
		No	Go to the DTC troubleshooting on FREEZE FRAME DATA (Mode 2). (See 01-02-12 DTC TABLE [L8, LF].)
5	**INSPECT RELAY** • Turn the ignition switch off. • Remove the main relay and drive-by-wire relay. • Inspect the main relay and drive-by-wire relay. (See 09-21-6 RELAY INSPECTION.) • Is there any malfunction?	Yes	Replace the main relay and/or drive-by-wire relay, then go to Step 22.
		No	Go to the next step.
6	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged, pulled out terminals, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 22.
		No	Go to the next step.
7	**INSPECT MAIN RELAY AND DRIVE-BY-WIRE RELAY CIRCUITS FOR SHORT TO POWER SUPPLY** • Main relay and drive-by-wire relay are removed, and PCM connector is disconnected. • Turn the ignition switch to the ON position (Engine off). • Measure the voltage between the following terminals (wiring harness-side) and body ground: — PCM terminal 1BE — PCM terminal 1BF — PCM terminal 1AX • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 22.
		No	Go to the next step.
8	**INSPECT MAIN RELAY OUTPUT VOLTAGE** • Turn the ignition switch off. • Install the main relay and drive-by-wire relay. • Reconnect the PCM connector. • Turn the ignition switch to the ON position (Engine off). • Measure the voltage between PCM terminal 1BE (wiring harness-side) and body ground. • Is the voltage **B+**?	Yes	Go to Step 12.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
9	**INSPECT MAIN RELAY POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT OR SHORT TO GROUND** • Turn the ignition switch off. • Remove the main relay. • Turn the ignition switch to the ON position (Engine off). • Measure the voltage between main relay terminal E (wiring harness-side) and body ground. • Is the voltage **B+**?	Yes	Go to the next step.
		No	Inspect the ETV 10 A fuse. If the fuse is melt: • Repair or replace the wiring harness for a possible short to ground, then replace the fuse. If the fuse is deterioration: • Replace the fuse. If the fuse is normal: • Repair or replace the wiring harness for a possible open circuit. Go to Step 22.
10	**INSPECT MAIN RELAY CIRCUITS FOR SHORT TO GROUND** • Main relay is removed. • Turn the ignition switch off. • Disconnect the PCM connector. • Inspect for continuity between the following terminals (wiring harness-side) and body ground: — PCM terminal 1BE — PCM terminal 1Q • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground. If the PCM terminal 1BE was shorted to ground: • Replace the EGI COMP2 10 A fuse, if necessary. Go to Step 22.
		No	Go to the next step.
11	**INSPECT MAIN RELAY CIRCUITS FOR OPEN CIRCUIT** • Main relay is removed and PCM connector is disconnected. • Inspect for continuity between the following terminals (wiring harness-side): — Main relay terminal C and PCM terminal 1BE — Main relay terminal A and PCM terminal 1Q • Is there continuity?	Yes	Go to Step 22.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 22.
12	**INSPECT DRIVE-BY-WIRE RELAY OUTPUT VOLTAGE** • Measure the voltage between PCM terminal 1BF (wiring harness-side) and body ground. • Is the voltage **B+**?	Yes	Go to Step 16.
		No	Go to the next step.
13	**INSPECT DRIVE-BY-WIRE RELAY POWER SUPPLY CIRCUITS FOR OPEN CIRCUIT** • Turn the ignition switch off. • Remove the drive-by-wire relay. • Turn the ignition switch to the ON position (Engine off). • Measure the voltage between the following terminals (wiring harness-side) and body ground: — Drive-by-wire relay terminal C — Drive-by-wire relay terminal E • Is the voltage **B+**?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 22.
14	**INSPECT DRIVE-BY-WIRE RELAY CIRCUITS FOR SHORT TO GROUND** • Drive-by-wire relay is removed. • Turn the ignition switch off. • Disconnect the PCM connector. • Inspect for continuity between the following terminals (wiring harness-side) and body ground: — PCM terminal 1BF — PCM terminal 1AX • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground, then go to Step 22.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
15	**INSPECT DRIVE-BY-WIRE RELAY CIRCUITS FOR OPEN CIRCUIT** • Drive-by-wire relay is removed and PCM connector is disconnected. • Inspect for continuity between the following terminals (wiring harness-side): — Drive-by-wire relay terminal D and PCM terminal 1BF — Drive-by-wire relay terminal A and PCM terminal 1AX • Is there continuity?	Yes	Go to Step 22.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 22.
16	**INSPECT THROTTLE BODY CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the throttle body connector. • Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 22.
		No	Go to the next step.
17	**INSPECT TP SENSOR NO.1/NO.2 CIRCUITS FOR SHORT TO GROUND** • Throttle body connector is disconnected. • Disconnect the PCM connector. • Inspect for continuity between the following terminals (wiring harness-side) and body ground: — Throttle body terminal E — Throttle body terminal F — Throttle body terminal D • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground, then go to Step 22.
		No	Go to the next step.
18	**INSPECT TP SENSOR NO.1/NO.2 CIRCUIT FOR SHORT TO EACH OTHER** • Throttle body and PCM connectors are disconnected. • Inspect for continuity between throttle body terminal E, F, C and D (wiring harness-side). • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to each other, then go to Step 22.
		No	Go to the next step.
19	**INSPECT TP SENSOR NO.1/NO.2 CIRCUITS FOR SHORT TO POWER SUPPLY** • Throttle body and PCM connectors are disconnected. • Turn the ignition switch to the ON position (Engine off). • Measure the voltage between the following terminals (wiring harness-side) and body ground: — Throttle body terminal F — Throttle body terminal D • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 22.
		No	Go to the next step.
20	**INSPECT TP SENSOR NO.1/NO.2 CIRCUIT FOR OPEN CIRCUIT** • Throttle body and PCM connectors are disconnected. • Turn the ignition switch off. • Inspect for continuity between the following terminals (wiring harness-side): — Throttle body terminal E and PCM terminal 2AO — Throttle body terminal F and PCM terminal 2AK — Throttle body terminal C and PCM terminal 2AP — Throttle body terminal D and PCM terminal 2AL • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 22.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
21	**INSPECT TP SENSOR NO.1/NO.2** • Reconnect the throttle body connector. • Inspect the TP sensor No.1/No.2. (See 01-40-28 THROTTLE POSITION (TP) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the throttle body, then go to the next step. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
22	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn the ignition switch to the ON position (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Turn the ignition switch off, then to the ON position (engine off). • Perform the KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
23	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

DTC P2107 [L8, LF]

id0102b1811400

DTC P2107	Throttle valve actuator control module processor error
DETECTION CONDITION	• Throttle valve actuator control module internal processor error. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• PCM malfunction — Throttle valve actuator control module internal processor malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2108 [L8, LF]

id0102b1811500

DTC P2108	Throttle valve actuator control module performance error
DETECTION CONDITION	• The PCM internal malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• PCM internal malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2109 [L8, LF]

id0102b1840200

DTC P2109	TP sensor minimum stop range/performance problem
DETECTION CONDITION	• The PCM monitors the minimum TP when the closed TP learning is completed. If the TP is **less than 6.03%** or **more than 18.7%**, the PCM determines that there is a TP sensor minimum stop range/performance problem. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Throttle valve actuator malfunction — Throttle valve malfunction • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT THROTTLE VALVE ACTUATOR** • Inspect the throttle valve actuator. (See 01-13-12 THROTTLE BODY INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the throttle body, then go to the next step. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
4	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
5	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2112 [L8, LF]

id0102b1840300

DTC P2112	Throttle valve actuator control system range/performance problem
DETECTION CONDITION	• The PCM monitors the throttle valve actuator control duty ratio when the engine is running. If the duty ratio is **more than 95%**, the PCM determines that there is a throttle valve actuator control system range/performance problem. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• PCM malfunction — Throttle valve actuator control module malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2119 [L8, LF]

id0102b1811600

DTC P2119	Throttle valve actuator control throttle body range/performance problem
DETECTION CONDITION	• The PCM compares the actual TP with initial setting TP when the ignition switch is off. If the difference is less than the specification, the PCM determines that there is a throttle valve actuator control circuit range/performance problem. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunctioning condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction conditions during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Throttle valve actuator malfunction — Throttle valve malfunction • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT THROTTLE VALVE ACTUATOR** • Inspect the throttle valve actuator. (See 01-13-12 THROTTLE BODY INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the throttle body, then go to the next step. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
4	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Turn the ignition switch to the ON position (engine off), then off. • Perform the KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
5	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2122 [L8, LF]

id0102b1811700

DTC P2122	APP sensor No.1 circuit low input
DETECTION CONDITION	• The PCM monitors the input voltage from APP sensor No.1 when the engine is running. If the input voltage is **less than 0.35 V**, the PCM determines that the APP sensor No.1 circuit input voltage is low. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• APP sensor connector or terminals malfunction • Short to ground in wiring harness between the following terminals: — APP sensor terminal D and PCM terminal 1AL — APP sensor terminal F and PCM terminal 1AO • PCM connector or terminals malfunction • APP sensor No.1 signal circuit and ground circuit are shorted to each other • Open circuit in wiring harness between the following terminals: — APP sensor terminal D and PCM terminal 1AL — APP sensor terminal F and PCM terminal 1AO • APP sensor No.1 malfunction • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT APP SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the APP sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
4	**INSPECT APP SENSOR NO.1 CIRCUIT FOR SHORT TO GROUND** • APP sensor connector is disconnected. • Inspect for continuity between the following terminals (wiring harness-side) and body ground: — APP sensor terminal D — APP sensor terminal F • Is there continuity?	Yes	If the short to ground circuit could be detected: • Repair or replace the wiring harness for a possible short to ground. If the short to ground circuit could not be detected: • Replace the PCM (short to ground in PCM internal circuit). (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) Go to Step 9.
		No	Go to the next step.
5	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
6	**INSPECT APP SENSOR NO.1 SIGNAL AND GROUND CIRCUIT FOR SHORT TO EACH OTHER** • APP sensor and PCM connectors are disconnected. • Inspect for continuity between APP sensor terminals F and E (wiring harness-side). • Is there continuity?	Yes	Repair or replace the suspected wiring harness, then go to Step 9.
		No	Go to the next step.
7	**INSPECT APP SENSOR NO.1 CIRCUIT FOR OPEN CIRCUIT** • APP sensor and PCM connectors are disconnected. • Inspect for continuity between the following terminals (wiring harness-side): — APP sensor terminal D and PCM terminal 1AL — APP sensor terminal F and PCM terminal 1AO • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 9.
8	**INSPECT APP SENSOR NO.1** • Reconnect the APP sensor and PCM connectors. • Inspect the APP sensor No.1. (See 01-40-29 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the APP sensor, then go to the next step. (See 01-13-20 ACCELERATOR PEDAL REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

DTC P2123 [L8, LF]

id0102b1811800

DTC P2123	APP sensor No.1 circuit high input
DETECTION CONDITION	• The PCM monitors the input voltage from APP sensor No.1 when the engine is running. If the input voltage is **above 4.8 V**, the PCM determines that the APP sensor No.1 circuit input voltage is high. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTCs is stored in the PCM memory.
POSSIBLE CAUSE	• APP sensor connector or terminals malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between APP sensor terminal F and PCM terminal 1AO • APP sensor No.1 power supply circuit and signal circuit are shorted to each other • Open circuit in wiring harness between APP sensor terminal E and PCM terminal 1AS • APP sensor No.1 malfunction • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT APP SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the APP sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
4	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
5	**INSPECT APP SENSOR NO.1 SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY** • APP sensor and PCM connectors are disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between APP sensor terminal F (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 9.
		No	Go to the next step.
6	**INSPECT APP SENSOR NO.1 POWER SUPPLY AND SIGNAL CIRCUIT FOR SHORT TO EACH OTHER** • APP sensor and PCM connectors are disconnected. • Turn the ignition switch off. • Inspect for continuity between APP sensor terminal D and F (wiring harness-side). • Is there continuity?	Yes	Repair or replace the suspected wiring harness, then go to Step 9.
		No	Go to the next step.
7	**INSPECT APP SENSOR NO.1 GROUND CIRCUIT FOR OPEN CIRCUIT** • APP sensor and PCM connectors are disconnected. • Inspect for continuity between APP sensor terminal E (wiring harness-side) and PCM terminal 1AS (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 9.
8	**INSPECT APP SENSOR NO.1** • Reconnect the APP sensor and PCM connectors. • Inspect APP sensor No.1. (See 01-40-29 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the APP sensor, then go to the next step. (See 01-13-20 ACCELERATOR PEDAL REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

DTC P2127 [L8, LF]

id0102b1811900

DTC P2127	APP sensor No.2 circuit low input
DETECTION CONDITION	• The PCM monitors the input voltage from APP sensor No.2 when the engine is running. If the input voltage is **less than 0.35 V**, the PCM determines that the APP sensor No.2 circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• APP sensor connector or terminals malfunction • Short to ground in wiring harness between the following terminals: — APP sensor terminal A and PCM terminal 1AJ — APP sensor terminal C and PCM terminal 1AP • PCM connector or terminals malfunction • APP sensor No.2 signal circuit and ground circuit are shorted to each other • Open circuit in wiring harness between the following terminals: — APP sensor terminal A and PCM terminal 1AJ — APP sensor terminal C and PCM terminal 1AP • APP sensor No.2 malfunction • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT APP SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the APP sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
4	**INSPECT APP SENSOR NO.2 CIRCUIT FOR SHORT TO GROUND** • APP sensor connector is disconnected. • Inspect for continuity between the following terminals (wiring harness-side) and body ground: — APP sensor terminal A — APP sensor terminal C • Is there continuity?	Yes	If the short to ground circuit could be detected: • Repair or replace the wiring harness for a possible short to ground. If the short to ground circuit could not be detected: • Replace the PCM (short to ground in PCM internal circuit). (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) Go to Step 9.
		No	Go to the next step.
5	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
6	**INSPECT APP SENSOR NO.2 SIGNAL AND GROUND CIRCUIT FOR SHORT TO EACH OTHER** • APP sensor and PCM connectors are disconnected. • Inspect for continuity between APP sensor terminals C and B (wiring harness-side). • Is there continuity?	Yes	Repair or replace the suspected wiring harness, then go to Step 9.
		No	Go to the next step.
7	**INSPECT APP SENSOR NO.2 CIRCUIT FOR OPEN CIRCUIT** • APP sensor and PCM connectors are disconnected. • Inspect for continuity between the following terminals (wiring harness-side): — APP sensor terminal A and PCM terminal 1AJ — APP sensor terminal C and PCM terminal 1AP • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 9.
8	**INSPECT APP SENSOR NO.2** • Reconnect the APP sensor and PCM connectors. • Inspect the APP sensor No.2. (See 01-40-29 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the APP sensor, then go to the next step. (See 01-13-20 ACCELERATOR PEDAL REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

DTC P2128 [L8, LF]

id0102b1812000

DTC P2128	APP sensor No.2 circuit high input
DETECTION CONDITION	• The PCM monitors the input voltage from APP sensor No.2 when the engine is running. If the input voltage is **more than 4.8 V**, the PCM determines that the APP sensor No.2 circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• APP sensor connector or terminals malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between APP sensor terminal C and PCM terminal 1AP • APP sensor No.2 power supply circuit and signal circuit are shorted to each other • Open circuit in wiring harness between APP sensor terminal B and PCM terminal 1AV • APP sensor No.2 malfunction • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT APP SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the APP sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
4	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
5	**INSPECT APP SENSOR NO.2 SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY** • APP sensor and PCM connectors are disconnected. • Turn the ignition switch to the ON position (engine off). • Measure the voltage between APP sensor terminal C (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 9.
		No	Go to the next step.
6	**INSPECT APP SENSOR NO.2 POWER SUPPLY AND SIGNAL CIRCUIT FOR SHORT TO EACH OTHER** • APP sensor and PCM connectors are disconnected. • Turn the ignition switch off. • Inspect for continuity between APP sensor terminal A and C (wiring harness-side). • Is there continuity?	Yes	Repair or replace the suspected wiring harness, then go to Step 9.
		No	Go to the next step.
7	**INSPECT APP SENSOR NO.2 GROUND CIRCUIT FOR OPEN CIRCUIT** • APP sensor and PCM connectors are disconnected. • Inspect for continuity between APP sensor terminal B (wiring harness-side) and PCM terminal 1AV (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 9.
8	**INSPECT APP SENSOR NO.2** • Reconnect the APP sensor and PCM connectors. • Inspect APP sensor No.2. (See 01-40-29 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the APP sensor, then go to the next step. (See 01-13-20 ACCELERATOR PEDAL REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2135 [L8, LF]

id0102b1812100

DTC P2135	TP sensor No.1/No.2 voltage correlation problem
DETECTION CONDITION	• The PCM compares the input voltage from TP sensor No.1 with the input voltage from TP sensor No.2 when the engine is running. If the difference is more than the specification, the PCM determines that there is a TP sensor No.1/No.2 voltage correlation problem. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Throttle body connector or terminals malfunction • PCM connector or terminals malfunction • TP sensor No.1/No.2 malfunction • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT THROTTLE BODY CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the throttle body connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 6.
		No	Go to the next step.
4	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 6.
		No	Go to the next step.
5	**INSPECT TP SENSOR NO.1/NO.2** • Reconnect the throttle body and PCM connectors. • Inspect the TP sensor No.1/No.2. (See 01-40-28 THROTTLE POSITION (TP) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the throttle body, then go to the next step. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
6	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2138 [L8, LF]

id0102b1812200

DTC P2138	APP sensor No.1/No.2 voltage correlation problem
DETECTION CONDITION	• The PCM compares the input voltage from APP sensor No.1 with the input voltage from APP sensor No.2 when the engine is running. If the difference is more than the specification, the PCM determines that there is an APP sensor No.1/No.2 angle correlation problem. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• APP sensor connector or terminals malfunction • PCM connector or terminals malfunction • APP sensor No.1/No.2 malfunction • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT APP SENSOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the APP sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 6.
		No	Go to the next step.
4	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 6.
		No	Go to the next step.
5	**INSPECT APP SENSOR NO.1/NO.2** • Reconnect the APP sensor and PCM connectors. • Inspect the APP sensor No.1/No.2. (See 01-40-29 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the APP sensor, then go to the next step. (See 01-13-20 ACCELERATOR PEDAL REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
6	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2177 [L8, LF]

id0102b1812300

DTC P2177	Fuel system too lean at off idle
DETECTION CONDITION	• The PCM monitors short term fuel trim (SHRTFT), long term fuel trim (LONGFT) during closed loop fuel control at off-idle. If the LONGFT and the sum total of these fuel trims exceed preprogrammed criteria. The PCM determines that fuel system is too lean at off-idle. **Diagnostic support note** • This is a continuous monitor (fuel system). • The MIL illuminates if the PCM detects the above malfunctioning condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction conditions during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Erratic signal to PCM — APP sensor signal malfunction — ECT sensor signal malfunction — MAF sensor signal malfunction — TP sensor signal malfunction — VSS signal malfunction • A/F sensor heater malfunction • A/F sensor malfunction — A/F sensor looseness — Exhaust system leakage — A/F sensor deterioration • MAF sensor malfunction • Air suction in intake air system • Purge system malfunction — Purge solenoid valve improper operation — Improper connection purge solenoid hose — Purge solenoid valve malfunction (stuck open) • Improper operation of fuel injector • Fuel supply system malfunction or improper fuel line malfunction — Pressure regulator (built-in fuel pump unit) malfunction — Clogged or restricted fuel filter (built-in fuel pump unit) — Fuel leakage in fuel line between fuel distribution pipe and fuel pump • Ignition system malfunction — Ignition coil related wiring harness malfunction — Ignition coil malfunction — Spark plug malfunction • Improper operation of variable valve timing control system • Insufficient compression • Misfire • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (fuel system related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off, then to the ON position (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Are any DTCs present?	Yes	If misfire DTC is present: • Go to Step 11. If other DTC is present: • Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	If driveability concern is present: • Go to Step 11. If not: • Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA (MODE 2)** • Perform the Freeze Frame PID Data Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P2177 on FREEZE FRAME DATA (Mode 2)?	Yes	Go to the next step.
		No	Go to the DTC troubleshooting on FREEZE FRAME DATA (Mode 2). (See 01-02-12 DTC TABLE [L8, LF].)
5	**VERIFY CURRENT INPUT SIGNAL STATUS** • Perform the PID/DATA Monitor and Record Procedure and access the following PIDs: (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) — APP1 — APP2 — ECT — MAF — TP REL — VSS • Is there any signal that is far out of specification when the ignition switch is at the ON position and the engine runs? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Inspect the sensor and excessive resistance in related wiring harnesses. Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
		No	Go to the next step.
6	**VERIFY CURRENT INPUT SIGNAL STATUS UNDER FREEZE FRAME DATA (MODE 2) CONDITION** • Perform the PID/DATA Monitor and Record Procedure and access the same PIDs as Step 5 under the FREEZE FRAME DATA (Mode 2) condition. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is there any signal which causes drastic changes?	Yes	Inspect the sensor and excessive resistance in related wiring harnesses. Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
		No	Go to the next step.
7	**INSPECT A/F SENSOR HEATER** • Inspect the A/F sensor heater. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the A/F sensor, then go to Step 21. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
8	**INSPECT A/F SENSOR** • Inspect the A/F sensor. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Go to the next step.
		No	Go to Step 11.
9	**INSPECT INSTALLATION OF A/F SENSOR** • Inspect if the A/F sensor is loosely installed. • Is the A/F sensor installed securely?	Yes	Go to the next step.
		No	Retighten the A/F sensor, then go to Step 21.
10	**INSPECT GAS LEAKAGE FROM EXHAUST SYSTEM** • Visually inspect if there is any gas leakage is found between the exhaust manifold and A/F sensor. • Is there gas leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21. (See 01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
		No	Replace the A/F sensor, then go to Step 21. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
11	**VERIFY CURRENT INPUT SIGNAL STATUS OF MAF SENSOR** • Connect the M-MDS to the DLC-2. • Start the engine. • Perform the PID/DATA Monitor and Record Procedure and access the MAF PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Verify that the MAF PID changes quickly according to engine speed. • Is the PID normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to Step 13.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
12	**INSPECT FOR EXCESSIVE AIR SUCTION OF INTAKE AIR SYSTEM** • Visually inspect for loosen, cracks or damages hoses on intake air system. • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
		No	Replace the MAF/IAT sensor, then go to Step 21. (See 01-40-26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/ INSTALLATION [L8, LF].)
13	**INSPECT PURGE SOLENOID OPERATION** • Perform the Purge Control System Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Does the purge control system work properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
14	**INSPECT FUEL INJECTOR OPERATION** • Perform the Fuel Injector Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
		No	Go to the next step.
15	**INSPECT FUEL LINE PRESSURE** • Turn the ignition switch off. • Inspect the fuel line pressure. (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].) • Is the fuel line pressure normal?	Yes	Go to Step 17.
		No	If the fuel pressure is too high: • Replace the fuel pump unit, then go to Step 21. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) If the fuel line pressure is low: • Go to the next step.
16	**INSPECT FUEL SYSTEM FOR FUEL LEAKAGE** • Visually inspect the fuel line for any leakage. • Is there fuel leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
		No	Inspect the fuel filters for the foreign material or stain inside the fuel filter (low-pressure side). If foreign material or stain is found inside the fuel filter (low-pressure side): • Clean the fuel tank and fuel filter. If normal: • Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) Go to Step 21.
17	**INSPECT IGNITION COIL RELATED WIRING HARNESS** • Inspect the ignition coil and related wiring harness. • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
		No	Go to the next step.
18	**INSPECT IGNITION SYSTEM** • Perform the Spark Test. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Is the strong blue spark visible at each cylinder?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
19	**INSPECT VARIABLE VALVE TIMING CONTROL SYSTEM OPERATION** • Perform the Variable Valve Timing Control System Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Does the variable valve timing control system work properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
20	**INSPECT ENGINE COMPRESSION** • Inspect the engine compression. (See 01-10-18 COMPRESSION INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Perform the engine overhaul for repairs, then go to the next step.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
21	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
22	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

DTC P2178 [L8, LF]

id0102b1812400

DTC P2178	Fuel system too rich at off idle
DETECTION CONDITION	• The PCM monitors short term fuel trim (SHRTFT), long term fuel trim (LONGFT) during closed loop fuel control at off-idle. If the LONGFT and the sum total of these fuel trims exceed preprogrammed criteria. The PCM determines that fuel system is too rich at off-idle. **Diagnostic support note** • This is a continuous monitor (fuel system). • The MIL illuminates if the PCM detects the above malfunctioning condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction conditions during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Erratic signal to PCM — APP sensor signal malfunction — ECT sensor signal malfunction — MAF sensor signal malfunction — TP sensor signal malfunction — VSS signal malfunction • A/F sensor heater malfunction • A/F sensor malfunction — A/F sensor looseness — Exhaust system leakage — A/F sensor deterioration • MAF sensor malfunction • Purge system malfunction — Purge solenoid valve improper operation — Improper connection purge solenoid hose — Purge solenoid valve malfunction (stuck open) • Improper operation of EGR valve • Improper operation of variable tumble control • Improper operation of fuel injector • Fuel supply system malfunction or improper fuel line malfunction — Pressure regulator (built-in fuel pump unit) malfunction — Fuel leakage in fuel line between fuel distribution pipe and fuel pump • Ignition system malfunction — Ignition coil related wiring harness malfunction — Ignition coil malfunction — Spark plug malfunction • Improper operation of variable valve timing control system • Improper operation of PCV valve • Misfire • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (fuel system related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off, then to the ON position (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Are any DTCs present?	Yes	If misfire DTC is present: • Go to Step 11. If other DTC is present: • Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	If driveability concern is present: • Go to Step 11. If not: • Go to the next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA (MODE 2)** • Perform the Freeze Frame PID Data Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P2178 on FREEZE FRAME DATA (Mode 2)?	Yes	Go to the next step.
		No	Go to the DTC troubleshooting on FREEZE FRAME DATA (Mode 2). (See 01-02-12 DTC TABLE [L8, LF].)
5	**VERIFY CURRENT INPUT SIGNAL STATUS** • Perform the PID/DATA Monitor and Record Procedure and access the following PIDs: (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) — APP1 — APP2 — ECT — MAF — TP REL — VSS • Is there any signal that is far out of specification when the ignition switch is at the ON position and the engine runs? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Inspect the sensor and excessive resistance in related wiring harnesses. Repair or replace the malfunctioning part according to the inspection results, then go to Step 22.
		No	Go to the next step.
6	**VERIFY CURRENT INPUT SIGNAL STATUS UNDER FREEZE FRAME DATA (MODE 2) CONDITION** • Perform the PID/DATA Monitor and Record Procedure and access the same PIDs as Step 5 under the FREEZE FRAME DATA (Mode 2) condition. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is there any signal which causes drastic changes?	Yes	Inspect the sensor and excessive resistance in related wiring harnesses. Repair or replace the malfunctioning part according to the inspection results, then go to Step 22.
		No	Go to the next step.
7	**INSPECT A/F SENSOR HEATER** • Inspect the A/F sensor heater. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the A/F sensor, then go to Step 22. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
8	**INSPECT A/F SENSOR** • Inspect the A/F sensor. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Go to the next step.
		No	Go to Step 11.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
9	**INSPECT INSTALLATION OF A/F SENSOR** • Inspect if the A/F sensor is loosely installed. • Is the A/F sensor installed securely?	Yes	Go to the next step.
		No	Retighten the A/F sensor, then go to Step 22.
10	**INSPECT GAS LEAKAGE FROM EXHAUST SYSTEM** • Visually inspect if there is any gas leakage is found between the exhaust manifold and A/F sensor. • Is there gas leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 22. (See 01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
		No	Replace the A/F sensor, then go to Step 22. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
11	**VERIFY CURRENT INPUT SIGNAL STATUS OF MAF SENSOR** • Connect the M-MDS to the DLC-2. • Start the engine. • Perform the PID/DATA Monitor and Record Procedure and access the MAF PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Verify that the MAF PID changes quickly according to engine speed. • Is the PID normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Replace the MAF/IAT sensor, then go to Step 22. (See 01-40-26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/ INSTALLATION [L8, LF].)
12	**INSPECT PURGE SOLENOID OPERATION** • Perform the Purge Control System Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Does the purge control system work properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 22.
13	**INSPECT EGR VALVE OPERATION** • Perform the EGR Control System Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Does the EGR control system work properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 22.
14	**INSPECT VARIABLE TUMBLE CONTROL OPERATION** • Perform the Variable Tumble Control Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 22.
		No	Go to the next step.
15	**INSPECT FUEL INJECTOR OPERATION** • Perform the Fuel Injector Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 22.
		No	Go to the next step.
16	**INSPECT FUEL LINE PRESSURE** • Turn the ignition switch off. • Inspect the fuel line pressure. (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].) • Is the fuel line pressure normal?	Yes	Go to Step 18.
		No	If the fuel pressure is too high: • Replace the fuel pump unit, then go to Step 22. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) If the fuel line pressure is low: • Go to the next step.
17	**INSPECT FUEL SYSTEM FOR FUEL LEAKAGE** • Visually inspect the fuel line for any leakage. • Is there fuel leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 22.
		No	Inspect the fuel filters for the foreign material or stain inside the fuel filter (low-pressure side). If foreign material or stain is found inside the fuel filter (low-pressure side): • Clean the fuel tank and fuel filter. If normal: • Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) Go to Step 22.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
18	**INSPECT IGNITION COIL AND RELATED WIRING HARNESS** • Inspect the ignition coil and related wiring harness. • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 22.
		No	Go to the next step.
19	**INSPECT IGNITION SYSTEM** • Perform the Spark Test. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Is the strong blue spark visible at each cylinder?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 22.
20	**INSPECT VARIABLE VALVE TIMING CONTROL SYSTEM OPERATION** • Perform the Variable Valve Timing Control System Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Does the variable valve timing control system work properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 22.
21	**INSPECT PCV VALVE OPERATION** • Inspect the PCV valve operation. (See 01-16-12 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to the next step.
		No	Go to the next step.
22	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
23	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2187 [L8, LF]

id0102b1812500

DTC P2187	Fuel system too lean at idle
DETECTION CONDITION	• The PCM monitors short term fuel trim (SHRTFT) and long term fuel trim (LONGFT) during closed loop fuel control at idle. If the LONGFT and the sum total of these fuel trims exceed preprogrammed criteria. The PCM determines that fuel system is too lean at idle. **Diagnostic support note** • This is a continuous monitor (fuel system). • The MIL illuminates if the PCM detects the above malfunctioning condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction conditions during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Erratic signal to PCM — APP sensor signal malfunction — ECT sensor signal malfunction — MAF sensor signal malfunction — TP sensor signal malfunction — VSS signal malfunction • A/F sensor heater malfunction • A/F sensor malfunction — A/F sensor looseness — Exhaust system leakage — A/F sensor deterioration • MAF sensor malfunction • Air suction in intake air system • Purge system malfunction — Purge solenoid valve improper operation — Improper connection purge solenoid hose — Purge solenoid valve malfunction (stuck open) • Improper operation of fuel injector • Fuel supply system malfunction or improper fuel line malfunction — Pressure regulator (built-in fuel pump unit) malfunction — Clogged or restricted fuel filter (built-in fuel pump unit) — Fuel leakage in fuel line between fuel distribution pipe and fuel pump • Ignition system malfunction — Ignition coil related wiring harness malfunction — Ignition coil malfunction — Spark plug malfunction • Improper operation of variable valve timing control system • Insufficient compression • Misfire • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (fuel system related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off, then to the ON position (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Are any DTCs present?	Yes	If misfire DTC is present: • Go to Step 11. If other DTC is present: • Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	If driveability concern is present: • Go to Step 11. If not: • Go to the next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA (MODE 2)** • Perform the Freeze Frame PID Data Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P2187 on FREEZE FRAME DATA (Mode 2)?	Yes	Go to the next step.
		No	Go to the DTC troubleshooting on FREEZE FRAME DATA (Mode 2). (See 01-02-12 DTC TABLE [L8, LF].)
5	**VERIFY CURRENT INPUT SIGNAL STATUS** • Perform the PID/DATA Monitor and Record Procedure and access the following PIDs: (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) — APP1 — APP2 — ECT — MAF — TP REL — VSS • Is there any signal that is far out of specification when the ignition switch is at the ON position and the engine runs? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Inspect the sensor and excessive resistance in related wiring harnesses. Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
		No	Go to the next step.
6	**VERIFY CURRENT INPUT SIGNAL STATUS UNDER FREEZE FRAME DATA (MODE 2) CONDITION** • Perform the PID/DATA Monitor and Record Procedure and access the same PIDs as Step 5 under the FREEZE FRAME DATA (Mode 2) condition. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is there any signal which causes drastic changes?	Yes	Inspect the sensor and excessive resistance in related wiring harnesses. Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
		No	Go to the next step.
7	**INSPECT A/F SENSOR HEATER** • Inspect the A/F sensor heater. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the A/F sensor, then go to Step 21. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
8	**INSPECT A/F SENSOR** • Inspect the A/F sensor. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Go to the next step.
		No	Go to Step 11.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
9	**INSPECT INSTALLATION OF A/F SENSOR** • Inspect if the A/F sensor is loosely installed. • Is the A/F sensor installed securely?	Yes	Go to the next step.
		No	Retighten the A/F sensor, then go to Step 21.
10	**INSPECT GAS LEAKAGE FROM EXHAUST SYSTEM** • Visually inspect if there is any gas leakage is found between the exhaust manifold and A/F sensor. • Is there gas leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21. (See 01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
		No	Replace the A/F sensor, then go to Step 21. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
11	**VERIFY CURRENT INPUT SIGNAL STATUS OF MAF SENSOR** • Connect the M-MDS to the DLC-2. • Start the engine. • Perform the PID/DATA Monitor and Record Procedure and access the MAF PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Verify that the MAF PID changes quickly according to engine speed. • Is the PID normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to Step 13.
		No	Go to the next step.
12	**INSPECT FOR EXCESSIVE AIR SUCTION OF INTAKE AIR SYSTEM** • Visually inspect for loosen, cracks or damages hoses on intake air system. • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
		No	Replace the MAF/IAT sensor, then go to Step 21. (See 01-40-26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/ INSTALLATION [L8, LF].)
13	**INSPECT PURGE SOLENOID OPERATION** • Perform the Purge Control System Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Does the purge control system work properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
14	**INSPECT FUEL INJECTOR OPERATION** • Perform the Fuel Injector Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
		No	Go to the next step.
15	**INSPECT FUEL LINE PRESSURE** • Turn the ignition switch off. • Inspect the fuel line pressure. (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].) • Is the fuel line pressure normal?	Yes	Go to Step 17.
		No	If the fuel pressure is too high: • Replace the fuel pump unit, then go to Step 21. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) If the fuel line pressure is low: • Go to the next step.
16	**INSPECT FUEL SYSTEM FOR FUEL LEAKAGE** • Visually inspect the fuel line for any leakage. • Is there fuel leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
		No	Inspect the fuel filters for the foreign material or stain inside the fuel filter (low-pressure side). If foreign material or stain is found inside the fuel filter (low-pressure side): • Clean the fuel tank and fuel filter. If normal: • Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) Go to Step 21.
17	**INSPECT IGNITION COIL AND RELATED WIRING HARNESS** • Inspect the ignition coil and related wiring harness. • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
18	**INSPECT IGNITION SYSTEM** • Perform the Spark Test. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Is the strong blue spark visible at each cylinder?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
19	**INSPECT VARIABLE VALVE TIMING CONTROL SYSTEM OPERATION** • Perform the Variable Valve Timing Control System Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Does the variable valve timing control system work properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
20	**INSPECT ENGINE COMPRESSION** • Inspect the engine compression. (See 01-10-18 COMPRESSION INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Perform the engine overhaul for repairs, then go to the next step.
		No	Go to the next step.
21	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
22	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2188 [L8, LF]

id0102b1812600

DTC P2188	Fuel system too rich at idle
DETECTION CONDITION	• The PCM monitors short term fuel trim (SHRTFT), long term fuel trim (LONGFT) during closed loop fuel control at idle. If the LONGFT and the sum total of these fuel trims exceed preprogrammed criteria. The PCM determines that fuel system is too rich at idle. **Diagnostic support note** • This is a continuous monitor. (fuel system) • The MIL illuminates if the PCM detects the above malfunctioning condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction conditions during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Erratic signal to PCM — APP sensor signal malfunction — ECT sensor signal malfunction — MAF sensor signal malfunction — TP sensor signal malfunction — VSS signal malfunction • A/F sensor heater malfunction • A/F sensor malfunction — A/F sensor looseness — Exhaust system leakage — A/F sensor deterioration • MAF sensor malfunction • Purge system malfunction — Purge solenoid valve improper operation — Improper connection purge solenoid hose — Purge solenoid valve malfunction (stuck open) • Improper operation of EGR valve • Improper operation of variable tumble control • Improper operation of fuel injector • Fuel supply system malfunction or improper fuel line malfunction — Pressure regulator (built-in fuel pump unit) malfunction — Fuel leakage in fuel line between fuel distribution pipe and fuel pump • Ignition system malfunction — Ignition coil related wiring harness malfunction — Ignition coil malfunction — Spark plug malfunction • Improper operation of variable valve timing control system • Improper operation of PCV valve • Misfire • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (fuel system related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off, then to the ON position (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Are any DTCs present?	Yes	If misfire DTC is present: • Go to Step 11. If other DTC is present: • Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	If driveability concern is present: • Go to Step 11. If not: • Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA (MODE 2)** • Perform the Freeze Frame PID Data Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P2188 on FREEZE FRAME DATA (Mode 2)?	Yes	Go to the next step.
		No	Go to the DTC troubleshooting on FREEZE FRAME DATA (Mode 2). (See 01-02-12 DTC TABLE [L8, LF].)
5	**VERIFY CURRENT INPUT SIGNAL STATUS** • Perform the PID/DATA Monitor and Record Procedure and access the following PIDs: (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) — APP1 — APP2 — ECT — MAF — TP REL — VSS • Is there any signal that is far out of specification when the ignition switch is at the ON position and the engine runs? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Inspect the sensor and excessive resistance in related wiring harnesses. Repair or replace the malfunctioning part according to the inspection results, then go to Step 22.
		No	Go to the next step.
6	**VERIFY CURRENT INPUT SIGNAL STATUS UNDER FREEZE FRAME DATA (MODE 2) CONDITION** • Perform the PID/DATA Monitor and Record Procedure and access the same PIDs as Step 5 under the FREEZE FRAME DATA (Mode 2) condition. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is there any signal which causes drastic changes?	Yes	Inspect the sensor and excessive resistance in related wiring harnesses. Repair or replace the malfunctioning part according to the inspection results, then go to Step 22.
		No	Go to the next step.
7	**INSPECT A/F SENSOR HEATER** • Inspect the A/F sensor heater. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the A/F sensor, then go to Step 22. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
8	**INSPECT A/F SENSOR** • Inspect the A/F sensor. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Go to the next step.
		No	Go to Step 11.
9	**INSPECT INSTALLATION OF A/F SENSOR** • Inspect if the A/F sensor is loosely installed. • Is the A/F sensor installed securely?	Yes	Go to the next step.
		No	Retighten the A/F sensor, then go to Step 22.
10	**INSPECT GAS LEAKAGE FROM EXHAUST SYSTEM** • Visually inspect if there is any gas leakage is found between the exhaust manifold and A/F sensor. • Is there gas leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 22. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
		No	Replace the A/F sensor, then go to Step 22. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
11	**VERIFY CURRENT INPUT SIGNAL STATUS OF MAF SENSOR** • Connect the M-MDS to the DLC-2. • Start the engine. • Perform the PID/DATA Monitor and Record Procedure and access the MAF PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Verify that the MAF PID changes quickly according to engine speed. • Is the PID normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Replace the MAF/IAT sensor, then go to Step 22. (See 01-40-26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/INSTALLATION [L8, LF].)

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
12	**INSPECT PURGE SOLENOID OPERATION** • Perform the Purge Control System Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Does the purge control system work properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 22.
13	**INSPECT EGR VALVE OPERATION** • Perform the EGR Control System Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Does the EGR control system work properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 22.
14	**INSPECT VARIABLE TUMBLE CONTROL OPERATION** • Perform the Variable Tumble Control Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 22.
		No	Go to the next step.
15	**INSPECT FUEL INJECTOR OPERATION** • Perform the Fuel Injector Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 22.
		No	Go to the next step.
16	**INSPECT FUEL LINE PRESSURE** • Turn the ignition switch off. • Inspect the fuel line pressure. (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].) • Is the fuel line pressure normal?	Yes	Go to Step 18.
		No	If the fuel pressure is too high: • Replace the fuel pump unit, then go to Step 22. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) If the fuel line pressure is low: • Go to the next step.
17	**INSPECT FUEL LINE SYSTEM FOR FUEL LEAKAGE** • Visually inspect the fuel line for any leakage. • Is there fuel leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 22.
		No	Inspect the fuel filters for the foreign material or stain inside the fuel filter (low-pressure side). If foreign material or stain is found inside the fuel filter (low-pressure side): • Clean the fuel tank and fuel filter. If normal: • Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) Go to Step 22.
18	**INSPECT IGNITION COIL AND RELATED WIRING HARNESS** • Inspect the ignition coil and related wiring harness. • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 22.
		No	Go to the next step.
19	**INSPECT IGNITION SYSTEM** • Perform the Spark Test. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Is the strong blue spark visible at each cylinder?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 22.
20	**INSPECT VARIABLE VALVE TIMING CONTROL SYSTEM OPERATION** • Perform the Variable Valve Timing Control System Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Does the variable valve timing control system work properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results, then go to Step 22.
21	**INSPECT PCV VALVE OPERATION** • Inspect the PCV valve operation. (See 01-16-12 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to the next step.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
22	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
23	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

DTC P2195 [L8, LF]

id0102b1812700

DTC P2195	A/F sensor signal stuck lean
DETECTION CONDITION	• The PCM monitors the A/F sensor output current when the following conditions are met. If the average output is **more than 1.2** for **25 s**, the PCM determines that the A/F sensor signal remains lean. **MONITORING CONDITIONS** — ECT: **more than 70 °C {158 °F}** — Engine speed: **1,000—3,200 rpm** — MAF amount: **6—80 g/s {0.80—10.58 lb/min}** — Target A/F feedback system status: feedback control — Output voltage from the HO2S: **more than 0.2 V** **Diagnostic support note** • This is an intermittent monitor (A/F sensor, HO2S). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• A/F sensor heater malfunction • A/F sensor malfunction — Exhaust system leakage — A/F sensor deterioration • MAF sensor malfunction • Air suction in intake air system • Improper operation of fuel injector • Fuel supply system malfunction or improper fuel line malfunction — Pressure regulator (built-in fuel pump unit) malfunction — Clogged or restricted fuel filter (built-in fuel pump unit) — Fuel leakage in fuel line between fuel distribution pipe and fuel pump • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (A/F sensor, HO2S related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off, then to the ON position (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P2177 or P2187 also present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-178 DTC P2177 [L8, LF].) (See 01-02-185 DTC P2187 [L8, LF].)
		No	Go to the next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA (MODE 2)** • Perform the Freeze Frame PID Data Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P2195 on FREEZE FRAME DATA (Mode 2)?	Yes	Go to the next step.
		No	Go to the DTC troubleshooting on FREEZE FRAME DATA (Mode 2). (See 01-02-12 DTC TABLE [L8, LF].)
5	**INSPECT A/F SENSOR HEATER** • Inspect the A/F sensor heater. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the A/F sensor, then go to Step 13. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
6	**INSPECT A/F SENSOR** • Inspect the A/F sensor. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Go to the next step.
		No	Go to Step 8.
7	**INSPECT GAS LEAKAGE FROM EXHAUST SYSTEM** • Visually inspect if there is any gas leakage is found between the exhaust manifold and A/F sensor. • Is there gas leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 13. (See 01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
		No	Replace the A/F sensor, then go to Step 13. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
8	**VERIFY CURRENT INPUT SIGNAL STATUS OF MAF SENSOR** • Connect the M-MDS to the DLC-2. • Start the engine. • Perform the PID/DATA Monitor and Record Procedure and access the MAF PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Verify that the MAF PID changes quickly according to engine speed. • Is the PID normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to Step 10.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
9	**INSPECT FOR EXCESSIVE AIR SUCTION OF INTAKE AIR SYSTEM** • Visually inspect for loosen, cracks or damages hoses on intake air system. **Note** • Engine speed may change when rust penetrating agent is sprayed on the air suction area. • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 13.
		No	Replace the MAF/IAT sensor, then go to Step 13. (See 01-40-26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/ INSTALLATION [L8, LF].)
10	**INSPECT FUEL INJECTOR OPERATION** • Perform the Fuel Injector Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 13.
		No	Go to the next step.
11	**INSPECT FUEL LINE PRESSURE** • Turn the ignition switch off. • Inspect the fuel line pressure. (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].) • Is the fuel line pressure normal?	Yes	Go to Step 13.
		No	Go to the next step.
12	**INSPECT FUEL SYSTEM FOR FUEL LEAKAGE** • Visually inspect the fuel leakage in the fuel system. • Is there fuel leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to the next step.
		No	Inspect the fuel filters for the foreign material or stain inside the fuel filter (low-pressure side). If foreign material or stain is found inside the fuel filter (low-pressure side): • Clean the fuel tank and fuel filter. If normal: • Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) Go to the next step.
13	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the Drive Mode 01 (Adopted Memory Procedure) and Drive Mode 03 (A/F sensor heater, HO2S heater, A/F sensor, HO2S and TWC Repair Verification). (See 01-02-10 OBD DRIVE MODE [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
14	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2196 [L8, LF]

id0102b1812800

DTC P2196	A/F sensor signal stuck rich
DETECTION CONDITION	• The PCM monitors the A/F sensor output current when the following conditions are met. If the average output is **less than 0.85** for **25 s**, the PCM determines that the A/F sensor signal remains rich. **MONITORING CONDITIONS** — ECT: **more than 70 °C {158 °F}** — Engine speed: **1,000—3,200 rpm** — MAF amount: **6—80 g/s {0.80—10.58 lb/min}** — Target A/F feedback system status: feedback control — Output voltage from the HO2S: **less than 0.7 V** **Diagnostic support note** • This is an intermittent monitor (A/F sensor, HO2S). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• A/F sensor heater malfunction • A/F sensor malfunction — Exhaust system leakage — A/F sensor deterioration • MAF sensor malfunction • Improper operation of fuel injector • Fuel supply system malfunction or improper fuel line malfunction — Pressure regulator (built-in fuel pump unit) malfunction — Fuel pump unit malfunction • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (A/F sensor, HO2S related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND STORED DTC** • Turn the ignition switch off, then ON position (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P2178 or P2188 also present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-181 DTC P2178 [L8, LF].) (See 01-02-189 DTC P2188 [L8, LF].)
		No	Go to the next step.
4	**IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA (MODE 2)** • Perform the Freeze Frame PID Data Access Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Is the DTC P2196 on FREEZE FRAME DATA (Mode 2)?	Yes	Go to the next step.
		No	Go to the DTC troubleshooting on FREEZE FRAME DATA (Mode 2). (See 01-02-12 DTC TABLE [L8, LF].)
5	**INSPECT A/F SENSOR HEATER** • Inspect the A/F sensor heater. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the A/F sensor, then go to Step 11. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [L8, LF]

STEP	INSPECTION		ACTION
6	**INSPECT A/F SENSOR** • Inspect the A/F sensor. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Go to the next step.
		No	Go to Step 8.
7	**INSPECT EXHAUST GAS LEAKAGE** • Visually inspect if there is any gas leakage is found between the exhaust manifold and A/F sensor. • Is there gas leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 11. (See 01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
		No	Replace the A/F sensor, then go to Step 11. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)
8	**VERIFY CURRENT INPUT SIGNAL STATUS OF MAF SENSOR** • Connect the M-MDS to the DLC-2. • Start the engine. • Perform the PID/DATA Monitor and Record Procedure and access the MAF PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Verify that the MAF PID changes quickly according to engine speed. • Is the PID normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Replace the MAF/IAT sensor, then go to Step 11. (See 01-40-26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/ INSTALLATION [L8, LF].)
9	**INSPECT FUEL INJECTOR OPERATION** • Perform the Fuel Injector Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 11.
		No	Go to the next step.
10	**INSPECT FUEL LINE PRESSURE** • Turn the ignition switch off. • Inspect the fuel line pressure. (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].) • Is the fuel line pressure normal?	Yes	Go to the next step.
		No	Replace the fuel pump unit, then go to the next step. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
11	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the Drive Mode 01 (Adopted Memory Procedure) and Drive Mode 03 (A/F sensor heater, HO2S heater, A/F sensor, HO2S and TWC Repair Verification). (See 01-02-10 OBD DRIVE MODE [L8, LF].) • Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2228 [L8, LF]

id0102b1812900

DTC P2228	BARO sensor circuit low input
DETECTION CONDITION	• The PCM monitors the input voltage from the BARO sensor. If the input voltage is **below 2.1 V**, the PCM determines that the BARO sensor circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• BARO sensor (built-in PCM) malfunction • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT BARO SENSOR** • Inspect the BARO sensor. (See 01-40-28 BAROMETRIC PRESSURE (BARO) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
4	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Turn the ignition switch to the ON position (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
5	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2229 [L8, LF]

id0102b1813000

DTC P2229	BARO sensor circuit high input
DETECTION CONDITION	• The PCM monitors the input voltage from the BARO sensor. If the input voltage is **above 4.0 V**, the PCM determines that the BARO sensor circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• BARO sensor (built-in PCM) malfunction • PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT BARO SENSOR** • Inspect the BARO sensor. (See 01-40-28 BAROMETRIC PRESSURE (BARO) SENSOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
4	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Turn the ignition switch to the ON position (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
5	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2502 [L8, LF]

id0102b1814000

DTC P2502	Charging system voltage problem
DETECTION CONDITION	• The PCM judges the generator output voltage is **above 17 V** or battery voltage is **below 11 V** during the engine running. **Diagnostic support note** • This is a continuous monitor (other). • The MIL does not illuminate. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• MAIN 120 A fuse malfunction • Short to ground in wiring harness at downstream circuit from MAIN 120 A fuse • Battery malfunction • Generator is poorly connected • Battery is poorly connected • Open circuit between generator terminal B and battery positive terminal • Generator malfunction • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (other related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT FUSE** • Turn the ignition switch off. • Disconnect the negative battery cable. • Remove the MAIN 120 A fuse. (See 09-21-2 MAIN FUSE REMOVAL/INSTALLATION.) • Inspect the fuse. • Is there any malfunction?	Yes	If the fuse is melt: • Repair or replace the wiring harness for a possible short to ground. • Replace the fuse. (See 09-21-2 MAIN FUSE REMOVAL/INSTALLATION.) If the fuse is deterioration: • Replace the fuse. (See 09-21-2 MAIN FUSE REMOVAL/INSTALLATION.) Go to Step 9.
		No	Install the fuse, then go to the next step.
4	**INSPECT BATTERY** • Inspect the battery. (See 01-17-3 BATTERY INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Recharge or replace the battery, then go to Step 9. (See 01-17-4 BATTERY RECHARGING [L8, LF].) (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
5	**INSPECT POOR INSTALLATION OF GENERATOR TERMINAL** • Turn the ignition switch off. • Inspect for looseness of generator terminal B installation nut. • Is the nut loose?	Yes	Tighten generator terminal B installation nut, then go to Step 9.
		No	Go to the next step.
6	**INSPECT POOR INSTALLATION OF BATTERY POSITIVE TERMINAL** • Inspect for looseness of battery positive terminal. • Is the terminal loose?	Yes	Connect the battery positive terminal correctly, then go to Step 9.
		No	Go to the next step.
7	**INSPECT BATTERY CHARGING CIRCUIT FOR OPEN CIRCUIT** • Measure the voltage between generator terminal B (wiring harness-side) and body ground. • Is the voltage **B+**?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 9.
8	**INSPECT GENERATOR** • Inspect the generator. (See 01-17-6 GENERATOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the generator, then go to the next step. (See 01-17-5 GENERATOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Reconnect the negative battery cable. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2503 [L8, LF]

id0102b1814100

DTC P2503	Charging system voltage low input
DETECTION CONDITION	• The PCM needs **more than 20 A** from generator, and judges generator output voltage to be **below 8.5 V** during the engine running. **Diagnostic support note** • This is a continuous monitor (other). • The MIL does not illuminate. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Drive belt exceed limit • Generator connector or terminals malfunction • PCM connector or terminals malfunction • Short to ground in wiring harness between the following terminals: — Generator terminal D and PCM terminal 2AI — Generator terminal P and PCM terminal 2AJ • Open circuit in wiring harness between the following terminals: — Generator terminal D and PCM terminal 2AI — Generator terminal P and PCM terminal 2AJ • Generator malfunction • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (other related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT DRIVE BELT CONDITION** • Verify that the drive belt auto tensioner indicator mark does not exceed limit. • Does the indicator mark exceed limit?	Yes	Replace the drive belt, then go to Step 9. (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].)
		No	Go to the next step.
4	**INSPECT GENERATOR CONNECTOR CONDITION** • Turn the ignition switch off. • Disconnect the generator connector. • Inspect for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
5	**INSPECT PCM CONNECTOR CONDITION** • Disconnect the PCM connector. • Inspect for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
6	**INSPECT GENERATOR CIRCUIT FOR SHORT TO GROUND** • Generator and PCM connectors are disconnected. • Inspect for continuity between the following terminals (wiring harness-side) and body ground: — Generator terminal D — Generator terminal P • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground, then go to Step 9.
		No	Go to the next step.
7	**INSPECT GENERATOR CIRCUIT FOR OPEN CIRCUIT** • Generator and PCM connectors are disconnected. • Inspect for continuity between the following terminals (wiring harness-side): — Generator terminal D and PCM terminal 2AI — Generator terminal P and PCM terminal 2AJ • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 9.
8	**INSPECT GENERATOR** • Inspect the generator. (See 01-17-6 GENERATOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the generator, then go to the next step. (See 01-17-5 GENERATOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2504 [L8, LF]

id0102b1814200

DTC P2504	Charging system voltage high input
DETECTION CONDITION	• The PCM judges the generator output voltage is **above 18.5 V** or battery voltage is **above 16.0 V** during the engine running. **Diagnostic support note** • This is a continuous monitor (other). • The MIL does not illuminate. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Generator connector or terminals malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between generator terminal D and PCM terminal 2AI • Generator malfunction • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED** • Have the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS (other related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT GENERATOR CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the generator connector. • Inspect for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 7.
		No	Go to the next step.
4	**INSPECT PCM CONNECTOR AND TERMINALS** • Disconnect the PCM connector. • Inspect for poor connection (damaged/pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 7.
		No	Go to the next step.
5	**INSPECT GENERATOR CONTROL CIRCUIT FOR SHORT TO POWER SUPPLY** • Generator and PCM connectors are disconnected. • Turn the ignition switch to the ON (engine off). • Measure the voltage between generator terminal D (wiring harness-side) and body ground. • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 7.
		No	Go to the next step.
6	**INSPECT GENERATOR** • Inspect the generator. (See 01-17-6 GENERATOR INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Replace the generator, then go to the next step. (See 01-17-5 GENERATOR REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
7	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Perform the KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [L8, LF]

DTC P2507 [L8, LF]

id0102b1814300

DTC P2507	PCM B+ voltage low input
DETECTION CONDITION	• The PCM monitors the voltage of back-up battery positive terminal. If the PCM detects battery positive terminal voltage **below 2.5 V** for **2 s**, the PCM determines that the backup voltage circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2/Mode 12) is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• PCM connector or terminals malfunction • Open circuit or short to ground in wiring harness between battery positive terminal and PCM terminal 1BA — Short to ground in wiring harness between battery positive terminal and PCM terminal 1BA — MAIN 120 A fuse and ROOM 15 A fuse malfunction — Open circuit in wiring harness between battery positive terminal and PCM terminal 1BA • PCM malfunction

ON-BOARD DIAGNOSTIC [L8, LF]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 12) HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 12) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 12) on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT PCM CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 5.
		No	Go to the next step.
4	**INSPECT MONITOR CIRCUIT FOR OPEN CIRCUIT OR SHORT TO GROUND** • PCM connector is disconnected. • Measure the voltage between PCM terminal 1BA (wiring harness-side) and body ground. • Is the voltage **B+**?	Yes	Go to the next step.
		No	Inspect the MAIN 120 A fuse and ROOM 15 A fuse. If the fuse is melt: • Repair or replace the wiring harness for a possible short to ground, then replace the fuse. If the fuse is deterioration: • Replace the fuse. If the fuse is normal: • Repair or replace the wiring harness for a possible open circuit. Go to the next step.
5	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn the ignition switch to the ON position (engine off). • Clear the DTC from the PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Start the engine and warm it up completely. • Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) • Is the same DTC present?	Yes	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
6	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].) • Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See 01-02-12 DTC TABLE [L8, LF].)
		No	DTC troubleshooting completed.

01-03 SYMPTOM TROUBLESHOOTING [L8, LF]

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NO.2 MIL ILLUMINATES [L8, LF]. 01-03–14
NO.3 WILL NOT CRANK [L8, LF]. 01-03–14
NO.4 HARD TO START/LONG CRANK/ERRATIC START/ERRATIC CRANK [L8, LF] 01-03–17
NO.5 ENGINE STALLS-AFTER START/AT IDLE [L8, LF]. 01-03–19
NO.6 CRANKS NORMALLY BUT WILL NOT START [L8, LF] 01-03–24
NO.7 SLOW RETURN TO IDLE [L8, LF] 01-03–29
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SYMPTOM TROUBLESHOOTING [L8, LF]

SYMPTOM TROUBLESHOOTING WIRING DIAGRAM [L8, LF]

id0103a0800100

amxzzn00000547

SYMPTOM TROUBLESHOOTING [L8, LF]

amxzzn00000548

SYMPTOM TROUBLESHOOTING [L8, LF]

ENGINE SYMPTOM TROUBLESHOOTING [L8, LF]

id0103a0800300

- Confirm trouble symptom using the following diagnostic index, then go to appropriate troubleshooting chart.

Diagnostic Index

No.	TROUBLESHOOTING ITEM		DESCRIPTION
1	Melting of main or other fuses		—
2	MIL illuminates		• MIL is illuminated incorrectly.
3	Will not crank		• Starter does not work.
4	Hard to start/long crank/erratic start/erratic crank		• Starter cranks engine at normal speed but engine requires excessive cranking time before starting. (The battery is in normal condition.)
5	Engine stalls	After start/at idle	• Engine stops unexpectedly at idle and/or after start.
6	Cranks normally but will not start		• Starter cranks engine at normal speed but engine will not run. • Refer to symptom troubleshooting "NO.5 ENGINE STALLS" if this symptom appears after engine stall. • Fuel is in tank. • Battery is in normal condition.
7	Slow return to idle		• Engine takes more time than normal to return to idle speed.
8	Engine runs rough/rolling idle		• Engine speed fluctuates between specified idle speed and lower speed and engine shakes excessively. • Idle speed is too slow and engine shakes excessively.
9	Fast idle/runs on		• Engine speed continues at fast idle after warm-up. • Engine runs after the ignition switch is turned off.
10	Low idle/stalls during deceleration		• Engine stops unexpectedly at beginning of deceleration or recovery from deceleration.
11	Engine stalls/quits	Acceleration/cruise	• Engine stops unexpectedly at beginning of acceleration or during acceleration. • Engine stops unexpectedly while cruising.
	Engine runs rough	Acceleration/cruise	• Engine speed fluctuates during acceleration or cruising.
	Misses	Acceleration/cruise	• Engine misses during acceleration or cruising.
	Buck/jerk	Acceleration/cruise/ deceleration	• Vehicle bucks/jerks during acceleration, cruising, or deceleration.
	Hesitation/stumble	Acceleration	• Momentary pause at beginning of acceleration or during acceleration.
	Surges	Acceleration/cruise	• Momentary minor irregularity in engine output.
12	Lack/loss of power	Acceleration/cruise	• Performance is poor under load (such as power down when climbing hills).
13	Knocking/pinging	Acceleration/cruise	• Sound is produced when air/fuel mixture is ignited by something other than spark plug (such as hot spot in combustion chamber).
14	Poor fuel economy		• Fuel economy is unsatisfactory.
15	Emission compliance		• Fails emissions test.
16	High oil consumption/leakage		• Oil consumption is excessive.
17	Cooling system concerns	Overheating	• Engine runs at higher than normal temperature/overheats.
18	Cooling system concerns	Runs cold	• Engine does not reach normal operating temperature.
19	Exhaust smoke		• Blue, black, or white smoke from exhaust system.
20	Fuel odor (in engine compartment)		• Gasoline fuel smell or visible leakage.
21	Engine noise		• Engine noise from under bonnet.
22	Vibration concerns (engine)		• Vibration from under bonnet or driveline.
23	A/C does not work sufficiently		• A/C compressor magnetic clutch does not engage when A/C is turned on.
24	A/C is always on or A/C compressor runs continuously		• A/C compressor magnetic clutch does not disengage.
25	A/C is not cut off under wide open throttle conditions		• A/C compressor magnetic clutch does not disengage under wide open throttle.
26	Exhaust sulphur smell		• Rotten egg smell (sulphur) from exhaust.
27	Spark plug condition		• Incorrect spark plug condition.
28	AT concerns	Upshift/downshift/ engagement	• AT concerns not related to engine performance.

SYMPTOM TROUBLESHOOTING [L8, LF]

QUICK DIAGNOSTIC CHART [L8, LF]

id0103a0800600

X: Applied

	Troubleshooting item		Starter motor malfunction (Mechanical or electrical)	Starter circuit including ignition switch is open	Improper engine oil level	Low or dead battery	Charging system malfunction	Improper engine compression	Improper valve timing	Hydrolocked engine	Improper engine oil viscosity	Improper dipstick	Base engine malfunction	Flywheel or drive plate are seized	Improper tension or damaged drive belts	Improper engine coolant level	Water and anti-freeze mixture is improper	Cooling system malfunction (Radiator, hoses, overflow system, thermostat, etc.)	Cooling fan system malfunction	Engine or transaxle mounts are improperly installed	Cooling fan seat is improper	Accelerator cable free play misadjustment	Fuel quality	Intake air temperature is too hot	Variable valve timing system malfunction
1	Melting of main or other fuses																								
2	MIL illuminates		X	X		X	X			X				X											X
3	Will not crank																								
4	Hard to start/long crank/erratic start/ erratic crank																						X		
5	Engine stalls	After start/ at idle						X	X	X													X		X
6	Cranks normally but will not start							X	X	X													X		X
7	Slow return to idle																		X						
8	Engine runs rough/ rolling idle							X	X														X		X
9	Fast idle/runs on																								
10	Low idle/stalls during deceleration																								
11	Engine stalls/ quits	Acceleration/cruise						X	X														X		
	Engine runs rough	Acceleration/cruise						X	X														X		
	Misses	Acceleration/cruise						X	X														X		
	Buck/jerk	Acceleration/cruise/ deceleration						X	X														X		
	Hesitation /stumble	Acceleration						X	X														X		
	Surges	Acceleration/cruise						X	X														X		X
12	Lack/loss of power	Acceleration/cruise						X	X														X	X	

SYMPTOM TROUBLESHOOTING [L8, LF]

	Troubleshooting item		Starter motor malfunction (Mechanical or electrical)	Starter circuit including ignition switch is open	Improper engine oil level	Low or dead battery	Charging system malfunction	Improper engine compression	Improper valve timing	Hydrolocked engine	Improper engine oil viscosity	Improper dipstick	Base engine malfunction	Flywheel or drive plate are seized	Improper tension or damaged drive belts	Improper engine coolant level	Water and anti-freeze mixture is improper	Cooling system malfunction (Radiator, hoses, overflow system, thermostat, etc.)	Cooling fan system malfunction	Engine or transaxle mounts are improperly installed	Cooling fan seat is improper	Accelerator cable free play misadjustment	Fuel quality	Intake air temperature is too hot	Variable valve timing system malfunction
13	Knocking/ pinging	Acceleration/cruise						X										X							X
14	Poor fuel economy							X	X							X		X	X				X		
15	Emission compliance							X	X				X					X							
16	High oil consumption/ leakage										X	X	X												
17	Cooling system concerns	Overheating													X	X	X	X	X						
18	Cooling system concerns	Runs cold																X	X						
19	Exhaust smoke							X					X					X							
20	Fuel odor (in engine compartment)																								
21	Engine noise				X								X		X										
22	Vibration concerns (engine)														X					X	X				
23	A/C does not work sufficiently																								
24	A/C is always on or A/C compressor runs continuously																								
25	A/C is not cut off under wide open throttle conditions																								
26	Exhaust sulphur smell																						X		
27	Spark plug condition							X					X												
28	ATX concerns	Upshift/ downshift/ engagement	(See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE [SJ6A-EL].)																						

SYMPTOM TROUBLESHOOTING [L8, LF]

X: Applied

	Troubleshooting item		Variable tumble control malfunction	Engine overheating	Air cleaner element clogging or restriction	Air leakage from intake-air system (Loose tubes, cracks, gaskets breakage)	Idle learning electronic throttle control system is not completed	Electronic throttle control system improper operation	Throttle body malfunction	Variable intake air control malfunction	Vacuum leakage (Vacuum hose damage, misrouting)	Ignition coil malfunction (e.g. open, short or cracks)	Initial ignition timing misadjustment (CKP sensor & crankshaft pulley misadjustment)	Erratic signal to ignition coil	Spark plug malfunction	CKP sensor is damaged (egg. open or short circuits)	Crankshaft pulley is damaged	Improper gap between CKP sensor and crankshaft	Fuel pump malfunction (Mechanically or electrically)	Pressure regulator malfunction	Fuel hoses restriction or clogging
1	Melting of main or other fuses																				
2	MIL illuminates		X					X		X						X					
3	Will not crank																				
4	Hard to start/long crank/erratic start/ erratic crank				X	X		X			X			X	X	X	X	X	X	X	X
5	Engine stalls	After start/ at idle	X	X	X	X		X			X	X	X	X	X	X	X	X	X	X	X
6	Cranks normally but will not start		X	X	X	X		X			X	X	X	X	X	X	X	X	X	X	X
7	Slow return to idle		X						X												
8	Engine runs rough/ rolling idle			X	X	X	X	X			X		X	X	X	X	X	X	X	X	X
9	Fast idle/runs on					X		X	X												
10	Low idle/stalls during deceleration					X		X			X										
11	Engine stalls/ quits	Acceleration/cruise		X	X	X		X	X		X			X	X	X	X	X	X	X	X
	Engine runs rough	Acceleration/cruise		X	X	X		X	X		X			X	X	X	X	X	X	X	X
	Misses	Acceleration/cruise		X	X	X		X	X		X			X	X	X	X	X	X	X	X
	Buck/jerk	Acceleration/cruise/ deceleration		X	X	X		X	X		X			X	X	X	X	X	X	X	X
	Hesitation /stumble	Acceleration	X	X	X	X		X	X		X			X	X	X	X	X	X	X	X
	Surges	Acceleration/cruise	X	X	X	X		X	X		X			X	X	X	X	X	X	X	X
12	Lack/loss of power	Acceleration/cruise	X	X	X	X		X	X	X	X			X	X	X	X	X	X	X	X

SYMPTOM TROUBLESHOOTING [L8, LF]

	Troubleshooting item		Variable tumble control malfunction	Engine overheating	Air cleaner element clogging or restriction	Air leakage from intake-air system (Loose tubes, cracks, gaskets breakage)	Idle learning electronic throttle control system is not completed	Electronic throttle control system improper operation	Throttle body malfunction	Variable intake air control malfunction	Vacuum leakage (Vacuum hose damage, misrouting)	Ignition coil malfunction (e.g. open, short or cracks)	Initial ignition timing misadjustment (CKP sensor & crankshaft pulley misadjustment)	Erratic signal to ignition coil	Spark plug malfunction	CKP sensor is damaged (egg. open or short circuits)	Crankshaft pulley is damaged	Improper gap between CKP sensor and crankshaft	Fuel pump malfunction (Mechanically or electrically)	Pressure regulator malfunction	Fuel hoses restriction or clogging
13	Knocking/ pinging	Acceleration/cruise		X															X	X	
14	Poor fuel economy		X		X					X					X					X	
15	Emission compliance				X	X			X		X			X	X				X	X	X
16	High oil consumption/ leakage																				
17	Cooling system concerns	Overheating																			
18	Cooling system concerns	Runs cold																			
19	Exhaust smoke				X										X				X	X	X
20	Fuel odor (in engine compartment)																			X	
21	Engine noise					X					X										
22	Vibration concerns (engine)																				
23	A/C does not work sufficiently																				
24	A/C is always on or A/C compressor runs continuously																				
25	A/C is not cut off under wide open throttle conditions																				
26	Exhaust sulphur smell										X								X	X	X
27	Spark plug condition				X										X	X			X	X	X
28	ATX concerns	Upshift/ downshift/ engagement	(See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE [SJ6A-EL].)																		

SYMPTOM TROUBLESHOOTING [L8, LF]

X: Applied

	Troubleshooting item		Injectors malfunction (Leakage or clogging, inope-rative)	Fuel leakage from fuel system (including insulator, injector O-ring)	Fuel filters restriction or clogging	CMP sensor is damaged (e.g. open or short circuit)	Camshaft is damaged	Improper air/fuel mixture ratio control	Exhaust system restriction or clogging	Catalytic converter malfunction	EGR system malfunction	Purge valve malfunction	Fuel into evaporative purge hose	Check valve (two-way) malfunction	PCV valve malfunction	Constant voltage supply circuit malfunction	Main relay malfunction (Mechanically or electrically)	PCM or sensor GND circuit open or short	ECT sensor malfunction	TR switch misadjustment (AT)	TR switch malfunction (AT)	Break switch and related circuit malfunction	Manifold absolute pressure sensor and related circuit malfunction	A/F sensor, HO2S and related circuit malfunction
1	Melting of main or other fuses																							
2	MIL illuminates					X		X											X			X	X	X
3	Will not crank																			X	X			
4	Hard to start/long crank/erratic start/ erratic crank				X			X	X		X				X			X						X
5	Engine stalls	After start/ at idle	X	X				X	X		X	X			X		X							X
6	Cranks normally but will not start		X	X				X	X		X	X			X	X	X							X
7	Slow return to idle																		X					
8	Engine runs rough/ rolling idle		X		X	X	X	X	X		X	X			X			X						X
9	Fast idle/runs on																		X					
10	Low idle/stalls during deceleration							X				X								X		X		X
11	Engine stalls/ quits	Acceleration/cruise	X		X	X	X	X	X		X	X	X	X	X	X	X							X
	Engine runs rough	Acceleration/cruise	X		X	X	X	X	X		X	X	X	X	X	X	X							X
	Misses	Acceleration/cruise	X		X	X	X	X	X		X	X	X	X	X	X	X							X
	Buck/jerk	Acceleration/cruise/ deceleration	X		X	X	X	X	X		X	X	X	X	X	X	X							X
	Hesitation /stumble	Acceleration	X		X	X	X	X	X		X	X	X	X	X	X	X							X
	Surges	Acceleration/cruise	X		X	X	X	X	X		X	X	X	X	X	X	X							X
12	Lack/loss of power	Acceleration/cruise	X			X	X		X		X	X			X				X					
13	Knocking/ pinging	Acceleration/cruise				X																		
14	Poor fuel economy				X	X	X		X						X									
15	Emission compliance				X	X	X	X	X	X	X	X			X									X
16	High oil consumption/ leakage														X									

SYMPTOM TROUBLESHOOTING [L8, LF]

Troubleshooting item			Injectors malfunction (Leakage or clogging, inope-rative)	Fuel leakage from fuel system (including insulator, injector O-ring)	Fuel filters restriction or clogging	CMP sensor is damaged (e.g. open or short circuit)	Camshaft is damaged	Improper air/fuel mixture ratio control	Exhaust system restriction or clogging	Catalytic converter malfunction	EGR system malfunction	Purge valve malfunction	Fuel into evaporative purge hose	Check valve (two-way) malfunction	PCV valve malfunction	Constant voltage supply circuit malfunction	Main relay malfunction (Mechanically or electrically)	PCM or sensor GND circuit open or short	ECT sensor malfunction	TR switch misadjustment (AT)	TR switch malfunction (AT)	Break switch and related circuit malfunction	Manifold absolute pressure sensor and related circuit malfunction	A/F sensor, HO2S and related circuit malfunction
17	Cooling system concerns	Overheating																							
18	Cooling system concerns	Runs cold																							
19	Exhaust smoke		X												X										
20	Fuel odor (in engine compartment)			X								X													
21	Engine noise																								
22	Vibration concerns (engine)																								
23	A/C does not work sufficiently																								
24	A/C is always on or A/C compressor runs continuously																								
25	A/C is not cut off under wide open throttle conditions																								
26	Exhaust sulphur smell				X							X													
27	Spark plug condition		X	X				X											X						
28	ATX concerns	Upshift/downshift/engagement	(See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE [SJ6A-EL].)																						

SYMPTOM TROUBLESHOOTING [L8, LF]

X: Applied

	Troubleshooting item		IAT sensor and related circuit malfunction	BARO sensor malfunction	Neutral or clutch switch and related circuit malfunction (MT)	MAF sensor and related circuit malfunction	KS and related circuit malfunction	TP sensor and related circuit malfunction	APP sensor and related circuit malfunction	PSP switch and related circuit malfunction	Improper refrigerant charging amount	A/C relay (A/C control signal circuit malfunction)	A/C compressor magnetic clutch malfunction	Improper load signal input	Clutch slippage (MT)	AT related parts malfunction (AT)	Improper ATF level (AT)	VSS and related circuit malfunction	Brake dragging	Loose parts	Improper balance of wheels and tires	Drive line malfunction	Suspension malfunction	Immobilizer system operating
1	Melting of main or other fuses																							
2	MIL illuminates		X	X	X	X	X	X		X								X						
3	Will not crank																							X
4	Hard to start/long crank/erratic start/ erratic crank					X																		
5	Engine stalls	After start/ at idle		X							X	X												X
6	Cranks normally but will not start																							X
7	Slow return to idle									X														
8	Engine runs rough/ rolling idle			X						X	X	X		X										
9	Fast idle/runs on													X										
10	Low idle/stalls during deceleration			X	X	X		X	X			X								X				
11	Engine stalls/ quits	Acceleration/cruise		X		X		X	X		X	X			X	X		X						
	Engine runs rough	Acceleration/cruise		X		X		X	X		X	X			X	X		X						
	Misses	Acceleration/cruise				X		X	X		X	X			X	X		X						
	Buck/jerk	Acceleration/cruise/ deceleration				X		X	X		X	X		X	X	X								
	Hesitation /stumble	Acceleration		X		X		X	X		X	X			X	X		X						
	Surges	Acceleration/cruise				X		X	X		X	X			X	X		X						
12	Lack/loss of power	Acceleration/cruise				X		X	X		X	X			X	X		X	X					
13	Knocking/ pinging	Acceleration/cruise	X			X	X																	
14	Poor fuel economy					X						X	X		X		X		X					
15	Emission compliance			X																				
16	High oil consumption/ leakage																							

SYMPTOM TROUBLESHOOTING [L8, LF]

Troubleshooting item			IAT sensor and related circuit malfunction	BARO sensor malfunction	Neutral or clutch switch and related circuit malfunction (MT)	MAF sensor and related circuit malfunction	KS and related circuit malfunction	TP sensor and related circuit malfunction	APP sensor and related circuit malfunction	PSP switch and related circuit malfunction	Improper refrigerant charging amount	A/C relay (A/C control signal circuit malfunction)	A/C compressor magnetic clutch malfunction	Improper load signal input	Clutch slippage (MT)	AT related parts malfunction (AT)	Improper ATF level (AT)	VSS and related circuit malfunction	Brake dragging	Loose parts	Improper balance of wheels and tires	Drive line malfunction	Suspension malfunction	Immobilizer system operating
17	Cooling system concerns	Overheating									X	X												
18	Cooling system concerns	Runs cold																						
19	Exhaust smoke																							
20	Fuel odor (in engine compartment)																							
21	Engine noise																			X				
22	Vibration concerns (engine)																			X	X	X	X	
23	A/C does not work sufficiently										X	X	X											
24	A/C is always on or A/C compressor runs continuously											X	X											
25	A/C is not cut off under wide open throttle conditions								X															
26	Exhaust sulphur smell																							
27	Spark plug condition				X	X																		
28	ATX concerns	Upshift/downshift/engagement	(See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE [SJ6A-EL].)																					

SYMPTOM TROUBLESHOOTING [L8, LF]

NO.1 MELTING OF MAIN OR OTHER FUSES [L8, LF]

id0103a0800700

1	MELTING OF MAIN OR OTHER FUSES

[TROUBLESHOOTING HINTS]
- Inspect condition of fuse.

Damaged fuse	Related wiring harness
MAIN	• FAN fuse*1 • Generator • IG KEY 2 fuse • ROOM fuse • ST fuse
ROOM	• DLC-2 • PCM
FUEL PUMP	• Fuel pump relay — Fuel pump unit
IG KEY1	• Ignition switch — ENGINE fuse • Ignition relay
IG KEY2	• Ignition switch — Starter relay
ETV	• Drive-by-wire-relay — PCM • Main relay — PCM
EGI COMP1	• EGR valve • OCV (if equipped) • Purge solenoid valve • Variable intake air solenoid valve • Variable tumble solenoid valve (if equipped)
EGI COMP2	• Drive-by-wire-relay • MAF sensor • PCM
EGI INJ	• Fuel injector No.1 • Fuel injector No.2 • Fuel injector No.3 • Fuel injector No.4
ENGINE*2 (15 A)	• Fuel pump relay • Condenser • Ignition coil No.1 • Ignition coil No.2 • Ignition coil No.3 • Ignition coil No.4 • A/F sensor • HO2S
ENGINE*2 (7.5 A)	• Ignition relay

SYMPTOM TROUBLESHOOTING [L8, LF]

Damaged fuse	Related wiring harness
FAN*1 (30 A)	• Cooling fan relay No.1 —Cooling fan motor • Cooling fan relay No.2 —Cooling fan motor
FAN*1 (7.5 A)	• Cooling fan relay No.1 —PCM • Cooling fan relay No.2 —PCM • Cooling fan relay No.3 —PCM
ST	• Starter relay —Starter

*1 : Two FAN fuses differs in a current value
*2 : Two ENGINE fuses differs in a current value

NO.2 MIL ILLUMINATES [L8, LF]

id0103a0800800

2	MIL ILLUMINATES
DESCRIPTION	• MIL is illuminated incorrectly.
POSSIBLE CAUSE	• The MIL illuminates for emission-related concern (DTC is stored in PCM). • Instrument cluster malfunction • PCM malfunction **Note** • If the MIL blinks at steady rate, misfire condition could possibly exist.

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Connect the M-MDS to the DLC-2. Perform the DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Are any DTCs present?	Yes	Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Inspect the instrument cluster operation. (See 09-22-4 INSTRUMENT CLUSTER INSPECTION.) Repair or replace the malfunctioning part according to the inspection results.
2	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. —If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

NO.3 WILL NOT CRANK [L8, LF]

id0103a0800900

3	WILL NOT CRANK
DESCRIPTION	• Starter does not work.
POSSIBLE CAUSE	• Coil antenna is not securely connected • Instrument cluster malfunction • Immobilizer system operating properly (ignition key is not registered) • Immobilizer system and/or circuit malfunction • Battery malfunction • Starter malfunction • Seized/hydrolocked engine, flywheel or drive plate • Charging system malfunction • TR switch misadjustment (AT) • TR switch malfunction (AT) • Open starter circuit between ignition switch and starter • PCM malfunction

SYMPTOM TROUBLESHOOTING [L8, LF]

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Connect the M-MDS to the DLC-2. Do the following conditions appear? • The engine is not completely started. • DTC P1260 is displayed.	Yes	Both conditions appear: • Go to Step 4.
		No	Either or other condition appears: • Go to the next step.
2	Is the coil antenna connector securely connected?	Yes	Go to the next step.
		No	Connect the coil antenna connector securely. Return to Step 1.
3	Does the security light flash?	Yes	Go to the next step.
		No	Inspect the instrument cluster. (See 09-22-4 INSTRUMENT CLUSTER INSPECTION.) Replace the instrument cluster, if necessary. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
4	Connect the M-MDS to the DLC-2. Retrieve the DTC for PCM and immobilizer system. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) (See 09-02A-3 DTC INSPECTION [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].) Are any DTCs present?	Yes	Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].) (See 09-02A-4 DTC TABLE [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].)
		No	Go to the next step.
5	Inspect the wiring harness between the following terminals and connectors: • Coil antenna terminal A and instrument cluster terminal 2S • Coil antenna terminal B and instrument cluster terminal 2Q Is there any malfunction?	Yes	Repair or replace the suspected wiring harness and connector.
		No	Go to the next step.
6	Inspect the wiring harness between the following terminals and connectors: • PCM terminal 1AI and instrument cluster terminal 1L • PCM terminal 1AM and instrument cluster terminal 1J	Yes	Repair or replace the suspected wiring harness and connector.
		No	AT: • Go to the next step. MT: • Go to Step 8.
7	Inspect for continuity between PCM terminal 1B and starter relay with P or N position. Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the suspected wiring harness.
8	Inspect the following: • Battery connection • Battery condition • Fuses • Transmission in Park or Neutral (AT) Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results. Repeat Step 8.
		No	Go to the next step.
9	Is clicking sound heard from starter when the ignition switch is turned to START?	Yes	Go to the next step.
		No	Go to Step 15.
10	Inspect the starting system. (See 01-19-3 STARTER INSPECTION [L8, LF].) Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results. (See 01-19-1 STARTER REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
11	Inspect for a seized/hydro locked engine or flywheel (MT) or drive plate (AT). (See 05-10-14 FLYWHEEL INSPECTION.) Is the engine seized or hydro locked?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
12	Do any other electrical accessories function?	Yes	AT: • Go to the next step. MT: • Go to Step 14.
		No	Inspect charging system. (See 01-17-6 GENERATOR INSPECTION [L8, LF].) Repair or replace the malfunctioning part according to the inspection results. (See 01-17-5 GENERATOR REMOVAL/ INSTALLATION [L8, LF].)
13	Connect the M-MDS to the DLC-2. Turn ignition switch to ON position. Perform the PID/DATA Monitor and Record Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Access the TR PID. Is TR PID indicated P/N when selecting P or N position?	Yes	Go to the next step.
		No	Inspect TR switch is adjusted properly. Inspect for open or short circuit between TR switch and PCM terminal 1X or starter. Repair or replace the malfunctioning part according to the inspection results.
14	Connect the M-MDS to the DLC-2. Perform the DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Are any DTCs present?	Yes	DTC is present: • Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].) Communication error message is displayed: • Inspect the following: — Open circuit in wiring harness between main relay and PCM terminal1AW, 1BE — Open circuit in wiring harness between main relay terminal E and PCM terminal 1Q — Main relay is stuck open — Open or short circuit in wiring harness between DLC-2 and PCM terminals 1AM and 1AI — Open or poor ground circuit (PCM terminal 1BH, 1AZ, 1BD or 1BB) — Poor connection of vehicle body ground • Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
15	Perform the KOEO self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) Are any DTCs present?	Yes	Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Inspect the following: • START circuit in ignition switch • Open circuit in wiring harness between ignition switch and starter Repair or replace the malfunctioning part according to the inspection results.
16	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

SYMPTOM TROUBLESHOOTING [L8, LF]

NO.4 HARD TO START/LONG CRANK/ERRATIC START/ERRATIC CRANK [L8, LF]

id0103a0801000

4	HARD TO START/LONG CRANK/ERRATIC START/ERRATIC CRANK
DESCRIPTION	• Starter cranks engine at normal speed but engine requires excessive cranking time before starting. (The battery is in normal condition.)
POSSIBLE CAUSE	• Air leakage from intake-air system • Air cleaner restriction • Poor fuel quality • Vacuum leakage • Erratic signal to ignition coil • Spark plug malfunction • Erratic signal from CKP sensor • Improper operation of electronic throttle control system • Inadequate fuel pressure • Pressure regulator malfunction (built-in fuel pump unit) • Purge solenoid valve malfunction • MAF sensor contamination • Incorrect MAF sensor ground voltage • Restriction in exhaust system • EGR valve malfunction • Starting system malfunction • PCV valve malfunction • PCM malfunction **Warning** **The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION" described in this manual.** **(See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)** **(See 01-14-5 AFTER SERVICE PRECAUTION [L8, LF].)** **Caution** • **Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Inspect the following: • Cracks on intake-air system parts • Intake-air system restriction (e.g. air cleaner element, fresh air duct) • Loose bands on intake-air system • Proper fuel quality (such as proper octane, contamination, winter/summer blend) • Vacuum leakage Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results. Repeat Step 1.
		No	Go to the next step.
2	Connect the M-MDS to the DLC-2. Perform the KOEO/KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) Are any DTCs present?	Yes	Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
3	Is the engine overheating?	Yes	Go to the symptom troubleshooting “NO.17 COOLING SYSTEM CONCERNS-OVERHEATING”. (See 01-03-53 NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [L8, LF].)
		No	Go to the next step.
4	Inspect the ignition coil related wiring harness condition (intermittent open or short circuit) for all cylinders. Is there any malfunction?	Yes	Repair or replace the suspected wiring harness.
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
5	Inspect the spark plug conditions. (See 01-18-3 SPARK PLUG INSPECTION [L8, LF].) Is spark plug wet, covered with carbon or grayish white?	Yes	Spark plug is wet or covered with carbon: • Inspect for fuel leakage from fuel injector. Spark plug is grayish white: • Inspect the fuel injector for clogging. Repair or replace the malfunctioning part according to the inspection results.
		No	Install the spark plugs on original cylinders. Go to the next step.
6	Visually inspect the CKP sensor and teeth of crankshaft pulley. Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
7	Attempt to start the engine at part throttle. Does the engine run smoothly at part throttle?	Yes	Perform the Electronic Throttle Control System Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
8	Install fuel pressure gauge between the fuel pipe and the fuel distributor. Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Turn the fuel pump on using FP PID in output state control of data logger function. Is the fuel line pressure correct? (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Zero or low: • Inspect the fuel pump and fuel pump relay related circuit. • Inspect for clogged fuel line. • If there is no malfunction: — Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) • If there is a malfunction: — Repair or replace the malfunctioning part according to the inspection results. High: • Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
9	Is the fuel line pressure held after the ignition switch is turned off? (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Inspect the fuel injector. (See 01-14-19 FUEL INJECTOR INSPECTION [L8, LF].) If the fuel injector is normal: • Replace fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) If the fuel injector has a malfunction: • Replace fuel injector. (See 01-14-18 FUEL INJECTOR REMOVAL/ INSTALLATION [L8, LF].)
10	Disconnect a vacuum hose from the purge solenoid valve and plug opening end of vacuum hose. Start the engine. Is the starting condition improved?	Yes	Inspect if the purge solenoid valve is stuck open. (See 01-16-8 PURGE SOLENOID VALVE INSPECTION [L8, LF].) Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
11	Inspect the MAF sensor the following: • Contamination • MAF sensor terminal B voltage (ground circuit) Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
12	Visually inspect the exhaust system part. Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
13	Inspect the engine condition while tapping the EGR valve housing. Does the engine condition improve?	Yes	Replace the EGR valve. (See 01-16-9 EGR VALVE REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
14	Inspect the starting system. (See 01-19-3 STARTER INSPECTION [L8, LF].) Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
15	Inspect the PCV valve. (See 01-16-12 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION [L8, LF].) Is there any malfunction?	Yes	Replace the PCV valve.
		No	Inspect for loose connectors or poor terminal contact. If there is no malfunction: • Remove the EGR valve and visually inspect for mechanically stuck EGR valve.
16	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

NO.5 ENGINE STALLS-AFTER START/AT IDLE [L8, LF]

id0103a0801100

5	ENGINE STALLS—AFTER START/AT IDLE
DESCRIPTION	• Engine stops unexpectedly at idle and/or after start.
POSSIBLE CAUSE	• Immobilizer system operating properly (Ignition key is not registered) • Immobilizer system and/or circuit malfunction • Air cleaner restriction • Electrical connector disconnection • Poor fuel quality • Air leakage from intake-air system • Restriction of intake-air system • Throttle valve malfunction • Vacuum leakage • Erratic signal to ignition coil • APP sensor and related wiring harness malfunction • TP sensor and related wiring harness malfunction • Improper operation of electronic throttle control system • No signal from CKP sensor due to sensor, related wire or wrong installation • Ignition coil related wiring harness malfunction • Spark plug malfunction • Restriction in exhaust system • Fuel supply system malfunction — Fuel pump and fuel pump relay related circuit malfunction — Fuel line clogging — Fuel pump unit malfunction — Fuel injector malfunction • Improper operation of A/C system • Purge solenoid valve malfunction • EVAP control system malfunction • Air leakage at intake-air system components • EGR valve malfunction • Improper operation of variable valve timing control system • Low engine compression • PCV valve malfunction • Improper valve timing • PCM malfunction **Warning** **The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION" described in this manual.** **(See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)** **(See 01-14-5 AFTER SERVICE PRECAUTION [L8, LF].)** **Caution** • **Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

SYMPTOM TROUBLESHOOTING [L8, LF]

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Connect the M-MDS to the DLC-2. Do the following conditions appear? • The engine is not completely started. • DTC P1260 is displayed.	Yes	Both conditions appear: • Go to Step 3.
		No	Either or other condition appears: • Go to the next step.
2	Does the engine stall after **approx. 2 s** since the engine is started?	Yes	Go to the next step.
		No	Immobilizer system is normal: • Go to Step 10.
3	Is the coil antenna connector securely connected?	Yes	Go to the next step.
		No	Connect the coil antenna connector securely. Return to Step 2.
4	Does the security light flash?	Yes	Go to the next step.
		No	Inspect the instrument cluster. (See 09-22-4 INSTRUMENT CLUSTER INSPECTION.) Replace the instrument cluster, if necessary. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)
5	Connect the M-MDS to the DLC-2. Retrieve the DTC for PCM and immobilizer system. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) (See 09-02A-3 DTC INSPECTION [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].) Are any DTCs present?	Yes	Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].) (See 09-02A-4 DTC TABLE [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].)
		No	Go to the next step.
6	Inspect the wiring harness between the following terminals and connectors: • Coil antenna terminal A and instrument cluster terminal 2S • Coil antenna terminal B and instrument cluster terminal 2Q Is there any malfunction?	Yes	Repair or replace the suspected wiring harness and connector.
		No	Go to the next step.
7	Inspect the wiring harness between the following terminals and connectors: • PCM terminal 1AI and instrument cluster terminal 1L • PCM terminal 1AM and instrument cluster terminal 1J	Yes	Repair or replace the suspected wiring harness and connector.
		No	Go to the next step.
8	Verify the following: • Air cleaner element • Electrical connections • Fuel quality: proper octane, contamination, winter/summer blend • Ignition wiring • No air leakage from intake-air system • No restriction of intake-air system • Proper sealing of intake manifold and components attached to intake manifold: EGR valve • Smooth operation of throttle valve • Vacuum connection Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results. Repeat Step 8.
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
9	Perform the PID/DATA Monitor and Record Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Access the APP1 and APP2 PIDs. Crank the engine with accelerator pedal released. Are the APP1 and APP2 PIDs indicating that the accelerator pedal is in the released position?	Yes	Go to the next step.
		No	Inspect the following: • APP sensor (See 01-40-29 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION [L8, LF].) • Wiring harness between the following terminals and connectors: — PCM terminal 1AJ and APP sensor terminal A — PCM terminal 1AV and APP sensor terminal B — PCM terminal 1AP and APP sensor terminal C — PCM terminal 1AL and APP sensor terminal D — PCM terminal 1AS and APP sensor terminal E — PCM terminal 1AO and APP sensor terminal F Repair or replace the malfunctioning part according to the inspection results.
10	Perform the PID/DATA Monitor and Record Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Access the TP PID. Crank the engine with accelerator pedal released. Is the TP PID indicating that the accelerator pedal is in the released position?	Yes	Go to the next step.
		No	Inspect the following: • TP sensor (See 01-40-28 THROTTLE POSITION (TP) SENSOR INSPECTION [L8, LF].) • Wiring harness between the following terminals and connectors: — PCM terminal 2AP and TP sensor terminal C — PCM terminal 2AL and TP sensor terminal D — PCM terminal 2AK and TP sensor terminal E — PCM terminal 2AO and TP sensor terminal F Repair or replace the malfunctioning part according to the inspection results.
11	Connect the M-MDS to the DLC-2. Perform the KOEO self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) If the engine stalls, Perform the DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Are any DTCs present?	Yes	DTC is present: • Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].) Communication error message is displayed: • Inspect the following: — Open circuit in wiring harness between main relay and PCM terminal1AW, 1BE — Open circuit in wiring harness between main relay terminal E and PCM terminal 1Q — Main relay is stuck open — Open or short circuit in wiring harness between DLC-2 and PCM terminals 1AM and 1AI — Open or poor ground circuit (PCM terminal 1BH, 1AZ, 1BD or 1BB) — Poor connection of vehicle body ground • Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
12	Attempt to start engine at part throttle. Does engine run smoothly at part throttle?	Yes	Perform the Electronic Throttle Control System Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
13	Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Access the RPM PID. Is the RPM PID indicating engine speed during engine cranking?	Yes	Go to the next step.
		No	Inspect the following: • Open or short circuit in CKP sensor • Open or short circuit between CKP sensor terminal A and PCM terminal 2AB • Open or short circuit in between CKP sensor terminal B and PCM terminal 2W • Open or short circuit in wiring harness between CKP sensor terminal C and PCM terminal 2AQ • Open or short circuit in CKP sensor wiring harnesses Repair or replace the malfunctioning part according to the inspection results. If the CKP sensor and wiring harness are normal: • Go to the next step.
14	Visually inspect CKP sensor and teeth of crankshaft pulley. Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
15	Inspect the ignition coil related wiring harness condition (intermittent open or short circuit) for all cylinders. Is there any malfunction?	Yes	Repair or replace the suspected wiring harness.
		No	Go to the next step.
16	Perform the Spark Test. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Is strong blue spark visible at each cylinder?	Yes	Go to the next step. If symptoms occurs with the A/C on: • Go to Step 21.
		No	Repair or replace the malfunctioning part according to the inspection results.
17	Inspect spark plug condition. (See 01-18-3 SPARK PLUG INSPECTION [L8, LF].) Is the spark plug wet, covered with carbon or grayish white?	Yes	Spark plug is wet or covered with carbon: • Inspect for fuel leakage from injector. Spark plug is grayish white: • Inspect for clogged fuel injector. Repair or replace the malfunctioning part according to the inspection results.
		No	Install spark plugs on original cylinders. Go to the next step.
18	Visually inspect the exhaust system part. Is there any deformed exhaust system part?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
19	Install the fuel pressure gauge between the fuel pipe and fuel distributor. Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Turn the fuel pump on using FP PID in output state control of datalogger function. Is the fuel line pressure correct? (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Zero or low: • Inspect the fuel pump and fuel pump relay related circuit. • Inspect for clogged fuel line. • If there is no malfunction: — Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) • If there is a malfunction: — Repair or replace the malfunctioning part according to the inspection results. High: • Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
20	Visually inspect the fuel injector for fuel leakage O-ring and fuel line. Is the fuel line pressure held after the ignition switch is turned off? (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Inspect the fuel injector. (See 01-14-19 FUEL INJECTOR INSPECTION [L8, LF].) If the fuel injector is normal: • Replace fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) If the fuel injector has a malfunction: • Replace fuel injector. (See 01-14-18 FUEL INJECTOR REMOVAL/ INSTALLATION [L8, LF].)

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
21	**Note** • Following test is for stall concerns with the A/C on. If other symptoms exist, go to the next step. Connect the pressure gauges to A/C low and high pressure side lines. Turn the A/C on and measure low side and high side pressures. Are pressures within specifications? (See 07-10-5 REFRIGERANT PRESSURE CHECK.)	Yes	Go to the next step.
		No	If the A/C is always on, go to the symptom troubleshooting “NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY”. (See 01-03-62 NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [L8, LF].) For other symptoms, inspect the following: • Refrigerant charging amount • Condenser fan operation Repair or replace the malfunctioning part according to the inspection results.
22	Disconnect vacuum hose between the purge solenoid valve and intake manifold from purge solenoid valve side. Plug the opening end of vacuum hose. Start the engine. Is the engine stall now eliminated?	Yes	Inspect if the purge solenoid valve is stuck open. (See 01-16-8 PURGE SOLENOID VALVE INSPECTION [L8, LF].) Inspect the EVAP control system. Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
23	Is air leakage felt or heard at the intake-air system components while racing the engine to higher speed?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
24	Inspect engine condition while tapping the EGR valve housing. Does the engine condition improve?	Yes	Replace the EGR valve. (See 01-16-9 EGR VALVE REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
25	Perform the Variable Valve Timing Control System Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Does the variable valve timing control system operate properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
26	Perform the “COMPRESSION INSPECTION”. (See 01-10-18 COMPRESSION INSPECTION [L8, LF].) Is the engine compression correct?	Yes	Go to the next step.
		No	Inspect for cause.
27	Inspect the PCV valve. (See 01-16-12 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION [L8, LF].) Is there any malfunction?	Yes	Replace the PCV valve.
		No	Inspect the valve timing. Repair or replace the malfunctioning part according to the inspection results.
28	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

SYMPTOM TROUBLESHOOTING [L8, LF]

NO.6 CRANKS NORMALLY BUT WILL NOT START [L8, LF]

id0103a0801200

6	CRANKS NORMALLY BUT WILL NOT START
DESCRIPTION	• Starter cranks engine at normal speed but engine will not run. • Refer to symptom troubleshooting "NO.5 ENGINE STALLS" if this symptom appears after engine stall. • Fuel is in tank. • Battery is in normal condition.
POSSIBLE CAUSE	• Immobilizer system operating properly (Ignition key is not registered) • Immobilizer system and/or circuit malfunction • Electrical connector disconnection • Poor fuel quality • Fuse malfunction • Restriction of intake-air system • Air leakage from intake-air system • Throttle valve malfunction • Vacuum leakage • Erratic signal to ignition coil • APP sensor and related wiring harness malfunction • TP sensor and related wiring harness malfunction • Improper operation of electronic throttle control system • No signal from CKP sensor due to sensor, related wire or wrong installation • Ignition coil related wiring harness malfunction • Spark plug malfunction • Restriction in exhaust system • Fuel supply system malfunction — Fuel pump and fuel pump relay related circuit malfunction — Fuel line clogging — Fuel pump unit malfunction — Fuel injector malfunction • Improper operation of A/C system • Purge solenoid valve malfunction • EVAP control system malfunction • Air leakage at intake-air system components • EGR valve malfunction • Improper operation of variable valve timing control system • Low engine compression • PCV valve malfunction • Improper valve timing • PCM malfunction **Warning** **The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION" described in this manual.** **(See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)** **(See 01-14-5 AFTER SERVICE PRECAUTION [L8, LF].)** **Caution** • **Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

SYMPTOM TROUBLESHOOTING [L8, LF]

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Connect the M-MDS to the DLC-2. Do any of the following conditions appear? • The engine is not completely started. • DTC P1260 is displayed.	Yes	Both conditions appear: • Go to Step 3.
		No	Either or other condition appears: • Go to the next step.
2	Does the engine stall after **approx. 2 s** since the engine is started?	Yes	Go to the next step.
		No	Immobilizer system is normal: • Go to Step 10.
3	Is the coil antenna connector securely connected?	Yes	Go to the next step.
		No	Connect the coil antenna connector securely. Return to Step 2.
4	Does the security light flash?	Yes	Go to the next step.
		No	Inspect the instrument cluster. (See 09-22-4 INSTRUMENT CLUSTER INSPECTION.) Replace the instrument cluster, if necessary. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)
5	Connect the M-MDS to the DLC-2. Retrieve the DTC for PCM and immobilizer system. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) (See 09-02A-3 DTC INSPECTION [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].) Are any DTCs present?	Yes	Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].) (See 09-02A-4 DTC TABLE [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].)
		No	Go to the next step.
6	Inspect the wiring harness between the following terminals and connectors: • Coil antenna terminal A and instrument cluster terminal 2S • Coil antenna terminal B and instrument cluster terminal 2Q Is there any malfunction?	Yes	Repair or replace the suspected wiring harness and connector.
		No	Go to the next step.
7	Inspect the wiring harness between the following terminals and connectors: • PCM terminal 1AI and instrument cluster terminal 1L • PCM terminal 1AM and instrument cluster terminal 1J	Yes	Repair or replace the suspected wiring harness and connector.
		No	Go to the next step.
8	Verify the following: • Electrical connections • External fuel shut off or accessory (such as kill switch, alarm) • Fuel quality: proper octane, contamination, winter/summer blend • Fuses • Ignition wiring • Intake-air system restriction (such as air cleaner element, fresh air duct) • No air leakage from intake-air system • Proper sealing of intake manifold and components attached to intake manifold: EGR valve • Smooth operation of throttle valve • Vacuum connection Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results. Repeat Step 8.
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
9	Perform the PID/DATA Monitor and Record Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Access the APP1 and APP2 PIDs. Crank the engine with accelerator pedal released. Are the APP1 and APP2 PIDs indicating that the accelerator pedal is in the released position?	Yes	Go to the next step.
		No	Inspect the following: • APP sensor (See 01-40-29 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION [L8, LF].) • Wiring harness between the following terminals and connectors: — PCM terminal 1AJ and APP sensor terminal A — PCM terminal 1AV and APP sensor terminal B — PCM terminal 1AP and APP sensor terminal C — PCM terminal 1AL and APP sensor terminal D — PCM terminal 1AS and APP sensor terminal E — PCM terminal 1AO and APP sensor terminal F Repair or replace the malfunctioning part according to the inspection results.
10	Perform the PID/DATA Monitor and Record Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Access the TP PID. Crank the engine with accelerator pedal released. Is the TP PID indicating that the accelerator pedal is in the released position?	Yes	Go to the next step.
		No	Inspect the following: • TP sensor (See 01-40-28 THROTTLE POSITION (TP) SENSOR INSPECTION [L8, LF].) • Wiring harness between the following terminals and connectors: — PCM terminal 2AP and TP sensor terminal C — PCM terminal 2AL and TP sensor terminal D — PCM terminal 2AK and TP sensor terminal E — PCM terminal 2AO and TP sensor terminal F Repair or replace the malfunctioning part according to the inspection results.
11	Connect the M-MDS to the DLC-2. Perform the KOEO self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) If the engine stalls, Perform the DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Are any DTCs present?	Yes	DTC is present: • Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].) Communication error message is displayed: • Inspect the following: — Open circuit in wiring harness between main relay and PCM terminal1AW, 1BE — Open circuit in wiring harness between main relay terminal E and PCM terminal 1Q — Main relay is stuck open — Open or short circuit in wiring harness between DLC-2 and PCM terminals 1AM and 1AI — Open or poor ground circuit (PCM terminal 1BH, 1AZ, 1BD or 1BB) — Poor connection of vehicle body ground • Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
12	Does the engine start with the throttle valve closed?	Yes	Go to Step 27.
		No	Go to the next step.
13	Will the engine start and run smoothly at part throttle?	Yes	Perform the Electronic Throttle Control System Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
14	Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Access the RPM PID. Is the RPM PID indicating engine speed during engine cranking?	Yes	Go to the next step.
		No	Inspect the following: • Open or short circuit in CKP sensor • Open or short circuit between CKP sensor terminal A and PCM terminal 2AB • Open or short circuit in between CKP sensor terminal B and PCM terminal 2W • Open or short circuit in wiring harness between CKP sensor terminal C and PCM terminal 2AQ • Open or short circuit in CKP sensor wiring harnesses Repair or replace the malfunctioning part according to the inspection results. If the CKP sensor and wiring harness are normal: • Go to the next step.
15	Visually inspect CKP sensor and teeth of crankshaft pulley. Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
16	Inspect the ignition coil related wiring harness condition (intermittent open or short circuit) for all cylinders. Is there any malfunction?	Yes	Repair or replace the suspected wiring harness.
		No	Go to the next step.
17	Perform the Spark Test. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Is strong blue spark visible at each cylinder?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
18	Inspect spark plug condition. (See 01-18-3 SPARK PLUG INSPECTION [L8, LF].) Is the spark plug wet, covered with carbon or grayish white?	Yes	Spark plug is wet or covered with carbon: • Inspect for fuel leakage from injector. Spark plug is grayish white: • Inspect for clogged fuel injector. Repair or replace the malfunctioning part according to the inspection results.
		No	Install spark plugs on original cylinders. Go to the next step.
19	Visually inspect the exhaust system part. Is there any deformed exhaust system part?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
20	Install fuel pressure gauge between the fuel pipe and the fuel distributor. Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Turn ON and/or OFF using FP PID in output state control of datalogger function. Is the fuel line pressure correct when FP PID is turned On/Off **five times**? (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Zero or low: • Inspect the fuel pump and fuel pump relay related circuit. • Inspect for clogged fuel line. • If there is no malfunction: — Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) • If there is a malfunction: — Repair or replace the malfunctioning part according to the inspection results. High: • Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
21	Visually inspect the fuel injector O-ring and fuel line for fuel leakage. Is fuel line pressure held after the ignition switch is turned off? (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Inspect the fuel injector. (See 01-14-19 FUEL INJECTOR INSPECTION [L8, LF].) If the fuel injector is normal: • Replace fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) If the fuel injector has a malfunction: • Replace fuel injector. (See 01-14-18 FUEL INJECTOR REMOVAL/ INSTALLATION [L8, LF].)

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
22	Disconnect the vacuum hose between the purge solenoid valve and the intake manifold from the purge solenoid valve side. Plug the opening end of vacuum hose. Start the engine. Is starting condition improved?	Yes	Inspect if the purge solenoid valve is stuck open. (See 01-16-8 PURGE SOLENOID VALVE INSPECTION [L8, LF].) Inspect the EVAP control system. Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
23	Is air leakage felt or heard at the intake-air system components while racing the engine to higher speed?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
24	Inspect engine condition while tapping the EGR valve housing. Is engine condition improved?	Yes	Replace the EGR valve. (See 01-16-9 EGR VALVE REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
25	Perform the Variable Valve Timing Control System Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Does the variable valve timing control system operate properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
26	Perform the “COMPRESSION INSPECTION”. (See 01-10-18 COMPRESSION INSPECTION [L8, LF].) Is the engine compression correct?	Yes	Go to the next step.
		No	Inspect for cause.
27	Inspect the PCV valve. (See 01-16-12 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION [L8, LF].) Is there any malfunction?	Yes	Replace the PCV valve.
		No	Inspect the valve timing. Repair or replace the malfunctioning part according to the inspection results.
28	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

SYMPTOM TROUBLESHOOTING [L8, LF]

NO.7 SLOW RETURN TO IDLE [L8, LF]

id0103a0801300

7	SLOW RETURN TO IDLE
DESCRIPTION	• Engine takes more time than normal to return to idle speed.
POSSIBLE CAUSE	• ECT sensor malfunction • Thermostat is stuck open • PSP switch and related wiring harness malfunction • Throttle body malfunction • Air leakage from intake-air system • PCM malfunction

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Connect the M-MDS to the DLC-2. Perform the KOEO/KOER self test and DTC Reading Procedure. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Are any DTCs present?	Yes	Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
2	Perform the PID/DATA Monitor and Record Procedure and access the ECT PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Start the engine and warm it up to ECT PID **above 90 °C {194 °F}**. Does the ECT PID increasing dull at thermostat initial operating temperature? **Thermostat initial opening temperature** • **80–84 °C {176–183 °F}**	Yes	Go to the next step.
		No	Inspect characteristic of the ECT sensor. (See 01-40-26 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [L8, LF].) If the ECT sensor has a malfunction: • Replace the ECT sensor. (See 01-40-25 ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/ INSTALLATION [L8, LF].) If the ECT sensor is normal: • Replace the thermostat. (See 01-12-9 THERMOSTAT REMOVAL/ INSTALLATION [L8, LF].)
3	Perform the PID/DATA Monitor and Record Procedure and access the PSP PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Does the PID indicate the correct values under trouble condition?	Yes	Go to the next step.
		No	Inspect the PSP switch and related wiring harness. (See 01-40-24 POWER STEERING PRESSURE (PSP) SWITCH INSPECTION [L8, LF].) Repair or replace the malfunctioning part according to the inspection results.
4	Is the throttle body free of contaminations?	Yes	Inspect for air leakage from the intake-air system components while racing engine to higher speed. Repair or replace the malfunctioning part according to the inspection results.
		No	Clean or replace the throttle body. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
5	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

SYMPTOM TROUBLESHOOTING [L8, LF]

NO.8 ENGINE RUNS ROUGH/ROLLING IDLE [L8, LF]

id0103a0801400

8	ENGINE RUNS ROUGH/ROLLING IDLE
DESCRIPTION	• Engine speed fluctuates between specified idle speed and lower speed and engine shakes excessively. • Idle speed is too slow and engine shakes excessively.
POSSIBLE CAUSE	• Electrical connector disconnection • Poor fuel quality • Fuse malfunction • Air leakage from intake-air system • PCM ground circuit malfunction • Throttle valve malfunction • Engine overheating • MAF sensor and related wiring harness malfunction • Improper operation of A/C system • PSP switch and related wiring harness malfunction • No signal from CKP sensor due to sensor, related wire or wrong installation • Ignition coil related wiring harness malfunction • Spark plug malfunction • Improper operation of electronic throttle control system • Fuel supply system malfunction — Fuel pump and fuel pump relay related circuit malfunction — Fuel line clogging — Fuel pump unit malfunction — Fuel injector malfunction • A/F sensor malfunction — Exhaust gas leakage between exhaust manifold and A/F sensor — Loose installation of A/F sensor — A/F sensor malfunction • Purge solenoid valve malfunction • EVAP control system malfunction • Restriction in exhaust system • Erratic signal from CMP sensor • EGR valve malfunction • Improper operation of variable valve timing control system • Low engine compression • PCV valve malfunction • Improper valve timing • PCM malfunction **Warning** **The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing the fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION" described in this manual.** **(See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)** **(See 01-14-5 AFTER SERVICE PRECAUTION [L8, LF].)** **Caution** • **Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

SYMPTOM TROUBLESHOOTING [L8, LF]

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Warm up the engine and idle for **5 min**. Is the symptom disappeared?	Yes	Symptom troubleshooting completed. (Cause of this symptom is that the idle learning of IAC system is not completed.)
		No	Go to the next step.
2	Verify the following: • Electrical connections • External fuel shut off or accessory (such as kill switch, alarm) • Fuel quality (such as proper octane, contamination, winter/summer blend) • Fuses • Ignition wiring • No air leakage from intake-air system • PCM ground circuit (PCM terminal 1AZ, 1BB, 1BD and/or 1BH) • Proper sealing of intake manifold and components attached to intake manifold: EGR valve • Smooth operation of throttle valve Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results. Repeat Step 2.
		No	Go to the next step.
3	Connect the M-MDS to the DLC-2. Perform the KOEO/KOER self test and DTC Reading Procedure. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Are any DTCs present?	Yes	Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
4	Is the engine overheating?	Yes	Go to the symptom troubleshooting “NO.17 COOLING SYSTEM CONCERNS-OVERHEATING”. (See 01-03-53 NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [L8, LF].)
		No	Go to the next step.
5	Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Access the MAF PID. Drive vehicle with monitoring PID. Is MAF PID within specification? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Inspect for open or short circuit of MAF sensor and related wiring harness. (See 01-40-28 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR INSPECTION [L8, LF].) Repair or replace the malfunctioning part according to the inspection results.
6	**Note** • Following test is for engine running rough idle with A/C on concerns. If other symptoms exist, go to the next step. Connect the pressure gauge to A/C low and high pressure side lines. Start engine and run it at idle. Turn A/C switch on. Measure low side and high side pressures. Are pressures within specifications? (See 07-10-5 REFRIGERANT PRESSURE CHECK.)	Yes	Go to the next step.
		No	If A/C is always on: • Go to the symptom troubleshooting “NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY”. (See 01-03-62 NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [L8, LF].) For other symptoms: • Inspect the following: — Refrigerant charging amount — Condenser fan operation • Repair or replace the malfunctioning part according to the inspection results.

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
7	**Note** • Following test is for engine running rough with P/S on. If other symptoms exist, go to the next step. Start engine and idle it. Perform the PID/DATA Monitor and Record Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Access the PSP PID. Inspect if PSP PID is On while turning the steering wheel right to left. Is PSP PID normal?	Yes	Go to the next step.
		No	Inspect for open or short circuit in wiring between PSP switch and PCM terminal 2T. If the circuit has a malfunction: • Repair or replace the suspected wiring harness. If there is no malfunction: • Inspect the PSP switch. (See 01-40-24 POWER STEERING PRESSURE (PSP) SWITCH INSPECTION [L8, LF].) • Replace the PSP switch, if necessary.
8	Visually inspect the CKP sensor and teeth of crankshaft pulley. Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
9	Inspect the ignition coil related wiring harness condition (intermittent open or short circuit) for all cylinders. Is there any malfunction?	Yes	Repair or replace the suspected wiring harness.
		No	Go to the next step.
10	Inspect spark plug condition. (See 01-18-3 SPARK PLUG INSPECTION [L8, LF].) Is the spark plug wet, covered with carbon or grayish white?	Yes	Spark plug is wet or covered with carbon: • Inspect for fuel leakage from injector. Spark plug is grayish white: • Inspect for clogged fuel injector. Repair or replace the malfunctioning part according to the inspection results.
		No	Install spark plugs on original cylinders. Go to the next step.
11	Perform the Electronic Throttle Control System Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Does the electronic throttle control system function properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
12	Install the fuel pressure gauge between fuel pipe and fuel distributor. Start the engine and run it at idle. Measure fuel line pressure at idle. Is fuel line pressure correct at idle? (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Zero or low: • Inspect the fuel pump and fuel pump relay related circuit. • Inspect for clogged fuel line. • If there is no malfunction: — Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) • If there is a malfunction: — Repair or replace the malfunctioning part according to the inspection results. High: • Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
13	Visually inspect for fuel leakage at fuel injector, O-ring, and fuel line. Does fuel line pressure hold after ignition switch is turned off? (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Inspect the fuel injector. (See 01-14-19 FUEL INJECTOR INSPECTION [L8, LF].) If the fuel injector is normal: • Replace fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) If the fuel injector has a malfunction: • Replace fuel injector. (See 01-14-18 FUEL INJECTOR REMOVAL/ INSTALLATION [L8, LF].)

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
14	Inspect the A/F sensor. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) Is there any malfunction?	Yes	Inspect the followings: • Exhaust gas leakage between exhaust manifold and A/F sensor • Loose installation of A/F sensor If there is no malfunction: • Replace the A/F sensor. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].) If there is a malfunction: • Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
15	Disconnect the vacuum hose between purge solenoid valve and intake manifold from purge solenoid valve side. Plug opening end of vacuum hose. Start the engine. Does the engine condition improve?	Yes	Inspect if the purge solenoid valve is stuck open. (See 01-16-8 PURGE SOLENOID VALVE INSPECTION [L8, LF].) Inspect the EVAP control system. Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
16	Visually inspect the exhaust system part. Is there any deformed exhaust system part?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
17	Visually inspect the CMP sensor and teeth of camshaft. Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
18	Inspect the engine condition while tapping the EGR valve housing. Does the engine condition improve?	Yes	Replace the EGR valve. (See 01-16-9 EGR VALVE REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
19	Perform the Variable Valve Timing Control System Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Does the variable valve timing control system operate properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
20	Perform the “COMPRESSION INSPECTION”. (See 01-10-18 COMPRESSION INSPECTION [L8, LF].) Is the engine compression correct?	Yes	Go to the next step.
		No	Inspect for cause.
21	Inspect the PCV valve. (See 01-16-12 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION [L8, LF].) Is there any malfunction?	Yes	Replace the PCV valve.
		No	Inspect the valve timing.
22	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

SYMPTOM TROUBLESHOOTING [L8, LF]

NO.9 FAST IDLE/RUNS ON [L8, LF]

id0103a0801500

9	FAST IDLE/RUNS ON
DESCRIPTION	• Engine speed continues at fast idle after warm-up. • Engine runs after the ignition switch is turned off.
POSSIBLE CAUSE	• ECT sensor malfunction • Improper load signal input — A/C switch, refrigerant pressure switch and fan switch — PSP switch — CPP switch (MT) — Neutral switch (MT) — TR switch (AT) • Air leakage from intake-air system • Improper operation of electronic throttle control system • APP sensor malfunction • PCM malfunction

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Access the ECT PID. Start and warm up engine to normal operating temperature. Is the ECT PID between **82—112°C {180—234°F}**?	Yes	Go to the next step.
		No	ECT PID is **higher than 112 °C {234 °F}**: • Go to the symptom troubleshooting “NO.17 COOLING SYSTEM CONCERNS-OVERHEATING”. (See 01-03-53 NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [L8, LF].) ECT PID is **less than 82 °C {180 °F}**: • Go to the symptom troubleshooting “NO.18 COOLING SYSTEM CONCERNS-RUNS COLD”. (See 01-03-55 NO.18 COOLING SYSTEM CONCERNS-RUNS COLD [L8, LF].)
2	Connect the M-MDS to the DLC-2. Perform the DTC Reading Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Are any DTCs present?	Yes	Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
3	Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure and access the following PIDs: (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) **PCM PID:** • AC_REQ • PSP • CPP (MT) • CPP/PNP (MT) **TCM PID:** • TR (AT) Are the PIDs normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	**AC_REQ:** • Inspect the A/C switch, refrigerant pressure switch and fan switch. **PSP:** • Inspect the PSP switch. (See 01-40-24 POWER STEERING PRESSURE (PSP) SWITCH INSPECTION [L8, LF].) **CPP (MT):** • Inspect the CPP switch. (See 01-40-24 CLUTCH PEDAL POSITION (CPP) SWITCH INSPECTION [L8, LF].) **CPP/PNP (MT):** • Inspect neutral switch. (See 01-40-24 NEUTRAL SWITCH INSPECTION [L8, LF].) **TR (AT):** • Inspect the TR switch. (See 05-13-14 TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL].) Repair or replace the malfunctioning part according to the inspection results.

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
4	Is there air leakage felt or heard at the intake-air system components while racing engine to higher speed?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Inspect the following: • Electronic throttle control system operation (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) • APP sensor (See 01-40-29 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION [L8, LF].) Repair or replace the malfunctioning part according to the inspection results.
5	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

NO.10 LOW IDLE/STALLS DURING DECELERATION [L8, LF]

id0103a0801600

10	LOW IDLE/STALLS DURING DECELERATION
DESCRIPTION	• Engine stops unexpectedly at the beginning of deceleration or recovery from deceleration.
POSSIBLE CAUSE	• Improper operation of A/C magnetic clutch • Air leakage from intake-air system • Vacuum leakage • Improper operation of electronic throttle control system • Improper air/fuel mixture ratio control • EVAP control system malfunction • Improper load signal input — APP sensor — TP sensor — MAF sensor — VSS — Brake switch — CPP switch (MT) — Neutral switch (MT) — TR switch (AT) • PCM malfunction

SYMPTOM TROUBLESHOOTING [L8, LF]

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Does the engine idle rough?	Yes	Go to the symptom troubleshooting “NO.8 ENGINE RUNS ROUGH/ROLLING IDLE”. (See 01-03-30 NO.8 ENGINE RUNS ROUGH/ ROLLING IDLE [L8, LF].)
		No	Go to the next step.
2	**Note** • Following test is for low idle/stalls during deceleration with A/C on concerns. If other symptoms exist, go to the next step. Turn off the A/C switch and fan switch. Does the A/C magnetic clutch engage?	Yes	Go to the symptom troubleshooting “NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY.“ (See 01-03-62 NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [L8, LF].)
		No	Go to the next step.
3	Verify the following: • No air leakage from intake-air system • Proper routing and no damage of vacuum lines Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results. Repeat Step 3.
		No	Go to the next step.
4	Connect the M-MDS to the DLC-2. Perform the KOEO/KOER self test and the DTC Reading Procedure. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Are any DTCs present?	Yes	Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
5	Perform the Electronic Throttle Control System Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Does the electronic throttle control system operate properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
6	Disconnect the vacuum hose between the purge solenoid valve and the intake manifold from the purge solenoid valve side. Plug opening end of vacuum hose. Drive the vehicle. Does the engine condition improve?	Yes	Inspect the EVAP control system. Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
7	Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure and access the following PIDs: (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].) **PCM PID:** • APP1 • APP2 • TP • MAF • VSS • BOO • CPP (MT) • CPP/PNP (MT) **TCM PID:** • TR (AT) Are the PIDs normal? (See 01-40-9 PCM INSPECTION [L8, LF].) (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].)	Yes	Intermittent concern exists. • Perform the “INTERMITTENT CONCERN TROUBLESHOOTING”. (See 01-03-69 INTERMITTENT CONCERN TROUBLESHOOTING [L8, LF].)
		No	**APP1, APP2:** • Inspect the APP sensor. (See 01-40-29 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION [L8, LF].) **TP:** • Inspect the TP sensor. (See 01-40-28 THROTTLE POSITION (TP) SENSOR INSPECTION [L8, LF].) **MAF:** • Inspect the MAF sensor. (See 01-40-27 MASS AIR FLOW (MAF) SENSOR INSPECTION [L8, LF].) **VSS:** • Inspect the VSS. (See 05-13-27 VEHICLE SPEED SENSOR (VSS) INSPECTION [SJ6A-EL].) **BOO:** • Inspect the brake switch. (See 04-11-7 BRAKE SWITCH INSPECTION.) **CPP (MT):** • Inspect the CPP switch. (See 01-40-24 CLUTCH PEDAL POSITION (CPP) SWITCH INSPECTION [L8, LF].) **CPP/PNP (MT):** • Inspect neutral switch. (See 01-40-24 NEUTRAL SWITCH INSPECTION [L8, LF].) **TR (AT):** • Inspect the TR switch. (See 05-13-14 TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL].) Repair or replace the malfunctioning part according to the inspection results.
8	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

NO.11 ENGINE STALLS/QUITS, ENGINE RUNS ROUGH, MISSES, BUCK/JERK, HESITATION/STUMBLE, SURGES [L8, LF]

id0103a0801700

11	**ENGINE STALLS/QUITS—ACCELERATION/CRUISE** **ENGINE RUNS ROUGH—ACCELERATION/CRUISE** **MISSES—ACCELERATION/CRUISE** **BUCK/JERK—ACCELERATION/CRUISE/DECELERATION** **HESITATION/STUMBLE—ACCELERATION** **SURGES—ACCELERATION/CRUISE**
DESCRIPTION	• Engine stops unexpectedly at the beginning of acceleration or during acceleration. • Engine stops unexpectedly while cruising. • Engine speed fluctuates during acceleration or cruising. • Engine misses during acceleration or cruising. • Vehicle bucks/jerks during acceleration, cruising, or deceleration. • Momentary pause at beginning of acceleration or during acceleration. • Momentary minor irregularity in engine output.

SYMPTOM TROUBLESHOOTING [L8, LF]

11	**ENGINE STALLS/QUITS—ACCELERATION/CRUISE** **ENGINE RUNS ROUGH—ACCELERATION/CRUISE** **MISSES—ACCELERATION/CRUISE** **BUCK/JERK—ACCELERATION/CRUISE/DECELERATION** **HESITATION/STUMBLE—ACCELERATION** **SURGES—ACCELERATION/CRUISE**
POSSIBLE CAUSE	• Air cleaner restriction • Electrical connector disconnection • Poor fuel quality • Air leakage from intake-air system • Throttle valve malfunction • Vacuum leakage • Engine overheating • Intermittent open or short circuit of the following: — APP sensor — TP sensor — MAF sensor — VSS — CKP sensor • Erratic signal from CKP sensor • Spark plug malfunction • Improper operation of variable valve timing control system • Restriction in exhaust system • Fuel supply system malfunction — Fuel pump and fuel pump relay related circuit malfunction — Fuel line clogging — Fuel pump unit malfunction — Fuel injector malfunction • Improper operation of A/C system • A/F sensor malfunction — Exhaust gas leakage between exhaust manifold and A/F sensor — Loose installation of A/F sensor — A/F sensor malfunction • Check valve (two-way) malfunction (integrated with fuel tank) • Purge solenoid valve malfunction • EVAP control system malfunction • Improper operation of electronic throttle control system • Erratic signal from CMP sensor • Improper operation of variable tumble control • Improper operation of EGR control system • Low engine compression • PCV valve malfunction • Check valve (two-way) malfunction • Clutch (MT) malfunction • EGR valve malfunction • Internal AT components (AT) malfunction • Valve timing malfunction • PCM malfunction **Warning** **The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION" described in this manual.** **(See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)** **(See 01-14-5 AFTER SERVICE PRECAUTION [L8, LF].)** **Caution** • **Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

SYMPTOM TROUBLESHOOTING [L8, LF]

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Verify the following: • Air cleaner element • Electrical connections • Fuel quality (e.g. proper octane, contamination, winter/summer blend) • Ignition wiring • No air leakage from intake-air system • No restriction of intake-air system • Proper sealing of intake manifold and components attached to intake manifold: such as EGR valve • Smooth operation of throttle valve • Vacuum connection Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results. Repeat Step 1.
		No	Go to the next step.
2	Connect the M-MDS to the DLC-2. Perform the KOEO/KOER self test and the DTC Reading Procedure. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Are any DTCs present?	Yes	Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
3	Is the engine overheating?	Yes	Go to the symptom troubleshooting “NO.17 COOLING SYSTEM CONCERNS-OVERHEATING”. (See 01-03-53 NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [L8, LF].)
		No	Go to the next step.
4	Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure and access the following PIDs: (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • APP1 • APP2 • TP • MAF • VSS • RPM • VPWR Are the PIDs normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	**APP1, APP2:** • Inspect if the APP sensor output increase smoothly. (See 01-40-29 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION [L8, LF].) **TP:** • Inspect if the TP sensor output increases smoothly. (See 01-40-28 THROTTLE POSITION (TP) SENSOR INSPECTION [L8, LF].) **MAF:** • Inspect the MAF sensor and related wiring harness for intermittent open circuit. (See 01-40-27 MASS AIR FLOW (MAF) SENSOR INSPECTION [L8, LF].) **VSS:** • Inspect the VSS and related wiring harness for intermittent open circuit. (See 05-13-27 VEHICLE SPEED SENSOR (VSS) INSPECTION [SJ6A-EL].) **RPM:** • Inspect the CKP sensor and related wiring harness for vibration and/or intermittent open/short circuit. (See 01-40-33 CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [L8, LF].) **VPWR:** • Inspect the open circuit intermittently. Repair or replace the malfunctioning part according to the inspection results.
5	Visually inspect the CKP sensor and teeth of crankshaft pulley. Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
6	Inspect spark plug condition. (See 01-18-3 SPARK PLUG INSPECTION [L8, LF].) Is the spark plug wet, covered with carbon or grayish white?	Yes	Spark plug is wet or covered with carbon: • Inspect for fuel leakage from injector. Spark plug is grayish white: • Inspect for clogged fuel injector. Repair or replace the malfunctioning part according to the inspection results.
		No	Install spark plugs on original cylinders. Go to the next step.
7	Perform the Variable Valve Timing Control System Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Does the variable valve timing control system operate properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
8	Visually inspect the exhaust system part. Is there any deformed exhaust system part?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
9	Install the fuel pressure gauge between the fuel pipe and fuel distributor. Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Turn the fuel pump on using FP PID in output state control of datalogger function. Is fuel line pressure correct? (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Zero or low: • Inspect the fuel pump and fuel pump relay related circuit. • Inspect for clogged fuel line. • If there is no malfunction: — Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) • If there is a malfunction: — Repair or replace the malfunctioning part according to the inspection results. High: • Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
10	Visually inspect for fuel leakage at fuel injector O-ring and fuel line. Is fuel line pressure held after the ignition switch is turned off? (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Inspect the fuel injector. (See 01-14-19 FUEL INJECTOR INSPECTION [L8, LF].) If the fuel injector is normal: • Replace fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) If the fuel injector has a malfunction: • Replace fuel injector. (See 01-14-18 FUEL INJECTOR REMOVAL/ INSTALLATION [L8, LF].)
11	**Note** • Following test is for engine stall with the A/C on. If other symptom exists, go to the next step. Connect the pressure gauge to the A/C low and high pressure side lines. Turn the A/C on and measure low side and high side pressure. Are pressure within specifications? (See 07-10-5 REFRIGERANT PRESSURE CHECK.)	Yes	Go to the next step.
		No	If A/C is always on: • Go to the symptom troubleshooting “NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY”. (See 01-03-62 NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [L8, LF].) For other symptoms: • Inspect the following: — Refrigerant charging amount — Condenser fan operation • Repair or replace the malfunctioning part according to the inspection results.

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
12	Inspect the A/F sensor. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) Is there any malfunction?	Yes	Inspect the followings: • Exhaust gas leakage between exhaust manifold and A/F sensor • Loose installation of A/F sensor If there is no malfunction: • Replace the A/F sensor. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].) If there is a malfunction: • Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
13	Inspect the evaporative purge hose between the fuel tank and the purge solenoid valve. Dose fuel flow into evaporative purge hose?	Yes	Inspect the check valve (two-way). (See 01-14-11 FUEL TANK INSPECTION [L8, LF].) Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
14	Disconnect the vacuum hose between the purge solenoid valve and the intake manifold from the purge solenoid valve side. Plug the opening end of vacuum hose. Drive the vehicle. Does the engine condition improve?	Yes	Inspect if the purge solenoid valve is stuck open. (See 01-16-8 PURGE SOLENOID VALVE INSPECTION [L8, LF].) Inspect the EVAP control system. Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
15	Visually inspect the CMP sensor and projections of the camshaft pulley. Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
16	Perform the Variable Tumble Control Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Does the variable tumble control normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
17	Perform the EGR Control System Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Is EGR control system normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
18	Perform the “COMPRESSION INSPECTION”. (See 01-10-18 COMPRESSION INSPECTION [L8, LF].) Is the engine compression correct?	Yes	Go to the next step.
		No	Inspect for cause.
19	Inspect the PCV valve. (See 01-16-12 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION [L8, LF].) Is there any malfunction?	Yes	Replace the PCV valve.
		No	Inspect the followings: • Check valve (two-way) • Clutch (MT) • EGR valve (mechanical stuck) • Engine mounts • Internal AT components (AT) • Valve timing Repair or replace the malfunctioning part according to the inspection results.
20	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

SYMPTOM TROUBLESHOOTING [L8, LF]

NO.12 LACK/LOSS OF POWER-ACCELERATION/CRUISE [L8, LF]

id0103a0804800

12	LACK/LOSS OF POWER—ACCELERATION/CRUISE
DESCRIPTION	• Performance is poor under load (such as power down when climbing hills).
POSSIBLE CAUSE	• Poor fuel quality • Air leakage from intake-air system • Restriction in intake-air system • Throttle valve malfunction • Vacuum leakage • Engine overheating • Intermittent open or short circuit of the following: — APP sensor — TP sensor — MAF sensor — VSS — CKP sensor — IAT sensor • Erratic signal from CKP sensor • Spark plug malfunction • Improper operation of electronic throttle control system • Restriction in exhaust system • Fuel supply system malfunction — Fuel pump and fuel pump relay related circuit malfunction — Fuel line clogging — Fuel pump unit malfunction — Fuel injector malfunction • Improper operation of variable tumble control • Improper operation of variable intake air control • Improper operation of A/C system • Improper operation of A/C cut-off control system • Purge solenoid valve malfunction • EVAP control system malfunction • Erratic signal from CMP sensor • Improper operation of EGR control system • Improper operation of variable valve timing control system • Low engine compression • PCV valve malfunction • Brake system malfunction • Clutch (MT) malfunction • Internal AT components (AT) malfunction • Valve timing malfunction • PCM malfunction **Warning** **The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete “BEFORE SERVICE PRECAUTION” and “AFTER SERVICE PRECAUTION” described in this manual.** **(See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)** **(See 01-14-5 AFTER SERVICE PRECAUTION [L8, LF].)** **Caution** • **Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

SYMPTOM TROUBLESHOOTING [L8, LF]

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Verify the following: • Fuel quality (such as proper octane, contamination, winter/summer blend) • No air leakage from intake-air system • No restriction of intake-air system • Proper sealing of intake manifold and components attached to intake manifold; such as EGR valve • Restriction in the intake-air system (such as air cleaner element, fresh air duct) • Vacuum connection Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results. Repeat Step 1.
		No	Go to the next step.
2	Connect the M-MDS to the DLC-2. Perform the KOEO/KOER self test and the DTC Reading Procedure. If engine stall condition exists, perform the KOEO self test and the DTC Reading Procedure. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Are any DTCs present?	Yes	Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
3	Is the engine overheating?	Yes	Go to the symptom troubleshooting “NO.17 COOLING SYSTEM CONCERNS-OVERHEATING”. (See 01-03-53 NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [L8, LF].)
		No	Go to the next step.
4	Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure and access the following PIDs: (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • APP1 • APP2 • TP • MAF • VSS • RPM • IAT Access the PIDs while driving the vehicle. Are the PIDs normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	**APP1, APP2:** • Inspect if the APP sensor output increase smoothly. (See 01-40-29 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION [L8, LF].) **TP:** • Inspect if the TP sensor output increases smoothly. (See 01-40-28 THROTTLE POSITION (TP) SENSOR INSPECTION [L8, LF].) **MAF:** • Inspect the MAF sensor and related wiring harness for intermittent open circuit. (See 01-40-27 MASS AIR FLOW (MAF) SENSOR INSPECTION [L8, LF].) **VSS:** • Inspect the VSS and related wiring harness for intermittent open circuit. (See 05-13-27 VEHICLE SPEED SENSOR (VSS) INSPECTION [SJ6A-EL].) **RPM:** • Inspect the CKP sensor and related wiring harness for vibration and/or intermittent open/short circuit. (See 01-40-33 CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [L8, LF].) **IAT:** • Inspect for air suction in intake-air system. • If normal, inspect the IAT senor and related wiring harness for intermittent short circuit. (See 01-40-27 INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [L8, LF].) Repair or replace the malfunctioning part according to the inspection results.
5	Visually inspect the CKP sensor and teeth of crankshaft pulley. Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
6	Inspect spark plug condition. (See 01-18-3 SPARK PLUG INSPECTION [L8, LF].) Is the spark plug wet, covered with carbon or grayish white?	Yes	Spark plug is wet or covered with carbon: • Inspect for fuel leakage from injector. Spark plug is grayish white: • Inspect for clogged fuel injector. Repair or replace the malfunctioning part according to the inspection results.
		No	Install spark plugs on original cylinders. Go to the next step.
7	Perform the Electronic Throttle Control System Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Does the electronic throttle control system operate properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
8	Visually inspect the exhaust system part. Is there any deformed exhaust system part?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
9	Install the fuel pressure gauge between the fuel pipe and fuel distributor. Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Turn the fuel pump on using FP PID in output state control of datalogger function. Is fuel line pressure correct? (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Zero or low: • Inspect the fuel pump and fuel pump relay related circuit. • Inspect for clogged fuel line. • If there is no malfunction: — Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) • If there is a malfunction: — Repair or replace the malfunctioning part according to the inspection results. High: • Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
10	Perform the Variable Tumble Control Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Does the variable tumble control normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
11	Perform the Variable Intake Air Control Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Does the variable intake air function properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
12	**Note** • Following test is for lack/loss of power with the A/C on. If other symptom exists, go to the next step. Connect the pressure gauge to the A/C low and high pressure side lines. Turn the A/C on and measure low side and high side pressure. Are pressure within specifications? (See 07-10-5 REFRIGERANT PRESSURE CHECK.)	Yes	Go to the next step.
		No	If A/C is always on: • Go to the symptom troubleshooting “NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY”. (See 01-03-62 NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [L8, LF].) For other symptoms: • Inspect the following: — Refrigerant charging amount — Condenser fan operation • Repair or replace the malfunctioning part according to the inspection results.
13	Perform the A/C Cut-off Control System Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Does A/C cut-off work properly?	Yes	Go to the next step.
		No	Inspect the A/C cut-off system components. Repair or replace the malfunctioning part according to the inspection results.

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
14	Disconnect the vacuum hose between the purge solenoid valve and the intake manifold from the purge solenoid valve side. Plug the opening end of vacuum hose. Drive the vehicle. Does the engine condition improve?	Yes	Inspect if the purge solenoid valve is stuck open. (See 01-16-8 PURGE SOLENOID VALVE INSPECTION [L8, LF].) Inspect the EVAP control system. Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
15	Visually inspect the CMP sensor and projections of the camshaft pulley. Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
16	Perform the EGR Control System Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Is EGR control system normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
17	Perform the Variable Valve Timing Control System Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Does the variable valve timing control system operate properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
18	Perform the “COMPRESSION INSPECTION”. (See 01-10-18 COMPRESSION INSPECTION [L8, LF].) Is the engine compression correct?	Yes	Go to the next step.
		No	Inspect for cause.
19	Inspect the PCV valve. (See 01-16-12 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION [L8, LF].) Is there any malfunction?	Yes	Replace the PCV valve.
		No	Inspect the following: • Brake system for dragging • Clutch (MT) • Internal AT components (AT) • Valve timing Repair or replace the malfunctioning part according to the inspection results.
20	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

SYMPTOM TROUBLESHOOTING [L8, LF]

NO.13 KNOCKING/PINGING-ACCELERATION/CRUISE [L8, LF]

id0103a0812100

13	KNOCKING/PINGING—ACCELERATION/CRUISE
DESCRIPTION	• Sound is produced when air/fuel mixture is ignited by something other than spark plug (such as hot spot in combustion chamber).
POSSIBLE CAUSE	• Engine overheating due to cooling system malfunction • IAT sensor malfunction • MAF sensor malfunction • Erratic signal from CMP sensor • KS malfunction • Inadequate engine compression • Inadequate fuel pressure • PCM malfunction **Warning** **The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION" described in this manual.** **(See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)** **(See 01-14-5 AFTER SERVICE PRECAUTION [L8, LF].)** **Caution** • **Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

SYMPTOM TROUBLESHOOTING [L8, LF]

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure and access the ECT PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Verify the ECT PID is **less than 116 °C {241 °F}** during driving. Is the ECT PID less than the specification?	Yes	Go to the next step.
		No	Go to the symptom troubleshooting “NO.17 COOLING SYSTEM CONCERNS-OVERHEATING”. (See 01-03-53 NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [L8, LF].)
2	Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure and access the following PIDs: (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • IAT • MAF • SPARKADV Are the PIDs normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	**IAT:** • Inspect the IAT sensor. (See 01-40-27 INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [L8, LF].) **MAF:** • Inspect the MAF sensor. (See 01-40-27 MASS AIR FLOW (MAF) SENSOR INSPECTION [L8, LF].) **SPARKADV:** • Inspect the CMP sensor and KS. (See 01-40-34 CAMSHAFT POSITION (CMP) SENSOR INSPECTION [L8, LF].) (See 01-40-34 KNOCK SENSOR (KS) INSPECTION [L8, LF].) Repair or replace the malfunctioning part according to the inspection results.
3	Connect the M-MDS to the DLC-2. Perform the KOEO/KOER self test and the DTC Reading Procedure. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Are any DTCs present?	Yes	Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
4	Perform the “COMPRESSION INSPECTION”. (See 01-10-18 COMPRESSION INSPECTION [L8, LF].) Is the engine compression correct?	Yes	Go to the next step.
		No	Inspect for cause.
5	Install fuel pressure gauge between the fuel pipe and fuel distributor. Start the engine and idle it. Measure the fuel line pressure during idle. (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].) Is fuel line pressure correct during idle?	Yes	Inspect the ignition timing. Repair or replace the malfunctioning part according to the inspection results.
		No	Zero or low: • Inspect the fuel pump and fuel pump relay related circuit. • Inspect for clogged fuel line. • If there is no malfunction: — Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) • If there is a malfunction: — Repair or replace the malfunctioning part according to the inspection results. High: • Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
6	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

SYMPTOM TROUBLESHOOTING [L8, LF]

NO.14 POOR FUEL ECONOMY [L8, LF]

id0103a0802000

14	POOR FUEL ECONOMY
DESCRIPTION	• Fuel economy is unsatisfactory.
POSSIBLE CAUSE	• Contaminated air cleaner element • Improper ATF level (AT) • Brake dragging • Clutch slippage (MT) • Improper coolant level • Poor fuel quality • Engine cooling system malfunction • Improper operation of A/C system • Spark plug malfunction • Inadequate fuel pressure • Improper operation of variable tumble control • Improper operation of variable intake air control • Variable intake-air control malfunction • Restriction in exhaust system • Contaminated MAF sensor • Improper operation of variable valve timing control system • Improper engine compression • PCV valve malfunction • Valve timing malfunction • PCM malfunction **Warning** **The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete “BEFORE SERVICE PRECAUTION” and “AFTER SERVICE PRECAUTION” described in this manual.** **(See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)** **(See 01-14-5 AFTER SERVICE PRECAUTION [L8, LF].)** **Caution** • **Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

SYMPTOM TROUBLESHOOTING [L8, LF]

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Inspect the following: • Air cleaner element for contamination • ATF level (AT) • Brake dragging • Clutch slippage (MT) • Coolant level • Fuel quality Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results. Repeat Step 1.
		No	Go to the next step.
2	Connect the M-MDS to the DLC-2. Perform the KOEO/KOER self test and the DTC Reading Procedure. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Are any DTCs present?	Yes	Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
3	Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Access and record the ECT PID while warm up the engine from it is cold. **Note** • ECT PID increase incline speed is slowly while engine coolant temperature **approx. 80 °C {176 °F}** because of thermostat begins to open. (The ECT PID climb gradient is moderated because the thermostat starts to open when the engine coolant temperature is **80 °C {176 °F} or more**.) Does the ECT PID increase incline become properly?	Yes	Go to the next step.
		No	Inspect the coolant leakage, cooling fan and thermostat operation. Repair or replace the malfunctioning part according to the inspection results.
4	**Note** • Following test is for vehicle with A/C system. If the A/C system is not equipped, go to the next step. Turn off the A/C switch and fan switch. Does the A/C magnetic clutch engage?	Yes	Go to the symptom troubleshooting “NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY”. (See 01-03-62 NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [L8, LF].)
		No	Go to the next step.
5	Perform the Spark Test. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Is the strong blue spark visible at each cylinder?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
6	Install fuel pressure gauge between the fuel pipe and the fuel distributor. Start the engine and idle it. Measure the fuel line pressure during idle. (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].) Is fuel line pressure correct during idle?	Yes	Go to the next step.
		No	Zero or low: • Inspect the fuel pump and fuel pump relay related circuit. • Inspect for clogged fuel line. • If there is no malfunction: — Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) • If there is a malfunction: — Repair or replace the malfunctioning part according to the inspection results. High: • Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
7	Perform the Variable Tumble Control Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Does the variable tumble control normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
8	Perform the Variable Intake Air Control Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Does the variable intake-air control function properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
9	Visually inspect the exhaust system part. Is there any deformed exhaust system part?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
10	Inspect the MAF sensor. (See 01-40-27 MASS AIR FLOW (MAF) SENSOR INSPECTION [L8, LF].) Is there any contamination?	Yes	Replace the MAF sensor. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
11	Perform the Variable Valve Timing Control System Operation Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Does the variable valve timing control system operate properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
12	Perform the “COMPRESSION INSPECTION”. (See 01-10-18 COMPRESSION INSPECTION [L8, LF].) Is the engine compression correct?	Yes	Go to the next step.
		No	Inspect for cause.
13	Inspect the PCV valve. (See 01-16-12 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION [L8, LF].) Is there any malfunction?	Yes	Replace the PCV valve.
		No	Inspect the valve timing. Repair or replace the malfunctioning part according to the inspection results.
14	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

SYMPTOM TROUBLESHOOTING [L8, LF]

NO.15 EMISSION COMPLIANCE [L8, LF]

id0103a0802100

15	EMISSION COMPLIANCE
DESCRIPTION	• Fails emissions test.
POSSIBLE CAUSE	• Disconnected electrical connectors • Intake-air system and air cleaner element clogging or restriction • Vacuum lines leakage or blockage • Cooling system malfunction • A/F sensor malfunction — Exhaust gas leakage between exhaust manifold and A/F sensor — Loose installation of A/F sensor — A/F sensor malfunction • Spark plug malfunction • Inadequate fuel pressure • Charcoal canister malfunction • Fuel tank ventilation system malfunction • Exhaust system clogging • TWC malfunction • Improper operation of EGR control system • PCV valve malfunction • PCM malfunction **Warning** **The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION" described in this manual.** **(See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)** **(See 01-14-5 AFTER SERVICE PRECAUTION [L8, LF].)** **Caution** • **Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Inspect the following: • Electrical connections • Intake-air system and air cleaner element concerns: obstructions, leakage or dirtiness • Proper maintenance schedule followed • Vacuum lines for leakage or blockage Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results. Repeat Step 1.
		No	Go to the next step.
2	Connect the M-MDS to the DLC-2. Perform the KOEO/KOER self test and the DTC Reading Procedure. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Are any DTCs present?	Yes	Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
3	Is any other driveability concern present?	Yes	Go to the appropriate symptom troubleshooting. (See 01-03-5 QUICK DIAGNOSTIC CHART [L8, LF].)
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
4	Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Access and record the ECT PID while warm up the engine from it is cold. **Note** • ECT PID increase incline speed is slowly while engine coolant temperature **approx. 80 °C {176 °F}** because of thermostat begins to open. (The ECT PID climb gradient is moderated because the thermostat starts to open when the engine coolant temperature is **80 °C {176 °F} or more**.) Does the ECT PID increase incline become properly?	Yes	Go to the next step.
		No	Inspect the coolant leakage, cooling fan and thermostat operation. Repair or replace the malfunctioning part according to the inspection results.
5	Inspect the A/F sensor. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].) Is there any malfunction?	Yes	Inspect the followings: • Exhaust gas leakage between exhaust manifold and A/F sensor • Loose installation of A/F sensor If there is no malfunction: • Replace the A/F sensor. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].) If there is a malfunction: • Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
6	Perform the Spark Test. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Is the strong blue spark visible at each cylinder?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
7	Install fuel pressure gauge between the fuel pipe and the fuel distributor. Start the engine and idle it. Measure the fuel line pressure during idle. (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].) Is fuel line pressure correct during idle?	Yes	Go to the next step.
		No	Zero or low: • Inspect the fuel pump and fuel pump relay related circuit. • Inspect for clogged fuel line. • If there is no malfunction: — Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) • If there is a malfunction: — Repair or replace the malfunctioning part according to the inspection results. High: • Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
8	Inspect for fuel saturation inside the charcoal canister. Is the excess amount of liquid fuel present in canister?	Yes	Replace the charcoal canister. (See 01-16-6 CHARCOAL CANISTER REMOVAL/ INSTALLATION [L8, LF].)
		No	Inspect the fuel tank vent system. (See 01-14-11 FUEL TANK INSPECTION [L8, LF].) Repair or replace the malfunctioning part according to the inspection results.
9	Visually inspect the exhaust system part. Is there any deformed exhaust system part?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
10	Inspect the TWC. (See 01-15-1 EXHAUST SYSTEM INSPECTION [L8, LF].) Is there any malfunction?	Yes	Replace the TWC. (See 01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
11	Perform the EGR Control System Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Replace the PCV valve.
12	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

NO.16 HIGH OIL CONSUMPTION/LEAKAGE [L8, LF]

id0103a0802200

16	HIGH OIL CONSUMPTION/LEAKAGE
DESCRIPTION	• Oil consumption is excessive.
POSSIBLE CAUSE	• Improper dipstick • Improper engine oil viscosity • Engine internal parts malfunction • PCV valve malfunction • PCM malfunction

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Inspect the following: • External leakage • Proper dipstick • Proper engine oil viscosity Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results. Repeat Step 1.
		No	Go to the next step.
2	Remove and shake the PCV valve. Does the PCV valve rattle?	Yes	Inspect the internal engine parts such as valves, valve guides, valve stem seals, cylinder head drain passage, and piston rings. Repair or replace the malfunctioning part according to the inspection results.
		No	Replace the PCV valve.
3	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [L8, LF]

id0103a0802300

17	COOLING SYSTEM CONCERNS—OVERHEATING
DESCRIPTION	• Engine runs at higher than normal temperature/overheats.
POSSIBLE CAUSE	• Collapsed or restricted radiator hoses • Coolant leakage • Improper coolant level • Blown fuses • Coolant overflow system malfunction • Poor radiator condition • Improper or damaged radiator cap • Improper water/anti-freeze mixture • Improper operation of A/C system • Improper operation of cooling fan control system • Drive belt damage • Leakage from heater unit in passenger compartment • Leakage from coolant hose and/or radiator • Thermostat malfunction • ECT sensor malfunction • Instrument cluster malfunction • PCM malfunction

SYMPTOM TROUBLESHOOTING [L8, LF]

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Inspect the following: • Collapsed or restricted radiator hoses • Coolant leakage • Engine coolant level • Fan rotational direction • Fuses • Overflow system • Radiator condition • Radiator pressure cap • Water and anti-freeze mixture Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results. Repeat Step 1.
		No	Go to the next step.
2	Connect the M-MDS to the DLC-2. Perform the KOEO/KOER self test and the DTC Reading Procedure. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Are any DTCs present?	Yes	Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
3	**Note** • Following test is for vehicle with A/C system. If the A/C system is not equipped, go to the next step. Start the engine and idle it. Turn the A/C switch on. Does the A/C compressor engage?	Yes	Go to Step 5.
		No	Inspect the following: • A/C magnetic clutch malfunction • Open circuit in wiring harness between A/C relay and PCM terminal 1I • Refrigerant charging amount • Seized A/C magnetic clutch Repair or replace the malfunctioning part according to the inspection results. If all items are normal, go to the next step.
4	Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure and access the AC_REQ PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Start the engine and idle it. Turn the A/C switch on. Does the AC_REQ PID read On?	Yes	Go to the next step.
		No	Inspect the following: • A/C switch is stuck open • Evaporator temperature sensor and A/C amplifier • Open or short circuit between refrigerant pressure switch and PCM terminal 1AU • Open circuit of blower motor fan switch and resistor (if blower motor does not operate) • Refrigerant pressure switch operation Repair or replace the malfunctioning part according to the inspection results.
5	Perform the Cooling Fan Control System Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Does the cooling fan control system function properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
6	Inspect the drive belt. (See 01-10-5 DRIVE BELT INSPECTION [L8, LF].) Is there any malfunction?	Yes	Replace the drive belt. (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].)
		No	Go to the next step.
7	Visually inspect the heater unit in passenger compartment. Is there any leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
8	Visually inspect the coolant hoses and/or radiator. Is there any leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
9	Cool down the engine. Remove thermostat and inspect operation. (See 01-12-9 THERMOSTAT REMOVAL/ INSTALLATION [L8, LF].) (See 01-12-9 THERMOSTAT INSPECTION [L8, LF].) Is there any malfunction?	Yes	Go to the next step.
		No	ECT sensor and thermostat are normal. • Inspect the engine block for leakage or blockage. • Repair or replace the malfunctioning part according to the inspection results.

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
10	Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure and access the ECT PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Inspect for both ECT PID and temperature gauge on instrument cluster readings. Is the ECT PID value same as temperature gauge on instrument cluster?	Yes	Go to the next step.
		No	Access the ECT PID. Inspect both the ECT PID and the low engine coolant temperature indicator light condition. • If the low engine coolant temperature indicator light on the instrument cluster indicates turned off but the ECT PID is not the same as the low engine coolant temperature indicator light condition: — Inspect the ECT sensor. (See 01-40-26 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [L8, LF].) • If the low engine coolant temperature indicator light indication on the instrument cluster illuminates but the ECT PID is normal: — Inspect the instrument cluster. (See 09-22-4 INSTRUMENT CLUSTER INSPECTION.) Repair or replace the malfunctioning part according to the inspection results.
11	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

NO.18 COOLING SYSTEM CONCERNS-RUNS COLD [L8, LF]

id0103a0802400

18	COOLING SYSTEM CONCERNS-RUNS COLD
DESCRIPTION	• Engine does not reach normal operating temperature.
POSSIBLE CAUSE	• Improper operation of cooling fan control system • Thermostat malfunction • ECT sensor malfunction • Instrument cluster malfunction • PCM malfunction

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Is the customer complaint “Lack of passenger compartment heat” only?	Yes	Inspect the A/C and heater system. Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
2	Does the engine speed continue at fast idle?	Yes	Go to the symptom troubleshooting “NO.9 FAST IDLE/ RUNS ON”. (See 01-03-34 NO.9 FAST IDLE/RUNS ON [L8, LF].)
		No	Go to the next step.
3	Perform the Cooling Fan Control System Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Does the cooling fan control system work properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
4	Remove the thermostat and inspect operation. (See 01-12-9 THERMOSTAT REMOVAL/ INSTALLATION [L8, LF].) (See 01-12-9 THERMOSTAT INSPECTION [L8, LF].) Is there any malfunction?	Yes	Replace the thermostat. (See 01-12-9 THERMOSTAT REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
5	Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure and access the ECT PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Inspect for both ECT PID and temperature gauge on instrument cluster readings. Is the ECT PID value same as temperature gauge on instrument cluster?	Yes	Go to the next step.
		No	Access the ECT PID. Inspect both the ECT PID and the low engine coolant temperature indicator light condition. • If the low engine coolant temperature indicator light on the instrument cluster indicates turned off but the ECT PID is not the same as the low engine coolant temperature indicator light condition: — Inspect the ECT sensor. (See 01-40-26 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [L8, LF].) • If the low engine coolant temperature indicator light indication on the instrument cluster illuminates but the ECT PID is normal: — Inspect the instrument cluster. (See 09-22-4 INSTRUMENT CLUSTER INSPECTION.) Repair or replace the malfunctioning part according to the inspection results.
6	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

NO.19 EXHAUST SMOKE [L8, LF]

id0103a0803900

19	EXHAUST SMOKE
DESCRIPTION	• Blue, black, or white smoke from exhaust system.
POSSIBLE CAUSE	**Blue smoke (Burning oil):** • PCV valve malfunction • Engine internal oil leakage **White smoke (Water in combustion):** • Cooling system malfunction (coolant loss) • Engine internal coolant leakage **Black smoke (Rich fuel mixture):** • Air cleaner restriction • Intake-air system is collapsed or restricted • Fuel return line is restricted • Excessive fuel pressure • Improper engine compression • Inadequate fuel pressure • Ignition system malfunction • CMP sensor malfunction **Other:** • PCM malfunction **Warning** **The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION" described in this manual.** **(See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)** **(See 01-14-5 AFTER SERVICE PRECAUTION [L8, LF].)** **Caution** • **Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

SYMPTOM TROUBLESHOOTING [L8, LF]

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	What color is smoke coming from the exhaust system?	Blue	Burning oil is indicated. • Go to the next step.
		White	Water in combustion is indicated. • Go to Step 3.
		Black	Rich fuel mixture is indicated. • Go to Step 4.
2	Inspect the PCV valve. (See 01-16-12 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION [L8, LF].) Is there any malfunction?	Yes	Replace the PCV valve.
		No	Inspect the following: • Blocked oil drain passage in cylinder head • Damaged cylinder bore • Damaged valve guide, stems or valve seals • Piston ring is not seated, seized or worn Repair or replace the malfunctioning part according to the inspection results. If other driveability symptoms are present, return to diagnostic index to service any additional symptoms.
3	Does the cooling system hold pressure?	Yes	Inspect for the following: • Cracked or porous engine block • Cylinder head gasket leakage • Intake manifold gasket leakage Repair or replace the malfunctioning part according to the inspection results. If other driveability symptoms are present, return to diagnostic index to service any additional symptoms.
		No	Inspect for cause.
4	Inspect the following: • Air cleaner restriction • Collapsed or restricted intake-air system • Restricted fuel return line Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results. Repeat Step 4.
		No	Go to the next step.
5	Connect the M-MDS to the DLC-2. Perform the KOEO/KOER self test and the DTC Reading Procedure. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Are any DTCs present?	Yes	Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
6	Install fuel pressure gauge between the fuel pipe and fuel distributor. Start the engine and idle it. Measure fuel line pressure during idle. (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].) Is fuel line pressure correct during idle?	Yes	Go to the next step.
		No	Zero or low: • Inspect the fuel pump and fuel pump relay related circuit. • Inspect for clogged fuel line. • If there is no malfunction: — Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/INSTALLATION [L8, LF].) • If there is a malfunction: — Repair or replace the malfunctioning part according to the inspection results. High: • Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/INSTALLATION [L8, LF].)
7	Perform the Spark Test. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Is strong blue spark visible at each cylinder?	Yes	Inspect the CMP sensor. (See 01-40-34 CAMSHAFT POSITION (CMP) SENSOR INSPECTION [L8, LF].) Replace the CMP sensor, if necessary. (See 01-40-33 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
		No	Repair or replace the malfunctioning part according to the inspection results.

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
8	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

NO.20 FUEL ODOR (IN ENGINE COMPARTMENT) [L8, LF]

id0103a0802600

20	FUEL ODOR (IN ENGINE COMPARTMENT)
DESCRIPTION	• Gasoline fuel smell or visible leakage.
POSSIBLE CAUSE	• Excessive fuel pressure • Fuel leakage from fuel system • Fuel tank vent system blockage • Purge solenoid valve malfunction • Charcoal canister malfunction • PCM malfunction **Warning** **The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION" described in this manual.** **(See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)** **(See 01-14-5 AFTER SERVICE PRECAUTION [L8, LF].)** **Caution** • **Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

SYMPTOM TROUBLESHOOTING [L8, LF]

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Visually inspect for fuel leakage at fuel injector O-ring and fuel line. Install the fuel pressure gauge between the fuel pipe and the fuel distributor. Start the engine and idle it. Measure the fuel line pressure during idle. (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].) Is fuel line pressure correct during idle?	Yes	Go to the next step.
		No	Inspect the fuel injector. (See 01-14-19 FUEL INJECTOR INSPECTION [L8, LF].) If the fuel injector is normal: • Replace fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) If the fuel injector has a malfunction: • Replace fuel injector. (See 01-14-18 FUEL INJECTOR REMOVAL/ INSTALLATION [L8, LF].)
2	Inspect for blockage/restriction or open circuit in wiring harness between the engine vacuum port and charcoal canister. Inspect for blockage in the fuel tank vent system. Is there any malfunction?	Yes	Replace the vacuum hose.
		No	Go to the next step.
3	Inspect purge solenoid valve. (See 01-16-8 PURGE SOLENOID VALVE INSPECTION [L8, LF].) Is there any malfunction?	Yes	Replace the purge solenoid valve. (See 01-16-7 PURGE SOLENOID VALVE REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
4	Connect the M-MDS to the DLC-2. Perform the KOEO/KOER self test and the DTC Reading Procedure. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Are any DTCs present?	Yes	Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Inspect the charcoal canister for fuel saturation. (See 01-16-6 CHARCOAL CANISTER INSPECTION [L8, LF].) If the excess amount of liquid fuel is present, replace the charcoal canister. (See 01-16-6 CHARCOAL CANISTER REMOVAL/ INSTALLATION [L8, LF].)
5	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

NO.21 ENGINE NOISE [L8, LF]

id0103a0802700

21	ENGINE NOISE
DESCRIPTION	• Engine noise from under bonnet.
POSSIBLE CAUSE	**Squeal, click or chirp noise:** • Improper engine oil level • Improper drive belt tension • Generation installation (alignment) • Splash shield or under cover looseness (splashed water to drive belts) **Rumble or grind noise:** • Improper drive belt tension • Improper P/S fluid level **Rattle sound noise:** • Loose parts **Hiss sound noise:** • Air leakage from intake-air system • Loose spark plug • Vacuum leakage **Rap or roar sound noise:** • Dynamic dumper looseness • Exhaust system looseness • Intake-air system looseness **Other noise:** • Camshaft friction gear noise or MLA noise • Timing chain noise • PCM malfunction

SYMPTOM TROUBLESHOOTING [L8, LF]

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Is a squealing, click or chirping sound present?	Yes	Inspect the following: • Engine oil level • Drive belt tension • Generator installation (alignment) • Splash shield or under cover looseness Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
2	Is a rumbling or grinding sound present?	Yes	Inspect the drive belts or P/S fluid level. (See 01-10-5 DRIVE BELT INSPECTION [L8, LF].) Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
3	Is a rattling sound present?	Yes	Inspect the rattling location for loose parts. Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
4	Is a hissing sound present?	Yes	Inspect the following: • Intake-air system leakage • Spark plug looseness • Vacuum leakage Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
5	Is a rapping or roaring sound present?	Yes	Inspect the looseness for the following: • Dynamic damper • Exhaust system • Intake-air system Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
6	Is a knocking sound present?	Yes	Go to the symptom troubleshooting "NO.13 KNOCKING/PINGING-ACCELERATION/CRUISE". (See 01-03-46 NO.13 KNOCKING/PINGING-ACCELERATION/CRUISE [L8, LF].)
		No	If the noise comes from the engine internal, inspect for friction gear, timing chain or MLA noise. Repair or replace the malfunctioning part according to the inspection results.
7	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

SYMPTOM TROUBLESHOOTING [L8, LF]

NO.22 VIBRATION CONCERNS (ENGINE) [L8, LF]

id0103a0802800

22	VIBRATION CONCERNS (ENGINE)
DESCRIPTION	• Vibration from under bonnet or driveline.
POSSIBLE CAUSE	• Loose attaching bolts or worn parts • Components malfunction such as worn parts • PCM malfunction

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Inspect the following components for loose attaching bolts or worn parts: • Cooling fan • Drive belt and pulleys • Engine mounts • Exhaust system mounts • Generator Is there any malfunction?	Yes	Inspect the following systems: • Driveline • Suspension • Wheels Repair or replace the malfunctioning part according to the inspection results.
		No	Readjust or retighten engine mount installation position. Service if necessary for other parts.
2	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

NO.23 A/C DOES NOT WORK SUFFICIENTLY [L8, LF]

id0103a0802900

23	A/C DOES NOT WORK SUFFICIENTLY
DESCRIPTION	• A/C compressor magnetic clutch does not engage when A/C switch is turned on.
POSSIBLE CAUSE	• Poor ground of A/C magnetic clutch • Open circuit A/C magnetic clutch • Refrigerant pressure switch is stuck open • A/C relay is stuck open • Open circuit in wiring harness between A/C switch and PCM through both refrigerant pressure switch and A/C amplifier • Open circuit in wiring harness between A/C relay and A/C magnetic clutch • Seized A/C compressor • Improper refrigerant charging amount • PCM malfunction

SYMPTOM TROUBLESHOOTING [L8, LF]

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Connect the M-MDS to the DLC-2. Perform the KOEO/KOER self test and the DTC Reading Procedure. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Are any DTCs present?	Yes	Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
2	Disconnect the A/C compressor connector. Start the engine and turn the A/C switch on. Is there correct voltage A/C compressor magnetic clutch terminal? **Specification** **More than 10.5 V**	Yes	Inspect for ground condition of magnetic clutch on A/C compressor. Repair or replace the malfunctioning part according to the inspection results. If ground condition is normal: • Inspect for open circuit magnetic clutch coil. • Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
3	Disconnect the refrigerant pressure switch connector. Connect the jumper wire between A/C high-pressure switch terminal. Connect jumper wires between refrigerant pressure switch terminal. Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure and access the AC_REQ PID: (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Turn the ignition switch to the ON position. Turn the A/C switch on and set blower fan at any speed. Does the AC_REQ PID read On?	Yes	Inspect the refrigerant pressure switch. (See 07-40B-14 REFRIGERANT PRESSURE SWITCH INSPECTION [MANUAL AIR CONDITIONER].) (See 07-40A-16 REFRIGERANT PRESSURE SWITCH INSPECTION [FULL-AUTO AIR CONDITIONER].) Repair or replace the malfunctioning part according to the inspection results. If the refrigerant pressure switch is normal: • Go to the next step.
		No	Inspect the following: • A/C switch is stuck open • Open circuit in wiring harness between refrigerant pressure switch and PCM terminal 1AU • Open circuit of blower motor fan switch and resistor (if blower motor does not operate) • Evaporator temperature sensor and A/C amplifier Repair or replace the malfunctioning part according to the inspection results.
4	Remove the jumper wire from the refrigerant pressure switch connector. Reconnect the refrigerant pressure switch connector. Start the engine and turn the A/C switch on. Does the fan operate?	Yes	Inspect for stuck open A/C relay. Replace the A/C relay, if necessary.
		No	Inspect the following: • A/C compressor for being seized • Refrigerant charging amount Repair or replace the malfunctioning part according to the inspection results.
5	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [L8, LF]

id0103a0803000

24	A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY
DESCRIPTION	• A/C compressor magnetic clutch does not disengage.
POSSIBLE CAUSE	• A/C relay is stuck closed • Short to ground in wiring harness between A/C switch and PCM • Short to power supply in wiring harness between A/C relay and magnetic clutch • Magnetic clutch stuck engagement or clearance • Short to ground in wiring harness between A/C switch and A/C amplifier • Short to ground in wiring harness between A/C amplifier and refrigerant pressure switch • Short circuit to battery power in A/C relay to magnetic clutch • A/C switch is stuck closed • PCM malfunction

SYMPTOM TROUBLESHOOTING [L8, LF]

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Connect the M-MDS to the DLC-2. Perform the KOEO/KOER self test and the DTC Reading Procedure. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Are any DTCs present?	Yes	Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
2	Start the engine and idle it. Turn the A/C switch on. Remove the A/C relay. Does the A/C magnetic clutch disengage?	Yes	Inspect the following: • A/C relay is stuck closed • Short to ground in wiring harness between A/C relay and PCM terminal 1I Repair or replace the malfunctioning part according to the inspection results, if necessary. If both items are normal: • Go to the next step.
		No	Inspect the wiring harness between the A/C relay and magnetic clutch for short to power supply. If the circuit has a malfunction: • Repair or replace the suspected wiring harness. If the circuit is normal: • Inspect for magnetic clutch stuck engagement or clearance. • Repair or replace the malfunctioning part according to the inspection results.
3	Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure and access the AC_REQ PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Start the engine and turn the A/C switch on. Monitor the AC_REQ PID while disconnecting refrigerant pressure switch connector. **Note** • AC_REQ PID should read Off when disconnecting connector. If AC_REQ PID remains On, short to ground may be present. Does the AC_REQ PID remain On?	Yes	Inspect the wiring harness between refrigerant pressure switch and PCM terminal 1AU for short to ground. Repair or replace the suspected wiring harness, if necessary.
		No	Go to the next step.
4	Reconnect the refrigerant pressure switch connector. Perform the PID/DATA Monitor and Record Procedure and access the AC_REQ PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Monitor the AC_REQ PID while turning off A/C switch. **Note** • AC_REQ PID should read Off when turning A/C switch off. If AC_REQ PID remains On, short to ground may be present. Does the AC_REQ PID remain On?	Yes	Inspect the following: • Short to ground in wiring harness between the A/C switch and A/C amplifier • Short to ground in wiring harness between the A/C amplifier and refrigerant pressure switch Repair or replace the suspected wiring harness, if necessary.
		No	Inspect for stuck closed A/C switch. Repair or replace the malfunctioning part according to the inspection results.
5	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

SYMPTOM TROUBLESHOOTING [L8, LF]

NO.25 A/C IS NOT CUT OFF UNDER WIDE OPEN THROTTLE CONDITIONS [L8, LF]

id0103a0803100

25	A/C IS NOT CUT OFF UNDER WIDE OPEN THROTTLE CONDITIONS
DESCRIPTION	• A/C compressor magnetic clutch does not disengage under wide open throttle.
POSSIBLE CAUSE	• TP sensor malfunction — TP sensor misadjustment — Loosely installed TP sensor • PCM malfunction

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Does the A/C compressor disengage when the A/C switch is turned off?	Yes	Go to the next step.
		No	Go to the symptom troubleshooting "NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY". (See 01-03-62 NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [L8, LF].)
2	Connect the M-MDS to the DLC-2. Perform the KOEO/KOER self test and the DTC Reading Procedure. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Are any DTCs present?	Yes	Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Inspect the TP sensor for proper adjustment. (See 01-40-28 THROTTLE POSITION (TP) SENSOR INSPECTION [L8, LF].) Adjust the TP sensor properly, if necessary. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
3	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

NO.26 EXHAUST SULPHUR SMELL [L8, LF]

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26	EXHAUST SULPHUR SMELL
DESCRIPTION	• Rotten egg smell (sulphur) from exhaust.
POSSIBLE CAUSE	• Electrical connectors are disconnected • Poor fuel quality • Vacuum lines are disconnected or connected improperly • Improper fuel pressure • Charcoal canister malfunction • Fuel tank vent system malfunction • PCM malfunction **Warning** **The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION" described in this manual.** **(See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)** **(See 01-14-5 AFTER SERVICE PRECAUTION [L8, LF].)** **Caution** • **Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

SYMPTOM TROUBLESHOOTING [L8, LF]

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Are any driveability or exhaust smoke concerns present?	Yes	Go to the appropriate symptom troubleshooting. (See 01-03-5 QUICK DIAGNOSTIC CHART [L8, LF].)
		No	Go to the next step.
2	Inspect the following: • Electrical connections • Fuel quality • Vacuum lines Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results. Repeat Step 2.
		No	Go to the next step.
3	Connect the M-MDS to the DLC-2. Perform the KOEO/KOER self test and the DTC Reading Procedure. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].) (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Are any DTCs present?	Yes	Go to the appropriate DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
4	Install the fuel pressure gauge between fuel pipe and fuel distributor. Start engine and run it at idle. Is fuel line pressure correct at idle? (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Zero or low: • Inspect the fuel pump and fuel pump relay related circuit. • Inspect for clogged fuel line. • If there is no malfunction: — Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) • If there is a malfunction: — Repair or replace the malfunctioning part according to the inspection results. High: • Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
5	Inspect the charcoal canister for fuel saturation. (See 01-16-6 CHARCOAL CANISTER INSPECTION [L8, LF].) Is the excess amount of liquid fuel present in canister?	Yes	Replace the charcoal canister. (See 01-16-6 CHARCOAL CANISTER REMOVAL/ INSTALLATION [L8, LF].)
		No	Inspect the fuel tank vent system. (See 01-14-11 FUEL TANK INSPECTION [L8, LF].) If the fuel tank vent system is normal: • Suggest trying a different brand since sulfur content can vary in different fuels. If the fuel tank vent system is not normal: • Repair or replace the malfunctioning part according to the inspection results.
6	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

SYMPTOM TROUBLESHOOTING [L8, LF]

NO.27 SPARK PLUG CONDITION [L8, LF]

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27	SPARK PLUG CONDITION
DESCRIPTION	• Incorrect spark plug condition.
POSSIBLE CAUSE	**Note** • Inspecting spark plugs condition can determine whether problem is related to a specific cylinder possibly all cylinders. **Wet/carbon stuck on specific plug:** • Spark—Weak, not visible • Compression—No compression, low compression • Spark plug malfunction • Air/fuel mixture—Excessive fuel injection volume **Grayish white with specific plug:** • Spark plug malfunction • Air/fuel mixture—Insufficient fuel injection volume **Wet/carbon is stuck on all plugs:** • Air/fuel mixture—Too rich • Spark—Spark weak • Clogging in intake/exhaust system • Compression—Low compression **Grayish white with all plugs:** • Air/fuel mixture—Too lean **Other:** • PCM malfunction **Warning** **The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION" described in this manual.** **(See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)** **(See 01-14-5 AFTER SERVICE PRECAUTION [L8, LF].)** **Caution** • **Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Remove all the spark plugs. (See 01-18-3 SPARK PLUG REMOVAL/ INSTALLATION [L8, LF].) Inspect the spark plug. (See 01-18-3 SPARK PLUG INSPECTION [L8, LF].) Is there any malfunction?	Yes	Specific plug is wet or covered with carbon: • Go to the next step. Specific plug looks grayish white: • Go to Step 7. All plugs are wet or covered with carbon: • Go to Step 9. All plugs look grayish white: • Go to Step 15.
		No	Symptom troubleshooting completed.
2	Are the spark plug wet/covered with carbon by engine oil?	Yes	Inspect the all areas related to oil, working up and down. Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
3	Inspect the spark plug for following: • Air gap • Cracked insulator • Heat range • Worn electrode Is there any malfunction?	Yes	Replace the spark plug. (See 01-18-3 SPARK PLUG REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
4	Perform the “COMPRESSION INSPECTION”. (See 01-10-18 COMPRESSION INSPECTION [L8, LF].) Is the engine compression correct?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
5	Install all spark plugs. Perform the Spark Test at suspected malfunction cylinder. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Is the strong blue spark visible? (Compare with normal cylinder.)	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
6	Perform the “FUEL LINE PRESSURE INSPECTION”. (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].) Is the fuel line pressure correct?	Yes	Inspect the fuel injector for following: • Injection volume • Leakage • Open or short circuit in injector Repair or replace the malfunctioning part according to the inspection results.
		No	Zero or low: • Inspect the fuel pump and fuel pump relay related circuit. • Inspect for clogged fuel line. • If there is no malfunction: — Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) • If there is a malfunction: — Repair or replace the malfunctioning part according to the inspection results. High: • Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
7	Inspect the spark plug for following: • Air gap • Heat range Is there any malfunction?	Yes	Replace the spark plug. (See 01-18-3 SPARK PLUG REMOVAL/ INSTALLATION [L8, LF].)
		No	Go to the next step.
8	Remove the suspected fuel injector. (See 01-14-18 FUEL INJECTOR REMOVAL/ INSTALLATION [L8, LF].) Inspect the following: (See 01-14-19 FUEL INJECTOR INSPECTION [L8, LF].) • Resistance • Fuel injection volume Is there any malfunction?	Yes	Replace the fuel injector. (See 01-14-18 FUEL INJECTOR REMOVAL/ INSTALLATION [L8, LF].)
		No	Inspect the wiring harness between fuel injector terminal B and PCM following terminals for open circuit: • For No.1 cylinder terminal 2BB • For No.2 cylinder terminal 2BC • For No.3 cylinder terminal 2BD • For No.4 cylinder terminal 2AZ Repair or replace the suspected wiring harness.
9	Is the air cleaner element free of restrictions?	Yes	Go to the next step.
		No	Replace the air cleaner element. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
10	Perform the Spark Test. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Is the strong blue spark visible at each cylinder?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
11	Perform the “FUEL LINE PRESSURE INSPECTION”. (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].) Is the fuel line pressure correct?	Yes	Go to the next step.
		No	Zero or low: • Inspect the fuel pump and fuel pump relay related circuit. • Inspect for clogged fuel line. • If there is no malfunction: — Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) • If there is a malfunction: — Repair or replace the malfunctioning part according to the inspection results. High: • Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
12	Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure and access the following PIDs: (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • ECT • MAF • O2S11 (When engine can be started) • O2S12 (When engine can be started) Are the PIDs normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
13	Perform the Purge Control System Inspection (when the engine can be started). (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Is the purge control system correct?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
14	Perform the “COMPRESSION INSPECTION”. (See 01-10-18 COMPRESSION INSPECTION [L8, LF].) Is the engine compression correct?	Yes	Visually inspect for deformed in exhaust system part. Repair or replace the malfunctioning part according to the inspection results.
		No	Repair or replace the malfunctioning part according to the inspection results.
15	When the engine cannot be started: • Inspect intake-air system for air leakage. When the engine can be started: • Perform the Intake Manifold Vacuum Inspection. (See 01-03-71 ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF].) Is the air sucked in from the intake-air system?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
16	Perform the “FUEL LINE PRESSURE INSPECTION”. (See 01-14-6 FUEL LINE PRESSURE INSPECTION [L8, LF].) Is the fuel line pressure correct?	Yes	Go to the next step.
		No	Zero or low: • Inspect the fuel pump and fuel pump relay related circuit. • Inspect for clogged fuel line. • If there is no malfunction: — Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) • If there is a malfunction: — Repair or replace the malfunctioning part according to the inspection results. High: • Replace the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)

SYMPTOM TROUBLESHOOTING [L8, LF]

STEP	INSPECTION	RESULTS	ACTION
17	Connect the M-MDS to the DLC-2. Perform the PID/DATA Monitor and Record Procedure and access the following PIDs: (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • ECT • MAF • O2S11 (When engine can be started) • O2S12 (When engine can be started) Are the PIDs normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Inspect PCM ground condition. Repair or replace the malfunctioning part according to the inspection results.
		No	Repair or replace the malfunctioning part according to the inspection results.
18	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)		

INTERMITTENT CONCERN TROUBLESHOOTING [L8, LF]

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Vibration Method

- If malfunction occurs or becomes worse while driving on a rough road or when the engine is vibrating, perform the steps below.

Note

- There are several reasons vehicle or engine vibration could cause an electrical malfunction. Inspect the following:
  — Connectors not fully seated
  — Wiring harnesses not having full play
  — Wiring harnesses laying across brackets or moving parts
  — Wiring harnesses routed too close to hot parts
- An improperly routed, improperly clamped, or loose wiring harness can cause wiring to become pinched between parts.
- The connector joints, points of vibration, and places where wiring harnesses pass such as through the firewall and body panels are the major areas to be checked.

Inspection Method for Switch Connectors or Wiring Harnesses

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position (engine off).

Note

- If the engine starts and runs, perform the following steps during idle.

3. Access PIDs for the switch you are inspecting. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) (See 01-40-9 PCM INSPECTION [L8, LF].)
4. Turn the switch on manually.
5. Slightly shake each connector or wiring harness vertically and horizontally while monitoring the PID.
   - If PID value is unstable, inspect for poor connection.

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SYMPTOM TROUBLESHOOTING [L8, LF]

Inspection Method for Sensor Connectors or Wiring Harnesses

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position (engine off).

Note
- If the engine starts and runs, perform the following steps during idle.

3. Access PIDs for the switch you are inspecting. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) (See 01-40-9 PCM INSPECTION [L8, LF].)
4. Slightly shake each connector or wiring harness vertically and horizontally while monitoring the PID.
   - If PID value is unstable, inspect for poor connection.

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Inspection Method for Sensors

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position (engine off).

Note
- If the engine starts and runs, perform the following steps during idle.

3. Access PIDs for the switch you are inspecting. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) (See 01-40-9 PCM INSPECTION [L8, LF].)
4. Vibrate the sensor slightly with your finger.
   - If PID value is unstable or malfunction occurs, check for poor connection or poorly mounted sensor or both.

Inspection Method for Actuators or Relays

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position (engine off).

Note
- If the engine starts and runs, perform the following steps during idle.

3. Prepare the output state control function for actuators or relays that you are inspecting.
4. Vibrate the actuator or relay with your finger for **3 s** after output state control function is activated.
   - If variable click sound is heard, check for poor connection or poorly mounted actuator or both, or the relay.

Note
- Vibrating relays too strongly may result in open relays.

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SYMPTOM TROUBLESHOOTING [L8, LF]

Water Sprinkling Method
If malfunction occurs only under high humidity or rainy/snowy weather, perform the following steps:

Caution
- **Indirectly change the temperature and humidity by spraying water onto the front of the radiator.**
- **If a vehicle is subject to water leakage, the leakage may damage the control module. When testing a vehicle with a water leakage problem, special caution must be used.**

1. Connect the M-MDS to the DLC-2 if you are inspecting sensors or switches.
2. Turn the ignition switch to the ON position (engine off).

Note
- If the engine starts and runs, perform the following steps at idle.

3. Access PIDs for sensor or switch if you are inspecting sensors or switches. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) (See 01-40-9 PCM INSPECTION [L8, LF].)
4. If you are inspecting the switch, turn it on manually.
5. Spray water onto the vehicle or run it through a car wash.
   - If PID value is unstable or malfunction occurs, repair or replace part if necessary.

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ENGINE CONTROL SYSTEM OPERATION INSPECTION [L8, LF]

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Main Relay Operation Inspection
1. Verify that the main relay clicks when the ignition switch is turned to ON position and off.
   - If there is no operation sound, inspect the following:
     —Main relay (See 09-21-6 RELAY INSPECTION.)
     — Wiring harness and connector between battery positive terminal and main relay terminal E
     — Wiring harness and connector between PCM terminal 1Q and main relay terminal A

Intake Manifold Vacuum Inspection
1. Verify that the intake air hoses are installed securely.
2. Disconnect the vacuum hose connecting the intake manifold and the purge solenoid valve (purge solenoid valve side) and install the vacuum gauge.
3. Warm up the engine.
4. Measure the intake manifold vacuum while idling (no load) using the vacuum gauge. (See 01-13-6 INTAKE MANIFOLD VACUUM INSPECTION [L8, LF].)
   - If not within the specification, perform the following inspections:
     —Compression pressure (See 01-10-18 COMPRESSION INSPECTION [L8, LF].)
     — Air intake
       - Each hose installation part
       - Throttle body installation part
       - Fuel injector installation part
       - PCV valve installation part
       - Dynamic chamber installation port
       - Intake manifold installation part

SYMPTOM TROUBLESHOOTING [L8, LF]

Electronic Throttle Control System Inspection
Engine coolant temperature compensation inspection

1. Connect the M-MDS to the DLC-2.
2. Access the following PIDs: (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
   - ECT
   - IAT
   - RPM
3. Verify that the engine is cold, then start the engine.
4. Verify that the engine speed decreases as the engine warms up.
   - If the engine speed does not decrease or decreases slowly, inspect the following:
     —ECT sensor and related wiring harness (See 01-40-26 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [L8, LF].)
     —Electronic throttle body and related wiring harness (See 01-13-12 THROTTLE BODY INSPECTION [L8, LF].)

Load compensation inspection

1. Start the engine and idle it.
2. Connect the M-MDS to the DLC-2.
3. Verify that P0506 or P0507 is not displayed. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
   - If P0506 or P0507 are displayed, perform DTC inspection. (See 01-02-111 DTC P0506 [L8, LF].) (See 01-02-113 DTC P0507 [L8, LF].)
4. Access the RPM PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)

   Note
   - Excludes temporary idle speed drop just after the loads are turned on.

5. Verify that the engine speed is within the specification under each load condition. (See 01-10-3 ENGINE TUNE-UP [L8, LF].)
   - If load condition is not as specified, inspect the following:
     — A/C switch and related wiring harness
       (See 07-40B-15 CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER].)
       (See 07-40A-17 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].)
     — Fan switch and related wiring harness
       (See 07-40B-15 CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER].)
       (See 07-40A-17 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].)

Throttle position (TP) sweep inspection

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position.
3. Verify that none of the following DTC are displayed: (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
   - P0122, P0123, P0222, P0223, P0638, P2101, P2107, P2108, P2109, P2112, P2119, P2122, P2123, P2127, P2128, P2135, P2138
     —If any one DTC is displayed, perform DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
4. Access TP PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
5. Verify that the PID value is within the CTP value. (See 01-40-9 PCM INSPECTION [L8, LF].)
   - If the PID value is out of range, perform the following:
     — Remove the air duct from the throttle body.
     — Verify that the throttle valve opens when the accelerator pedal is depressed.
       - If the throttle valve opens, inspect the TP sensor and related wiring harness. (See 01-40-28 THROTTLE POSITION (TP) SENSOR INSPECTION [L8, LF].)
       - If the throttle valve does not open, inspect the throttle actuator control motor and related wiring harness. (See 01-13-12 THROTTLE BODY INSPECTION [L8, LF].)
6. Gradually depress the throttle pedal and verify that the PID reading increases accordingly.
   - If the PID reading drops momentarily, inspect the following:
     —TP sensor (See 01-40-28 THROTTLE POSITION (TP) SENSOR INSPECTION [L8, LF].)
7. Fully depress the throttle pedal and verify that the PID reading is within WOT value. (See 01-40-9 PCM INSPECTION [L8, LF].)
   - If the PID reading is out of range, perform the followings:
     — Remove the air duct from throttle body.
     — Verify that the throttle valve opens when throttle pedal is depressed.
       - If the throttle valve opens, inspect the TP sensor and related wiring harness. (See 01-40-28 THROTTLE POSITION (TP) SENSOR INSPECTION [L8, LF].)
       - If the throttle valve does not open, inspect the throttle actuator control motor and related wiring harness. (See 01-13-12 THROTTLE BODY INSPECTION [L8, LF].)

SYMPTOM TROUBLESHOOTING [L8, LF]

Variable Intake Air Control Operation Inspection

1. Start the engine.
2. Inspect the rod operation. (See 01-13-15 VARIABLE INTAKE AIR SHUTTER VALVE ACTUATOR INSPECTION [L8, LF].)
   - If the rod operation is not as specified, inspect as follows:
   (1) Stop the engine.
   (2) Connect M-MDS to the DLC-2.
   (3) Verify that DTC P0661 or P0662 is not displayed. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
      - If DTC P0661 or P0662 is shown, perform the DTC inspection. (See 01-02-127 DTC P0661 [L8, LF].) (See 01-02-129 DTC P0662 [L8, LF].)
   (4) Turn the ignition switch to the ON position.
   (5) Turn the variable intake-air control solenoid valve from on to off using the IMTV PID and verify that operation sound of the solenoid valve is heard.
      - If the operation sound is heard, inspect the following:
        — Vacuum hose and vacuum chamber for looseness or damage
        — Shutter valve actuator (See 01-13-15 VARIABLE INTAKE AIR SHUTTER VALVE ACTUATOR INSPECTION [L8, LF].)
        — Shutter valve stuck open or close (See 01-13-15 VARIABLE INTAKE AIR SHUTTER VALVE ACTUATOR INSPECTION [L8, LF].)
      - If the operation sound is not heard, inspect the following:
        — Variable intake air solenoid valve (See 01-13-13 VARIABLE INTAKE AIR SOLENOID VALVE INSPECTION [L8, LF].)

Variable Tumble Control Operation Inspection

1. Connect the M-MDS to the DLC-2.
2. Access ECT PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
3. Verify that ECT PID is **below 60 °C {140 °F}**.
4. Start the engine.
5. Inspect rod operation. (See 01-13-19 VARIABLE TUMBLE SHUTTER VALVE ACTUATOR INSPECTION [L8, LF].)
   - If the rod operation is not specified, inspect as follows:
   (1) Verify that DTC P2009 or P2010 is not displayed. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
      - If DTC P2009 or P2010 are shown, perform the DTC inspection. (See 01-02-143 DTC P2009 [L8, LF].) (See 01-02-145 DTC P2010 [L8, LF].)
   (2) Turn the ignition switch to the ON position.
   (3) Turn the variable tumble solenoid valve from on to off using the IMRC PID and verify that operation sound of the solenoid valve is heard.
      - If the operation sound is heard, inspect the following:
        — Vacuum hose and vacuum chamber for looseness or damage
        — Shutter valve actuator (See 01-13-19 VARIABLE TUMBLE SHUTTER VALVE ACTUATOR INSPECTION [L8, LF].)
        — Shutter valve stuck open or close See 01-13-19 VARIABLE TUMBLE SHUTTER VALVE ACTUATOR INSPECTION [L8, LF].)
      - If the operation sound is not heard, inspect the following:
        — Variable tumble solenoid valve (See 01-13-17 VARIABLE TUMBLE SOLENOID VALVE INSPECTION [L8, LF].)

SYMPTOM TROUBLESHOOTING [L8, LF]

Fuel Injector Operation Inspection
If simulation function of M-MDS is used:

STEP	INSPECTION	RESULTS	ACTION
1	Start the engine and warm it up until normal operating temperature. Connect the M-MDS to the DLC-2. Select the INJ#1, INJ#2, INJ#3, and INJ#4 PIDs. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) Turn the fuel injector from on to off using the PIDs for each cylinder. Does the engine speed drop?	Yes	Fuel injector work properly.
		No	Go to the next step.
2	Disconnect the fuel injector that the engine speed does not drop at Step 1. Turn the ignition switch to ON position. Measure the voltage between suspect fuel injector connector terminal A (wiring harness-side) and body ground. Is the voltage **B+**?	Yes	Go to the next step.
		No	Repair or replace for open or short circuit between fuel injector connector terminal A and main relay connector terminal C.
3	Inspect for open or short circuit between suspect fuel injector terminal B and following PCM terminals: • Fuel injector No.1—PCM terminal 2BB • Fuel injector No.2—PCM terminal 2BC • Fuel injector No.3—PCM terminal 2BD • Fuel injector No.4—PCM terminal 2AZ Is there any malfunction?	Yes	Repair or replace the suspected wiring harness.
		No	Go to the next step.
4	Inspect the suspect fuel injector. (See 01-14-19 FUEL INJECTOR INSPECTION [L8, LF].) Is there any malfunction?	Yes	Replace the fuel injector. (See 01-14-18 FUEL INJECTOR REMOVAL/ INSTALLATION [L8, LF].)
		No	Replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)

If simulation function of M-MDS is not used:

STEP	INSPECTION	RESULTS	ACTION
1	While cranking the engine, inspect for fuel injector operation sound at each cylinder using a soundscope. Is the operation sound heard?	Yes	Fuel injector work properly.
		No	All cylinders no heard: • Go to the next step. Some cylinders no heard: • Go to Step 3.
2	Perform the Main Relay Operation Inspection. (See01-03-71 Main Relay Operation Inspection.) Does the main relay work properly?	Yes	Inspect the following: • Fuel injector power system related wiring harness and connectors • PCM connectors • Fuel injector ground and related wiring harness and connectors Repair or replace the malfunctioning parts according to the inspection results.
		No	Repair or replace the malfunctioning parts according to the inspection results.
3	Change the fuel injector connector of not operating fuel injector and operating fuel injector. Is the operation sound heard?	Yes	Go to the next step.
		No	Replace the fuel injector. (See 01-14-18 FUEL INJECTOR REMOVAL/ INSTALLATION [L8, LF].)
4	Are wiring harness and connectors of not operation fuel injector normal? (Open or short circuit.)	Yes	Inspect PCM terminal voltage of fuel injector signal. Repair or replace the malfunctioning parts according to the inspection results.
		No	Repair or replace the malfunctioning parts according to the inspection results.

SYMPTOM TROUBLESHOOTING [L8, LF]

Fuel Cut Control System Inspection

1. Warm up the engine and idle it.
2. Turn off the electrical loads and A/C switch.
3. Connect the M-MDS to the DLC-2.
4. Access RPM and FUELPW1 PIDs. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
5. Monitor both PIDs while performing the following steps:
   (1) Depress the accelerator pedal and increase the engine speed to **4,000 rpm**.
   (2) Release the accelerator pedal (brake pedal is not depressed) and verify that the fuel injector duration time is **0 ms**, and **2—5 ms** when the engine speed drops below **1,300 rpm**.
   - If not as specified, inspect the following:
     — ECT sensor and related wiring harness (See 01-40-26 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [L8, LF].)
     — Neutral/CPP switch and related wiring harness (See 01-40-24 NEUTRAL SWITCH INSPECTION [L8, LF].) (See 01-40-24 CLUTCH PEDAL POSITION (CPP) SWITCH INSPECTION [L8, LF].)

Fuel Pump Operation Inspection

1. Connect the M-MDS to the DLC-2.
2. Remove the fuel-filler cap.
3. Turn the ignition switch to the ON position.
4. Turn the fuel pump relay from off to on using the FP PID and inspect if the operation sound is heard. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
   - If no operation sounds is heard, proceed to next step.
5. Measure the voltage at wiring harness-side fuel pump terminal B.

   Specification
   B+ (Ignition switch is ON position)

   - If the voltage is as specified, inspect the following:
     — Fuel pump continuity
     — Fuel pump ground
     — Wiring harness between fuel pump relay and PCM terminal 1H
   - If not as specified, inspect the following:
     — Fuel pump relay (See 09-21-6 RELAY INSPECTION.)
     — Wiring harness and connector (Main relay—fuel pump relay—fuel pump)

Fuel Pump Control System Inspection

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position.
3. Access FP PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
4. Turn the fuel pump relay from off to on and inspect if the operation sound of the fuel pump relay is heard.
   - If no operation sound is heard, inspect the fuel pump relay.
   - If the fuel pump relay is normal, inspect the following:
     — Wiring harnesses and connectors (Main relay—fuel pump relay—PCM)

SYMPTOM TROUBLESHOOTING [L8, LF]

Spark Test

1. Remove the fuel pump relay.
2. Verify that each ignition coil and connector is connected properly.
3. Inspect the ignition system in the following procedure.

Warning

- **High voltage in the ignition system can cause strong electrical shock which can result in serious injury. Avoid direct contact to the vehicle body during the following spark test.**

STEP	INSPECTION		ACTION
1	• Disconnect the ignition coil from spark plugs. • Remove the spark plugs. (See 01-18-3 SPARK PLUG REMOVAL/ INSTALLATION [L8, LF].) — Verify that the spark plugs do not have carbon deposits. • Is there any malfunction?	Yes	Perform no-load racing at **4,000 rpm** for **2 min**, 2 times to burn off the carbon deposits. Repeat Step 1.
		No	Go to the next step.
2	• Inspect the spark plugs for damage, wear, and proper plug gap. • Is there any malfunction?	Yes	Go to the next step.
		No	Replace spark plugs, then go to the next step. (See 01-18-3 SPARK PLUG REMOVAL/INSTALLATION [L8, LF].)
3	• Reconnect the spark plugs to the ignition coil. • Ground the spark plugs to the engine. • Is a strong blue spark visible at each cylinder while cranking the engine?	Yes	Ignition system is normal.
		No	Some cylinders do not spark: • Go to the next step. All cylinders do not spark: • Go to Step 5.
4	• Inspect the following wiring harnesses for open or short circuit: — Ignition coil No.1 terminal C—PCM terminal 2BA — Ignition coil No.2 terminal C—PCM terminal 2AW — Ignition coil No.3 terminal C—PCM terminal 2AX — Ignition coil No.4 terminal C—PCM terminal 2AT • Is there any malfunction?	Yes	Repair or replace the suspected wiring harness, then return Step 1.
		No	Inspect the ignition coil. (See 01-18-2 IGNITION COIL INSPECTION [L8, LF].) Replace the ignition coil, if necessary. (See 01-18-2 IGNITION COIL REMOVAL/INSTALLATION [L8, LF].)
5	• Measure the voltage at terminal A in each ignition coils. • Is the voltage **B+**?	Yes	Go to the next step.
		No	Inspect the power supply circuit of ignition coils. Repair or replace the suspected wiring harness, if necessary.
6	• Inspect for continuity between each ignition coils terminal B and battery negative terminal . • Is there continuity?	Yes	Go to the next step.
		No	Inspect the ground circuit of ignition coils. Repair or replace the suspected wiring harness, if necessary.
7	• Does the PCM connector or ignition coil connectors have poor connection?	Yes	Repair or replace connector, then return to Step.1.
		No	Go to the next step.
8	• Inspect the CKP sensor and crankshaft pulley. • Is there any malfunction?	Yes	Repair or replace the malfunctioning parts according to the inspection results.
		No	Inspect the wiring harness for short or open circuit and CKP sensor connector. Repair or replace the malfunctioning parts according to the inspection results.

EGR Control System Inspection

1. Crank the engine and verify that EGR valve operation (initial operation) sound is heard.
   - If the operation sound is not heard, connect M-MDS to the DLC-2 and verify that the DTC P0403 is shown. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
     —If DTC 0403 is shown, perform the DTC inspection. (See 01-02-95 DTC P0403 [L8, LF].)
2. Start the engine and run it at idle.
3. Increase the step value of EGR valve from **0** to **52** using SEGRP PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
4. Operate the EGR valve and inspect if the engine speed becomes unstable or the engine stalls.
   - If the engine speed will not change, proceed to following:
   (1) Stop the engine.
   (2) Remove the EGR valve. (See 01-16-9 EGR VALVE REMOVAL/INSTALLATION [L8, LF].)

SYMPTOM TROUBLESHOOTING [L8, LF]

(3) Connect the EGR valve connector.
(4) Turn the ignition switch to the ON position.
(5) Increase the step value of EGR valve from **0** to **52** using SEGRP PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
(6) Inspect the EGR operation.
- If the EGR valve is operated, clean the EGR valve and reinspect from Step 2.
- If the EGR valve will not operate, replace the EGR valve and reinspect from Step 2.

5. Start the engine and warm it up completely.
6. Access the following PIDs: (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
   - ECT
   - RPM
   - SEGRP
   - TP
   - VSS
7. Idle the vehicle and verify that the SEGRP PID value is **0**.
8. Put the vehicle in drive.
9. Depress the accelerator pedal and verify that the SEGRP value is increased.
   - If the SEGRP value will not increase, inspect the VSS, APP1, APP2, TP and ECT PIDs. (See 01-40-9 PCM INSPECTION [L8, LF].)
10. Stop the vehicle and verify that the SEGRP PID value is returned **0**.

Purge Control System Inspection

1. Start the engine.
2. Disconnect the vacuum hose between the purge solenoid valve and the charcoal canister.
3. Put a finger to the purge solenoid valve and verify that there is no vacuum applied when the engine is cold.
   - If there is a vacuum, inspect the following:
     — Wiring harness and connectors (Purge solenoid valve—PCM terminal 2C)
     — Purge solenoid valve (See 01-16-8 PURGE SOLENOID VALVE INSPECTION [L8, LF].)
4. Start the engine and warm it up completely.
5. Stop the engine.
6. Connect the M-MDS to the DLC-2 and verify that the DTC P0443 is shown. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
   - If DTC 0443 is shown, perform the DTC inspection. (See 01-02-100 DTC P0443 [L8, LF].)
7. Turn the ignition switch to the ON position.
8. Access ECT PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
9. Verify that the engine coolant temperature is **above 78 °C {172 °F}**.
   - If M-MDS indicates **below 78 °C {172 °F}**, perform the ECT sensor inspection. (See 01-40-26 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [L8, LF].)
10. Access EVAPCP PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
11. Increase the duty value of the purge solenoid valve to **50%** and inspect if the operation sound of the valve is heard.
    - If the operation sound is heard, inspect for the loose or damaged vacuum hose. (Intake manifold—purge solenoid valve—charcoal canister)
    - If the operation sound is not heard, perform the purge solenoid valve inspection. (See 01-16-8 PURGE SOLENOID VALVE INSPECTION [L8, LF].)

A/C Cut-off Control System Inspection

1. Start the engine.
2. Turn the A/C switch and fan switch on.
3. Verify that the A/C compressor magnetic clutch actuates.
   - If it does not actuate, go to symptom troubleshooting “NO.23 A/C DOES NOT WORK SUFFICIENTLY“. (See 01-03-61 NO.23 A/C DOES NOT WORK SUFFICIENTLY [L8, LF].)
4. Fully open the throttle valve and verify that the A/C compressor magnetic clutch does not actuate for **2—5 s**.
   - If it actuates, inspect as follows:

(1) Connect the M-MDS to the DLC-2.
(2) Turn the A/C switch off.
(3) Turn the ignition switch to the ON position.
(4) Access ACCS PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
(5) Turn the A/C relay from off to on and inspect if the operation sound of the relay is heard.
- If the operation sound is heard, inspect APP1, APP2, PIDs. (See 01-40-9 PCM INSPECTION [L8, LF].)
- If the operation sound is not heard, inspect following:
  — A/C relay (See 09-21-6 RELAY INSPECTION.)
  — Open circuit or short to ground in wiring harness and connectors (Ignition switch—A/C relay—PCM terminal 1I)
  — A/C related parts

SYMPTOM TROUBLESHOOTING [L8, LF]

Cooling Fan Control System Inspection

If simulation function of M-MDS is used:

1. Connect the M-MDS to the DLC-2.
2. Start the engine and warm it up to normal operating temperature.
3. Verify that the DTC P0480, P0481 or P0482 is not shown and cooling fan operating while the KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].)
   - If the DTC P0480, P0481 or P0482 is shown, perform the DTC inspection. (See 01-02-102 DTC P0480 [L8, LF].) (See 01-02-104 DTC P0481 [L8, LF].) (See 01-02-106 DTC P0482 [L8, LF].)
   - If the cooling fans do not operate while KOER self test, proceed the followings:
   (1) Inspect the cooling fan motor and wiring harness between cooling fan motor and .
   (2) Select FAN1, FAN2 and FAN3 PIDs. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
   (3) Turn ignition switch off and disconnect the cooling fan motor connector.
   (4) Verify that each cooling fan relay operating sound is heard, when turn each cooing fan relay to on from off using simulation function of FAN1, FAN2 and FAN3 PIDs.
      - If the operation sound is not heard, inspect for suspected cooling fan relay is stuck open or close.
      - If the operation sound is heard, inspect wiring harness and connector between all cooling fan relays and cooling fan motor.

If simulation function of M-MDS is not used:

1. Connect the M-MDS to the DLC-2.
2. Start the engine and warm it up to normal operating temperature.
3. Verify that the DTC P0480, P0481 or P0482 is not shown and cooling fan operating while the KOER self test. (See 01-02-10 KOEO/KOER SELF TEST [L8, LF].)
   - If the DTC P0480, P0481 or P0482 is shown, perform the DTC inspection. (See 01-02-102 DTC P0480 [L8, LF].) (See 01-02-104 DTC P0481 [L8, LF].) (See 01-02-106 DTC P0482 [L8, LF].)
   - If the cooling fans do not operate while KOER self test, proceed the followings:
   (1) Inspect the cooling fan motor and wiring harness between cooling fan motor and ground.
   (2) Turn the ignition switch to off.
   (3) Disconnect ECT sensor connector.
   (4) Verify that the operation sound heard form all cooling fan relays (No.1, No.2 and No.3), when the ignition switch to ON position.
      - If the operation sound is not heard, inspect for suspected cooling fan relay is stuck open or close.
      - If the operation sound is heard, inspect wiring harness and connector between all cooling fan relays and cooling fan motor.
   (5) Turn the ignition switch off and disconnect the ECT sensor connector.
   (6) Reconnect the ECT sensor and clear the DTC from PCM memory using the M-MDS. (See 01-02-10 AFTER REPAIR PROCEDURE [L8, LF].)

Variable Valve Timing Control System Operation Inspection

If simulation function of M-MDS is used:

1. Warm up the engine to normal operating temperature.
2. Connect the M-MDS to the DLC-2.
3. Start the engine and run it at idle.
4. Select VT DUTY1 PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
5. Increase the OCV duty value and verify that the engine idles roughly or stalls.
   - If as specified, inspect the timing chain component (valve timing deviation).
   - If not as specified, go to the next step.
6. Remove the OCV with connector is connected.
7. Turn the ignition switch to the ON position.
8. Select VT DUTY1 PID. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
9. Increase the OCV duty value and verify that the spool valve operates in the advance direction.
   - If as specified, inspect the following hydraulic passage for clogging and/or leakage.
     — Oil pressure switch—OCV
     — OCV—camshaft
     — Camshaft internal passage
   - If not as specified, inspect the following:
     — OCV operation
     — Harness and connectors for open or short (OCV—PCM terminal 2E)
10. If they are okay, replace the intake camshaft pulley (with a built-in variable valve timing actuator).

01-10 MECHANICAL [L8, LF]

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MECHANICAL [L8, LF]

ENGINE LOCATION INDEX [L8, LF]

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amxzzw0000145

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9	Variable valve timing actuator (With variable valve timing mechanism.) (See 01-10-15 VARIABLE VALVE TIMING ACTUATOR REMOVAL/INSTALLATION [LF].) (See 01-10-15 VARIABLE VALVE TIMING ACTUATOR INSPECTION [LF].)
10	Plug hole plate (See 01-10-4 PLUG HOLE PLATE REMOVAL/ INSTALLATION [L8, LF].)

MECHANICAL [L8, LF]

ENGINE TUNE-UP [L8, LF]

id0110a9800600

Engine Tune-up Preparation

1. Verify the following:
   - AT: Selector lever is in P or N position.
   - MT: Shift lever is in neutral position.
2. Verify that no DTCs are available.
3. Warm up the engine (ECT is **approx. 80 °C {176 °F} or more**) as follows.
   (1) Start the engine.
   (2) Racing at the engine speed **2,500—3,000 rpm** for 3 min.
4. Turn off the electrical loads.
5. Wait until the cooling fans stop.
6. Connect the M-MDS to the DLC-2.
7. Verify that the idling speed (M-MDS: RPM PID) is within the specification using the M-MDS function.

   Standard
   AT: 700—800 rpm
   MT: 670—770 rpm

amxzzw0000210

Ignition Timing Inspection

Note
- Ignition timing is not adjustable.
- Ignition timing verification requires M-MDS.

1. Verify that the ignition timing (M-MDS: SPARKADV PID) is within the specification using M-MDS.

   Ignition timing
   Approx. BTDC 8 °

2. Verify that ignition timing advances when the engine speed increases gradually.
   - If there is malfunction, refer to “ENGINE SYMPTOM TROUBLESHOOTING”. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].)

Idle Speed Inspection

Note
- Idle speed is not adjustable.
- Idle speed verification requires M-MDS.

1. Verify that the idle speed (M-MDS: RPM PID) is within the specification using M-MDS.
   - If there is malfunction, refer to “ENGINE SYMPTOM TROUBLESHOOTING”. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].)

   Idle speed
   No load: 670—770 rpm (MT), 700—800 rpm (AT)
   Electrical loads (38—48 A): 700—800 rpm
   Electrical loads (more than 48 A): 800—900 rpm
   P/S ON: 700—800 rpm (MT), 750—850 rpm (AT)
   A/C ON: 825—925 rpm (MT), 775—875 rpm (AT)

MECHANICAL [L8, LF]

Idle Mixture Inspection

1. Verify that the idle speed and ignition timing are within the specification. (See 01-10-3 Idle Speed Inspection.) (See 01-10-3 Ignition Timing Inspection.)
2. Insert an exhaust gas analyzer to the tailpipe.
3. Verify that the CO and HC concentrations are within the regulation.
   - If there is malfunction, refer to "ENGINE SYMPTOM TROUBLESHOOTING". (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].)

Idle mixture
HC concentration: Within the regulation
CO concentration: Within the regulation

PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF]

id0110a9803900

1. Remove the plug hole plate.

Note
- Lift off and remove the plug hole plate from the installation areas (rubber and clips) as shown in the figure.

e5u110zw5105

2. Install the plug hole plate.

a6a4712w301

(1) To position the plug hole plate, grasp rubber 1 and 2, as shown in the figure, with your hands and press them in.
(2) Grasp clips 3 with your hands and press them in.

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MECHANICAL [L8, LF]

DRIVE BELT INSPECTION [L8, LF]

id0110a9801500

Note
- Drive belt deflection/tension inspection is not necessary because of the use of the auto tensioner.

1. Remove the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)

Note
- Use a mirror to see the position of the drive belt auto tensioner indicator mark.

2. Verify that the drive belt auto tensioner indicator mark does not exceed the limit.
   - If it exceeds the limit, replace the drive belt. (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].)

e5u110zw5021

AT

e5u110zw5020

MT

3. Install the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)

e5u110zw5001

MECHANICAL [L8, LF]

DRIVE BELT REPLACEMENT [L8, LF]

id0110a9803800

1. Remove the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Rotate the drive belt auto tensioner in the direction shown in the figure and remove the drive belt.

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3. Install a new drive belt.

Note
- Use a mirror to see the position of the drive belt auto tensioner indicator mark.

4. Verify that the drive belt auto tensioner indicator mark does not exceed the limit. (See 01-10-5 DRIVE BELT INSPECTION [L8, LF].)
   - If it exceeds the limit, replace the drive belt.
5. Install the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)

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DRIVE BELT AUTO TENSIONER INSPECTION [L8, LF]

id0110a9801700

1. Remove the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the drive belt. (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].)

Note
- Use a mirror to see the position of the drive belt auto tensioner indicator mark.

3. Verify that the drive belt auto tensioner moves smoothly in the operational direction.
   - Replace the drive belt auto tensioner if necessary.

e5u110zw5021

4. Turn the drive belt auto tensioner pulley by hand and verify that it rotates smoothly.
   - Replace the drive belt auto tensioner if necessary.
5. Install the drive belt. (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].)
6. Install the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)

MECHANICAL [L8, LF]

VALVE CLEARANCE INSPECTION [L8, LF]

id0110a9803400

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the plug hole plate. (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF].)
4. Disconnect the ventilation hose. (See 01-16-12 QUICK RELEASE CONNECTOR (EMISSION SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
5. Remove the front suspension tower bar (joint). (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
6. Remove the CMP sensor. (See 01-40-33 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
7. Disconnect the oil control valve (OCV) connector. (With variable valve timing mechanism.)
8. Disconnect the P/S pressure switch connector.
9. Remove the ignition coils. (See 01-18-2 IGNITION COIL REMOVAL/INSTALLATION [L8, LF].)
10. Remove the cylinder head cover. (See 01-10-19 TIMING CHAIN REMOVAL/INSTALLATION [L8, LF].)
11. Measure the valve clearance.
    (1) Turn the crankshaft clockwise so that the No.1 piston is at TDC of the compression stroke.
    (2) Measure the valve clearance at A in the figure.
    - If the valve clearance is out of the specification, adjust it. (See 01-10-8 VALVE CLEARANCE ADJUSTMENT [L8, LF].)

Note
- Make sure to note down the measured values for choosing the suitable replacement tappets.

Valve clearance [Engine cold]
IN: 0.22—0.28 mm {0.0087—0.0110 in}
EX: 0.27—0.33 mm {0.0107—0.0129 in}

(3) Turn the crankshaft **360**° clockwise so that the No.4 piston is at TDC of the compression stroke.
(4) Measure the valve clearance at B in the figure.
- If the valve clearance is out of the specification, adjust it. (See 01-10-8 VALVE CLEARANCE ADJUSTMENT [L8, LF].)

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Note
- Make sure to note down the measured values for choosing the suitable replacement tappets.

Valve clearance [Engine cold]
IN: 0.22—0.28 mm {0.0087—0.0110 in}
EX: 0.27—0.33 mm {0.0107—0.0129 in}

12. Install the cylinder head cover. (See 01-10-19 TIMING CHAIN REMOVAL/INSTALLATION [L8, LF].)
13. Install the ignition coils. (See 01-18-2 IGNITION COIL REMOVAL/INSTALLATION [L8, LF].)
14. Connect the P/S pressure switch connector.
15. Connect the OCV connector. (With variable valve timing mechanism.)
16. Install the CMP sensor. (See 01-40-33 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
17. Install the front suspension tower bar (joint). (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
18. Connect the ventilation hose. (See 01-16-12 QUICK RELEASE CONNECTOR (EMISSION SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
19. Install the plug hole plate. (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF].)
20. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
21. Install the battery cover.

MECHANICAL [L8, LF]

VALVE CLEARANCE ADJUSTMENT [L8, LF]

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1. Remove the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the plug hole plate. (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF].)
3. Remove the air cleaner. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
4. Disconnect the ventilation hose. (See 01-16-12 QUICK RELEASE CONNECTOR (EMISSION SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
5. Remove the front suspension tower bar (joint).02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
6. Remove the CMP sensor. (See 01-40-33 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
7. Disconnect the oil control valve (OCV) connector. (With variable valve timing mechanism.)
8. Disconnect the P/S pressure switch connector.
9. Remove the ignition coils. (See 01-18-2 IGNITION COIL REMOVAL/INSTALLATION [L8, LF].)
10. Remove the cylinder head cover. (See 01-10-19 TIMING CHAIN REMOVAL/INSTALLATION [L8, LF].)
11. Remove the drive belt. (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].)
12. Remove the engine front cover lower blind plug.

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13. Remove the engine front cover upper blind plug.
14. Remove the cylinder block lower blind plug.
15. Remove the under cover. (See 02-13-19 TRANSVERSE MEMBER REMOVAL/INSTALLATION.)

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16. Install the **SST** as shown.
17. Turn the crankshaft clockwise until the crankshaft is in the No.1 cylinder TDC position.
18. Loosen the timing chain using the following procedure.

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MECHANICAL [L8, LF]

(1) Insert a suitable bolt (M6 X 1.0, length 25—35 mm {0.99—1.3 in}) into the engine front cover upper blind plug and tighten it until it contacts the chain tensioner arm, and then rotate it back one turn. (Set the bolt slightly away from the chain tensioner arm so that it does not contact it.)

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(2) Using the cast hexagon on the exhaust camshaft, apply force counterclockwise to facilitate unlocking the chain tensioner ratchet.

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(3) Using a Hex bit socket (2.5 mm {0.098 in}) or T15 Torx bit socket, unlock the chain tensioner ratchet so that it can be lifted up.

am8rrw00002601

MECHANICAL [L8, LF]

(4) Using the cast hexagon on the exhaust camshaft, apply force in the direction of the engine rotation to increase tension on the chain.

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Note

- The chain tensioner rack is compressed using the chain tension generated by applying force to the exhaust camshaft in the direction of the engine rotation.

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(5) Screw in the bolt set in Step 1 approx. 5 mm {0.2 in} and secure the tensioner arm with the rack compressed.

Note

- The ratchet has not been unlocked if the bolt cannot be pressed in approx. 5 mm {0.2 in}.

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- If the tensioner arm cannot be secured, return the bolt to its original position and repeat the procedure from Step 3.

MECHANICAL [L8, LF]

19. Hold the exhaust camshaft using a suitable wrench on the cast hexagon as shown.

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20. Remove the exhaust camshaft sprocket bolt, exhaust camshaft sprocket, and washer as a single unit.

Caution
- **Perform the work carefully so that the washer does not drop out.**

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21. Remove the OCV. (With variable valve timing mechanism.) (See 01-10-17 OIL CONTROL VALVE (OCV) REMOVAL/INSTALLATION [L8, LF].)
22. Loosen the camshaft cap bolts in several passes in the order shown.

Note
- The cylinder head and the camshaft caps are numbered to make sure they are reassembled in their original position. Do not mix the caps.

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23. Remove the camshafts.
24. Remove the tappet.
25. Select proper adjustment tappet.

New adjustment tappet
= Removed tappet thickness + Measured valve clearance - Standard valve clearance (IN: 0.25 mm {0.0098 in}, EX: 0.30 mm {0.0118 in})

Valve clearance [Engine cold]
IN: 0.22—0.28 mm {0.0087—0.0110 in}
EX: 0.27—0.33 mm {0.0107—0.0129 in}

26. Apply the gear oil (SAE No. 90 or equivalent) to each journal of the cylinder head as shown in the figure.
27. Install the camshaft with No.1 cylinder aligned with the TDC position.

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MECHANICAL [L8, LF]

28. Apply the gear oil (SAE No. 90 or equivalent) to each journal of the camshaft as shown in the figure.

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29. Tighten the camshaft cap bolt with the following two steps.
    (1) Tighten to **5.0—9.0 N·m {51.0—91.7 kgf·cm, 44.3—79.6 in·lbf}**.
    (2) Tighten to **14.0—17.0 N·m {1.5—1.7 kgf·m, 10.4—12.5 ft·lbf}**.
30. Install the OCV. (With variable valve timing mechanism.) (See 01-10-17 OIL CONTROL VALVE (OCV) REMOVAL/INSTALLATION [L8, LF].)
31. Install the exhaust camshaft sprocket bolt, exhaust camshaft sprocket, and a new washer as a single unit.

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Caution

- **Install a washer to the fourth or fifth thread of the exhaust camshaft sprocket bolt being careful not to drop the washer.**
- **Do not tighten the camshaft sprocket bolt at this stage. Verify the valve timing before performing the bolt tightening.**

32. Install the **SST** to the camshaft as shown.

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Europe

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MECHANICAL [L8, LF]

Except Europe

33. Remove the **M6 X 1.0 bolt (length 25mm—35mm {0.99in—1.37in})** from the engine front cover to apply tension to the timing chain.
34. Turn the crankshaft clockwise until the crankshaft is in the No.1 cylinder TDC position.

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35. Hold the exhaust camshaft using a suitable wrench on the cast hexagon as shown.
36. Tighten the exhaust camshaft sprocket bolt.

    Tightening torque
    69—75 N·m {7.1—7.6 kgf·m, 50.9—55.3 ft·lbf}

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37. Remove the **SST** from the camshaft.
38. Remove the **SST** from the block lower blind plug.
39. Rotate the crankshaft clockwise two turns until the TDC position.
    - If not aligned, loosen the camshaft sprocket bolt and repeat the procedure from Step 32.
40. Apply silicone sealant to the engine front cover upper blind plug.
41. Install the engine front cover upper blind plug.

    Tightening torque
    8.0—11.5 N·m {82—117 kgf·cm, 71—101 ft·lbf}

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42. Install the cylinder block lower blind plug.

    Tightening torque:
    18—22 N·m {1.9—2.2 kgf·m, 13.3—16.2 ft·lbf}

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MECHANICAL [L8, LF]

43. Install the new engine front cover lower blind plug.

    Tightening torque:
    10—14 N·m {102—142 kgf·cm, 89—123 in·lbf}

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44. Install the drive belt. (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].)
45. Measure the valve clearance.
    (1) Turn the crankshaft clockwise so that the No.1 piston is at TDC of the compression stroke.
    (2) Measure the valve clearance at A in the figure.
        - If the valve clearance is out of the specification, adjust it. (See 01-10-8 VALVE CLEARANCE ADJUSTMENT [L8, LF].)

    Note
    - Make sure to note down the measured values for choosing the suitable replacement tappets.

    Valve clearance [Engine cold]
    IN: 0.22—0.28 mm {0.0087—0.0110 in}
    EX: 0.27—0.33 mm {0.0107—0.0129 in}

    (3) Turn the crankshaft **360**° clockwise so that the No.4 piston is at TDC of the compression stroke.
    (4) Measure the valve clearance at B in the figure.
        - If the valve clearance is out of the specification, adjust it. (See 01-10-8 VALVE CLEARANCE ADJUSTMENT [L8, LF].)

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    Note
    - Make sure to note down the measured values for choosing the suitable replacement tappets.

    Valve clearance [Engine cold]
    IN: 0.22—0.28 mm {0.0087—0.0110 in}
    EX: 0.27—0.33 mm {0.0107—0.0129 in}

46. Install the cylinder head cover. (See 01-10-19 TIMING CHAIN REMOVAL/INSTALLATION [L8, LF].)
47. Install the ignition coils. (See 01-18-2 IGNITION COIL REMOVAL/INSTALLATION [L8, LF].)
48. Connect the OCV connector. (With variable valve timing mechanism.)
49. Install the CMP sensor. (See 01-40-33 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
50. Install the front suspension tower bar (joint). (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
51. Connect the ventilation hose. (See 01-16-12 QUICK RELEASE CONNECTOR (EMISSION SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
52. Install the air cleaner. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
53. Install the plug hole plate. (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF].)
54. Install the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)

MECHANICAL [L8, LF]

VARIABLE VALVE TIMING ACTUATOR INSPECTION [LF]

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Caution
- **Variable valve timing actuator can not be disassembled it is a precision unit.**

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the plug hole plate. (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF].)
4. Disconnect the ventilation hose. (See 01-16-12 QUICK RELEASE CONNECTOR (EMISSION SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
5. Remove the front suspension tower bar (joint). (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
6. Remove the CMP sensor. (See 01-40-33 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
7. Disconnect the oil control valve (OCV) connector.
8. Disconnect the P/S pressure switch connector.
9. Remove the ignition coils. (See 01-18-2 IGNITION COIL REMOVAL/INSTALLATION [L8, LF].)
10. Remove the cylinder head cover. (See 01-10-19 TIMING CHAIN REMOVAL/INSTALLATION [L8, LF].)
11. Confirm that notch of the rotor and bump of the cover at the variable valve timing actuator are aligned and fitted.
    - If the notch and the bump are not aligned, turn the crankshaft clockwise two rotations. Verify that the bump and the notch are aligned.
    - If the bump and notch are still not aligned, replace the variable valve timing actuator.
    - If, when turning the crankshaft, there is a hitting noise from the variable valve timing actuator each time the cam passes the fully lifted position, it means that the actuator is not secured. Replace the actuator.
12. Install the cylinder head cover. (See 01-10-19 TIMING CHAIN REMOVAL/INSTALLATION [L8, LF].)
13. Install the ignition coils. (See 01-18-2 IGNITION COIL REMOVAL/INSTALLATION [L8, LF].)
14. Connect the P/S pressure switch connector.
15. Connect the OCV connector.
16. Install the CMP sensor. (See 01-40-33 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
17. Install the front suspension tower bar (joint). (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)

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18. Connect the ventilation hose. (See 01-16-12 QUICK RELEASE CONNECTOR (EMISSION SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
19. Install the plug hole plate. (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF].)
20. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
21. Install the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)

VARIABLE VALVE TIMING ACTUATOR REMOVAL/INSTALLATION [LF]

id0110a9803745

Caution
- **Variable valve timing actuator can not be disassembled because it is a precision unit.**

Note
- Intake camshaft sprocket is integrated with the variable valve timing actuator and cannot be disassembled.

1. Follow the valve clearance adjustment procedure from 1 to 23 and remove the intake camshaft and variable valve timing actuator as a single unit. (See 01-10-8 VALVE CLEARANCE ADJUSTMENT [L8, LF].)

2. Remove the variable valve timing actuator.
   (1) Mark the camshaft and variable valve timing actuator as shown in the figure to make sure they are installed in their original position.
   (2) Secure the camshaft in a vise.
   (3) Loosen the variable valve timing actuator tightening bolt.

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3. Install a new washer.
4. Install the variable valve timing actuator.
   (1) Secure the camshaft in a vise.
   (2) Align the marks of the camshaft and variable valve timing actuator.

   Caution
   - **When the variable valve timing actuator is replaced with a new one, mark it in the same location as the old one.**

   (3) Tighten the variable valve timing actuator tightening bolt.

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   Tightening torque
   69—75 N·m {7.1—7.6 kgf·m, 50.9—55.3 ft·lbf}

5. Follow the valve clearance adjustment procedure from 24 to 54 and install the intake camshaft and variable valve timing actuator. (See 01-10-8 VALVE CLEARANCE ADJUSTMENT [L8, LF].)

   Note
   - If the alignment marks on the variable valve timing actuator are not available, refer to the "TIMING CHAIN ASSEMBLY" in the engine workshop manual and perform the sprocket position alignment again.

OIL CONTROL VALVE (OCV) INSPECTION [L8, LF]

id0110a9801400

Coil Resistance Inspection

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the OCV connector.
4. Measure the resistance between terminals A and B using an ohmmeter.
   - If not as specified, replace the OCV. (See 01-10-17 OIL CONTROL VALVE (OCV) REMOVAL/INSTALLATION [L8, LF].)

   Oil control valve resistance
   6.9—7.9 ohms [20°C {68°F}]

5. Connect the OCV connector.

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MECHANICAL [L8, LF]

Spool Valve Operation Inspection

1. Remove the battery cover. (See01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the OCV. (See 01-10-17 OIL CONTROL VALVE (OCV) REMOVAL/INSTALLATION [L8, LF].)
4. Verify that the spool valve in the OCV is in the maximum valve timing retard position as indicated in the figure.
   - If not as specified, replace the OCV. (See 01-10-17 OIL CONTROL VALVE (OCV) REMOVAL/INSTALLATION [L8, LF].)
5. Verify that the battery is fully charged.
   - If not as specified, recharge the battery. (See 01-17-3 BATTERY INSPECTION [L8, LF].)
6. Apply battery positive voltage between the OCV terminals and verify that the spool valve operates and moves to the maximum valve timing advance position.
   - If not as specified, replace the OCV.

   Note
   - When applying battery positive voltage between the OCV terminals, the connection can be either of the following:
     — Positive battery cable to terminal A, negative battery cable to terminal B
     — Positive battery cable to terminal B, negative battery cable to terminal A

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7. Stop applying battery positive voltage and verify that the spool valve returns to the maximum valve timing retard position.
   - If not as specified, replace the OCV. (See 01-10-17 OIL CONTROL VALVE (OCV) REMOVAL/INSTALLATION [L8, LF].)

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OIL CONTROL VALVE (OCV) REMOVAL/INSTALLATION [L8, LF]

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1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the plug hole plate. (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF].)
4. Remove the ignition coils. (See 01-18-2 IGNITION COIL REMOVAL/INSTALLATION [L8, LF].)
5. Remove the CMP sensor. (See 01-40-33 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
6. Remove the OCV connector.
7. Remove the ventilation hose. (See 01-16-12 QUICK RELEASE CONNECTOR (EMISSION SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
8. Remove the cylinder head cover. (See 01-10-19 TIMING CHAIN REMOVAL/INSTALLATION [L8, LF].)
9. Remove the OCV.
10. Install in the reverse order of removal.

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MECHANICAL [L8, LF]

COMPRESSION INSPECTION [L8, LF]

id0110a9800300

Warning
- **Hot engines and oil can cause severe burns. Be careful not to burn yourself during removal/installation of each component.**

1. Verify that the battery is fully charged.
   - Recharge it if necessary. (See 01-17-3 BATTERY INSPECTION [L8, LF].)
2. Warm up the engine to the normal operating temperature.
3. Stop the engine and allow it to cool down for **about 10 min**.
4. Perform “Fuel Line Safety Procedures”. Leave the fuel pump relay removed. (See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)

Warning
- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the “Fuel Line Safety Procedure”. (See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)**

5. Remove the fuel pump relay.
6. Remove the front suspension tower bar (joint). (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
7. Remove the ignition coils. (See 01-18-2 IGNITION COIL REMOVAL/INSTALLATION [L8, LF].)
8. Remove the spark plugs. (See 01-18-3 SPARK PLUG REMOVAL/INSTALLATION [L8, LF].)
9. Connect a compression gauge into the spark plug hole.
10. Fully depress the accelerator pedal and crank the engine.
11. Note the maximum gauge reading.
12. Inspect each cylinder as above.
    - If the measured value is less than the limited value, or there is a cylinder whose compression value varies from that of other cylinders by **196.1 kPa {2.0 kgf/cm^2, 28.5 psi}** or more, add a small amount of engine oil through the spark plug hole. Then measure the compression pressure and perform the respective operations for the following cases.
      — If the compression increases, the piston, the piston rings, or cylinder wall may be worn and overhaul is required.
      — If the compression stays low, a valve may be stuck or improperly seated and overhaul is required.
      — If the compression in adjacent cylinders stays low, the cylinder head gasket may be damaged or the cylinder head distorted and overhaul is required.

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Compression [L8]

Standard: 1,750 kPa {17.845 kgf/cm^2, 253.816 psi} [300 rpm]
Minimum: 1,225 kPa {12.492 kgf/cm^2, 177.64 psi} [300 rpm]
Maximum difference between cylinders: 196.1 kPa {2.0 kgf/cm^2, 28.5 psi}

Compression [LF]

Standard: 1,720 kPa {17.5391 kgf/cm^2, 249.465 psi} [300 rpm]
Minimum: 1,204 kPa {12.277 kgf/cm^2, 174.58 psi} [300 rpm]
Maximum difference between cylinders: 196.1 kPa {2.0 kgf/cm^2, 28.5 psi}

13. Disconnect the compression gauge.
14. Install the spark plugs. (See 01-18-3 SPARK PLUG REMOVAL/INSTALLATION [L8, LF].)
15. Install the ignition coils. (See 01-18-2 IGNITION COIL REMOVAL/INSTALLATION [L8, LF].)
16. Install the front suspension tower bar (joint). (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
17. Install the fuel pump relay.
18. Complete the “AFTER SERVICE PRECAUTION”. (See 01-14-5 AFTER SERVICE PRECAUTION [L8, LF].)

MECHANICAL [L8, LF]

TIMING CHAIN REMOVAL/INSTALLATION [L8, LF]

id0110a9801000

Warning

- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injures or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedure". (See Fuel Line Safety Procedure.)**

1. Remove the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the air cleaner. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the ventilation hose. (See 01-16-12 QUICK RELEASE CONNECTOR (EMISSION SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
4. Loosen the water pump pulley bolt and remove the drive belt. (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].)
5. Remove the front suspension tower bar (joint). (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
6. Remove the CMP sensor. (See 01-40-33 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
7. Disconnect the oil control valve (OCV) connector. (With variable valve timing mechanism.)
8. Remove the ignition coils. (See 01-18-2 IGNITION COIL REMOVAL/INSTALLATION [L8, LF].)
9. Remove the under cover. (See 02-13-19 TRANSVERSE MEMBER REMOVAL/INSTALLATION.)
10. Remove the CKP sensor. (See 01-40-31 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
11. Remove the P/S oil pump with the oil hose still connected and position the P/S oil pump so that it is out of the way. (See 06-14-20 POWER STEERING OIL PUMP REMOVAL/INSTALLATION.)
12. Move the cooler pipe No.3 and heater pipe slightly out of the way (L.H.D.).
13. Remove in the order indicated in the table.
14. Install in the reverse order of removal.
15. Start the engine and:
    - Verify the ignition timing, idle speed and idle mixture. (See 01-10-3 ENGINE TUNE-UP [L8, LF].)

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MECHANICAL [L8, LF]

16. Perform a road test.

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1	Dipstick
2	Cylinder head cover (See 01-10-25 Cylinder Head Cover Installation Note)
3	Crankshaft pulley lock bolt (See 01-10-21 Crankshaft Pulley Lock Bolt Removal Note) (See 01-10-24 Crankshaft Pulley Lock Bolt Installation Note)
4	Crankshaft pulley
5	Water pump pulley
6	Drive belt idler pulley
7	Engine front cover (See 01-10-23 Engine Front Cover Installation Note [L8, LF])
8	Front oil seal (See 01-10-21 Front Oil Seal Removal Note) (See 01-10-24 Front Oil Seal Installation Note)

9	Chain tensioner (See 01-10-21 Chain Tensioner Removal Note)
10	Tensioner arm
11	Chain guide
12	Timing chain (See 01-10-22 Timing Chain Installation Note)
13	Seal
14	Oil pump chain tensioner
15	Oil pump sprocket (See 01-10-22 Oil Pump Sprocket Removal Note) (See 01-10-22 Oil Pump Sprocket Installation Note)
16	Oil pump chain
17	Crankshaft sprocket

MECHANICAL [L8, LF]

Crankshaft Pulley Lock Bolt Removal Note

1. Remove the cylinder block lower blind plug.
2. Install the **SST**.
3. Turn the crankshaft clockwise until the crankshaft is in the No.1 cylinder TDC position (until the balance weight contacts the **SST**).

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4. Hold the crankshaft pulley by using the **SSTs**.
5. Remove the crankshaft pulley lock bolt.

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Front Oil Seal Removal Note

1. Remove the oil seal using a screwdriver as shown.

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Chain Tensioner Removal Note

1. Using a thin screwdriver, hold the chain tensioner ratchet lock mechanism away from the ratchet stem.
2. Slowly compress the tensioner piston.
3. Hold the tensioner piston using a **1.5 mm {0.059 in}** wire or paper clip.

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MECHANICAL [L8, LF]

Oil Pump Sprocket Removal Note

1. Temporarily install the crankshaft pulley and crankshaft pulley lock bolt to the crankshaft, and lock the oil pump against rotation as shown in figure.
2. Remove the oil pump sprocket, and then remove the crankshaft pulley and crankshaft pulley lock bolt.

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Oil Pump Sprocket Installation Note

1. Temporarily install the crankshaft pulley and crankshaft pulley lock bolt to the crankshaft, and lock the oil pump against rotation as shown in figure.
2. Install the oil pump sprocket, and then remove the crankshaft pulley and crankshaft pulley lock bolt.

   Tightening torque
   20—30 N·m {2.1—3.0 kgf·m, 14.8—22.1 ft·lbf}

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Timing Chain Installation Note

1. Install the **SST** to the camshaft as shown.

Europe

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Except Europe

2. Install the timing chain.
3. Remove the retaining wire or paper clip from the chain tensioner to apply tension to the timing chain.

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MECHANICAL [L8, LF]

Engine Front Cover Installation Note [L8, LF]

Note
- Install the front oil seal before performing the following procedure.

1. Apply silicone sealant to the engine front cover as shown.

Caution
- **Install the engine front cover before the applied silicone sealant starts to harden.**
- **Verify that there is no oil or dust on the seal.**

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Thickness
A: 2.2—3.2 mm {0.087—0.12 in}
B: 1.5—2.5 mm {0.06—0.098 in}
C: 2.2—4.3 mm {0.09—0.16 in}
D: 3.3—4.3 mm {0.13—0.16 in}

2. Install the engine front cover bolts in the order as shown.

Bolt No.	Tightening torque
1—18	**8.0—11.5 N·m {81.6—117.2 kgf·cm, 70.9—101.7 in·lbf}**
19—22	**40—55 N·m {4.1—5.6 kgf·m, 29.7—40.5 ft·lbf}**

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MECHANICAL [L8, LF]

Front Oil Seal Installation Note

1. Apply clean engine oil to a new oil seal.
2. Push the front oil seal in the engine front cover by hand.
3. Compress the oil seal using the **SST** and a hammer.

   Front oil seal press-in amount
   0—1.0 mm {0—0.039 in}

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Crankshaft Pulley Lock Bolt Installation Note

1. Install the **SST** to the camshaft as shown.

Europe

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Except Europe

2. Verify that cylinder No.1 is at TDC of the compression stroke. (Crankshaft balance weight contacts **SST**.)

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3. To position the crankshaft pulley, temporarily tighten it and, using a suitable bolt **(M6 X 1.0 length 25 mm—35 mm {0.99 in—1.37 in})**, fix the crankshaft pulley to the engine front cover.

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MECHANICAL [L8, LF]

4. Install the **SSTs** to the crankshaft pulley, lock the crankshaft against rotation.
5. Tighten the crankshaft pulley lock bolt using the following two steps.
   (1) Tighten to **96—104 N·m {9.8—10.6 kgf·m, 70.9—76.7 ft·lbf}**
   (2) Tighten **87°—93°**
6. Remove the **M6 x 1.0 bolt**.
7. Remove the **SST** from the camshaft.
8. Remove the **SST** from the cylinder block lower blind plug.
9. Remove the **SST** from the crankshaft pulley.
10. Rotate the crankshaft clockwise two turns until the TDC position.
    - If not aligned, loosen the crankshaft pulley lock bolt and repeat from Step 1.
11. Install the cylinder block lower blind plug.

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Tightening torque:
18—22 N·m {1.9—2.2 kgf·m, 13.3—16.2 ft·lbf}

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Cylinder Head Cover Installation Note

1. Apply silicone sealant to the mating surfaces as shown.

Caution
- **Install the cylinder head cover before the applied silicone sealant starts to harden.**

Thickness:
4.0—6.0 mm {0.16—0.23 in}

2. Install the cylinder head cover with a new gasket.
3. Tighten the bolts in the order shown.

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Tightening torque:
8.0—9.5 N·m {82—96 kgf·cm, 71—84 in·lbf}

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MECHANICAL [L8, LF]

CYLINDER HEAD GASKET REPLACEMENT [L8, LF]

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Warning

- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedure". (See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)**

1. Perform "Fuel Line Safety Procedures". Leave the fuel pump relay removed. (See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)
2. Remove the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Drain the engine coolant. (See 01-12-4 ENGINE COOLANT REPLACEMENT [L8, LF].)
4. Remove the front suspension tower bar (joint, right side, left side). (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
5. Remove the air cleaner. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
6. Remove the dynamic chamber. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
7. Remove the ignition coil. (See 01-18-2 IGNITION COIL REMOVAL/INSTALLATION [L8, LF].)
8. Remove the drive belt. (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].)
9. Remove the CKP sensor. (See 01-40-31 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
10. Remove the P/S oil pump with the oil hose still connected and position the P/S oil pump so that it is out of the way. (See 06-14-20 POWER STEERING OIL PUMP REMOVAL/INSTALLATION.)
11. Remove the timing chain. (See 01-10-19 TIMING CHAIN REMOVAL/INSTALLATION [L8, LF].)
12. Remove the wiper arm and blade. (See 09-19-3 WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
13. Remove the cowl grille. (See 09-16-5 COWL GRILLE REMOVAL/INSTALLATION.)
14. Remove the side cowl grille. (See 09-16-5 SIDE COWL GRILLE REMOVAL/INSTALLATION.)
15. Remove the service hole cover. (See 01-16-9 EGR VALVE REMOVAL/INSTALLATION [L8, LF].)
16. Disconnect the generator, but do not remove it from the vehicle. Fix the generator using a rope to prevent it from falling. (See 01-17-5 GENERATOR REMOVAL/INSTALLATION [L8, LF].)
17. Remove the exhaust manifold. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
18. Remove in the order indicated in the table.
19. Install in the reverse order of removal.
20. Inspect the compression. (See 01-10-18 COMPRESSION INSPECTION [L8, LF].)
21. Start the engine and:
    - Inspect for the engine coolant leakage.

MECHANICAL [L8, LF]

- Verify the ignition timing, idle speed and idle mixture. (See 01-10-3 ENGINE TUNE-UP [L8, LF].)

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1	OCV (With variable valve timing mechanism.)
2	Camshaft cap
3	Camshaft (See 01-10-28 Camshaft Removal Note) (See 01-10-29 Camshaft Installation Note)

4	Cylinder head (See 01-10-28 Cylinder Head Removal Note) (See 01-10-28 Cylinder Head Installation Note)
5	Cylinder head gasket

MECHANICAL [L8, LF]

Camshaft Removal Note

Note
- The cylinder head and the camshaft caps are numbered to make sure they are reassembled in their original position. Do not mix the caps.

1. Loosen the camshaft cap bolts in several passes in the order shown.

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Cylinder Head Removal Note

1. Loosen the cylinder head bolts in two or three steps in the order shown.

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Cylinder Head Installation Note

1. Measure the length of each cylinder head bolt.
   - Replace any that exceed the maximum length.

   Cylinder Head Bolt Length L
   145.2—145.8 mm {5.72—5.74 in}

   Cylinder Head Bolt Maximum
   146.5 mm {5.77 in}

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2. Tighten the cylinder head bolts in the order shown with the following 5 steps using the SST (49 D032 316).
   (1) Tighten to **5.0 N·m {51.0 kgf·cm, 44.3 in·lbf}**
   (2) Tighten **13—17 N·m {1.4—1.7 kgf·m, 10.0—12.5 ft·lbf}**
   (3) Tighten **44—46 N·m {4.5—4.6 kgf·m, 32.5—33.9 ft·lbf}**
   (4) Tighten **88°—92°**
   (5) Tighten **88°—92°**

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MECHANICAL [L8, LF]

Camshaft Installation Note

1. Apply the gear oil (SAE No. 90 or equivalent) to each journal of the cylinder head as shown in the figure.
2. Set the cam position of No.1 cylinder at the top dead center (TDC) and install the camshaft.

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3. Apply the gear oil (SAE No. 90 or equivalent) to each journal of the camshaft as shown in the figure.
4. Temporarily tighten the camshaft bearing caps evenly in two or three steps.

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5. Tighten the camshaft cap bolts in the order shown with the following two steps.
   (1) Tighten to **5.0—9.0 N·m {51.0—91.7 kgf·cm, 44.3—79.6 in·lbf}**
   (2) Tighten to **14.0—17.0 N·m {1.5—1.7 kgf·m, 10.4—12.5 ft·lbf}**

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MECHANICAL [L8, LF]

FRONT OIL SEAL REPLACEMENT [L8, LF]

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1. Remove the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the air cleaner. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
3. Remove the drive belt. (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].)
4. Remove the under cover. (See 02-13-19 TRANSVERSE MEMBER REMOVAL/INSTALLATION.)
5. Remove the front suspension tower bar. (joint) (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
6. Remove the ignition coil. (See 01-18-2 IGNITION COIL REMOVAL/INSTALLATION [L8, LF].)
7. Remove the oil control valve (OCV) connector. (With variable valve timing mechanism.)
8. Remove the cylinder head cover. (See 01-10-19 TIMING CHAIN REMOVAL/INSTALLATION [L8, LF].)
9. Remove the CKP sensor. (See 01-40-31 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
10. Remove in the order indicated in the table.
11. Install in the reverse order of removal.

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1	Crankshaft pulley lock bolt (See 01-10-31 Crankshaft Pulley Lock Bolt Removal Note) (See 01-10-32 Crankshaft Pulley Lock Bolt Installation Note)

2	Crankshaft pulley
3	Front oil seal (See 01-10-31 Front Oil Seal Removal Note) (See 01-10-31 Front Oil Seal Installation Note)

MECHANICAL [L8, LF]

Crankshaft Pulley Lock Bolt Removal Note

1. Remove the cylinder block lower blind plug.
2. Install the **SST**.
3. Turn the crankshaft clockwise until the crankshaft is in the No.1 cylinder TDC position (until the balance weight contacts the **SST**).

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4. Hold the crankshaft pulley using the **SSTs**.
5. Remove the crankshaft pulley lock bolt.

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Front Oil Seal Removal Note

1. Cut the oil seal lip using a razor knife.
2. Remove the oil seal using a screwdriver wrapped with a rag.

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Front Oil Seal Installation Note

1. Apply clean engine oil to a new oil seal.
2. Push the front oil seal in the engine front cover by hand.
3. Tap the oil seal in evenly using the **SST** and a hammer.

   Front oil seal press-in amount
   0—1.0 mm {0—0.039 in}

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MECHANICAL [L8, LF]

Crankshaft Pulley Lock Bolt Installation Note

1. Install the **SST** on the camshaft as shown.

Europe

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Except Europe

2. Verify that cylinder No.1 is at TDC of the compression stroke. (Crankshaft balance weight contacts **SST**.)

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3. To position the crankshaft pulley, temporarily tighten it and, using a suitable bolt **(M6 X 1.0 length 25 mm—35 mm {0.99 in—1.37 in})**, fix the crankshaft pulley to the engine front cover.

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4. Install the **SSTs** to the crankshaft pulley, lock the crankshaft against rotation.
5. Tighten the crankshaft pulley lock bolt in the order shown using the following two steps.
   (1) Tighten to **96—104 N·m {9.8—10.6 kgf·m, 70.9—76.7 ft·lbf}**
   (2) Tighten **87°—93°**
6. Remove the **M6 x 1.0** bolt.
7. Remove the **SST** from the camshaft.
8. Remove the **SST** from the cylinder block lower blind plug.
9. Remove the **SST** from the crankshaft pulley.
10. Rotate the crankshaft clockwise two turns until the TDC position.
    - If not aligned, loosen the crankshaft pulley lock bolt and repeat from Step 1.

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MECHANICAL [L8, LF]

11. Install the cylinder block lower blind plug.

    Tightening torque:
    18—22 N·m {1.9—2.2 kgf·m, 13.3—16.2 ft·lbf}

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REAR OIL SEAL REPLACEMENT [L8, LF]

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1. Remove the flywheel (MT) or remove the drive plate (AT). (See 05-10-9 CLUTCH UNIT REMOVAL/INSTALLATION.) (See 05-13-46 DRIVE PLATE REMOVAL/INSTALLATION [SJ6A-EL].)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

1	Bolt
2	Rear oil seal (See 01-10-33 Rear Oil Seal Installation Note)

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Rear Oil Seal Installation Note

1. Apply silicone sealant to the mating faces as shown.

   Thickness:
   4.0—6.0 mm {0.16—0.23 in}

2. Apply clean engine oil to the new oil seal lip.

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3. Install the **SST** to the non-woven fabric side of the rear oil seal.

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MECHANICAL [L8, LF]

4. From the back side of the rear oil seal, verify that there is no damage or separation in the lip area of the rear oil seal.

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5. Install the rear oil seal to the engine as shown in the figure.

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6. Tighten the rear oil seal bolts in the order as shown.

   Tightening torque:
   8.0—11.5 N·m {81.6—117.2 kgf·m, 70.9—101.7 in·lbf}

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MECHANICAL [L8, LF]

ENGINE REMOVAL/INSTALLATION [L8, LF]

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Warning

- **Fuel is very flammable liquid. If fuel spills or leaks from the pressurized fuel system, it will cause serious injury or death and facility breakage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedure", while referring to the "BEFORE SERVICE PRECAUTION".**

Note

- Remove the engine, transmission, and crossmember component as a single unit from under the vehicle.

1. Perform "Fuel Line Safety Procedures". Leave the fuel pump relay removed. (See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)
2. Drain the engine coolant. (See 01-12-4 ENGINE COOLANT REPLACEMENT [L8, LF].)
3. Remove the following parts:
   (1) The front wheel and tires (See 02-10-1 GENERAL PROCEDURES (SUSPENSION).)
   (2) The plug hole plate (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF].)
   (3) The battery cover, battery, battery box, battery tray and battery duct (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
   (4) The air cleaner (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
   (5) The throttle body (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
   (6) The PCM, PCM duct and air cleaner insulator (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
   (7) The coolant reserve tank (See 01-12-6 COOLANT RESERVE TANK REMOVAL/INSTALLATION [L8, LF].)
   (8) The console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
4. Disconnect the P/S oil pump hoses and drain the P/S fluid reservoir. (See 06-14-20 POWER STEERING OIL PUMP REMOVAL/INSTALLATION.)
5. Remove the splash shield A, splash shield B and front under cover. (See 09-16-20 FRONT UNDER COVER REMOVAL/INSTALLATION.)
6. Remove the under cover. (See 02-13-19 TRANSVERSE MEMBER REMOVAL/INSTALLATION.)
7. Remove the generator duct. (See 01-17-5 GENERATOR REMOVAL/INSTALLATION [L8, LF].)
8. Drain the transmission oil (MT) or ATF (AT). (See 05-11A-3 TRANSMISSION OIL REPLACEMENT [M15M-D].) (See 05-11B-3 TRANSMISSION OIL REPLACEMENT [P66M-D].) (See 05-13-10 AUTOMATIC TRANSMISSION FLUID (ATF) REPLACEMENT [SJ6A-EL].)
9. Disconnect the brake vacuum hose. (See 04-11-19 BRAKE HOSE (FRONT) REMOVAL/INSTALLATION.)
10. Disconnect the quick release connector from the dynamic chamber. (See 01-16-12 QUICK RELEASE CONNECTOR (EMISSION SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
11. Disconnect the quick release connector from the fuel distributor. (See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].) (See 01-14-14 QUICK RELEASE CONNECTOR (FUEL SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
12. Remove the drive belt. (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].)
13. Remove the A/C compressor with the pipes connected and secure the A/C compressor using wire or rope so that it is out of the way.
14. Disconnect the water hose and heater hose.
15. Secure the caliper (front) using wire or rope so that it is out of the way.
16. Disconnect the wiring harness.
17. Disconnect front ABS wheel-speed sensor connector. (See 04-13-8 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)
18. Remove the radiator. (See 01-12-7 RADIATOR REMOVAL/INSTALLATION [L8, LF].)
19. Perform the following procedure.
    AT
    1. Disconnect the manual shaft lever component. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)
    MT
    1. Remove the clutch release cylinder with the pipes connected and secure the clutch release cylinder using wire or rope so that it is out of the way. (See 05-10-8 CLUTCH RELEASE CYLINDER REMOVAL/INSTALLATION.)
    2. Remove the shift lever knob. (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].) (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)

MECHANICAL [L8, LF]

20. Remove the engine, transmission, and crossmember component using an engine lifter in the order indicated in the table.

Warning

- **Remove the engine, transmission and crossmember carefully, holding it steady. If the transmission falls it could be damaged or cause injury.**

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MECHANICAL [L8, LF]

1	Under guard (LF MT)
2	Insulator (LF MT)
3	Member bracket (MT)
4	Tunnel member
5	Transverse member
6	Middle pipe (See 01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
7	Power plant frame

8	Propeller shaft (See 03-15-2 PROPELLER SHAFT REMOVAL/ INSTALLATION.)
9	Bolt (Intermediate Shaft) (See 06-14-8 STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION.) (See 06-14-8 STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION.)
10	Engine, transmission, crossmember component (See 01-10-38 Engine, Transmission, Crossmember Component Removal Note.)

21. Remove the engine and transmission from the crossmember component lifter in the order indicated in the table by suspending them with a crane.

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1	Engine mount rubber
2	Engine mount bracket

3	Engine, transmission
4	Oil pipe, oil hose

MECHANICAL [L8, LF]

22. Install in the reverse order of removal.
23. Start the engine and inspect and adjust the following:
    - Pulley and belt for runout, tension, and contact
    - Leakage of engine oil, engine coolant, ATF, MT oil, and fuel
    - Ignition timing, idle speed, and idle mixture (CO and HC) (See 01-10-3 ENGINE TUNE-UP [L8, LF].)
    - Front wheel alignment (See 02-11-2 FRONT WHEEL ALIGNMENT.)
    - Engine-driven accessories operation
24. Perform the on-road test and verify that there is no vibration or noise.

Engine, Transmission, Crossmember Component Removal Note

1. Secure the engine, transmission, and crossmember component using an engine lifter.

ENGINE DISASSEMBLY/ASSEMBLY [L8, LF]

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1. Remove the transmission from the engine. (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].)(See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].) (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)
2. Remove the following parts:
   (1) The clutch unit (MT) (See 05-10-9 CLUTCH UNIT REMOVAL/INSTALLATION.)
   (2) The ignition coil (See 01-18-2 IGNITION COIL REMOVAL/INSTALLATION [L8, LF].)
   (3) The CMP sensor (See 01-40-33 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
   (4) The power steering oil pump (See 06-14-20 POWER STEERING OIL PUMP REMOVAL/INSTALLATION.)
   (5) The fuel distributor and fuel injector (See 01-14-18 FUEL INJECTOR REMOVAL/INSTALLATION [L8, LF].)
   (6) The intake-air system (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
   (7) The exhaust system (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
   (8) The CKP sensor (See 01-40-31 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
3. Remove the drive belt auto tensioner .

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4. Install in the reverse order of removal.

01-11 LUBRICATION [L8, LF]

LUBRICATION SYSTEM
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[L8, LF] **01-11–2**
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LUBRICATION [L8, LF]

LUBRICATION SYSTEM LOCATION INDEX [L8, LF]

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1	Dipstick (See 01-11-2 ENGINE OIL LEVEL INSPECTION [L8, LF].) (See 01-11-2 ENGINE OIL REPLACEMENT [L8, LF].)
2	Oil cooler (See 01-11-5 OIL COOLER REMOVAL/INSTALLATION [L8, LF].)
3	Oil pressure switch (See 01-11-3 OIL PRESSURE INSPECTION [L8, LF].)

4	Oil filter (See 01-11-3 OIL FILTER REPLACEMENT [L8, LF].)
5	Oil pan (See 01-11-6 OIL PAN REMOVAL/INSTALLATION [L8, LF].)
6	Oil strainer (See 01-11-9 OIL PUMP REMOVAL/INSTALLATION [L8, LF].)
7	Oil pump component (See 01-11-9 OIL PUMP REMOVAL/INSTALLATION [L8, LF].)

LUBRICATION [L8, LF]

ENGINE OIL LEVEL INSPECTION [L8, LF]

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1. Position the vehicle on level ground.
2. Warm up the engine.
3. Stop the engine and allow **at least 5 min** before continuing.
4. Remove the dipstick, wipe it cleanly, and reinstall it fully.
5. Remove the dipstick and verify that the oil level is between the F and L marks on the dipstick.
   - If the oil level is below the L mark, add engine oil.

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ENGINE OIL REPLACEMENT [L8, LF]

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Warning
- **Hot engines and engine oil can cause severe burns. Turn off the engine and wait until it and the engine oil have cooled.**
- **A vehicle that is lifted but not securely supported on safety stands is dangerous. It can slip or fall, causing death or serious injury. Never work around or under a lifted vehicle if it is not securely supported on safety stands.**
- **Continuous exposure to USED engine oil has caused skin cancer in laboratory mice. Protect your skin by washing with soap and water immediately after working with engine oil.**

Caution
- **If engine oil is spilled on the exhaust system, wipe it off completely. If you fail to wipe the spilled engine oil, it will produce fumes because of the heat.**

1. Position the vehicle on level ground.
2. Remove the oil filler cap.
3. Remove the oil pan drain plug.
4. Drain the engine oil into a container.
5. Install the oil pan drain plug with a new washer.

Oil pan drain plug tightening torque
30—41 N·m {3.1—4.1 kgf·m, 23—30 ft·lbf}

Note
- The amount of residual oil in the engine can vary according to factors such as the replacement method and oil temperature. Verify the oil level after engine oil replacement.

6. Refill with the following type and amount of the engine oil.

Note
- The maintenance intervals on scheduled maintenance table (See 00-00-38 SCHEDULED MAINTENANCE) can only be supported with the use of the following oils.

Recommended engine oil

Item	Specifications		
Grade	API SL or ACEA A3/A5	API SL or ACEA A3	API SL/SM or ACEA A3/A5
Viscosity (SAE)	5W–30	10W–40	5W–30, 5W–20, 10W–40
Remarks	**Mazda genuine Dexelia oil e.g.**		—

Engine oil capacity (approx. quantity)
Oil replacement: 4.05 L {4.28 US qt, 3.56 Imp qt}
Oil and oil filter replacement: 4.55 L {4.81 US qt, 4.00 Imp qt}
Total (dry engine): 4.85 L {5.12 US qt, 4.27 Imp qt}

7. Install the oil filler cap.
8. Start the engine and confirm that there is no oil leakage.
   - If there is oil leakage, repair or replace the applicable part.
9. Inspect the oil level. (See 01-11-2 ENGINE OIL LEVEL INSPECTION [L8, LF].)

LUBRICATION [L8, LF]

OIL FILTER REPLACEMENT [L8, LF]

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Warning
- **Hot engines and engine oil can cause severe burns. Turn off the engine and wait until it and the engine oil have cooled.**
- **A vehicle that is lifted but not securely supported on safety stands is dangerous. It can slip or fall, causing death or serious injury. Never work around or under a lifted vehicle if it is not securely supported on safety stands.**
- **Continuous exposure to USED engine oil has caused skin cancer in laboratory mice. Protect your skin by washing with soap and water immediately after working with engine oil.**

Caution
- **If engine oil is spilled on the exhaust system, wipe it off completely. If you fail to wipe the spilled engine oil, it will produce fumes because of the heat.**

1. Remove the under guard. (LF MT) (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].) (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)
2. Remove the oil filter using a commercially available, cup-type oil filter wrench (**76 mm {3.0 in} diameter, 15 sided**).
3. Use a clean rag to wipe off the mounting surface.
4. Apply clean engine oil to the O-ring of a new oil filter.
5. Tighten the oil filter according to the instructions on the package or side of the oil filter.

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Note
Tightening torque
12—16 N·m {123—163 kgf·cm, 107—141 in·lbf}
Angle tightening
When the O-ring contacts the oil filter installation surface, turn the filter another one rotation by hand.

6. Start the engine and confirm that there is no oil leakage.
   - If there is oil leakage, repair or replace the applicable part.
7. Inspect the oil level. (See 01-11-2 ENGINE OIL LEVEL INSPECTION [L8, LF].)
8. Install the under guard. (LF MT) (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].) (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)

OIL PRESSURE INSPECTION [L8, LF]

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Warning
- **Hot engines and engine oil can cause severe burns. Turn off the engine and wait until it and the engine oil have cooled.**
- **A vehicle that is lifted but not securely supported on safety stands is dangerous. It can slip or fall, causing death or serious injury. Never work around or under a lifted vehicle if it is not securely supported on safety stands.**
- **Continuous exposure to USED engine oil has caused skin cancer in laboratory mice. Protect your skin by washing with soap and water immediately after working with engine oil.**

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable.
3. Remove the under guard. (LF MT) (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].) (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)

LUBRICATION [L8, LF]

4. Remove the oil pressure switch.

Note
- This inspection can be performed using a combination of **SSTs 49 0187 280A** (oil pressure gauge) and **49 E019 001** (adapter), or using the following combination of the **SSTs**.
  —**49 D019 908** (gauge), **49 D019 909** (hose), **49 D019 910** (adapter), **49 D019 911** (adapter), and **49 D019 914** (adapter)

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5. Install the **SSTs** to the oil pressure switch installation hole using the following procedure.
   Using SSTs 49 0187 280A and 49 E019 001
   1. Install **SST 49 E019 001** to the oil pressure switch installation hole.
   2. Install **SST 49 0187 280A** to the **SST 49 E019 001**.

   Using SSTs 49 D019 908, 49 D019 909, 49 D019 910, 49 D019 911 and 49 D019 914
   1. Assemble **SSTs 49 D019 910** and **49 D019 914** outside of the engine compartment beforehand.
   2. Assemble **SSTs 49 D019 908**, 49 D019 909 and **49 D019 911** outside of the engine compartment beforehand.
   3. Install **SST 49 D019 914** to the oil pressure switch installation hole.
   4. Install **SST 49 D019 911** to the **SST 49 D019 910**.
6. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
7. Warm up the engine to normal operating temperature.
8. Run the engine at the specified speed, and note the gauge readings.
   - If not within the specification, inspect for the cause and repair or replace if necessary.

Note
- The oil pressure can vary with oil viscosity and temperature.

Oil pressure (reference value) [oil temperature: 100 °C {212 °F}]
L8: 234—521 kPa {2.39—5.31 kgf/cm^2, 33.9—75.5 psi} [3,000 rpm]
LF: 337—591 kPa {3.44—6.03 kgf/cm^2, 49.0—85.8 psi} [3,000 rpm]

9. Stop the engine and wait until it is cool.
10. Disconnect the negative battery cable.
11. Remove the **SSTs**.

Caution
- **Be sure that there is no sealant between 1.0—2.0 mm {0.04—0.07 in} from the end of the oil pressure switch to prevent a possible operation malfunction.**

12. Apply silicone sealant to the oil pressure switch threads as shown in the figure.
13. Install the oil pressure switch.

Tightening torque
12—18 N·m {1.3—1.8 kgf·m, 9—13 ft·lbf}

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14. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
15. Install the battery cover.
16. Start the engine and confirm that there is no oil leakage.
    - If there is oil leakage, repair or replace the applicable part.
17. Install the under guard. (LF MT) (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].) (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)

LUBRICATION [L8, LF]

OIL COOLER REMOVAL/INSTALLATION [L8, LF]

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Warning

- **Hot engines and engine oil can cause severe burns. Turn off the engine and wait until it and the engine oil have cooled.**
- **A vehicle that is lifted but not securely supported on safety stands is dangerous. It can slip or fall, causing death or serious injury. Never work around or under a lifted vehicle if it is not securely supported on safety stands.**
- **Continuous exposure to USED engine oil has caused skin cancer in laboratory mice. Protect your skin by washing with soap and water immediately after working with engine oil.**

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Drain the engine coolant. (See 01-12-4 ENGINE COOLANT REPLACEMENT [L8, LF].)
4. Remove the under cover. (See 02-13-19 TRANSVERSE MEMBER REMOVAL/INSTALLATION.)
5. Remove the under guard. (LF MT) (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].) (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)
6. Remove the side cover. (LH)
7. Remove the oil filter. (See 01-11-3 OIL FILTER REPLACEMENT [L8, LF].)
8. Remove in the order indicated in the table.
9. Use a clean rag to wipe off the mounting surface on the oil filter adapter and the oil cooler.
10. Install in the reverse order of the removal.
11. Refill the engine coolant. (See 01-12-4 ENGINE COOLANT REPLACEMENT [L8, LF].)
12. Start the engine and confirm that there is no oil leakage.
    - If there is oil leakage, repair or replace the applicable part.
13. Inspect the oil level. (See 01-11-2 ENGINE OIL LEVEL INSPECTION [L8, LF].)
14. Inspect for engine coolant leakage. (See 01-12-5 ENGINE COOLANT LEAKAGE INSPECTION [L8, LF].)

1	Water hose
2	Oil pressure switch connector
3	Oil cooler and oil filter adapter component
4	Oil cooler (See 01-11-5 Oil Cooler Removal Note.)

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Oil Cooler Removal Note

1. Secure the oil cooler and oil filter adapter component in a vise.
2. Loosen the oil cooler fitting bolt.
3. Remove the oil cooler.

LUBRICATION [L8, LF]

OIL PAN REMOVAL/INSTALLATION [L8, LF]

id0111c6800200

Warning

- **Hot engines and engine oil can cause severe burns. Turn off the engine and wait until it and the engine oil have cooled.**
- **A vehicle that is lifted but not securely supported on safety stands is dangerous. It can slip or fall, causing death or serious injury. Never work around or under a lifted vehicle if it is not securely supported on safety stands.**
- **Continuous exposure to USED engine oil has caused skin cancer in laboratory mice. Protect your skin by washing with soap and water immediately after working with engine oil.**

1. Remove the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the air cleaner. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
3. Drain the engine oil. (See 01-11-2 ENGINE OIL REPLACEMENT [L8, LF].)
4. Loosen the water pump pulley bolts before removing the drive belt.
5. Remove the drive belt. (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].)
6. Remove the front suspension tower bar (joint, right side, and left side). (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
7. Remove the plug hole plate. (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF].)
8. Remove the ignition coils. (See 01-18-2 IGNITION COIL REMOVAL/INSTALLATION [L8, LF].)
9. Remove the P/S oil pump with the hose and pipe still connected. Position the P/S oil pump out of the way. (See 06-14-20 POWER STEERING OIL PUMP REMOVAL/INSTALLATION.)
10. Remove the crankshaft position (CKP) sensor. (See 01-40-31 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
11. Remove the engine front cover. (See 01-10-19 TIMING CHAIN REMOVAL/INSTALLATION [L8, LF].)
12. Remove the transverse member. (See 02-13-19 TRANSVERSE MEMBER REMOVAL/INSTALLATION.)
13. Remove the member bracket. (MT) (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].) (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)
14. Remove in the order indicated in the table.
15. Install in the reverse order of removal.
16. Refill with the specified type and amount of the engine oil. (See 01-11-2 ENGINE OIL REPLACEMENT [L8, LF].)
17. Start the engine and confirm that there is no oil leakage.
    - If there is oil leakage, repair or replace the applicable part.
18. Inspect the oil level. (See 01-11-2 ENGINE OIL LEVEL INSPECTION [L8, LF].)
19. Inspect for the ignition timing and idle speed. (See 01-10-3 ENGINE TUNE-UP [L8, LF].)

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1	Oil pan (See 01-11-7 Oil Pan Removal Note.) (See 01-11-8 Oil Pan Installation Note.)

LUBRICATION [L8, LF]

Oil Pan Removal Note

Note

- Lift up the engine **approx. 25 mm {0.98 in}** to assure clearance for the oil pan removal, then remove the oil pan.

1. Remove the windshield wiper arm and blade. (See 09-19-3 WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
2. Remove the cowl grille. (See 09-16-5 COWL GRILLE REMOVAL/INSTALLATION.)
3. Remove the side cowl grille. (See 09-16-5 SIDE COWL GRILLE REMOVAL/INSTALLATION.)
4. Remove the engine compartment service hole cover. (See 01-16-9 EGR VALVE REMOVAL/INSTALLATION [L8, LF].)
5. Remove the front wheel and tires. (See 02-10-1 GENERAL PROCEDURES (SUSPENSION).)
6. Support the engine using the **SST**.

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7. Remove the engine mount rubber installation nuts.
8. Lift up the engine **approx. 25 mm {0.98 in}** using the **SST**.
9. Remove the oil pan installation bolts.

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10. Remove the oil pan using a separator tool.
11. Remove the oil pan.

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LUBRICATION [L8, LF]

Oil Pan Installation Note

Caution
- **Apply the silicon sealant in a single, unbroken line.**
- **Tighten the oil pan installation bolts before the applied sealant starts to harden.**
- **Using bolts with the old seal adhering could cause cracks in the cylinder block.**

1. Completely clean and remove any oil, dirt, sealant or other foreign material that may be adhering to the cylinder block and oil pan.
2. When reusing the oil pan installation bolts, clean any old sealant from the bolts.

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3. Apply silicone sealant to the oil pan along the inside of the bolt holes as shown in the figure.

   Thickness
   2.2—3.2 mm {0.087—0.126 in}

4. Install the oil pan to the cylinder block.

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5. Use a square ruler to align the oil pan and the cylinder block junction side on the engine front cover side.

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6. Tighten the bolts in the order shown in the figure.

   Tightening torque
   17—23 N·m {1.8—2.3 kgf·m, 12.6—16.9 ft·lbf}

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7. Tighten the oil pan-transmission installation bolts.

   Tightening torque
   37—52 N·m {3.8—5.3 kgf·m, 28—38 ft·lbf}

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LUBRICATION [L8, LF]

OIL PUMP REMOVAL/INSTALLATION [L8, LF]

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Warning

- **Hot engines and engine oil can cause severe burns. Turn off the engine and wait until it and the engine oil have cooled.**
- **A vehicle that is lifted but not securely supported on safety stands is dangerous. It can slip or fall, causing death or serious injury. Never work around or under a lifted vehicle if it is not securely supported on safety stands.**
- **Continuous exposure to USED engine oil has caused skin cancer in laboratory mice. Protect your skin by washing with soap and water immediately after working with engine oil.**

1. Remove the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the air cleaner. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
3. Drain the engine oil. (See 01-11-2 ENGINE OIL REPLACEMENT [L8, LF].)
4. Loosen the water pump pulley bolts before removing the drive belt.
5. Remove the drive belt. (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].)
6. Remove the front suspension tower bar (joint, right side, and left side). (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
7. Remove the plug hole plate. (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF].)
8. Remove the ignition coils. (See 01-18-2 IGNITION COIL REMOVAL/INSTALLATION [L8, LF].)
9. Remove the P/S oil pump with the hose and pipe still connected. Position the P/S oil pump out of the way. (See 06-14-20 POWER STEERING OIL PUMP REMOVAL/INSTALLATION.)
10. Remove the crankshaft position (CKP) sensor. (See 01-40-31 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
11. Remove the engine front cover. (See 01-10-19 TIMING CHAIN REMOVAL/INSTALLATION [L8, LF].)
12. Remove the transverse member. (See 02-13-19 TRANSVERSE MEMBER REMOVAL/INSTALLATION.)
13. Remove the member bracket. (MT) (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].) (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)
14. Remove the oil pan. (See 01-11-6 OIL PAN REMOVAL/INSTALLATION [L8, LF].)
15. Remove in the order indicated in the table.
16. Install in the reverse order of removal.
17. Refill with the specified type and amount of the engine oil. (See 01-11-2 ENGINE OIL REPLACEMENT [L8, LF].)
18. Start the engine and confirm that there is no oil leakage.
    - If there is oil leakage, repair or replace the applicable part.
19. Inspect the oil level. (See 01-11-2 ENGINE OIL LEVEL INSPECTION [L8, LF].)
20. Inspect for the ignition timing and idle speed. (See 01-10-3 ENGINE TUNE-UP [L8, LF].)

LUBRICATION [L8, LF]

21. Inspect the oil pressure. (See 01-11-3 OIL PRESSURE INSPECTION [L8, LF].)

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1	Oil strainer
2	Oil pump chain tensioner
3	Oil pump chain
4	Oil pump sprocket (See 01-11-10 Oil Pump Sprocket Removal/ Installation Note.)
5	Oil pump (See 01-11-10 Oil Pump Installation Note.)

Oil Pump Sprocket Removal/Installation Note

1. Temporarily install the crankshaft pulley and crankshaft pulley lock bolt to the crankshaft, and lock the oil pump against rotation as shown in figure.
2. Remove/install the oil pump sprocket, and then remove the crankshaft pulley and crankshaft pulley lock bolt.

   Tightening torque
   20—30 N·m {2.1—3.0 kgf·m, 14.8—22.1 ft·lbf}

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Oil Pump Installation Note

1. Tighten the oil pump bolts in two steps in the order shown in the figure.

   Tightening torque
   Step 1: 8—12 N·m {82—122 kgf·cm, 71—105 in·lbf}
   Step 2: 17—23 N·m {1.8—2.3 kgf·m, 12.6—16.9 ft·lbf}

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01-12 COOLING SYSTEM [L8, LF]

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1	Cooling system cap (See 01-12-6 COOLING SYSTEM CAP INSPECTION [L8, LF].)
2	Coolant reserve tank (See 01-12-2 ENGINE COOLANT LEVEL INSPECTION [L8, LF].) (See 01-12-6 COOLANT RESERVE TANK REMOVAL/INSTALLATION [L8, LF].)

3	Radiator (See 01-12-3 ENGINE COOLANT PROTECTION INSPECTION [L8, LF].) (See 01-12-4 ENGINE COOLANT REPLACEMENT [L8, LF].) (See 01-12-5 ENGINE COOLANT LEAKAGE INSPECTION [L8, LF].) (See 01-12-7 RADIATOR REMOVAL/ INSTALLATION [L8, LF].)
4	Thermostat (See 01-12-9 THERMOSTAT REMOVAL/ INSTALLATION [L8, LF].) (See 01-12-9 THERMOSTAT INSPECTION [L8, LF].)

COOLING SYSTEM [L8, LF]

5	Water pump (See 01-12-10 WATER PUMP REMOVAL/ INSTALLATION [L8, LF].)

6	Cooling fan motor (See 01-12-11 COOLING FAN MOTOR REMOVAL/ INSTALLATION [L8, LF].) (See 01-12-12 COOLING FAN MOTOR INSPECTION [L8, LF].)

COOLING SYSTEM SERVICE WARNINGS [L8, LF]

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Warning

- **Never remove the cooling system cap or loosen the radiator drain plug while the engine is running, or when the engine and radiator are hot. Scalding engine coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you are sure all the pressure is gone, press down on the cap using the cloth, turn it, and remove it.**
- **Depending on the vehicle, the cooling fan may operate suddenly even when the ignition switch is turned off. Therefore, keep hands and tools away from the cooling fan even if the cooling fan is not operating to prevent injury to personnel or damage to the cooling fan. Always disconnect the negative battery cable when servicing the cooling fan or parts near the cooling fan.**

ENGINE COOLANT LEVEL INSPECTION [L8, LF]

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Warning

- **Never remove the cooling system cap or loosen the radiator drain plug while the engine is running, or when the engine and radiator are hot. Scalding engine coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you are sure all the pressure is gone, press down on the cap using the cloth, turn it, and remove it.**

Note

- If the “FL22” mark is shown on or near the cooling system cap, use FL22 type engine coolant.
- FL22 type engine coolant is shipped as a diluted solution. Use the solution as is when replacing coolant.

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1. Verify that the engine coolant level in the coolant reserve tank is between the L and F marks.
   - If the engine coolant level is below the L mark, add engine coolant.

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COOLING SYSTEM [L8, LF]

ENGINE COOLANT PROTECTION INSPECTION [L8, LF]

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1. Measure the engine coolant temperature and specific gravity using a thermometer and a hydrometer.

Caution

- **Use engine coolant at a concentration that meets the environmental conditions in which the vehicle is driven, otherwise engine damage could occur.**
- **The engine has aluminum parts and must be protected by an ethylene-glycol-based coolant to prevent corrosion and freezing.**
- **Do not use coolants containing Alcohol, Methanol, Borate or Silicate. These coolants could damage the cooling system.**
- **Use only soft (demineralized) water in the coolant mixture. Water that contains minerals will cut down on the coolant's effectiveness.**
- **Engine coolant damages paint. If engine coolant does get on a painted surface, rinse it off quickly.**

Note

- If the "FL22" mark is shown on or near the cooling system cap, use FL22 type engine coolant.
- FL22 type engine coolant is shipped as a diluted solution. Use the solution as is when replacing coolant.

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2. Determine the engine coolant protection level by referring to the graph shown in the figure.
   - If the engine coolant protection level is not correct, add water or engine coolant.

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COOLING SYSTEM [L8, LF]

ENGINE COOLANT REPLACEMENT [L8, LF]

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Warning

- **Never remove the cooling system cap or loosen the radiator drain plug while the engine is running, or when the engine and radiator are hot. Scalding engine coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you are sure all the pressure is gone, press down on the cap using the cloth, turn it, and remove it.**

Caution

- **Use engine coolant at a concentration that meets the environmental conditions in which the vehicle is driven, otherwise engine damage could occur.**
- **The engine has aluminum parts and must be protected by an ethylene-glycol-based coolant to prevent corrosion and freezing.**
- **Do not use coolants containing Alcohol, Methanol, Borate or Silicate. These coolants could damage the cooling system.**
- **Use only soft (demineralized) water in the coolant mixture. Water that contains minerals will cut down on the coolant's effectiveness.**
- **Engine coolant damages paint. If engine coolant does get on a painted surface, rinse it off quickly.**

Note

- If the "FL22" mark is shown on or near the cooling system cap, use FL22 type engine coolant.
- FL22 type engine coolant is shipped as a diluted solution. Use the solution as is when replacing coolant.

Engine coolant capacity (approx. quantity)
7.5 L {7.9 US qt, 6.6 Imp qt}

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1. Remove the cooling system cap.

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2. Remove the radiator drain plug and drain the engine coolant into a container.
3. Flush the cooling system with water until all traces of color are gone.
4. Let the system drain completely.
5. Tighten the radiator drain plug.

Tightening torque
0.8—1.5 N·m {8—15 kgf·cm, 7—13 in·lbf}

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COOLING SYSTEM [L8, LF]

6. Referring to the following chart, select the correct volume percentage of the water and engine coolant.

Antifreeze solution mixture percentage (Except FL22 type engine coolant)

Engine coolant protection	Volume percentage (%)		Gravity at 20 °C {68 °F}
	Water	Coolant	
Above -16 °C {3 °F}	65	35	1.057
Above -26 °C {-15 °F}	55	45	1.072
Above -40 °C {-40 °F}	45	55	1.086

7. Refill the engine coolant into the coolant reserve tank up to the F mark on the tank.
8. Install the cooling system cap.

Caution
- **If the water temperature gauge rises too high, stop the engine and decrease the engine coolant temperature to prevent overheating. Then, verify the malfunctioning part and repair or replace it.**
- **If the engine coolant level in the coolant reserve tank is below the L mark during engine coolant air bleeding operation, stop the engine, and after the engine coolant temperature decreases, add engine coolant. Then, resume the engine coolant air bleeding operation.**

9. Start the engine and warm up the engine by idling.

Note
- If the accelerator pedal is depressed continuously for a specified time, the engine speed may decrease to the idle speed. This is due to the fuel cut control operation, which prevents overheating, and it does not indicate a malfunction.

10. After the engine warms up, perform the following steps. At this time, be careful of the coolant temperature to prevent overheating.
    (1) Run the engine at **approx. 2,500 rpm** for **5 min**.
    (2) Run the engine at **approx. 3,000 rpm** for 5 s, then idle.
    (3) Repeat step (2) 4—5 times.
11. Stop the engine, and inspect the engine coolant level after the engine coolant temperature decreases. If it is low, repeat steps 7—10.
12. Inspect for engine coolant leakage. (See 01-12-5 ENGINE COOLANT LEAKAGE INSPECTION [L8, LF].)

ENGINE COOLANT LEAKAGE INSPECTION [L8, LF]

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Warning
- **Never remove the cooling system cap or loosen the radiator drain plug while the engine is running, or when the engine and radiator are hot. Scalding engine coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you are sure all the pressure is gone, press down on the cap using the cloth, turn it, and remove it.**

1. Inspect the engine coolant level. (See 01-12-2 ENGINE COOLANT LEVEL INSPECTION [L8, LF].)
2. Remove the cooling system cap.
3. Install the **SST** and a radiator cap tester to the coolant reserve tank filler port.
4. Apply pressure using the radiator cap tester.

Caution
- **Applying more than 122.6 kPa {1.25 kgf/cm^2, 17.8 psi} can damage the hoses, fittings, and other components, and cause leakage.**

Engine coolant leakage inspection pressure
122.6 kPa {1.25 kgf/cm^2, 17.8 psi} [1 min]

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5. When pressurizing the cooling system, verify that the pressure is maintained.
   - If the gauge needle drops, it may indicate water leakage. Repair or replace the applicable part.

COOLING SYSTEM [L8, LF]

COOLING SYSTEM CAP INSPECTION [L8, LF]

id0112b4801500

Warning
- **Never remove the cooling system cap or loosen the radiator drain plug while the engine is running, or when the engine and radiator are hot. Scalding engine coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you are sure all the pressure is gone, press down on the cap using the cloth, turn it, and remove it.**

1. Clean the cooling system cap and the sealed part.
2. Inspect the cooling system cap for cracks or everted seal.
   - If there is any malfunction, replace the cooling system cap.
3. Attach the cooling system cap to the **SST** and a radiator cap tester.
4. Hold the cooling system cap downward and apply pressure gradually. Verify that the pressure is held stable for **10 s**.
   - If the pressure is not held stable, replace the cooling system cap.

Cooling system cap valve opening pressure
93.2—122.6 kPa {0.95—1.25 kgf/cm^2, 13.5—17.8 psi}

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COOLANT RESERVE TANK REMOVAL/INSTALLATION [L8, LF]

id0112b4801000

Warning
- **Never remove the cooling system cap or loosen the radiator drain plug while the engine is running, or when the engine and radiator are hot. Scalding engine coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you are sure all the pressure is gone, press down on the cap using the cloth, turn it, and remove it.**

1. Drain the engine coolant until the coolant reserve tank becomes empty. (See 01-12-4 ENGINE COOLANT REPLACEMENT [L8, LF].)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.
4. Refill the engine coolant. (See 01-12-4 ENGINE COOLANT REPLACEMENT [L8, LF].)
5. Inspect for engine coolant leakage. (See 01-12-5 ENGINE COOLANT LEAKAGE INSPECTION [L8, LF].)

1	Hose
2	Coolant reserve tank
3	Hose

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COOLING SYSTEM [L8, LF]

RADIATOR REMOVAL/INSTALLATION [L8, LF]

id0112b4801400

Warning

- **Never remove the cooling system cap or loosen the radiator drain plug while the engine is running, or when the engine and radiator are hot. Scalding engine coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you are sure all the pressure is gone, press down on the cap using the cloth, turn it, and remove it.**

1. Remove the front under cover. (See 09-16-20 FRONT UNDER COVER REMOVAL/INSTALLATION.)
2. Drain the engine coolant. (See 01-12-4 ENGINE COOLANT REPLACEMENT [L8, LF].)
3. Remove the battery, battery tray, and battery duct. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Remove the air cleaner. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
5. Remove the PCM component (PCM, PCM cover, and PCM bracket) with the PCM connector still connected. Position the PCM component out of the way. (U.K. specs.) (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
6. Remove the PCM. (Except for U.K. specs.) (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
7. Remove the air cleaner insulator. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
8. Remove the coolant reserve tank. (See 01-12-6 COOLANT RESERVE TANK REMOVAL/INSTALLATION [L8, LF].)
9. Disconnect the ATF oil cooler hose from the radiator. (AT)
10. Remove in the order indicated in the table.
11. Install in the reverse order of removal.
12. Refill the engine coolant. (See 01-12-4 ENGINE COOLANT REPLACEMENT [L8, LF].)
13. Inspect for engine coolant leakage. (See 01-12-5 ENGINE COOLANT LEAKAGE INSPECTION [L8, LF].)

COOLING SYSTEM [L8, LF]

14. Inspect the ATF level. (AT) (See 05-13-9 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL].)

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1	Cooling fan motor connector
2	PCM duct
3	Radiator lower hose
4	Radiator upper hose
5	Coolant reserve tank hose
6	P/S cooling pipe (See 01-12-8 P/S Cooling Pipe Removal Note.)

7	Condenser (See 01-12-8 Condenser Removal Note.)
8	Upper mount rubber bracket
9	Lower mount rubber bracket
10	Radiator and cooling fan component
11	Cooling fan component
12	Radiator

P/S Cooling Pipe Removal Note

1. Remove the P/S cooling pipe with the hoses still connected.

Condenser Removal Note

1. Remove the condenser with the cooler pipes still connected.

COOLING SYSTEM [L8, LF]

THERMOSTAT REMOVAL/INSTALLATION [L8, LF]

id0112b4801200

Warning
- **Never remove the cooling system cap or loosen the radiator drain plug while the engine is running, or when the engine and radiator are hot. Scalding engine coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you are sure all the pressure is gone, press down on the cap using the cloth, turn it, and remove it.**

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Drain the engine coolant. (See 01-12-4 ENGINE COOLANT REPLACEMENT [L8, LF].)
4. Remove the throttle body. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.
7. Refill the engine coolant. (See 01-12-4 ENGINE COOLANT REPLACEMENT [L8, LF].)
8. Inspect for engine coolant leakage. (See 01-12-5 ENGINE COOLANT LEAKAGE INSPECTION [L8, LF].)

1	Water hose
2	Lower radiator hose
3	Thermostat component
4	Gasket

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THERMOSTAT INSPECTION [L8, LF]

id0112b4801300

1. Remove the thermostat. (See 01-12-9 THERMOSTAT REMOVAL/INSTALLATION [L8, LF].)
2. Visually check that the thermostat valve is closed.
3. Place the thermostat in water.

Warning
- **During inspection, the thermostat and water are extremely hot and can cause severe burns. Do not touch the thermostat and water.**

4. Heat the water and check the following.
   - The valve should not open under normal temperature.
   - Opening temperature and valve lift
     —If there is a malfunction, replace the thermostat. (See 01-12-9 THERMOSTAT REMOVAL/INSTALLATION [L8, LF].)

Thermostat initial-opening temperature
80—84 °C {176—183 °F}

Thermostat full-open temperature
97 °C {207 7F}

Thermostat full-open lift
More than 8.0 mm {0.31 in}

COOLING SYSTEM [L8, LF]

WATER PUMP REMOVAL/INSTALLATION [L8, LF]

id0112b4800700

Warning

- **Never remove the cooling system cap or loosen the radiator drain plug while the engine is running, or when the engine and radiator are hot. Scalding engine coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you are sure all the pressure is gone, press down on the cap using the cloth, turn it, and remove it.**

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Drain the engine coolant. (See 01-12-4 ENGINE COOLANT REPLACEMENT [L8, LF].)
4. Remove the air cleaner. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
5. Loosen the water pump pulley bolts before removing the drive belt.
6. Remove the drive belt. (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].)
7. Remove in the order indicated in the table.
8. Install in the reverse order of removal.
9. Refill the engine coolant. (See 01-12-4 ENGINE COOLANT REPLACEMENT [L8, LF].)
10. Inspect for engine coolant leakage. (See 01-12-5 ENGINE COOLANT LEAKAGE INSPECTION [L8, LF].)

1	Water pump pulley
2	Water pump
3	O-ring (See 01-12-10 O-ring Installation Note.)

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O-ring Installation Note

1. Apply engine coolant to a new O-ring.
2. Install the O-ring.

COOLING SYSTEM [L8, LF]

COOLING FAN MOTOR REMOVAL/INSTALLATION [L8, LF]

id0112b4801900

Warning

- **Never remove the cooling system cap or loosen the radiator drain plug while the engine is running, or when the engine and radiator are hot. Scalding engine coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you are sure all the pressure is gone, press down on the cap using the cloth, turn it, and remove it.**

1. Remove the front under cover. (See 09-16-20 FRONT UNDER COVER REMOVAL/INSTALLATION.)
2. Drain the engine coolant. (See 01-12-4 ENGINE COOLANT REPLACEMENT [L8, LF].)
3. Remove the battery, battery tray, and battery duct. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Remove the air cleaner. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
5. Remove the PCM component (PCM, PCM cover, and PCM bracket) with the PCM connector still connected. Position the PCM component out of the way. (U.K. specs.) (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
6. Remove the PCM. (Except for U.K. specs.) (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
7. Remove the air cleaner insulator. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
8. Remove the coolant reserve tank. (See 01-12-6 COOLANT RESERVE TANK REMOVAL/INSTALLATION [L8, LF].)
9. Disconnect the ATF oil cooler hose from the radiator. (AT)
10. Remove the radiator and cooling fan component. (See 01-12-7 RADIATOR REMOVAL/INSTALLATION [L8, LF].)
11. Remove in the order indicated in the table.
12. Install in the reverse order of removal.
13. Refill the engine coolant. (See 01-12-4 ENGINE COOLANT REPLACEMENT [L8, LF].)
14. Inspect for engine coolant leakage. (See 01-12-5 ENGINE COOLANT LEAKAGE INSPECTION [L8, LF].)
15. Inspect the ATF level. (AT) (See 05-13-9 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL].)

1	Cooling fan
2	Cooling fan motor
3	Radiator cowling

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COOLING SYSTEM [L8, LF]

COOLING FAN MOTOR INSPECTION [L8, LF]

id0112b4801800

Part Inspection

1. Verify that the battery is fully charged. (See 01-17-3 BATTERY INSPECTION [L8, LF].)
2. Install a tester and battery to the cooling fan motor connector (4 terminals) as shown in the figure.

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Cooling fan motor rotation speed	Connection terminal	
	Positive	Negative
High	A and C	B and D
Middle	C	B and D
Low	C	B

3. Verify that the cooling fan motor operates smoothly at the standard current.
   - If there is any malfunction, replace the applicable part.

Cooling fan motor standard current [12 V]
High: 9.0—12.0 A
Middle: 6.4—9.4 A
Low: 4.8—7.8 A

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INTAKE-AIR SYSTEM [L8, LF]

INTAKE-AIR SYSTEM LOCATION INDEX [L8, LF]

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Except 6MT

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1	Intake-air system (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
2	Intake manifold (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
3	Variable tumble solenoid valve (See 01-13-16 VARIABLE TUMBLE SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].) (See 01-13-17 VARIABLE TUMBLE SOLENOID VALVE INSPECTION [L8, LF].)
4	Variable intake air solenoid valve (See 01-13-12 VARIABLE INTAKE AIR SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].) (See 01-13-13 VARIABLE INTAKE AIR SOLENOID VALVE INSPECTION [L8, LF].)
5	Dynamic chamber (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)

6	Variable tumble shutter valve actuator (See 01-13-17 VARIABLE TUMBLE SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [L8, LF].) (See 01-13-19 VARIABLE TUMBLE SHUTTER VALVE ACTUATOR INSPECTION [L8, LF].)
7	Accelerator pedal (See 01-13-20 ACCELERATOR PEDAL REMOVAL/INSTALLATION [L8, LF].)
8	Variable intake air shutter valve actuator (See 01-13-15 VARIABLE INTAKE AIR SHUTTER VALVE ACTUATOR INSPECTION [L8, LF].)
9	Throttle body (See 01-13-12 THROTTLE BODY INSPECTION [L8, LF].)
10	Air cleaner (See 01-13-12 AIR CLEANER ELEMENT INSPECTION [L8, LF].)

INTAKE-AIR SYSTEM [L8, LF]

11	Resonance chamber (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
12	Fresh-air duct (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)

6MT

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1	Intake-air system (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
2	Intake manifold (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
3	Variable tumble solenoid valve (See 01-13-16 VARIABLE TUMBLE SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].) (See 01-13-17 VARIABLE TUMBLE SOLENOID VALVE INSPECTION [L8, LF].)
4	Variable intake air solenoid valve (See 01-13-12 VARIABLE INTAKE AIR SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].) (See 01-13-13 VARIABLE INTAKE AIR SOLENOID VALVE INSPECTION [L8, LF].)

5	Dynamic chamber (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
6	Variable tumble shutter valve actuator (See 01-13-17 VARIABLE TUMBLE SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [L8, LF].) (See 01-13-19 VARIABLE TUMBLE SHUTTER VALVE ACTUATOR INSPECTION [L8, LF].)
7	Accelerator pedal (See 01-13-20 ACCELERATOR PEDAL REMOVAL/ INSTALLATION [L8, LF].)
8	Variable intake air shutter valve actuator (See 01-13-15 VARIABLE INTAKE AIR SHUTTER VALVE ACTUATOR INSPECTION [L8, LF].)

INTAKE-AIR SYSTEM [L8, LF]

9	Resonance chamber No. 2 (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
10	Throttle body (See 01-13-12 THROTTLE BODY INSPECTION [L8, LF].)

11	Air cleaner (See 01-13-12 AIR CLEANER ELEMENT INSPECTION [L8, LF].)
12	Fresh-air duct (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)

INTAKE-AIR SYSTEM DIAGRAM [L8, LF]

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INTAKE-AIR SYSTEM [L8, LF]

INTAKE-AIR SYSTEM VACUUM HOSE ROUTING DIAGRAM [L8, LF]

id0113a3100400

Except 6MT

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INTAKE-AIR SYSTEM [L8, LF]

6MT

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INTAKE MANIFOLD VACUUM INSPECTION [L8, LF]

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1. Verify that the intake air hoses are installed securely.
2. Disconnect the vacuum hose connecting the intake manifold and the purge solenoid valve (purge solenoid valve side) and install the vacuum gauge.
3. Warm up the engine.
4. Measure the intake manifold vacuum while idling (no load) using the vacuum gauge.
   - If not within the specification, perform the following inspections.
     — Compression pressure (See 01-10-18 COMPRESSION INSPECTION [L8, LF].)
     — Air intake
       - Each hose installation part
       - Throttle body installation part
       - Fuel injector installation part
       - PCV valve installation part
       - Dynamic chamber installation port
       - Intake manifold installation part

Standard
–66.7 kPa {–500 mmHg, –19.7 inHg} or more

INTAKE-AIR SYSTEM [L8, LF]

INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF]

id0113a3801900

Warning

- **A hot engine and intake-air system can cause severe burns. Turn off the engine and wait until they are cool before removing the intake-air system.**
- **Fuel line spills and leakage from the pressurized fuel system are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedure", while referring to the "BEFORE SERVICE PRECAUTIONS".**

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

Step 1 (Except 6MT)

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1	Air cleaner cover (See 01-13-9 Air Cleaner Cover Removal Note.)
2	Air cleaner element
3	Air cleaner case
4	Quick release connector (See 01-16-12 QUICK RELEASE CONNECTOR (EMISSION SYSTEM) REMOVAL/INSTALLATION [L8, LF].)

5	Air hose
6	Fresh-air duct (See 01-13-9 Fresh-air Duct Removal Note.)

INTAKE-AIR SYSTEM [L8, LF]

Step 1 (6MT)

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1	Air cleaner cover (See 01-13-9 Air Cleaner Cover Removal Note.)
2	Air cleaner element
3	Air cleaner case
4	Quick release connector (See 01-16-12 QUICK RELEASE CONNECTOR (EMISSION SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
5	Air hose

6	Fresh-air duct (See 01-13-9 Fresh-air Duct Removal Note.)
7	Air intake hose
8	Resonance chamber No. 2
9	Resonance duct No. 1
10	Resonance duct No. 2
11	Hose clamp

INTAKE-AIR SYSTEM [L8, LF]

Step 2

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1	Throttle body (See 01-13-9 Throttle Body Removal Note.) (See 01-13-11 Throttle Body Installation Note.)
2	Quick release connector (See 01-16-12 QUICK RELEASE CONNECTOR (EMISSION SYSTEM) REMOVAL/INSTALLATION [L8, LF].)

3	Dynamic chamber (See 01-13-10 Dynamic Chamber Removal Note.)
4	Intake manifold (See 01-13-11 Intake Manifold Removal Note.)

Air Cleaner Cover Removal Note

1. Remove the MAF/IAT sensor. (See 01-40-26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/INSTALLATION [L8, LF].)
2. Remove the air cleaner cover.

Fresh-air Duct Removal Note

1. Remove the front bumper. (See 09-10-7 FRONT BUMPER REMOVAL/INSTALLATION.)
2. Remove the fresh-air duct.

Throttle Body Removal Note

1. Drain the engine coolant. (See 01-12-4 ENGINE COOLANT REPLACEMENT [L8, LF].)
2. Disconnect the water hose.
3. Remove the throttle body.

INTAKE-AIR SYSTEM [L8, LF]

Dynamic Chamber Removal Note

1. Remove the plug hole plate. (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF])
2. Follow “BEFORE SERVICE PRECAUTION” before performing any work operations to prevent fuel from spilling from the fuel system. (See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)
3. Remove the following parts:
   (1) Remove the front suspension tower bar (joint), (right side) and (left side). (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
   (2) Remove the wiper arm and blade. (See 09-19-3 WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
   (3) Remove the cowl grille. (See 09-16-5 COWL GRILLE REMOVAL/INSTALLATION.)
   (4) Remove the side cowl grille. (See 09-16-5 SIDE COWL GRILLE REMOVAL/INSTALLATION.)
   (5) Move the cooler pipe No.3 and heater pipe slightly out of the way. (L.H.D.)

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   (6) Remove the service hole cover.

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4. Disconnect the heater hose and move the heater pipe slightly out of the way. (L.H.D.)

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5. Disconnect the heater hose and move the heater hose slightly out of the way. (L.H.D.)

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INTAKE-AIR SYSTEM [L8, LF]

6. Remove the harness bracket.
7. Remove the under cover. (See 02-13-19 TRANSVERSE MEMBER REMOVAL/ INSTALLATION.)
8. Disconnect the variable intake air solenoid valve connector, variable tumble solenoid valve connector, EGR valve connector, CMP sensor connector and PSP switch connector.
9. Disconnect the ignition coil connector and fuel injector connector and move the harness slightly out of the way.
10. Disconnect the quick release connector from the fuel distributor. (See 01-14-14 QUICK RELEASE CONNECTOR (FUEL SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
11. Remove the fuel distributor. (See 01-14-18 FUEL INJECTOR REMOVAL/INSTALLATION [L8, LF].)
12. Disconnect the water hose from the EGR valve.
13. Disconnect two water hoses from the thermostat.
14. Remove the heater hose and heater pipe from the dynamic chamber.
15. Remove the variable intake air solenoid valve. (See 01-13-12 VARIABLE INTAKE AIR SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].)
16. Remove the variable tumble solenoid valve. (See 01-13-16 VARIABLE TUMBLE SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].)
17. Remove the dynamic chamber installation bolts.
18. Remove the EGR pipe.
19. Disconnect the connector from the A/C compressor.
20. Disconnect the KS connector.
21. Move the vacuum hose between the purge solenoid valve and the charcoal canister slightly out of the way.
22. Move the clutch release cylinder slightly out of the way. (MT) (See 05-10-8 CLUTCH RELEASE CYLINDER REMOVAL/INSTALLATION.)

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23. Disconnect the evaporative hose with the dynamic chamber raised.
24. Remove the dynamic chamber.
25. Remove the variable intake air shutter valve actuator. (See 01-13-13 VARIABLE INTAKE AIR SHUTTER VALVE ACTUATOR REMOVAL/ INSTALLATION [L8, LF].)
26. Remove the MAP sensor. (See 01-40-27 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR REMOVAL/INSTALLATION [L8, LF].)

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Intake Manifold Removal Note

1. Remove the intake manifold.
2. Remove the variable tumble shutter valve actuator. (See 01-13-17 VARIABLE TUMBLE SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [L8, LF].)

Throttle Body Installation Note

1. Tighten the bolts in the order as shown in the figure.

   Throttle body tightening torque
   8.0—11.5 N·m {82—110 kgf·cm, 71—100 in·lbf}

amxzzw0000079

INTAKE-AIR SYSTEM [L8, LF]

AIR CLEANER ELEMENT INSPECTION [L8, LF]

id0113a3800800

1. Remove the air cleaner element. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
2. Inspect the following items:
   - Has the replacement interval come?
   - Is the air cleaner element soiled, damaged, or bent?
   - Are the air cleaner case and the air cleaner element correctly sealed?
   - Is the correct air cleaner element installed?
     —If there is any abnormality, clean or replace the air cleaner element. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)

THROTTLE BODY INSPECTION [L8, LF]

id0113a3802600

Resistance Inspection

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the throttle body connector.
4. Measure the resistance between throttle actuator terminals A and B.

   Throttle body resistance
   0.3—100 ohms [20 °C {68 °F}]

   - If not as specified, replace the throttle body. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)

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VARIABLE INTAKE AIR SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF]

id0113a3805500

1. Remove the plug hole plate. (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF].)
2. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Move the variable tumble solenoid valve slightly out of the way. (See 01-13-16 VARIABLE TUMBLE SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].)
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.

1	Connector
2	Vacuum hose
3	Variable intake air solenoid valve

amxzzw0000090

INTAKE-AIR SYSTEM [L8, LF]

VARIABLE INTAKE AIR SOLENOID VALVE INSPECTION [L8, LF]

id0113a3802800

Airflow Inspection

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the variable intake air solenoid valve. (See 01-13-12 VARIABLE INTAKE AIR SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].)
4. Inspect airflow between the ports under the following conditions.

: Continuity : Airflow

Step	Terminal		Port		
	A	B	A	B	C
1	○—○			○═○	
2	B+	GND	○═○		

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- If not as specified, replace the variable intake air solenoid valve. (See 01-13-12 VARIABLE INTAKE AIR SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].)

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VARIABLE INTAKE AIR SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [L8, LF]

id0113a3804800

Warning

- **A hot engine and intake-air system can cause severe burns. Turn off the engine and wait until they are cool before removing the intake-air system.**
- **Fuel line spills and leakage from the pressurized fuel system are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedure", while referring to the "BEFORE SERVICE PRECAUTIONS".**

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the throttle body. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
4. Disconnect the quick release connector. (See 01-16-12 QUICK RELEASE CONNECTOR (EMISSION SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
5. Remove the plug hole plate. (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF].)
6. Remove the following parts:
   (1) Front suspension tower bar (joint), (right side) and (left side) (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
   (2) Wiper arm and blade (See 09-19-3 WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
   (3) Cowl grille (See 09-16-5 COWL GRILLE REMOVAL/INSTALLATION.)
   (4) Side cowl grille (See 09-16-5 SIDE COWL GRILLE REMOVAL/INSTALLATION.)
   (5) Move the cooler pipe No.3 slightly out of the way. (L.H.D)

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INTAKE-AIR SYSTEM [L8, LF]

(6) Service hole cover (See 01-16-9 EGR VALVE REMOVAL/INSTALLATION [L8, LF].)

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7. Remove the harness bracket.
8. Remove the under cover. (See 02-13-19 TRANSVERSE MEMBER REMOVAL/INSTALLATION.)
9. Follow “BEFORE SERVICE PRECAUTION” before performing any work operations to prevent fuel from spilling from the fuel system. (See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)
10. Disconnect the quick release connector from the fuel distributor. (See 01-14-14 QUICK RELEASE CONNECTOR (FUEL SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
11. Remove the fuel distributor. (See 01-14-18 FUEL INJECTOR REMOVAL/INSTALLATION [L8, LF].)

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12. Move the clutch release cylinder slightly out of the way. (MT) (See 05-10-8 CLUTCH RELEASE CYLINDER REMOVAL/INSTALLATION.)
13. Remove the dynamic chamber. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
14. Remove in the order indicated in the table.

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1	Vacuum hose
2	Variable intake air shutter valve actuator (See 01-13-15 Variable Intake Air Shutter Valve Actuator Removal Note.) (See 01-13-15 Variable Intake Air Shutter Valve Actuator Installation Note.)

15. Install in the reverse order of removal.

INTAKE-AIR SYSTEM [L8, LF]

Variable Intake Air Shutter Valve Actuator Removal Note

1. Disengage the variable intake air shutter valve actuator rod from the dynamic chamber on the opposite side using a suitable screwdriver or equivalent tool as shown in the figure.

Caution

- **Do not remove the lever, otherwise the variable intake air shutter valve opening angle will deviate. To prevent removal of the lever when removing the variable intake shutter valve actuator, press the lever firmly to the dynamic chamber side by hand.**

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Variable Intake Air Shutter Valve Actuator Installation Note

1. Press the variable intake air shutter valve actuator rod into the dynamic chamber on the opposite side until a click is heard, and install it.

VARIABLE INTAKE AIR SHUTTER VALVE ACTUATOR INSPECTION [L8, LF]

id0113a3803000

Operation Inspection

1. Remove the plug hole plate. (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF].)
2. Remove the following parts:
   (1) Front suspension tower bar (joint), (right side) and (left side) (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
   (2) Wiper arm and blade (See 09-19-3 WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
   (3) Cowl grille (See 09-16-5 COWL GRILLE REMOVAL/INSTALLATION.)
   (4) Side cowl grille (See 09-16-5 SIDE COWL GRILLE REMOVAL/INSTALLATION.)
   (5) Move the cooler pipe No.3 and heater pipe slightly out of the way. (L.H.D.)

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   (6) Service hole cover (See 01-16-9 EGR VALVE REMOVAL/INSTALLATION [L8, LF].)

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INTAKE-AIR SYSTEM [L8, LF]

3. Disconnect the vacuum hose from the variable intake air solenoid valve.

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4. Connect a vacuum pump to the vacuum hose.

Note
- Verify that the variable intake air shutter valve actuator rod moves using a mirror.

5. Apply vacuum and verify that the rod moves.
   - If the rod does not move, replace the variable intake air shutter valve actuator. (See 01-13-13 VARIABLE INTAKE AIR SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [L8, LF].)
   - When the variable intake air shutter valve actuator cannot be activated even though the operation of the rod can be confirmed, check for any incorrect connections or brakage of the vacuum hose.

Vacuum kPa {mmHg, inHg}	Rod movement
Below –2.7 {–20, –0.8}	Not operate
Above –33.4 {–251, –9.86}	Fully pulled

VARIABLE TUMBLE SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF]

id0113a3810100

1. Remove the plug hole plate. (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF].)
2. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.

1	Connector
2	Vacuum hose
3	Variable tumble solenoid valve

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INTAKE-AIR SYSTEM [L8, LF]

VARIABLE TUMBLE SOLENOID VALVE INSPECTION [L8, LF]

id0113a3802900

Airflow Inspection

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the variable tumble solenoid valve. (See 01-13-16 VARIABLE TUMBLE SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].)
4. Inspect airflow between the ports under the following conditions.

○—○ : Continuity ○═○ : Airflow

Step	Terminal		Port		
	A	B	A	B	C
1	○—○			○═○	
2	B+	GND	○═○		

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- If not as specified, replace the variable tumble solenoid valve. (See 01-13-16 VARIABLE TUMBLE SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].)

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VARIABLE TUMBLE SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [L8, LF]

id0113a3804900

Warning

- **A hot engine and intake-air system can cause severe burns. Turn off the engine and wait until they are cool before removing the intake-air system.**
- **Fuel line spills and leakage from the pressurized fuel system are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedure", while referring to the "BEFORE SERVICE PRECAUTIONS".**

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the throttle body. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
4. Disconnect the quick release connector (Type A). (See 01-16-12 QUICK RELEASE CONNECTOR (EMISSION SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
5. Remove the plug hole plate. (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF].)
6. Remove the following parts:
   (1) Front suspension tower bar (joint), (right side) and (left side) (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
   (2) Wiper arm and blade (See 09-19-3 WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
   (3) Cowl grille (See 09-16-5 COWL GRILLE REMOVAL/INSTALLATION.)
   (4) Side cowl grille (See 09-16-5 SIDE COWL GRILLE REMOVAL/INSTALLATION.)
   (5) Move the cooler pipe No.3 and heater pipe slightly out of the way. (L.H.D.)

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INTAKE-AIR SYSTEM [L8, LF]

(6) Service hole cover (See 01-16-9 EGR VALVE REMOVAL/INSTALLATION [L8, LF].)

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7. Remove the harness bracket.
8. Remove the under cover. (See 02-13-19 TRANSVERSE MEMBER REMOVAL/ INSTALLATION.)
9. Follow “BEFORE SERVICE PRECAUTION” before performing any work operations to prevent fuel from spilling from the fuel system. (See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)
10. Disconnect the quick release connector from the fuel distributor. (See 01-14-14 QUICK RELEASE CONNECTOR (FUEL SYSTEM) REMOVAL/ INSTALLATION [L8, LF].)
11. Remove the fuel distributor. (See 01-14-18 FUEL INJECTOR REMOVAL/INSTALLATION [L8, LF].)

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12. Move the clutch release cylinder slightly out of the way. (MT) (See 05-10-8 CLUTCH RELEASE CYLINDER REMOVAL/INSTALLATION.)
13. Remove the dynamic chamber. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
14. Remove the intake manifold. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
15. Remove in the order indicated in the table.

1	Vacuum hose
2	Variable tumble shutter valve actuator (See 01-13-18 Variable Tumble Shutter Valve Actuator Removal Note.) (See 01-13-18 Variable Tumble Shutter Valve Actuator Installation Note.)

16. Install in the reverse order of removal.

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Variable Tumble Shutter Valve Actuator Removal Note

1. Disengage the variable tumble shutter valve actuator rod from the intake manifold using a suitable screwdriver or equivalent tool as shown in the figure.

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Variable Tumble Shutter Valve Actuator Installation Note

1. Press the variable tumble shutter valve actuator into the variable tumble shutter valve actuator rod and the intake manifold on the opposite side until a click is heard, and install it.

INTAKE-AIR SYSTEM [L8, LF]

VARIABLE TUMBLE SHUTTER VALVE ACTUATOR INSPECTION [L8, LF]

id0113a3803100

Operation Inspection

1. Remove the plug hole plate. (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF].)
2. Remove the following parts:
   (1) Front suspension tower bar (joint), (right side) and (left side) (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
   (2) Wiper arm and blade (See 09-19-3 WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
   (3) Cowl grille (See 09-16-5 COWL GRILLE REMOVAL/INSTALLATION.)
   (4) Side cowl grille (See 09-16-5 SIDE COWL GRILLE REMOVAL/INSTALLATION.)
   (5) Move the cooler pipe No.3 and heater pipe slightly out of the way. (L.H.D.)

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   (6) Service hole cover (See 01-16-9 EGR VALVE REMOVAL/INSTALLATION [L8, LF].)

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3. Disconnect the vacuum hose from the variable tumble solenoid valve.

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4. Connect a vacuum pump to the vacuum hose.

Note

- Verify that the variable tumble shutter valve actuator rod moves using a mirror.

INTAKE-AIR SYSTEM [L8, LF]

5. Apply vacuum and verify that the rod moves.
   - If the rod dose not move, replace the variable tumble shutter valve actuator. (See 01-13-17 VARIABLE TUMBLE SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [L8, LF].)
   - When the variable tamble shatter valve actuator cannot be activated even though the operation of the rod can be confirmed, check for any incorrect connections or breakage of the vacuum hose.

Vacuum kPa {mmHg, inHg}	Rod movement
Below –2.7 {–20, –0.8}	No operate
Above –33.4 {–251, –9.86}	Fully pulled

ACCELERATOR PEDAL REMOVAL/INSTALLATION [L8, LF]

id0113a3801400

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF])
3. Remove in the order indicated in the table.

1	Connector
2	Accelerator pedal
3	Accelerator pedal pad (If equipped)

4. Install in the reverse order of removal.

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01-14 FUEL SYSTEM [L8, LF]

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FUEL SYSTEM [L8, LF]

FUEL SYSTEM LOCATION INDEX [L8, LF]

id0114a3800100

Engine Compartment Side

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1	Fuel injector (See 01-14-18 FUEL INJECTOR REMOVAL/INSTALLATION [L8, LF].) (See 01-14-19 FUEL INJECTOR INSPECTION [L8, LF].)

2	Quick release connector (See 01-14-14 QUICK RELEASE CONNECTOR (FUEL SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
3	Fuel pump relay
4	Check connector

FUEL SYSTEM [L8, LF]

Fuel Tank Side

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1	Fuel tank (See 01-14-8 FUEL TANK REMOVAL/INSTALLATION [L8, LF].) (See 01-14-11 FUEL TANK INSPECTION [L8, LF].)
2	Fuel pump unit (See 01-14-12 FUEL PUMP UNIT REMOVAL/INSTALLATION [L8, LF].) (See 01-14-13 FUEL PUMP UNIT DISASSEMBLY/ASSEMBLY [L8, LF].) (See 01-14-14 FUEL PUMP UNIT INSPECTION [L8, LF].)
3	Quick release connector (See 01-14-14 QUICK RELEASE CONNECTOR (FUEL SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
4	Nonreturn valve (See 01-14-12 NONRETURN VALVE INSPECTION [L8, LF].)

FUEL SYSTEM [L8, LF]

FUEL SYSTEM FLOW DIAGRAM [L8, LF]

id0114a3100300

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BEFORE SERVICE PRECAUTION [L8, LF]

id0114a3802000

Warning

- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and leakage from the pressurized fuel system are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedure".**
- **A person charged with static electricity could cause a fire or explosion, resulting in death or serious injury. Before performing work on the fuel system, discharge static electricity by touching the vehicle body.**

Fuel Line Safety Procedure

1. Remove the fuel-filler cap to release the pressure inside the fuel tank.
2. Remove the fuel pump relay.
3. Start the engine.
4. After the engine stalls, crank the engine **several times**.
5. Turn the ignition switch to the LOCK position.
6. Install the fuel pump relay.

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FUEL SYSTEM [L8, LF]

AFTER SERVICE PRECAUTION [L8, LF]

id0114a3801900

Warning

- **Fuel is very flammable liquid. If fuel spills or leaks from the pressurized fuel system, it will cause serious injury or death and facility breakage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Leakage Inspection".**
- **A person charged with static electricity could cause a fire or explosion, resulting in death or serious injury. Before performing work on the fuel system, discharge static electricity by touching the vehicle body.**

Fuel Leakage Inspection

Using M-MDS

1. Connect the M-MDS to the DLC-2.
2. Start the fuel pump using the "FP" simulation function. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
3. Verify that there is no fuel leakage from the pressurized parts.

   Standard
   There shall be no leakage after 5 min.

4. In the case of fuel leakage, replace the following components and then do the recheck by the fuel leakage checking procedure.
   - If there is leakage, replace the fuel hoses and clips.
   - If there is damage on the seal on the fuel pipe side, replace the fuel pipe.

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Without using M-MDS

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Short the check connector terminal F/P to ground using a jumper wire.

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4. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
5. Turn the ignition switch to the ON position to operate the fuel pump.
6. Verify that there is no fuel leakage from the pressurized parts.

   Standard
   There shall be no leakage after 5 min.

7. In the case of fuel leakage, replace the following components and then do the recheck by the fuel leakage checking procedure.
   - If there is leakage, replace the fuel hoses and clips.
   - If there is damage on the seal on the fuel pipe side, replace the fuel pipe.

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FUEL SYSTEM [L8, LF]

FUEL LINE PRESSURE INSPECTION [L8, LF]

id0114a3800500

Warning

- **Fuel line spills and leakage from the pressurized fuel system are dangerous. Fuel can ignite and cause serious injury or death and damage. To prevent this, complete the following inspection with the engine stopped.**

1. Follow “BEFORE SERVICE PRECAUTION” before performing any work operations to prevent fuel from spilling from the fuel system. (See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)
2. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Disconnect the quick release connector. (See 01-14-14 QUICK RELEASE CONNECTOR (FUEL SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
5. Turn the lever of the **SST** parallel to the hose as shown in the figure.
6. Insert the **SST** quick release connector into the fuel pipe until a click is heard.
7. Verify that the quick release connector is firmly connected by pulling it by hand.
8. Start the fuel pump using the following procedure:

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Using M-MDS

1. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Connect the M-MDS to the DLC-2.
3. Start the fuel pump using the “FP” simulation function. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)

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Without using M-MDS

1. Short the check connector terminal F/P to ground using a jumper wire.

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FUEL SYSTEM [L8, LF]

2. Turn the ignition switch to the ON position to operate the fuel pump.

9. Operate the fuel pump for **10 s**.
10. Measure the fuel line pressure.
    - If not within the specification, inspect the following:
      If it less than the specification:
      — Fuel pump unit
      — Fuel line for clogging or leakage
      If it exceeds the specification:
      — Fuel line clogging

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Fuel line pressure (Reference)
375—450 kPa {3.83—4.58 kgf/cm^2, 54.4—65.2 psi}

11. Stop the fuel pump using the following procedure:
    Using M-MDS
    1. Stop the fuel pump using the “FP” simulation function. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].)
    Without using M-MDS
    1. Turn the ignition switch to off to stop the fuel pump.
12. Measure the fuel hold pressure **after 5 min**.
    - If not within the specification, inspect the following:
      — Fuel line clogging

Fuel hold pressure (Reference)
200 kPa {2.04 kgf/cm^2, 29.0 psi} or more

13. Follow “BEFORE SERVICE PRECAUTION” before performing any work operations to prevent fuel from spilling from the fuel system. (See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)
14. Disconnect the **SST**.
15. Connect the quick release connector to the fuel distributor. (See 01-14-14 QUICK RELEASE CONNECTOR (FUEL SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
16. Complete the “AFTER SERVICE PRECAUTION”. (See 01-14-5 AFTER SERVICE PRECAUTION [L8, LF].)

FUEL SYSTEM [L8, LF]

FUEL TANK REMOVAL/INSTALLATION [L8, LF]

id0114a3801600

Warning

- **Fuel is very flammable liquid. If fuel spills or leaks from the pressurized fuel system, it will cause serious injury or death and facility breakage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedure", while referring to "BEFORE SERVICE PRECAUTION".**
- **Fuel is very flammable liquid. If fuel spills or leaks from the pressurized fuel system, it will cause serious injury or death and facility breakage. Fuel can also irritate skin and eyes. To prevent this, before performing the fuel pump unit removal/installation, always complete the "Fuel Leak Inspection After Fuel Pump Unit Installation".**
- **A person charged with static electricity could cause a fire or explosion, resulting in death or serious injury. Before draining fuel, make sure to discharge static electricity by touching the vehicle body.**

1. Park the vehicle on a level surface.
2. Follow "BEFORE SERVICE PRECAUTION" before performing any work operations to prevent fuel from spilling from the fuel system. (See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)
3. Remove the battery cover.(See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
5. Remove the following parts.
   (1) Middle pipe (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
   (2) Propeller shaft (See 03-15-2 PROPELLER SHAFT REMOVAL/INSTALLATION.)
   (3) Power plant frame (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].) (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].) (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)
   (4) Rear drive shaft (See 03-13-2 REAR DRIVE SHAFT REMOVAL/INSTALLATION)
   (5) Rear differential (See 03-14-5 REAR DIFFERENTIAL REMOVAL/INSTALLATION.)
   (6) Rear crossmember component (See 02-14-15 REAR CROSSMEMBER REMOVAL/INSTALLATION.)
6. Perform the following procedure to remove the service hole cover.
   (1) To remove the back trim, remove the following parts:
      1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
      2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
      3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
      4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
      5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
      6) Front seat bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (2) Remove the back trim. (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (3) Remove the service hole cover.
7. Disconnect the quick release connector using the **SST** from the fuel pump unit. (See 01-14-14 QUICK RELEASE CONNECTOR (FUEL SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
8. Remove the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/INSTALLATION [L8, LF].)
9. Siphon the fuel from the fuel tank.
10. Remove in the order indicated in the table.
11. Install in the reverse order of removal.

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FUEL SYSTEM [L8, LF]

12. Complete the “AFTER SERVICE PRECAUTION”. (See 01-14-5 AFTER SERVICE PRECAUTION [L8, LF].)

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1	Protector (See 01-14-9 Protector Removal Note.)
2	Joint hose (See 01-14-11 Joint Hose Installation Note.)
3	Breather hose (See 01-14-10 Breather Hose Installation Note.)
4	Fuel-filler pipe

5	Fuel-filler cap
6	Evaporative hose
7	Fuel tank (See 01-14-9 Fuel Tank Removal Note.)
8	Insulator (See 01-14-10 Insulator Removal Note.)

Protector Removal Note

1. Remove the trunk side trim. (See 09-17-11 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
2. Remove the protector.

Fuel Tank Removal Note

1. Move the dust cover slightly out of the way.
2. Move the charcoal canister slightly out of the way. (See 01-16-6 CHARCOAL CANISTER REMOVAL/INSTALLATION [L8, LF].)
3. Remove the fuel tank.

FUEL SYSTEM [L8, LF]

Insulator Removal Note

Caution
- **Be careful not to damage the fuel tank when removing the rivet. If the fuel tank is damaged, it may cause fuel leakage.**

Note
- The insulator is installed using rivets.
- When reinstalling the rivet, install the same rivet or M5 bolt and nut.

1. Push out the mandrel using a hammer and punch (**2—2.8 mm {0.08—0.11 in}** diameter).

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2. Remove the flange using a drill (**5 mm {0.20 in}** drill bit).

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Breather Hose Installation Note

1. Install the breather hose and clamp as shown in the figure.

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FUEL SYSTEM [L8, LF]

Joint Hose Installation Note

1. Install the joint hose and clamp as shown in the figure.
2. Install the clamp between the spool and stopper without overlapping the stopper.

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FUEL TANK INSPECTION [L8, LF]

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Note

- The two rollover valves and check valve (two-way) built into the fuel tank and check valves (two-way) built into the rollover valves are inspected in this inspection.

1. Follow “BEFORE SERVICE PRECAUTION” before performing any work operations to prevent fuel from spilling from the fuel system. (See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)
2. Remove the battery cover.(See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Remove the fuel tank with the fuel pump unit. (See 01-14-8 FUEL TANK REMOVAL/INSTALLATION [L8, LF].)
5. Perform the following procedure to verify the fuel tank airtightness.
   (1) Plug the fuel pump unit pipe, port B and port C.
   (2) Apply a pressure of **3 kPa {23 mmHg, 0.9 inHg}** to port A and wait for a while.
   (3) Verify that there is no air leakage from the fuel tank.
      - If there is airflow, replace the fuel tank. (See 01-14-8 FUEL TANK REMOVAL/INSTALLATION [L8, LF].)
6. Plug the fuel pump unit pipe and port B.
7. Level the fuel tank.
8. Apply a pressure of **3 kPa {23 mmHg, 0.9 inHg}** to port C and wait for a while.
9. With the pressure still applied, verify that there is airflow from port A and the pressure is **0— 3 kPa {0—22 mmHg, 0— 0.8 inHg}**.
   - If there is no airflow, replace the fuel tank. (See 01-14-8 FUEL TANK REMOVAL/INSTALLATION [L8, LF].)
10. Apply a pressure of **–0.5 kPa {–3.8 mmHg, –0.1 inHg}** to port C and wait for a while.
11. With the pressure still applied, verify that there is airflow from port A and the pressure is **–0.5— 0 kPa {–3.8— 0 mmHg, –0.2— 0 inHg}.**
    - If there is no airflow, replace the fuel tank. (See 01-14-8 FUEL TANK REMOVAL/INSTALLATION [L8, LF].)
    - If there is airflow, place the fuel tank upside down.
12. Apply a pressure of **3 kPa {23 mmHg, 0.9 inHg}** to port C and wait for a while.
13. With the pressure still applied, verify that there is no airflow from port A.
    - If there is airflow, replace the fuel tank. (See 01-14-8 FUEL TANK REMOVAL/INSTALLATION [L8, LF].)

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FUEL SYSTEM [L8, LF]

NONRETURN VALVE INSPECTION [L8, LF]

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Warning

- **Fuel is very flammable liquid. If fuel spills or leaks from the pressurized fuel system, it will cause serious injury or death and facility breakage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedure", while referring to the "BEFORE SERVICE PRECAUTION".**

1. Follow "BEFORE SERVICE PRECAUTION" before performing any work operations to prevent fuel from spilling from the fuel system. (See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)
2. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Remove the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/INSTALLATION [L8, LF].)
5. Siphon the fuel from the fuel tank.

Note

- Nonreturn valve is integrated in the fuel tank.
- The nonreturn valve is normally closed by the spring force.

6. Verify that the nonreturn valve is closed.
   - If the nonreturn valve is stuck open and dose not open even when pulled up by a finger, replace the fuel tank. (See 01-14-8 FUEL TANK REMOVAL/INSTALLATION [L8, LF].)

FUEL PUMP UNIT REMOVAL/INSTALLATION [L8, LF]

id0114a3800900

Warning

- **Fuel is very flammable liquid. If fuel spills or leaks from the pressurized fuel system, it will cause serious injury or death and facility breakage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedure", while referring to "BEFORE SERVICE PRECAUTION".**

1. Follow "BEFORE SERVICE PRECAUTION" before performing any work operations to prevent fuel from spilling from the fuel system. (See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)
2. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Perform the following procedure to remove the service hole cover.
   (1) To remove the back trim, remove the following parts:
      1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
      2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
      3) Scuff plate (09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
      4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
      5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
      6) Front seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (2) Remove the back trim. (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (3) Remove the service hole cover.
5. Disconnect the quick release connector from the fuel pump unit. (See 01-14-14 QUICK RELEASE CONNECTOR (FUEL SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
6. Disconnect the fuel pump unit connector.

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FUEL SYSTEM [L8, LF]

7. Remove in the order indicated in the table.

1	Plate
2	Packing
3	Fuel pump unit

8. Install in the reverse order of removal.
9. Complete the “AFTER SERVICE PRECAUTION”. (See 01-14-5 AFTER SERVICE PRECAUTION [L8, LF].)

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FUEL PUMP UNIT DISASSEMBLY/ASSEMBLY [L8, LF]

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Warning

- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, do not damage the sealing surface of the fuel pump unit when removing or installing.**

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

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1	E-ring
2	Fuel filter body
3	Fuel pressure regulator

4	Fuel pump
5	Fuel filter (low-pressure)

FUEL SYSTEM [L8, LF]

FUEL PUMP UNIT INSPECTION [L8, LF]

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Warning

- **Fuel is very flammable liquid. If fuel spills or leaks from the pressurized fuel system, it will cause serious injury or death and facility breakage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedure", while referring to "BEFORE SERVICE PRECAUTION".**
- **Fuel is very flammable liquid. If fuel spills or leaks from the pressurized fuel system, it will cause serious injury or death and facility breakage. Fuel can also irritate skin and eyes. To prevent this, before performing the fuel pump unit removal/installation, always complete the "Fuel Leak Inspection After Fuel Pump Unit Installation".**
- **A person charged with static electricity could cause a fire or explosion, resulting in death or serious injury. Before draining fuel, make sure to discharge static electricity by touching the vehicle body.**

Continuity Inspection

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the fuel pump unit connector. (See 01-14-12 FUEL PUMP UNIT REMOVAL/INSTALLATION [L8, LF].)
4. Inspect for continuity between fuel pump unit terminals B and D.
   - If there is no continuity, replace the fuel pump. (See 01-14-13 FUEL PUMP UNIT DISASSEMBLY/ASSEMBLY [L8, LF].)

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QUICK RELEASE CONNECTOR (FUEL SYSTEM) REMOVAL/INSTALLATION [L8, LF]

id0114a3810000

Warning

- **Fuel is very flammable liquid. If fuel spills or leaks from the pressurized fuel system, it will cause serious injury or death and facility breakage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedure", while referring to the "BEFORE SERVICE PRECAUTION".**

Quick Release Connector Type

Caution

- **There are two types of quick release connectors. Verify the type and location, and install/remove properly.**

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FUEL SYSTEM [L8, LF]

Type A Removal

1. Follow “BEFORE SERVICE PRECAUTION” before performing any work operations to prevent fuel from spilling from the fuel system. (See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)

   Caution
   - **The quick release connector may be damaged if the release tab is bent excessively. Do not expand the release tab over the stopper.**

   Note
   - The fuel hose can be removed by pushing it to the pipe side to release the lock.

2. Rotate the release tab on the quick release connector to the stopper position.

   Note
   - The retainer is attached to the fuel pipe even after the connector is disconnected.

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3. Pull out the fuel hose straight from the fuel pipe and disconnect it.

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4. Cover the disconnected quick release connector and fuel pipe with vinyl sheeting or a similar material to prevent it from becoming scratched or dirty.

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FUEL SYSTEM [L8, LF]

Type B Removal

Caution
- **Be careful not to damage the pipe when unlocking the retainer.**

Note
- When removing the quick release connector, either SST 49 E042 001 or 49 N013 103A (Part of 49 N013 1A0D) can be used.

When using SST 49 E042 001

Note
- If the quick release connector is removed, replace the retainer with a new one.

1. Set the SST parallel to the quick release connector.

   Note
   - The quick release connector can be removed by pushing the center of the retainer tabs.
   - The retainer is attached to the pipe even after the connector is disconnected.

2. Hold the center of the retainer tabs with the SST ends and press the retainer.
3. Pull the connector side and disconnect the quick release connector.
4. Raise a retainer tab using the SST and remove the retainer.
5. Cover the disconnected quick release connector and fuel pipe with vinyl sheeting or a similar material to prevent it from scratches or dirt.

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When using SST 49 N013 103A (Part of 49 N013 1A0D)

1. Insert the SST into the quick release connector.
2. Pull out the fuel hose straight from the fuel pipe and disconnect it.
3. Cover the disconnected quick release connector and fuel pipe with vinyl sheeting or a similar material to prevent it from scratches or dirt.

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FUEL SYSTEM [L8, LF]

Type A Installation

Note
- If the quick release connector O-ring is damaged or has slipped, replace the fuel hose.
- A checker tab is integrated with the quick release connector for new fuel hoses and fuel hoses. Remove the checker tab from the quick release connector after the connector is completely engaged with the fuel pipe.

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1. Inspect the fuel hose and fuel pipe sealing surface for damage and deformation.
   - If there is any malfunction, replace it with a new one.
2. Apply a small amount of clean engine oil to the sealing surface of the fuel pipe.
3. Reconnect the fuel hose straight to the fuel pipe until a click is heard.

Note
- If the quick release connector does not move at all, disconnect it, verify that the O-ring is not damaged or has not slipped, and then reconnect the quick release connector.

4. Lightly pull and push the quick release connector a few times by hand, and then verify that it can move **2.0—3.0 mm {0.08—0.12 in}** and is connected securely.
5. Complete the “AFTER SERVICE PRECAUTION”. (See 01-14-5 AFTER SERVICE PRECAUTION [L8, LF].)

Type B Installation

Caution
- **Always replace the retainer with a new one when using SST 49 E042 001, otherwise, fuel leakage could result.**

Note
- If the quick release connector O-ring is damaged or has slipped, replace the piping component.
- A checker tab is integrated with the quick release connector for new fuel hoses and fuel hoses. Remove the checker tab from the quick release connector after the connector is completely engaged with the fuel pipe.

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1. Inspect the fuel hose and fuel pipe sealing surface for damage and deformation.
   - If there is any malfunction, replace it with a new one.
2. Apply a small amount of clean engine oil to the sealing surface of the fuel pipe.
3. Install a new retainer to the quick release connector.
4. Reconnect the hose straight to the pipe until a click is heard.
5. Lightly pull and push the quick release connector a few times by hand, and then verify that it is connected securely.

FUEL SYSTEM [L8, LF]

FUEL INJECTOR REMOVAL/INSTALLATION [L8, LF]

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Warning

- **Fuel is very flammable liquid. If fuel spills or leaks from the pressurized fuel system, it will cause serious injury or death and facility breakage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedure", while referring to the "BEFORE SERVICE PRECAUTION".**

1. Follow "BEFORE SERVICE PRECAUTION" before performing any work operations to prevent fuel from spilling from the fuel system. (See 01-14-4 BEFORE SERVICE PRECAUTION [L8, LF].)
2. Remove the plug hole plate. (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF].)
3. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
5. Disconnect the fuel injector connector and move the harness slightly out of the way.
6. Remove in the order indicated in the table.

1	Quick release connector (Type A) (See 01-14-14 QUICK RELEASE CONNECTOR (FUEL SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
2	Fuel distributor
3	Injector clip (See 01-14-18 Fuel Injector Removal Note.)
4	Fuel injector (See 01-14-19 Fuel Injector Installation Note.)

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7. Install in the reverse order of removal.
8. Complete the "AFTER SERVICE PRECAUTION". (See 01-14-5 AFTER SERVICE PRECAUTION [L8, LF].)

Fuel Injector Removal Note

Caution

- **Use of a deformed injector clip will cause the fuel injector to be connected incorrectly and could result in fuel leakage. It will also cause the injector to rotate. Therefore, always replace the clip when the injector is removed.**

1. Insert a flathead screwdriver between the injector cup and clip finger.

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Note

- When pushing the clip finger outward, deform the finger until it is removed completely from the cup notch.

2. Push the clip finger outward using a flathead screwdriver.
3. Remove the injector with the clip.

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FUEL SYSTEM [L8, LF]

4. Remove the clip from the fuel injector using the following procedure:

Note
- The clip will not be reused.

(1) Hold the clip using pliers.
(2) Pull the clip parallel to the injector groove and remove it from the injector.

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Fuel Injector Installation Note
1. Apply a small amount of clean oil to the injector groove and the O-ring.
2. Temporarily attach a new clip to the injector groove.

Note
- When the clip is attached correctly, the central area of the injector and the clip finger positions are aligned.

3. Hold the injector firmly and push the clip into the injector until the clip stops sliding.
4. Verify that the injector connector position is correct.
5. Press the injector into the injector cup. Continue pressing until the clip contacts the lower surface of the injector cup.
6. Verify that the injector and clip are correctly installed with the clip locked onto the injector cup notch.

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FUEL INJECTOR INSPECTION [L8, LF]

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Resistance Inspection
1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the fuel injector connector.
4. Inspect the resistance between fuel injector terminals A and B.
   - If not within the specification, replace the fuel injector. (See 01-14-18 FUEL INJECTOR REMOVAL/INSTALLATION [L8, LF].)

Fuel injector resistance
11.4—12.6 ohms [20 °C {68 °F}]

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01-15 EXHAUST SYSTEM [L8, LF]

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Seal Ring Installation Note **01-15–5**

EXHAUST SYSTEM [L8, LF]

EXHAUST SYSTEM INSPECTION [L8, LF]

1. Start the engine and inspect each exhaust system component for exhaust gas leakage.
   - If there is leakage, repair or replace the appropriate component.

EXHAUST SYSTEM [L8, LF]

EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF]

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Warning

- **A hot engine and exhaust system can cause severe burns. Turn off the engine and wait until they are cool before servicing the exhaust system.**

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

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1	Main silencer
2	Under guard (LF MT)
3	Insulator (LF MT)
4	Member bracket (MT)
5	Tunnel member
6	Middle pipe
7	Seal ring (See 01-15-4 Seal Ring Removal Note.) (See 01-15-5 Seal Ring Installation Note.)
8	Exhaust manifold insulator (upper) (See 01-15-4 Exhaust Manifold Insulator (Upper) Removal Note.)

9	Exhaust manifold insulator (lower)
10	Exhaust manifold bracket
11	Exhaust manifold (See 01-15-4 Exhaust Manifold Removal Note.)
12	HO2S (See 01-40-30 HEATED OXYGEN SENSOR (HO2S) REMOVAL/INSTALLATION [L8, LF].)
13	A/F sensor (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)

EXHAUST SYSTEM [L8, LF]

Exhaust System Insulator Removal/installation Note

1. Remove the exhaust system insulator in the order shown in the figure.
2. Install in the reverse order of removal.

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1	Insulator (rear)
2	Insulator (middle)
3	Insulator (front)

Insulator (Rear) Removal Note

Note

- The insulator (rear) are installed using rivets.

1. Push out the mandrel using a hammer and punch (2—2.8 mm {0.08—0.11 in} diameter).

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EXHAUST SYSTEM [L8, LF]

2. Remove the flange using a drill (5 mm {0.20 in} drill bit).

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Seal Ring Removal Note

1. Remove the seal ring using a flathead screwdriver being careful not to damage the pipe.

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Exhaust Manifold Insulator (Upper) Removal Note

1. Remove the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the drive belt. (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].)
3. Remove the under cover. (See 02-13-19 TRANSVERSE MEMBER REMOVAL/INSTALLATION.)
4. Remove the suspension tower bar (joint) and (right side). (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
5. Remove the generator. (See 01-17-5 GENERATOR REMOVAL/INSTALLATION [L8, LF].)
6. Remove the insulator.

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Exhaust Manifold Removal Note

1. Disconnect the A/F sensor connector and HO2S connector.
2. Move the water pipe and heater hose slightly out of the way.
3. Disconnect the ventilation hose from the cylinder head. (See 01-16-12 QUICK RELEASE CONNECTOR (EMISSION SYSTEM) REMOVAL/INSTALLATION [L8, LF].)

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EXHAUST SYSTEM [L8, LF]

Middle pipe Installation Note

1. Spray carbon remover (TB6601 or equivalent) on the flared section of the middle pipe.
2. Remove the carbon adhering to the flared section shown in the figure using a nylon brush or sandpaper (No. 400 or equivalent).

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Seal Ring Installation Note

Caution

- **If installation is performed without using the SST, the seal ring will be damaged and deformed, resulting in an incorrect installation. Always use the SST to install the seal ring.**

1. Temporarily install the seal ring to the pipe so that the seal ring is even with the flange.

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2. Install the SST to the seal ring so that the SST is even with the flange.

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3. Press in the seal ring by tapping the SST using a plastic hammer until the seal ring contacts the flange.

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01-16 EMISSION SYSTEM [L8, LF]

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EMISSION SYSTEM [L8, LF]

EMISSION SYSTEM LOCATION INDEX [L8, LF]

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Engine Compartment Side
Except 6MT

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EMISSION SYSTEM [L8, LF]

6MT

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1	Quick release connector (See 01-16-12 QUICK RELEASE CONNECTOR (EMISSION SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
2	PCV valve (See 01-16-11 POSITIVE CRANKCASE VENTILATION (PCV) VALVE REMOVAL/INSTALLATION [L8, LF].) (See 01-16-12 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION [L8, LF].)
3	EGR valve (See 01-16-9 EGR VALVE REMOVAL/INSTALLATION [L8, LF].) (See 01-16-10 EGR VALVE INSPECTION [L8, LF].)

4	Quick release connector (See 01-16-12 QUICK RELEASE CONNECTOR (EMISSION SYSTEM) REMOVAL/INSTALLATION [L8, LF].)
5	Purge solenoid valve (See 01-16-7 PURGE SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].) (See 01-16-8 PURGE SOLENOID VALVE INSPECTION [L8, LF].)
6	Quick release connector (See 01-16-12 QUICK RELEASE CONNECTOR (EMISSION SYSTEM) REMOVAL/INSTALLATION [L8, LF].)

EMISSION SYSTEM [L8, LF]

Exhaust System Side

1	WU-TWC
2	TWC

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Fuel Tank Side

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1	Fuel-filler cap
2	Charcoal canister (See 01-16-6 CHARCOAL CANISTER REMOVAL/INSTALLATION [L8, LF].) (See 01-16-6 CHARCOAL CANISTER INSPECTION [L8, LF].)
3	Evaporative chamber (See 01-16-5 EVAPORATIVE CHAMBER REMOVAL/INSTALLATION [L8, LF].) (See 01-16-6 EVAPORATIVE CHAMBER INSPECTION [L8, LF].)
4	Rollover valve (See 01-16-8 ROLLOVER VALVE REMOVAL/INSTALLATION [L8, LF].) (See 01-16-8 ROLLOVER VALVE INSPECTION [L8, LF].)
5	Check valve (two-way) (See 01-16-8 CHECK VALVE (TWO-WAY) REMOVAL/INSTALLATION [L8, LF].) (See 01-16-8 CHECK VALVE (TWO-WAY) INSPECTION [L8, LF].)

EMISSION SYSTEM [L8, LF]

EMISSION SYSTEM DIAGRAM [L8, LF]

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EVAPORATIVE CHAMBER REMOVAL/INSTALLATION [L8, LF]

id0116a3809800

1. Disconnect the evaporative hose.
2. Remove the evaporative chamber.
3. Cover the evaporative hose with vinyl sheets or the like to prevent them from being scratched or contaminated with foreign material.
4. Install in the reverse order of removal.

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EMISSION SYSTEM [L8, LF]

EVAPORATIVE CHAMBER INSPECTION [L8, LF]

id0116a3804700

Aieflow Inspection

1. Remove the evaporative chamber. (See 01-16-5 EVAPORATIVE CHAMBER REMOVAL/INSTALLATION [L8, LF].)
2. Blow from port A and verify that there is airflow from port B.
   - If not as specified, replace the evaporative chamber. (See 01-16-5 EVAPORATIVE CHAMBER REMOVAL/INSTALLATION [L8, LF].)

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CHARCOAL CANISTER REMOVAL/INSTALLATION [L8, LF]

id0116a3803900

1. Remove in the order indicated in the table.

1	Evaporative hose
2	Charcoal canister

2. Install in the reverse order of removal.

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CHARCOAL CANISTER INSPECTION [L8, LF]

id0116a3800500

Airflow Inspection

1. Remove the charcoal canister. (See 01-16-6 CHARCOAL CANISTER REMOVAL/INSTALLATION [L8, LF].)
2. Perform the following procedures:
   - Assemble the hose used for inspection (bore: **approx. 5.8 mm {0.23 in}**) to port A.
   - Cover ports B and C with the caps.

Caution

- **Do not apply a pressure 20kPa {150 mmHg, 5.91 inHg} or more to the charcoal canister for 1 min. or more. Doing so will damage the charcoal canister.**

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3. Apply pressure (**19.6 kPa {147 mmHg, 5.79 inHg**}) through the hose, and verify that air does not leak from the charcoal canister.
   - If there is airflow, replace the chacoal canister. (See 01-16-6 CHARCOAL CANISTER REMOVAL/INSTALLATION [L8, LF].)

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EMISSION SYSTEM [L8, LF]

PURGE SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF]

id0116a3804300

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)

Except 6MT

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6MT

1	Connector
2	Vacuum hose (to dynamic chamber) (See 01-16-7 Vacuum Hose Installation Note.)
3	Evaporative hose (to charcoal canister) (See 01-16-7 Evaporative Hose Installation Note.)
4	Purge solenoid valve
5	Bracket

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3. Install in the reverse order of removal.

Evaporative Hose Installation Note

1. Fit the evaporative hose onto the respective fittings, and install clamps as shown.
   (1) Insert the evaporative hose securely to the nipple.
   (2) Inspect the evaporative hose for damage and deformation.

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Vacuum Hose Installation Note

1. Fit the vacuum hose onto the respective fittings, and install clamps as shown.
   (1) Insert the vacuum hose securely to the nipple.
   (2) Inspect the vacuum hose for damage and deformation.

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EMISSION SYSTEM [L8, LF]

PURGE SOLENOID VALVE INSPECTION [L8, LF]

id0116a3800900

Airflow Inspection

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the purge solenoid valve without disconnecting the evaporative hose. (See 01-16-7 PURGE SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].)
4. Verify that the airflow is as indicated in the table.

Measured condition	Continuity between A—B
When voltage is not applied between terminals A and B	No airflow
When voltage is applied between terminals A and B	Airflow detected

- If not as specified in the table, replace the purge solenoid valve. (See 01-16-7 PURGE SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].)

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ROLLOVER VALVE REMOVAL/INSTALLATION [L8, LF]

id0116a3804600

Note
- The rollover valve cannot be removed as it is built into the fuel tank.

ROLLOVER VALVE INSPECTION [L8, LF]

id0116a3804500

Note
- The rollover valve cannot be removed and inspected as it is built into the fuel tank.

1. Perform the fuel tank inspection. (See 01-14-11 FUEL TANK INSPECTION [L8, LF].)
   - If malfunction, replace the fuel tank. (See 01-14-8 FUEL TANK REMOVAL/INSTALLATION [L8, LF].)

CHECK VALVE (TWO-WAY) REMOVAL/INSTALLATION [L8, LF]

id0116a3099700

Note
- The check valve (two-way) cannot be removed as it is built into the fuel tank.

CHECK VALVE (TWO-WAY) INSPECTION [L8, LF]

id0116a3093700

Note
- The check valve (two-way) cannot be removed and inspected as it is built into the fuel tank.

1. Perform the fuel tank inspection. (See 01-14-11 FUEL TANK INSPECTION [L8, LF].)
   - If malfunction, replace the fuel tank. (See 01-14-8 FUEL TANK REMOVAL/INSTALLATION [L8, LF].)

EMISSION SYSTEM [L8, LF]

EGR VALVE REMOVAL/INSTALLATION [L8, LF]

id0116a3801000

1. Remove the plug hole plate. (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF].)
2. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Drain the engine coolant from the radiator. (See 01-12-4 ENGINE COOLANT REPLACEMENT [L8, LF].)
5. Remove the following parts:
   (1) Suspension tower bar (joint), (right side) and (left side) (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
   (2) Wiper arm and blade (See 09-19-3 WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
   (3) Cowl grille (See 09-16-5 COWL GRILLE REMOVAL/INSTALLATION.)
   (4) Side cowl grille (See 09-16-5 SIDE COWL GRILLE REMOVAL/INSTALLATION.)
   (5) Move the cooler pipe No.3 and heater pipe slightly out of the way. (L.H.D.)

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   (6) Service hole cover

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6. Remove the harness bracket.

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EMISSION SYSTEM [L8, LF]

7. Disconnect the heater hose and move the heater hose slightly out of the way. (L.H.D.)
8. Disconnect the EGR valve connector.

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9. Set the **SST** to the EGR valve installation bolt.

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10. Remove both EGR valve installation bolts.
11. Remove the EGR valve with the engine coolant hose.
12. Disconnect the engine coolant hose from the EGR valve.
13. Replace the EGR valve gasket.
14. Install in the reverse order of removal.

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EGR VALVE INSPECTION [L8, LF]

id0116a3801100

Resistance Inspection

1. Disconnect the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the EGR valve connector. (See 01-16-9 EGR VALVE REMOVAL/INSTALLATION [L8, LF].)
4. Measure the resistance between the EGR valve terminals.

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EGR valve terminal	Resistance (ohm)
C—E C—A D—B D—F	12—16

- If not within the specification, replace the EGR valve. (See 01-16-9 EGR VALVE REMOVAL/INSTALLATION [L8, LF].)

EMISSION SYSTEM [L8, LF]

POSITIVE CRANKCASE VENTILATION (PCV) VALVE REMOVAL/INSTALLATION [L8, LF]

id0116a3819800

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF])
3. Remove the dynamic chamber. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
4. Remove in the order indicated in the table.

1	Oil separator
2	Retainer (See 01-16-11 Retainer Removal Note.) (See 01-16-11 Retainer Installation Note.)
3	PCV valve

5. Install in the reverse order of removal.

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Retainer Removal Note

Caution

- **Be sure to follow the removal procedures below to prevent the leakage of blow-by gas caused by the damage to the tab of the oil separator or the oil separator itself.**

1. Insert a flat blade screwdriver with its tip wrapped in a waste cloth into the gap between the retainer and the oil separator as shown in the figure.
2. Spread the side surface of the retainer outward to dismount it with attention to the tab.

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Retainer Installation Note

Caution

- **Be sure to replace the old retainer with a new one to prevent the escape of blow-by gas. Reinstalling the old retainer will reduce airtightness.**

1. Make sure that the retainer alignment mark is directed as shown in the left diagram before install the retainer to the oil separator.

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EMISSION SYSTEM [L8, LF]

POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION [L8, LF]

id0116a3800400

Airflow Inspection

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the intake manifold and the fuel distributor component as a single unit. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
4. Remove the PCV valve and the oil separator as a single unit. (See 01-16-11 POSITIVE CRANKCASE VENTILATION (PCV) VALVE REMOVAL/INSTALLATION [L8, LF].)
5. Verify that there is no airflow when pressure is applied to port A.
   - If there is airflow, replace the PCV valve. (See 01-16-11 POSITIVE CRANKCASE VENTILATION (PCV) VALVE REMOVAL/INSTALLATION [L8, LF].)
6. Verify that there is airflow when vacuum is applied to port A.
   - If there is no airflow, replace the PCV valve. (See 01-16-11 POSITIVE CRANKCASE VENTILATION (PCV) VALVE REMOVAL/INSTALLATION [L8, LF].)

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QUICK RELEASE CONNECTOR (EMISSION SYSTEM) REMOVAL/INSTALLATION [L8, LF]

id0116a3805500

Quick Release Connector Type

Caution

- **There are three types of quick release connectors. Verify the type and location, and install/remove properly.**

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EMISSION SYSTEM [L8, LF]

Type A Removal

Caution
- **The quick release connector may be damaged if the release tab is bent excessively. Do not expand the release tab over the stopper.**

Note
- The evaporative hose can be removed by pushing it to the evaporative pipe side to release the lock.

1. Rotate the release tab on the quick release connector to the stopper position.

Note
- The retainer is attached to the evaporative pipe even after the connector is disconnected.

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2. Pull out the evaporative hose straight from the evaporative pipe and disconnect it.

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3. Cover the disconnected quick release connector and evaporative pipe with vinyl sheeting or a similar material to prevent it from scratches or dirt.

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EMISSION SYSTEM [L8, LF]

Type B Removal

1. Squeeze the release tab until the locks are released.

   Note
   - The retainer has two internal locking tabs which retain the evaporative pipe. Be sure that the squeezing place on the retainer is squeezed until it can be released from the evaporative pipe.

2. Pull the quick release connector straight outward.

   Note
   - The retainer is attached to the evaporative pipe even after the connector is disconnected.

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3. Cover the disconnected quick release connector and evaporative pipe with vinyl sheeting or a similar material to prevent it from becoming scratched or dirty.

Type C Removal

Caution
- **Be careful not to damage the pipe when unlocking the retainer.**

Note
- When removing the quick release connector, either SST 49 E042 001 or 49 N013 103A (Part of 49 N013 1A0D) can be used.

When using SST 49 E042 001

Note
- If the quick release connector is removed, replace the retainer with a new one.

1. Set the SST parallel to the quick release connector.

   Note
   - The quick release connector can be removed by pushing the center of the retainer tabs.
   - The retainer is attached to the pipe even after the connector is disconnected.

2. Hold the center of the retainer tabs with the SST ends and press the retainer.
3. Pull the connector side and disconnect the quick release connector.

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EMISSION SYSTEM [L8, LF]

4. Raise a retainer tab using the SST and remove the retainer.
5. Cover the disconnected quick release connector and evaporative pipe with vinyl sheeting or a similar material to prevent it from scratches or dirt.

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When using SST 49 N013 103A (Part of 49 N013 1A0D)

1. Insert the SST into the quick release connector.
2. Pull out the evaporative hose straight from the evaporative pipe and disconnect it.
3. Cover the disconnected quick release connector and evaporative pipe with vinyl sheeting or a similar material to prevent it from scratches or dirt.

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Type A Installation

Note

- If the quick release connector O-ring is damaged or has slipped, replace the evaporative hose.
- A checker tab is integrated with the quick release connector for new evaporative hoses. Remove the checker tab from the quick release connector after the connector is completely engaged with the evaporative pipe.

1. Inspect the evaporative hose and evaporative pipe sealing surface for damage and deformation.
   - If there is any malfunction, replace it with a new one.
2. Apply a small amount of clean engine oil to the sealing surface of the evaporative pipe.
3. Reconnect the evaporative hose straight to the evaporative pipe until a click is heard.

Note

- If the quick release connector does not move at all, disconnect it, verify that the O-ring is not damaged or has not slipped, and then reconnect the quick release connector.

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4. Lightly pull and push the quick release connector a few times by hand, and then verify that it can move **2.0—3.0 mm {0.08—0.12 in}** and is connected securely.

EMISSION SYSTEM [L8, LF]

Type B Installation

Note
- If the quick release connector O-ring is damaged or has slipped, replace the evaporative hose.
- When replacing with a new evaporative hose, disengage the release tabs from the join port.
- A checker tab is integrated with the quick release connector for new evaporative hoses. Remove the checker tab from the quick release connector after the connector is completely engaged with the evaporative pipe.

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1. When newly replacing the quick release connector, remove the release tab using the following procedure.
   (1) Widen the retainer lock using a flathead screwdriver, then pull out the release tab from the evaporative pipe and remove it.
2. Inspect the quick release connector and evaporative pipe sealing surface for damage and deformation.
   - If there is any malfunction, replace it with a new one.
3. Apply a small amount of clean engine oil to the sealing surface of the evaporative pipe.
4. Reconnect the quick release connector straight to the evaporative pipe until a click is heard.

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Note
- If the quick release connector does not move at all, disconnect it, verify that the O-ring is not damaged or has not slipped, and then reconnect the quick release connector.

5. Lightly pull and push the quick release connector a few times by hand, and then verify that it is connected securely.

EMISSION SYSTEM [L8, LF]

Type C Installation

Caution

- **Always replace the retainer with a new one when using SST 49 E042 001, otherwise, evaporative leakage could result.**

Note

- If the quick release connector O-ring is damaged or has slipped, replace the piping component.
- A checker tab is integrated with the quick release connector for new evaporative hoses and evaporative hoses. Remove the checker tab from the quick release connector after the connector is completely engaged with the evaporative pipe.

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1. Inspect the evaporative hose and evaporative pipe sealing surface for damage and deformation.
   - If there is any malfunction, replace it with a new one.
2. Apply a small amount of clean engine oil to the sealing surface of the evaporative pipe.
3. Install a new retainer to the quick release connector.
4. Reconnect the hose straight to the pipe until a click is heard.
5. Lightly pull and push the quick release connector a few times by hand, and then verify that it is connected securely.

01-17 CHARGING SYSTEM [L8, LF]

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CHARGING SYSTEM [L8, LF]

CHARGING SYSTEM LOCATION INDEX [L8, LF]

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1	Battery (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].) (See 01-17-3 BATTERY INSPECTION [L8, LF].) (See 01-17-4 BATTERY RECHARGING [L8, LF].)

2	Generator (See 01-17-5 GENERATOR REMOVAL/ INSTALLATION [L8, LF].) (See 01-17-6 GENERATOR INSPECTION [L8, LF].) (See 01-17-11 GENERATOR DISASSEMBLY/ ASSEMBLY [L8, LF].)

CHARGING SYSTEM [L8, LF]

BATTERY REMOVAL/INSTALLATION [L8, LF]

id0117a6800500

Warning

- **For vehicles with DSC, if the negative battery cable is disconnected, the stored initial position of the steering angle sensor will be cleared and the DSC will not operate properly, making the vehicle unsafe to drive. Perform the steering angle sensor initialization procedure after connecting the negative battery cable.**

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. Perform the steering angle sensor initialization procedure. (See 04-15-15 STEERING ANGLE SENSOR INITIALIZATION PROCEDURE.)

1	Battery cover (See 01-17-2 Battery Cover Removal Note.)
2	Negative battery cable (See 01-17-3 Negative Battery Cable Installation Note.)
3	Positive battery cable
4	Battery clamp
5	Battery
6	Battery box
7	Battery tray
8	Battery duct (See 01-17-3 Battery Duct Removal Note.)

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Battery Cover Removal Note

1. Remove the rubber hose from the battery cover.

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2. Remove the battery cover from its right side.

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CHARGING SYSTEM [L8, LF]

Battery Duct Removal Note

1. Remove the front under cover. (See 09-16-20 FRONT UNDER COVER REMOVAL/INSTALLATION.)
2. Remove the battery duct.

Negative Battery Cable Installation Note

1. When connecting the negative battery cable to the battery, connect the negative battery cable and the ground cable as shown in the figure.

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BATTERY INSPECTION [L8, LF]

id0117a6800600

Warning

- **Since battery acid is toxic, be careful when handling the battery.**
- **Since battery acid is highly corrosive, be careful not to allow it to contact clothing or the vehicle.**
- **In case battery acid contacts skin, eyes, or clothing, flush it immediately with running water. Especially if the acid gets in the eyes, flush with water for more than 15 min and get prompt medical attention.**

Electrolyte Specific Gravity

1. Measure the electrolyte specific gravity using a hydrometer.
   - If it is less than the specification, recharge the battery. (See 01-17-4 BATTERY RECHARGING [L8, LF].)

Battery electrolyte specific gravity [20 °C {68 °F}]
1.22—1.29

Battery Voltage

1. Inspect the battery as follows:

Step	Inspection		Action
1	Measure the battery positive voltage.	12.4 V or more	Go to Step 3.
		Less than 12.4 V	Go to the next step.
2	Quick charge for **30 min** and recheck voltage.	12.4 V or more	Go to the next step.
		Less than 12.4 V	Replace the battery.
3	Using the battery load tester, apply load current (see battery load test current) and record battery voltage after **15 s**. Is voltage more than the specification?	Yes	Normal
		No	Replace the battery.

Battery load test current
46B24L (36): 135 A

Standard specification

Battery temp. (°C {°F})	Minimum voltage (V)
4 {39}	9.3
10 {50}	9.4
16 {61}	9.5
21 {70}	9.6

CHARGING SYSTEM [L8, LF]

Back-up Current

1. Verify that the ignition switch is off (key has been removed) and that all doors are closed.
2. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)

Caution
- **Operating electrical loads while the back-up current is being measured can damage the tester.**

Note
- If the battery is not left undisturbed for **30 min**, the tester will indicate a high value (**approx. 300 mA**).
- If the key or any electrical accessory is operated within **approx. 30 min** after the tester is connected, the battery must be left undisturbed for **approx. 30 min** from that point.
- For vehicles with the immobilizer system, the system periodically shifts synchronization of the security light flashing. Therefore, **45 mA (0.1 s)** current is supplied when the security light is illuminated, and **25 mA (2 s)** current is supplied when the security light is not illuminated. In addition, the measuring instrument, which shows the average value, indicates around **30 mA**.

4. Connect the tester between the negative battery terminal and negative battery cable, leave the battery undisturbed for **30 min**, and then measure the back-up current.
   - If not within the specification, measure the back-up current while removing the fuses one by one from the inside of the main fuse block and the inside of the fuse block.
   - Inspect and repair wiring harnesses and connectors of the fuse where the current has decreased.

Battery back-up current (When the ignition switch is off, the ignition key is removed, and all doors are closed.)
25—45 mA

BATTERY RECHARGING [L8, LF]

id0117a6800700

Warning
- **Keep all flames away from the battery, otherwise evaporated gas from the battery fluid may catch fire, and cause serious injury.**
- **Remove the battery filler caps when recharging to prevent battery deformation or damage.**

Caution
- **Do not quick charge for more than 30 min. It will damage the battery.**

1. Remove the battery and then place it in a pan of water.
2. Remove the battery filler caps.
3. Connect a battery charger to the battery and adjust the charging current as follows.

Battery slow charge current
46B24L (36): 3.5—4.5 A

Battery quick charge current [30 min]
46B24L (36): 25 A

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4. After the battery is recharged, verify that the voltage is within the specification and remains at the same value for **1 h or more** after the recharging has been completed.
   - If not within the specification, replace the battery.

Standard voltage
12.4 V or more

CHARGING SYSTEM [L8, LF]

GENERATOR REMOVAL/INSTALLATION [L8, LF]

id0117a6800200

Warning

- **Remove and install all parts when the engine is cold, otherwise they can cause severe burns or serious injury.**
- **When the battery cables are connected, touching the vehicle body with generator terminal B will generate sparks. This can cause personal injury, fire, and damage to the electrical components. Always disconnect the negative battery cable before performing the following operation.**

Caution

- **The generator can be damaged by the heat from the exhaust manifold. Make sure the generator duct is installed securely.**

1. Remove the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the drive belt. (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

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1	P/S pressure hose bracket
2	Generator bracket
3	Generator duct

4	Terminal B cable
5	Generator connector
6	Generator (See 01-17-5 Generator Installation Note.)

Generator Installation Note

1. Tighten bolt A temporarily.
2. Tighten bolt B, C to the specified tightening torque.
3. Tighten bolt A to the specified tightening torque.

CHARGING SYSTEM [L8, LF]

GENERATOR INSPECTION [L8, LF]

id0117a6800300

Caution
- **Do not apply direct battery positive voltage to generator terminal D, otherwise it could cause damage to the internal parts (power transistor) of the generator.**

Generator Warning Light
1. Verify that the battery is fully charged.
2. Verify that the drive belt is correct. (See 01-10-5 DRIVE BELT INSPECTION [L8, LF].)
3. With the ignition switch turned to the ON position, verify that the generator warning light illuminates.
   - If it does not illuminate, inspect the generator warning light and the wiring harness.
     — If the generator warning light and the wiring harness are normal, inspect the PCM.
4. Verify that the generator warning light goes out after the engine is started.
   - If the generator warning light does not go out, perform the DTC inspection, then perform troubleshooting according to the corresponding diagnostic procedure. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) (See 01-02-12 DTC TABLE [L8, LF].)

Generator
Voltage
1. Verify that the battery is fully charged.
2. Verify that the drive belt is correct. (See 01-10-5 DRIVE BELT INSPECTION [L8, LF].)
3. Turn off all electrical loads.
4. Start the engine.
5. Verify that the generator rotates smoothly without any noise while the engine is running.
   - If there is any noise, find the cause and repair or replace the generator.
6. Measure the voltage at each terminal using a tester.
   - If it is not as specified, find the cause and repair or replace the applicable part.

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Generator standard voltage [IG-ON]
Terminal B: B+
Terminal P: Approx. 1 V or less
Terminal D: Approx. 0 V

Generator standard voltage [Idle, 20 °C {68 °F}]
Terminal B: 13—15 V
Terminal P: Approx. 3—8 V
Terminal D: Turn the electrical loads (headlights, blower motor, rear window defroster, brake lights, etc.) on and verify that the voltage reading increases.

Current

Note
- Since the charging current decreases rapidly after starting the engine, carry out the following procedure quickly, and read the maximum current value.

1. Verify that the battery is fully charged.
2. Verify that the drive belt is correct. (See 01-10-5 DRIVE BELT INSPECTION [L8, LF].)
3. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Disconnect the negative battery cable.
5. Connect a tester, which can read **120 A or more,** between generator terminal B and the wiring harness.
6. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
7. Turn off all electrical loads.
8. Start the engine.
9. Increase engine speed to **2,500 rpm**.

Note
- When the electrical load on the vehicle is low, the specified current cannot be verified although the generator is normal. In this case, increase the electrical load (Leave the headlights turned on for a while, then discharge the battery, or use a similar method.) and recheck.
- When the generator itself or the ambient temperature are too high, the specified current also cannot be verified. In this case, cool down the generator and recheck.

CHARGING SYSTEM [L8, LF]

10. Turn the electrical loads (headlights, blower motor, rear window defroster, brake lights, etc.) on and verify that the current reading increases more than the minimum value indicated below.
    —If it is not as specified, go to the PCM and generator shearing inspection. (See 01-17-7 PCM and generator shearing inspection.)

    Generator generated current minimum value
    70 % of the nominal output current (nominal output current: 100 A)
    [Ambient temp. 20 °C {68 °F}, voltage 13.0—15.0 V, both engine and generator are hot]

PCM and generator shearing inspection

1. Connect the M-MDS to the DLC-2.
2. Inspect as follows:

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Step	Inspection		Action
1	Measure the generator terminal B voltage when the electrical loads*1 are on and off.	15 V or more	Go to Step 2.
		13—15 V	Normal*2
		13 V or less	Go to Step 3.
2	Monitor the ALTT V PID using the M-MDS, (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) or measure the PCM 2AJ terminal waveform using an oscilloscope. (See 01-40-9 PCM INSPECTION [L8, LF].) Is the value normal?	Yes	Go to Step 4.
		No	Inspect followings, then repair or replace as necessary. • If there is no malfunction, replace the PCM. 1. Wiring harness between PCM terminal 2AJ-generator terminal P. 2. Wiring harness between PCM terminal 2AI-generator terminal D. 3. Generator inner parts.

CHARGING SYSTEM [L8, LF]

Step	Inspection		Action
3	Monitor the ALTT V PID using the M-MDS, (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) or measure the PCM 2AJ terminal waveform using an oscilloscope. (See 01-40-9 PCM INSPECTION [L8, LF].) Is the value normal?	Yes	Go to Step 5.
		No	Inspect followings, then repair or replace as necessary. • If there is no malfunction, replace the PCM. 1. Wiring harness between PCM terminal 2AJ-generator terminal P. 2. Wiring harness between PCM terminal 2AI-generator terminal D. 3. Generator inner parts.
4	Monitor the ALTF PID using the M-MDS, or calculate the duty value of the PCM terminal 2AI using an oscilloscope. Is the duty value 100%? $\frac{A}{B}$ x 100 (%) = DUTY (%)	Yes	Replace PCM.
		No	Inspect followings, then repair or replace as necessary. • If there is no malfunction, replace the PCM. 1. Wiring harness between PCM terminal 2AI-generator terminal D. 2. Generator inner parts.
5	Monitor the ALTF PID using the M-MDS, or calculate the duty value of the PCM terminal 2AI using an oscilloscope. Is the duty value 0%? $\frac{A}{B}$ x 100 (%) = DUTY (%)	Yes	Replace PCM.
		No	Inspect followings, then repair or replace as necessary. • If there is no malfunction, replace the PCM. 1. Wiring harness between PCM terminal 2AI-generator terminal D. 2. Generator inner parts.

*1 : Headlights, blower motor, rear window defroster, brake lights, etc.
*2 : If the generator field coil duty value does not change when electrical loads (such as headlights, blower motor, rear window defroster, brake lights) are on or off, inspection with discharged battery is needed.

CHARGING SYSTEM [L8, LF]

Generator Inner Parts

Rotor

1. Measure the resistance between the slip rings using a tester.
   - If not within the specification, replace the rotor.

   Generator rotor resistance (between slip rings) [20 °C {68 °F}]
   1.9—2.2 ohm

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2. Verify that there is no continuity between the slip ring and core using a tester.
   - If there is continuity, replace the rotor.
3. Inspect the slip ring surface condition.
   - If the slip ring surface is rough, use a lathe or fine sandpaper to smooth it.

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Stator coil

1. Verify that the continuity is as indicated in the table.

○—○ : Continuity

Terminal					
1	2	3	4	5	6
○—○					
○—	—	—○			
	○—	—○			
			○—	—○	
			○—	—	—○
				○—	—○

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   - If there is any malfunction, replace the stator.

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2. Verify that there is no continuity between the stator coil leads and core using a tester.
   - If there is continuity, replace the stator coil.

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CHARGING SYSTEM [L8, LF]

Brush

1. Inspect brushes for wear.
   - If any brush is worn almost to or beyond the limit, replace all of the brushes.

   Generator brush length
   Standard: 22.5 mm {0.89 in}
   Minimum: 5.0 mm {0.20 in}

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Brush spring

1. Measure the force of the brush spring using a spring pressure gauge.
2. Read the spring pressure gauge at the brush tip projection of **2 mm {0.079 in}**.
   - Replace the brush spring if necessary.

   Generator brush spring force
   Standard: 4.1—5.3 N {0.42—0.54 kgf, 0.92—1.19 lbf}
   Minimum: 1.7 N {0.17 kgf, 0.38 lbf}

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Rectifier (Using an analog circuit tester)

1. Inspect for continuity of the diodes using an analog circuit tester.
   - If not as specified, replace the rectifier.

Specification

Negative	Positive	Continuity
E	P1, P2, P3, P4, P5, P6	Yes
B		No
P1, P2, P3, P4, P5, P6	E	No
	B	Yes

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Rectifier (Using a digital circuit tester)

1. Inspect for continuity of the diodes using a digital circuit tester.
   - If not as specified, replace the rectifier.

Specification

Negative	Positive	Continuity
E	P1, P2, P3, P4, P5, P6	No
B		Yes
P1, P2, P3, P4, P5, P6	E	Yes
	B	No

Bearing

1. Inspect for abnormal noise, looseness, and sticking.
   - Replace the bearing if necessary.

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CHARGING SYSTEM [L8, LF]

GENERATOR DISASSEMBLY/ASSEMBLY [L8, LF]

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Caution

- **Melt the solder quickly, otherwise the diodes (rectifier) and regulator will be damaged by excessive heat.**

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

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1	Rotor component
2	Stator coil component
3	Pulley
4	Rotor
5	Front bearing
6	Front cover

7	Heat insulator
8	Stator coil
9	Rectifier
10	Regulator component
11	Rear cover

01-18 IGNITION SYSTEM [L8, LF]

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IGNITION SYSTEM [L8, LF]

IGNITION SYSTEM LOCATION INDEX [L8, LF]

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1	Ignition coil (See 01-18-2 IGNITION COIL REMOVAL/ INSTALLATION [L8, LF].) (See 01-18-2 IGNITION COIL INSPECTION [L8, LF].)

2	Spark plug (See 01-18-3 SPARK PLUG REMOVAL/ INSTALLATION [L8, LF].) (See 01-18-3 SPARK PLUG INSPECTION [L8, LF].)

IGNITION SYSTEM [L8, LF]

IGNITION COIL REMOVAL/INSTALLATION [L8, LF]

id0118a3800200

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the plug hole plate. (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF].)
4. Remove the front suspension tower bar (joint). (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.

1	Connector
2	Ignition coil

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IGNITION COIL INSPECTION [L8, LF]

id0118a3800300

Ignition Coil Inspection

1. Perform the spark test and identify the malfunctioning cylinder.
2. Replace the ignition coil of the malfunctioning cylinder with that of a normal cylinder, and reperform the spark test.
   - If the spark is not normal due to a malfunctioning ignition coil, replace that ignition coil.
   - It is unlikely that all four ignition coils fail to operate properly. To prevent replacing a normal component, perform the above procedure, identify the malfunctioning ignition coil, and replace it.

Ignition Coil with Built-In Igniter Inspection

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the plug hole plate. (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF].)
4. Disconnect the ignition coil connector.
5. Measure the resistance between each terminal on the ignition coil connector using an analog circuit tester.
   - If the measurement corresponds to the table, replace the ignition coil.

Item	Tester Connection Position		Condition
	Positive	Negative	
Terminal	C	A	0 ohm is not normal (∞ ohm is normal)
	B	A	
	C	B	∞ or 0 ohm is not normal (several kilohms is normal)

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IGNITION SYSTEM [L8, LF]

SPARK PLUG REMOVAL/INSTALLATION [L8, LF]

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Caution
- **If a spark plug that is not as specified is installed, engine performance will be deteriorated. Install only the specified spark plug when replacing.**

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the plug hole plate. (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF].)
4. Remove the front suspension tower bar (joint). (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
5. Remove the ignition coils. (See 01-18-2 IGNITION COIL REMOVAL/INSTALLATION [L8, LF].)
6. Remove the spark plugs using a plug-wrench.
7. Install in the reverse order of removal.

Tightening torque
10—14 N·m {1.1—1.4 kgf·m, 8—10 ft·lbf}

SPARK PLUG INSPECTION [L8, LF]

id0118a3800500

Specification

Spark plug type
L8: L303 18 110 (ITR5F13)
LF: L3G2 18 110, L3Y1 18 110

Plug Gap Inspection

Caution
- **To avoid possible damage to the tip, do not adjust the plug gap.**
- **To prevent damaging the tip, use a wire type plug gap gauge when inspecting the plug gap.**

1. Measure the spark plug gap using a wire type plug gap gauge.
   - If not within the standard specification, replace the spark plug.

Spark plug gap
Standard: 1.25—1.45 mm {0.050—0.057 in}
New spark plug (reference): 1.25—1.35 mm {0.050—0.053 in}

Cleaning

Caution
- **Carbon may adhere to the tip of the spark plug during vehicle delivery or repeated short distance driving during the winter time. If there is any malfunction such as rough idling or start difficulty due to carbon adhesion causing plug fouling, burn off the carbon by performing no-load racing of the engine.**
- **When performing the no-load racing, apply the side brake and foot brake, move the shift lever to neutral (MT), or the selector lever to P position (AT) to prevent an accident and serious injury.**
- **To avoid possible damage to the spark plug tip, do not use a wire brush for cleaning.**

Note
- To avoid possible damage to the tip, use gasoline to clean the spark plugs after removing dirt.
- If the accelerator pedal is depressed continuously for a specified time, the engine speed may decrease to the idle speed. This is due to the fuel cut control operation, which prevents overheating, and it does not indicate a malfunction.
- Do not perform no-load racing at high engine speed continuously for **10 s or more**.

1. If there is carbon adhering to the spark plug, perform no-load racing at **4,000 rpm** for **2 min**, **2 times**.

IGNITION SYSTEM [L8, LF]

Visual Inspection

1. Inspect the following items:
   - If any of the following malfunctions are indicated, replace the spark plug.
     — Insulator breakage
     — Worn electrode
     — Damaged gasket
     — Badly burned insulator (sparking side)

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Resistance Inspection

1. Measure the resistance of the spark plug using a tester as shown in the figure.
   - If not within the specification, replace the spark plug.

   Spark plug resistance [25 °C {77 °F}]
   3.0—7.5 kilohms

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01-19 STARTING SYSTEM [L8, LF]

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STARTING SYSTEM [L8, LF]

STARTING SYSTEM LOCATION INDEX [L8, LF]

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1	Starter (See 01-19-1 STARTER REMOVAL/INSTALLATION [L8, LF].) (See 01-19-3 STARTER INSPECTION [L8, LF].) (See 01-19-7 STARTER DISASSEMBLY/ASSEMBLY [L8, LF].)

STARTER REMOVAL/INSTALLATION [L8, LF]

id0119a4800200

Warning

- **Remove and install all parts when the engine is cold, otherwise they can cause severe burns or serious injury.**
- **When the battery cables are connected, touching the vehicle body with starter terminal B will generate sparks. This can cause personal injury, fire, and damage to the electrical components. Always disconnect the negative battery cable before performing the following operation.**

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the side cover. (LH)
4. Remove the under cover. (MT) (See 02-13-19 TRANSVERSE MEMBER REMOVAL/INSTALLATION.)
5. Remove the under guard. (LF MT) (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].) (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)
6. Remove the clutch release cylinder with the pipes still connected. Position the clutch release cylinder so that it is out of the way. (MT) (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].) (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)

STARTING SYSTEM [L8, LF]

7. Remove the oil filter. (See 01-11-3 OIL FILTER REPLACEMENT [L8, LF].)
8. Remove the oil cooler and oil filter adapter component with the water hoses still connected. Position the oil cooler and oil filter adapter component so that it is out of the way. (See 01-11-5 OIL COOLER REMOVAL/ INSTALLATION [L8, LF].)
9. Remove in the order indicated in the table.
10. Install in the reverse order of removal.
11. Inspect the oil level. (See 01-11-2 ENGINE OIL LEVEL INSPECTION [L8, LF].)

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1	Terminal B cable
2	Terminal S connector

3	Wiring harness and bracket
4	Starter (See 01-19-2 Starter Installation Note.)

Starter Installation Note

Note

- If there is peeling on or damage to the insulator, attach a new insulator using the following procedure:

1. Peel off the insulator from the starter completely using a scraper.

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STARTING SYSTEM [L8, LF]

2. Degrease the insulator attachment area.

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3. Attach a new insulator to the starter.

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STARTER INSPECTION [L8, LF]

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On-vehicle Inspection

1. Verify that the battery is fully charged.
2. The starter is normal if it rotates smoothly and without any noise when the engine is cranked.
   - If the starter does not operate, inspect the following:
     — Remove the starter, and inspect the starter unit.
     — Inspect the related wiring harnesses, the ignition switch, and the transmission range switch (AT).

No-load Test

1. Verify that the battery is fully charged.
2. Connect the starter, battery, and a tester as shown in the figure.
3. Operate the starter and verify that it rotates smoothly.
   - If the starter does not rotate smoothly, inspect the starter unit.
4. Measure the voltage and current while the starter is operating.
   - If not within the specification, replace the starter.

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Starter no-load test voltage
11 V

Starter no-load test current
90 A or less

STARTING SYSTEM [L8, LF]

Magnetic Switch Operation Inspection
Pull-out test

Note
- Depending on the battery charge condition, the starter motor pinion may rotate while in an extended state. This is due to current flowing to the starter motor through the pull-in coil to turn the starter motor, and does not indicate an abnormality.

1. Verify that the starter motor pinion is extended while battery positive voltage is connected to terminal S and the starter body is grounded.
   - If the starter motor pinion is not extended, repair or replace the starter.

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Return test
1. Disconnect the motor wire from terminal M.
2. Connect battery positive voltage to terminal M and ground the starter body.
3. Pull out the drive pinion with a screwdriver. Verify that it returns to its original position when released.
   - If it does not return, repair or replace the starter.

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Pinion Gap Inspection
1. Pull out the drive pinion with the battery positive voltage connected to terminal S and the starter body grounded.

   Caution
   - **Applying power for more than 10 s can damage the starter. Do not apply power for more than 10 s.**

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2. Measure the pinion gap while the drive pinion is extended.
   - If not as specified, adjust with an adjustment washer (between drive housing front cover and magnetic switch).

   Starter pinion gap
   0.5—2.0 mm {0.02—0.07 in}

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STARTING SYSTEM [L8, LF]

Starter Inner Parts Inspection
Armature

1. Verify that there is no continuity between the commutator and the core at each segment using a tester.
   - If there is continuity, replace the armature.

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2. Verify that there is no continuity between the commutator and the shaft using a tester.
   - If there is continuity, replace the armature.

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3. Place the armature on V-blocks, and measure the runout using a dial indicator.
   - If not within the specification, replace the armature.

   Starter armature runout
   0.1 mm {0.004 in} max.

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4. Measure the commutator diameter.
   - If not within the minimum specification, replace the armature.

   Starter commutator diameter
   Standard: 29.4 mm {1.16 in}
   Minimum: 28.8 mm {1.13 in}

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5. Measure the segment groove depth of the commutator.
   - If not within the minimum specification, undercut the grooves to the standard depth.

   Segment groove depth of starter commutator
   Standard: 0.5 mm {0.02 in}
   Minimum: 0.2 mm {0.008 in}

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STARTING SYSTEM [L8, LF]

Magnetic switch

1. Inspect for continuity between terminals S and M using a tester.
   - If there is no continuity, replace the magnetic switch.

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2. Inspect for continuity between terminal S and the body using a tester.
   - If there is no continuity, replace the magnetic switch.

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3. Verify that there is no continuity between terminals M and B using a tester.
   - If there is continuity, replace the magnetic switch.

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Brush and brush holder

1. Verify that there is no continuity between each insulated brush and plate using a tester.
   - If there is continuity, replace the brush holder.

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2. Measure the brush length.
   - If any brush is worn almost to or beyond the minimum specification, replace all of the brushes.

   Starter brush length
   Standard: 12.3 mm {0.48 in}
   Minimum: 5.5 mm {0.22 in}

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STARTING SYSTEM [L8, LF]

3. Measure the brush spring force using a spring balance.
   - If not within the minimum specification, replace the brush and brush holder component.

   Starter brush spring force
   Standard: 15.0—20.4 N {1.53—2.08 kgf, 3.38—4.58 lbf}
   Minimum: 2.75 N {0.28 kgf, 0.62 lbf}

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STARTER DISASSEMBLY/ASSEMBLY [L8, LF]

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1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

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1	Magnetic switch
2	Adjustment washer
3	Rear housing
4	Brush and brush holder
5	Armature
6	Yoke

7	Planetary gear
8	Front cover
9	Lever
10	Drive pinion
11	Internal gear
12	Gear shaft

01-20 CRUISE CONTROL SYSTEM [L8, LF]

CRUISE CONTROL SWITCH
INSPECTION [L8, LF] 01-20–1

CRUISE CONTROL SYSTEM [L8, LF]

CRUISE CONTROL SWITCH INSPECTION [L8, LF]

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1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable and wait for **1 min or more**.
3. Remove the driver-side air bag module. (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
4. Disconnect the clock spring (cruise control switch-side) connector.
5. Inspect for resistance and continuity between terminals B—C (part-side) using a tester.
   - If not as specified, replace the cruise control switch. (See 09-20-21 AUDIO CONTROL SWITCH REMOVAL/INSTALLATION.)

Switch Condition	Resistance (Ohm)	System Wiring Diagram
ON OFF switch pressed	Continuity	
CANCEL switch pressed	Approx. 120	
SET/– switch pressed	Approx. 680	
RES/+ switch pressed	Approx. 2.200	
No switch pressed	No continuity	

01-40 CONTROL SYSTEM [L8, LF]

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CAMSHAFT POSITION (CMP) SENSOR INSPECTION [L8, LF] 01-40–34
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CONTROL SYSTEM [L8, LF]

CONTROL SYSTEM LOCATION INDEX [L8, LF]

id0140i7804100

amxzzw0000013

1	A/F sensor (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].) (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF].)
2	HO2S (See 01-40-30 HEATED OXYGEN SENSOR (HO2S) REMOVAL/INSTALLATION [L8, LF].) (See 01-40-31 HEATED OXYGEN SENSOR (HO2S) INSPECTION [L8, LF].)

3	ECT sensor (See 01-40-25 ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/ INSTALLATION [L8, LF].) (See 01-40-26 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [L8, LF].)
4	APP sensor (See 01-40-29 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION [L8, LF].)

CONTROL SYSTEM [L8, LF]

5	CPP switch (MT) (See 01-40-24 CLUTCH PEDAL POSITION (CPP) SWITCH INSPECTION [L8, LF].)
6	CMP sensor (See 01-40-33 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [L8, LF].) (See 01-40-34 CAMSHAFT POSITION (CMP) SENSOR INSPECTION [L8, LF].)
7	PCM (built into BARO sensor) (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) (See 01-40-9 PCM INSPECTION [L8, LF].) (See 01-40-23 PCM CONFIGURATION [L8, LF].) (See 01-40-28 BAROMETRIC PRESSURE (BARO) SENSOR INSPECTION [L8, LF].)
8	CKP sensor (See 01-40-31 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [L8, LF].) (See 01-40-33 CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [L8, LF].)
9	KS (See 01-40-34 KNOCK SENSOR (KS) REMOVAL/ INSTALLATION [L8, LF].) (See 01-40-34 KNOCK SENSOR (KS) INSPECTION [L8, LF].)

10	MAP sensor (See 01-40-27 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR REMOVAL/ INSTALLATION [L8, LF].) (See 01-40-28 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR INSPECTION [L8, LF].)
11	TP sensor (See 01-40-28 THROTTLE POSITION (TP) SENSOR INSPECTION [L8, LF].)
12	Neutral switch (MT) (See 01-40-24 NEUTRAL SWITCH INSPECTION [L8, LF].)
13	PSP switch (See 01-40-24 POWER STEERING PRESSURE (PSP) SWITCH INSPECTION [L8, LF].)
14	MAF/IAT sensor (See 01-40-26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/ INSTALLATION [L8, LF].) (See 01-40-27 MASS AIR FLOW (MAF) SENSOR INSPECTION [L8, LF].) (See 01-40-27 INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [L8, LF].)

CONTROL SYSTEM DIAGRAM [L8, LF]

id0140i7800300

amxzzn00000546

CONTROL SYSTEM [L8, LF]

CONTROL SYSTEM WIRING DIAGRAM [L8, LF]

id0140i7800400

amxzzn00000547

CONTROL SYSTEM [L8, LF]

amxzzn00000548

CONTROL SYSTEM [L8, LF]

PCM REMOVAL/INSTALLATION [L8, LF]

id0140i7802400

1. When replacing the PCM, perform the following:
   - PCM configuration (See 01-40-23 PCM CONFIGURATION [L8, LF].)
2. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Remove the air cleaner case. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
5. Move the water hose from the PCM cover slightly out of the way.
6. Remove in the order indicated in the table.

Except for U.K. specs.

amxzzw0000001

1	PCM cover
2	PCM connector (See 01-40-8 PCM Connector Connection Note.)

3	PCM
4	Air cleaner insulator
5	PCM duct

CONTROL SYSTEM [L8, LF]

U.K. specs.

amxzzw0000002

1	Set bolt (See 01-40-7 Set Bolt Removal Note.) (See 01-40-8 Set Bolt Installation Note.)
2	PCM cover
3	PCM connector (See 01-40-8 PCM Connector Connection Note.)

4	PCM
5	PCM bracket
6	Air cleaner insulator
7	PCM duct

7. Install in the reverse order of removal.
8. When replacing the PCM on the vehicles, perform the following:
   - PCM parameter reset (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.)

Set Bolt Removal Note

1. Using a chisel and a hammer, cut a groove on the head of the set bolt so that a screwdriver can be inserted.
2. Loose the set bolt using an impact screwdriver or pliers.

amxzzw0000002

CONTROL SYSTEM [L8, LF]

PCM Connector Connection Note

Caution

- **If the PCM connector is inserted at an angle and the lever is moved, the connector could be damaged. Verify that the PCM connector is inserted straight.**

acxaaw00000768

1. Verify that the PCM connector lever is tilted towards the wiring harness side as shown in the figure.
2. Insert the PCM connector straight until it contacts the PCM and verify that the lever reverts upward naturally.

acxaaw00000766

3. Push the lever until a click is heard.

acxaaw00000767

Set Bolt Installation Note

1. Install a new set bolt and tighten it until the neck of the bolt is cut.

amxzzw0000002

CONTROL SYSTEM [L8, LF]

PCM INSPECTION [L8, LF]

id0140i7802500

Not Using the M-MDS

Note

- The PCM terminal voltage can vary with the conditions when measuring and changes due to aged deterioration on the vehicle, causing false diagnosis. Therefore determine comprehensively where the malfunction occurs among the input systems, output systems, and the PCM.

PCM
WIRING HARNESS-SIDE CONNECTOR

2BE	2BA	2AW	2AS	2AO	2AK	2AG	2AC	2Y	2U	2Q	2M	2I	2E	2A
2BF	2BB	2AX	2AT	2AP	2AL	2AH	2AD	2Z	2V	2R	2N	2J	2F	2B
2BG	2BC	2AY	2AU	2AQ	2AM	2AI	2AE	2AA	2W	2S	2O	2K	2G	2C
2BH	2BD	2AZ	2AV	2AR	2AN	2AJ	2AF	2AB	2X	2T	2P	2L	2H	2D

1BE	1BA	1AW	1AS	1AO	1AK	1AG	1AC	1Y	1U	1Q	1M	1I	1E	1A
1BF	1BB	1AX	1AT	1AP	1AL	1AH	1AD	1Z	1V	1R	1N	1J	1F	1B
1BG	1BC	1AY	1AU	1AQ	1AM	1AI	1AE	1AA	1W	1S	1O	1K	1G	1C
1BH	1BD	1AZ	1AV	1AR	1AN	1AJ	1AF	1AB	1X	1T	1P	1L	1H	1D

amxzzw0000002

Terminal	Signal	Connected to	Test condition		Voltage (V)	Inspection item
1A	—	—	—		—	—
1B	Starter relay control	Starter relay	Under any condition		Below 1.0	• Starter relay • Related wiring harness
1C	—	—	—		—	—
1D*1	Clutch operation	CPP switch	Clutch pedal depressed		Below 1.0	• CPP switch • Related wiring harness
			Clutch pedal released		B+	
1E	—	—	—		—	—
1F	—	—	—		—	—
1G	—	—	—		—	—
1H	Fuel pump control	Fuel pump relay	Ignition switch is turned to the ON position (Engine off) and a certain period has elapsed		B+	• Fuel pump relay • Related wiring harness
			Cranking		Below 1.0	
			Idle		Below 1.0	
1I	A/C	A/C relay	Engine running	A/C operating	Below 1.0	• A/C relay • Related wiring harness
				A/C not operating	B+	
1J	Refrigerant pressure switch (middle)	Refrigerant pressure switch (middle)	Refrigerant pressure is more than the specification. (Refrigerant pressure switch (middle) is on.)		Below 1.0	• Refrigerant pressure switch (middle) • Related wiring harness
			Refrigerant pressure is less than the specification. (Refrigerant pressure switch (middle) is off.)		B+	
1K	—	—	—		—	—
1L	—	—	—		—	—
1M	Cooling fan control	Cooling fan relay No.1	Cooling fan not operating		B+	• Cooling fan relay No.1 • Related wiring harness
			Cooling fan operating		Below 1.0	
1N	Cooling fan control	Cooling fan relay No.2	Cooling fan not operating		B+	• Cooling fan relay No.2 • Related wiring harness
			Cooling fan operating		Below 1.0	
1O	—	—	—		—	—
1P	MAF sensor ground	MAF sensor	Under any condition		Below 1.0	• Related wiring harness

CONTROL SYSTEM [L8, LF]

Terminal	Signal	Connected to	Test condition		Voltage (V)	Inspection item
1Q	Main relay control	Main relay	Ignition switch is turned to the ON position		Below 1.0	• Main relay • Related wiring harness
			Ignition switch off and a certain period has elapsed		B+	
1R	Cooling fan control	Cooling fan relay No.3	Cooling fan not operating		B+	• Cooling fan relay No.3 • Related wiring harness
			Cooling fan operating		Below 1.0	
1S	—	—	—		—	—
1T	—	—	—		—	—
1U	—	—	—		—	—
1V	—	—	—		—	—
1W	—	—	—		—	—
1X	Neutral position*1	Neutral switch	Shift lever is at neutral position		Below 1.0	• Neutral switch • Related wiring harness
			Shift lever is not at neutral position		B+	
	Selector lever position*2	TR switch	Ignition switch is turned to the ON position	P, N position	Below 1.0	• TR switch • Related wiring harness
				Except above	B+	
1Y	—	—	—		—	—
1Z	—	—	—		—	—
1AA	—	—	—		—	—
1AB	Brake switch No.1	Brake switch No.1	Brake pedal depressed		B+	• Brake switch No.1 • Related wiring harness
			Brake pedal released		Below 1.0	
1AC	—	—	—		—	—
1AD	—	—	—		—	—
1AE	—	—	—		—	—
1AF*3	Brake switch No.2	Brake switch No.2	Brake pedal depressed		B+	• Brake switch No.2 • Related wiring harness
			Brake pedal released		Below 1.0	
1AG	—	—	—		—	—
1AH	—	—	—		—	—
1AI	CAN_L	CAN related module	Because this terminal is for CAN, no valid determination of terminal voltage is possible			• Related wiring harness
1AJ	APP sensor No.2 power supply	APP sensor	Ignition switch is turned to the ON position		Approx. 5.0	• Related wiring harness
1AK	MAF	MAF sensor	Ignition switch is turned to the ON position		Approx. 0.7	• MAF sensor • Related wiring harness
			Idle		Approx. 1.4	
1AL	APP sensor No.1 power supply	APP sensor	Ignition switch is turned to the ON position.		Approx. 5.0	• Related wiring harness
1AM	CAN_H	CAN related module	Because this terminal is for CAN, no valid determination of terminal voltage is possible			• Related wiring harness
1AN	—	—	—		—	—
1AO	APP sensor No.1	APP sensor	Ignition switch is turned to the ON position	Accelerator pedal depressed	Approx. 3.9	• APP sensor • Related wiring harness
				Accelerator pedal released	Approx. 1.6	
1AP	APP sensor No.2	APP sensor	Ignition switch is turned to the ON position	Accelerator pedal depressed	Approx. 3.4	• APP sensor • Related wiring harness
				Accelerator pedal released	Approx. 1.0	

CONTROL SYSTEM [L8, LF]

Terminal	Signal	Connected to	Test condition		Voltage (V)	Inspection item
1AQ*3	Cruise control switch	Cruise control switch	Ignition switch is turned to the ON position	ON OFF switch pressed in	Approx. 0	• Cruise control switch • Related wiring harness
				CANCEL switch pressed in	Approx. 1.1	
				SET/– switch pressed in	Approx. 3.1	
				RES/+ switch pressed in	Approx. 4.2	
				Except above	Approx. 5.0	
1AR	Sensor ground	MAF/IAT sensor	Under any condition		Below 1.0	• Related wiring harness
1AS	APP sensor No.1 ground	APP sensor	Under any condition		Below 1.0	• Related wiring harness
1AT	IAT	MAF/IAT sensor	Ignition switch is turned to the ON position	IAT is 20 °C {68 °F}	Approx. 2.4	• IAT sensor • Related wiring harness
				IAT is 60°C {140 °F}	Approx. 0.9	
1AU	Refrigerant pressure switch (high, low)	Refrigerant pressure switch (high, low)	Ignition switch is turned to the ON position	A/C operating	Below 1.0	• Refrigerant pressure switch (high, low) • Related wiring harness
				A/C not operating	B+	
1AV	APP sensor No.2 ground	APP sensor	Under any condition		Below 1.0	• Related wiring harness
1AW	B+	Main relay	Ignition switch off		Below 1.0	• Main relay • Related wiring harness
			Ignition switch is turned to the ON position		B+	
1AX	Drive-by-wire relay control	Drive-by-wire relay	Under any condition		Below 1.0	• Drive-by-wire relay • Related wiring harness
1AY	Ignition switch	Ignition switch	Ignition switch off		Below 1.0	• Ignition switch • Related wiring harness
			Ignition switch is turned to the ON position		B+	
1AZ	Ground	Ground	Under any condition		Below 1.0	• Related wiring harness
1BA	Back-up power supply	Battery (positive terminal)	Under any condition		B+	• Battery • Related wiring harness
1BB	Ground	Ground	Under any condition		Below 1.0	• Related wiring harness
1BC	—	—	—		—	—
1BD	Ground	Ground	Under any condition		Below 1.0	• Related wiring harness
1BE	B+	Main relay	Ignition switch off		Below 1.0	• Main relay • Related wiring harness
			Ignition switch is turned to the ON position		B+	
1BF	Drive-by-wire relay control	Drive-by-wire relay	Ignition switch is turned to the ON position	Drive-by-wire system is malfunction	Below 1.0	• Drive-by-wire relay • Related wiring harness
				Drive-by-wire system is normal	B+	
1BG	—	—	—		—	—
1BH	Ground	Ground	Under any condition		Below 1.0	• Related wiring harness
2A	Throttle control (+)	Throttle body (Throttle valve actuator)	• Inspect using the wave profile. (See 01-40-15 Inspection Using An Oscilloscope (Reference).)			• Throttle valve actuator • Related wiring harness

CONTROL SYSTEM [L8, LF]

Terminal	Signal	Connected to	Test condition		Voltage (V)	Inspection item
2B	Throttle control (–)	Throttle body (Throttle valve actuator)	• Inspect using the wave profile. (See 01-40-15 Inspection Using An Oscilloscope (Reference).)			• Throttle valve actuator • Related wiring harness
2C	Purge control	Purge solenoid valve	• Inspect using the wave profile. (See 01-40-15 Inspection Using An Oscilloscope (Reference).)			• Purge solenoid valve • Related wiring harness
2D	—	—	—		—	—
2E*4	OCV control	OCV	• Inspect using the wave profile. (See 01-40-15 Inspection Using An Oscilloscope (Reference).)			• OCV • Related wiring harness
2F	—	—	—		—	—
2G	EGR valve #2 coil control	EGR valve	Idle (EGR control not operating)		B+	• EGR valve • Related wiring harness
2H	EGR valve #4 coil control	EGR valve	Idle (EGR control not operating)		B+	• EGR valve • Related wiring harness
2I	Variable tumble control	Variable tumble solenoid valve	ECT 60 °C {142 °F} or more and engine speed 3,750 rpm or more		B+	• Variable tumble solenoid valve • Related wiring harness
			ECT less than 60 °C {142 °F} and engine speed less than 3,750 rpm		Below 1.0	
2J	Variable intake air control	Variable intake air solenoid valve	Ignition switch is turned to the ON position		Below 1.0	• Variable intake air solenoid valve • Related wiring harness
			Engine speed: less than 4,750 rpm		Below 1.0	
			Engine speed: 4,750 rpm or more		B+	
2K	EGR valve #1 coil control	EGR valve	Idle (EGR control not operating)		Below 1.0	• EGR valve • Related wiring harness
2L	EGR valve #3 coil control	EGR valve	Idle (EGR control not operating)		B+	• EGR valve • Related wiring harness
2M	—	—	—		—	—
2N	—	—	—		—	—
2O	—	—	—		—	—
2P	CMP sensor ground	CMP sensor	Under any condition		Below 1.0	• Related wiring harness
2Q	HO2S	HO2S	Idle after warm-up		Alternates between 0 and 1.0	• HO2S • Related wiring harness
2R	—	—	—		—	—
2S	CMP	CMP sensor	• Inspect using the wave profile. (See 01-40-15 Inspection Using An Oscilloscope (Reference).)			• CMP sensor • Related wiring harness
2T	Power steering pressure	PSP switch	Idle	Steering wheel at straight ahead position	B+	• PSP switch • Related wiring harness
				While turning steering wheel	Below 1.0	
2U	Knocking (+)	KS	Ignition switch ON (Use digital type voltmeter, because measurement voltage will be detected less than true voltage when using analog type voltmeter)		Approx. 4.3	• KS • Related wiring harness

CONTROL SYSTEM [L8, LF]

Terminal	Signal	Connected to	Test condition		Voltage (V)	Inspection item
2V	Knocking (–)	KS	Ignition switch ON (Use digital type voltmeter, because measurement voltage will be detected less than true voltage when using analog type voltmeter)		Below 1.0	• KS • Related wiring harness
2W	CKP	CKP sensor	• Inspect using the wave profile. (See 01-40-15 Inspection Using An Oscilloscope (Reference).)			• CKP sensor • Related wiring harness
2X	Ground	Shield wire	Under any condition		Below 1.0	• Related wiring harness
2Y	—	—	—		—	—
2Z	A/F sensor	A/F sensor	Idle after warm-up		Approx. 2.4	• A/F sensor • Related wiring harness
2AA	—	—	—		—	—
2AB	CKP sensor ground	CKP sensor	Under any condition		Below 1.0	• Related wiring harness
2AC	—	—	—		—	—
2AD	A/F sensor	A/F sensor	Idle after warm-up		Approx. 2.8	• A/F sensor • Related wiring harness
2AE	—	—	—		—	—
2AF	—	—	—		—	—
2AG	Manifold absolute pressure	MAP sensor	Ignition switch is turned to the ON position (at sea level)		Approx. 4.1	• MAP sensor • Related wiring harness
			Idle		Approx. 1.2	
2AH	ECT	ECT sensor	Ignition switch is turned to the ON position	ECT is 20 °C {68 °F}	Approx. 3.0	• ECT sensor • Related wiring harness
				ECT is 80 °C {176 °F}	Approx. 0.9	
2AI	Generator field coil control	Generator (terminal D)	• Inspect using the wave profile. (See 01-40-15 Inspection Using An Oscilloscope (Reference).)			• Generator • Related wiring harness
2AJ	Generator output voltage	Generator (terminal P)	• Inspect using the wave profile. (See 01-40-15 Inspection Using An Oscilloscope (Reference).)			• Generator • Related wiring harness
2AK	Throttle valve opening angle No. 1	Throttle body (TP sensor)	Ignition switch is turned to the ON position	Accelerator pedal depressed	Approx. 4.5	• TP sensor • Related wiring harness
				Accelerator pedal released	Approx. 0.5	
2AL	Throttle valve opening angle No. 2	Throttle body (TP sensor)	Ignition switch is turned to the ON position	Accelerator pedal depressed	Approx. 0.5	• TP sensor • Related wiring harness
				Accelerator pedal released	Approx. 4.5	
2AM	Constant voltage	CMP sensor	Ignition switch is turned to the ON position		B+	• Related wiring harness
2AN	—	—	—		—	—
2AO	Constant voltage (Vref)	Throttle body (TP sensor)	Ignition switch is turned to the ON position		Approx. 5.0	• Related wiring harness
2AP	Sensor ground	Throttle body (TP sensor)	Under any condition		Below 1.0	• Related wiring harness
2AQ	Constant voltage	CKP sensor	Ignition switch is turned to the ON position		B+	• Related wiring harness
2AR	—	—	—		—	—
2AS	—	—	—		—	—

CONTROL SYSTEM [L8, LF]

Terminal	Signal	Connected to	Test condition	Voltage (V)	Inspection item
2AT	IGT4	Ignition coil (No.4 cylinders)	• Inspect using the wave profile. (See 01-40-15 Inspection Using An Oscilloscope (Reference).)		• Ignition coil No.4 • Related wiring harness
2AU	Constant voltage (Vref)	MAP sensor	Ignition switch is turned to the ON position	Approx. 5.0	• Related wiring harness
2AV	MAP sensor ground	MAP sensor	Under any condition	Below 1.0	• Related wiring harness
2AW	IGT2	Ignition coil (No.2 cylinders)	• Inspect using the wave profile. (See 01-40-15 Inspection Using An Oscilloscope (Reference).)		• Ignition coil No.2 • Related wiring harness
2AX	IGT3	Ignition coil (No.3 cylinders)	• Inspect using the wave profile. (See 01-40-15 Inspection Using An Oscilloscope (Reference).)		• Ignition coil No.3 • Related wiring harness
2AY	ECT sensor ground	ECT sensor	Under any condition	Below 1.0	• Related wiring harness
2AZ	Fuel injection (#4)	Fuel injector No.4	• Inspect using the wave profile. (See 01-40-15 Inspection Using An Oscilloscope (Reference).)		• Fuel injector No.4 • Related wiring harness
2BA	IGT1	Ignition coil (No.1 cylinders)	• Inspect using the wave profile. (See 01-40-15 Inspection Using An Oscilloscope (Reference).)		• Ignition coil No.1 • Related wiring harness
2BB	Fuel injection (#1)	Fuel injector No.1	• Inspect using the wave profile. (See 01-40-15 Inspection Using An Oscilloscope (Reference).)		• Fuel injector No.1 • Related wiring harness
2BC	Fuel injection (#2)	Fuel injector No.2	• Inspect using the wave profile. (See 01-40-15 Inspection Using An Oscilloscope (Reference).)		• Fuel injector No.2 • Related wiring harness
2BD	Fuel injection (#3)	Fuel injector No.3	• Inspect using the wave profile. (See 01-40-15 Inspection Using An Oscilloscope (Reference).)		• Fuel injector No.3 • Related wiring harness
2BE	HO2S heater control	HO2S heater	Heavy load (Heater control not operating)	B+	• HO2S heater • Related wiring harness
2BF	—	—	—	—	—
2BG	A/F sensor heater control	A/F sensor heater	• Inspect using the wave profile. (See 01-40-15 Inspection Using An Oscilloscope (Reference).)		• A/F sensor heater • Related wiring harness
2BH	HO2S ground	HO2S	Under any condition	Below 1.0	• Related wiring harness

*1 : MT
*2 : AT
*3 : With cruise control system
*4 : LF

CONTROL SYSTEM [L8, LF]

Inspection Using An Oscilloscope (Reference)
Throttle control (+) signal

amxzzw0000002

PCM terminals
- 2A (+)—Negative battery terminal (–)

Oscilloscope setting
- 5 V/DIV (Y), 1 ms/DIV (X), DC range

Vehicle condition
- Idle (Accelerator pedal released)

Throttle control (–) signal

amxzzw0000002

PCM terminals
- 2B (+)—Negative battery terminal (–)

Oscilloscope setting
- 5 V/DIV (Y), 1 ms/DIV (X), DC range

Vehicle condition
- Idle (Accelerator pedal released)

Purge control signal

amxzzw0000002

PCM terminals
- 2C (+)—Negative battery terminal (–)

Oscilloscope setting
- 2 V/DIV (Y), 0.1 s/DIV (X), DC range

Vehicle condition
- Idle after warm-up

CONTROL SYSTEM [L8, LF]

OCV control signal

amxzzw0000002

PCM terminals
- 2E (+)—Negative battery terminal (–)

Oscilloscope setting
- 2.5 V/DIV (Y), 1 ms/DIV (X), DC range

Vehicle condition
- Idle after warm-up

CMP signal

amxzzw0000002

PCM terminals
- 2S (+)—Negative battery terminal (–)

Oscilloscope setting
- 2 V/DIV (Y), 50 ms/DIV (X), DC range

Vehicle condition
- Idle after warm-up

CKP signal

amxzzw0000002

PCM terminals
- 2W (+)—Negative battery terminal (–)

Oscilloscope setting
- 2 V/DIV (Y), 10 ms/DIV (X), DC range

Vehicle condition
- Idle after warm-up

CONTROL SYSTEM [L8, LF]

Generator field coil control signal

amxzzw0000003

PCM terminals
- 2AI (+)—Negative battery terminal (–)

Oscilloscope setting
- 0.5 V/DIV (Y), 1 ms/DIV (X), DC range

Vehicle condition
- Idle after warm-up

Generator output voltage signal

amxzzw0000003

PCM terminals
- 2AJ (+)—Negative battery terminal (–)

Oscilloscope setting
- 2 V/DIV (Y), 1 ms/DIV (X), DC range

Vehicle condition
- Idle after warm-up

Ignition timing signals

amxzzw0000003

PCM terminals
- IGT1 (No.1): 2BA (+)—Negative battery terminal (–)
- IGT2 (No.2): 2AW (+)—Negative battery terminal (–)
- IGT3 (No.3): 2AX (+)—Negative battery terminal (–)
- IGT4 (No.4): 2AT (+)—Negative battery terminal (–)

Oscilloscope setting
- 2 V/DIV (Y), 50 ms/DIV (X), DC range

Vehicle condition
- Idle after warm-up

CONTROL SYSTEM [L8, LF]

Fuel injection signals

amxzzw0000003

PCM terminals
- Fuel Injection No.1: 2BB (+)—Negative battery terminal (–)
- Fuel Injection No.2: 2BC (+)—Negative battery terminal (–)
- Fuel Injection No.3: 2BD (+)—Negative battery terminal (–)
- Fuel Injection No.4: 2AZ (+)—Negative battery terminal (–)

Oscilloscope setting
- 10 V/DIV (Y), 10 ms/DIV (X), DC range

Vehicle condition
- Idle after warm-up

A/F sensor heater control signal

amxzzw0000003

PCM terminals
- 2BG (+)—Negative battery terminal (–)

Oscilloscope setting
- 5 V/DIV (Y), 50 ms/DIV (X), DC range

Vehicle condition
- Idle after warm-up (no load)

Using the M-MDS

Note
- PIDs for the following parts are not available on this model. Go to the appropriate part inspection page.
  - — CMP sensor
  - — Main relay

1. Connect the **SST** (M-MDS) to the DLC-2.
2. Turn the ignition switch to ON position.
3. Measure the PID value.
   - If PID value is not within the specification, follow the instructions in “Inspection item (s)” column.

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CONTROL SYSTEM [L8, LF]

Note

- The PID/DATA MONITOR function monitors the calculated value of the input/output signals in the PCM. Therefore, an output device malfunction is not directly indicated as a malfunction of the monitored value for the output device. If a monitored value of an output device is out of specification, inspect the monitored value of the input device related to the output control.
- For input/output signals except those of the monitoring items, use a voltmeter to measure the PCM terminal voltage.
- The simulation items that are used in the ENGINE CONTROL SYSTEM OPERATION INSPECTION are as follows.
  — ACCS, ALTF, EVAPCP, FAN1, FAN2, FAN3, FP, FUELPW1, GENVDSD, HTR11, HTR12, IMRC, IMTV, INJ_1, INJ_2, INJ_3, INJ_4, SEGRP, test, VT DUTY1 Wt

PID/DATA monitor table (reference)

Item (definition)	Unit/Condition	Condition/Specification (Reference)	Inspection item(s)	PCM terminal
AC_REQ (Refrigerant pressure switch (high, low)	Off/On	• Refrigerant pressure is more than the specification or less than the specification. (Refrigerant pressure switch (high, low) is off.): Off • Except above: On	• Refrigerant pressure switch (high, low) • A/C amplifier	1AU
ACCS (A/C relay)	Off/On	• A/C relay is ON: On • A/C relay is OFF: Off	• The following PIDs — CPP*1, CPP/PNP*1, ECT, RPM, TP REL, TR*2, AC_REQ, COLP • A/C relay	1I
AFR (Air/fuel ratio)	-	• Idle after warm-up: Approx. 1	• A/F sensor	2Z, 2AD
AFR_ACT (Actual air/fuel ratio)	-	• Idle after warm-up: Approx. 1	• A/F sensor • HO2S	—
ALTF (Generator field coil control duty value)	%	• Ignition switch is turned to the ON position: 0% • Idle, E/L is operating: Duty value increases.	• Generator	2AI
ALTT V (Generator output voltage)	V	• Idle (no E/L): Approx. 14 V (This is an internal calculation value and differs from the terminal voltage.)	• Generator	2AJ
APP (Accelerator pedal position)	%	• Accelerator pedal released: 0% • Accelerator pedal depressed: 100%	• The following PIDs — APP1, APP2	1AO, 1AP
APP1 (APP sensor No.1)	%	• Accelerator pedal released: Approx. 32% • Accelerator pedal depressed: Approx. 78%	• APP sensor	1AO
	V	• Accelerator pedal released: Approx. 1.6 V • Accelerator pedal depressed: Approx. 3.9 V		
APP2 (APP sensor No.2)	%	• Accelerator pedal released: Approx. 21% • Accelerator pedal depressed: Approx. 67%	• APP sensor	1AP
	V	• Accelerator pedal released: Approx. 1.0 V • Accelerator pedal depressed: Approx. 3.4 V		
ARPMDES (Target engine speed)	RPM	• Indicate the target engine speed.	• The following PIDs — CPP*1, CPP/PNP*1, ECT, IAT, RPM, TP REL, MAF, MAP, VSS, AC_REQ, COLP	—
BARO (Barometric pressure)	Pa	• Indicate the barometric pressure	—	—
	V	• Ignition switch is turned to the ON position (at sea level): 4.1 V		

CONTROL SYSTEM [L8, LF]

Item (definition)	Unit/Condition		Condition/Specification (Reference)	Inspection item(s)	PCM terminal
BOO (Brake switch)	Off/On		• Brake pedal depressed: On • Brake pedal released: Off	• Brake switch No.1	1AB
BPA*3 (Brake pressure applied switch)	Off/On		• Brake pedal depressed: On • Brake pedal released: Off	• Brake switch No.2	1AF
CATT11_DSD (Catalyst temperature)	°C	°F	• Indicate the catalyst temperature	—	—
CHRGLP (Generator warning light)	Off/On		• Idle, Generator warning light illuminate: On • Idle, Generator warning light not illuminate: Off	• Generator warning light	—
COLP (Refrigerant pressure switch (middle))	OFF/ON		• Refrigerant pressure is more than the specification. (Refrigerant pressure switch (middle) is on.): On • Refrigerant pressure is less than the specification. (Refrigerant pressure switch (middle) is off.): Off	• Refrigerant pressure switch (middle)	1J
CPP*1 (Clutch pedal position)	Off/On		• Clutch pedal depressed: On • Clutch pedal released: Off	• CPP switch	1D
CPP/PNP*1 (Shift lever position)	Drive/Neutral		• Neutral: Neutral • Other than neutral: Drive	• Neutral switch	1X
DTCCNT (Number of DTC detected)	—		• Number of DTCs stored	—	—
ECT (Engine coolant temperature)	°C	°F	• Indicate the ECT	• ECT sensor	2AH
	V		• ECT is 20 °C {68 °F}: Approx. 3.0 V • ECT is 80 °C {176 °F}: Approx. 0.9 V		
EQ_RAT11 (Actual lambda signal)	—		• Idle after warm-up: Approx. 1	• A/F sensor	—
EQ_RAT11_DSD (Target lambda)	—		• Target lambda (Excess air factor = supplied air amount / theoretical air/fuel ratio)	• A/F sensor	—
ETC_ACT (Throttle control)	°		• Accelerator pedal released: Approx. 0 ° • Accelerator pedal depressed: Approx. 94.5 °	• Throttle valve actuator	2A, 2B
ETC_DSD (Throttle control desired)	%		• Indicate the target throttle valve opening ratio	• The following PIDs — APP, RPM	—
	°		• Indicate the target throttle valve opening angle		
EVAPCP (Purge solenoid valve duty value)	%		• Ignition switch is turned to the ON position: 0% • Increase the engine speed (after warm-up): Duty value rises	• The following PIDs — ECT, IAT, RPM, TP REL, MAF, O2S11, O2S12, BOO, VPWR • Purge solenoid valve	2C
FAN1 (Cooling fan relay No.1 control signal)	Off/On		• During test mode CTP: Off WOT: On	• The following PIDs — ECT, test, TP REL • Cooling fan relay No.1	1M
FAN2 (Cooling fan relay No.2 control signal)	Off/On		• During test mode CTP: Off WOT: On	• The following PIDs — ECT, test, TP REL • Cooling fan relay No.2	1N
FAN3 (Cooling fan relay No.3 control signal)	Off/On		• During test mode CTP: Off WOT: On	• The following PIDs — ECT, test, TP REL • Cooling fan relay No.3	1R

CONTROL SYSTEM [L8, LF]

Item (definition)	Unit/Condition	Condition/Specification (Reference)	Inspection item(s)	PCM terminal
FP (Fuel pump relay)	Off/On	• Ignition switch is turned to the ON position and a certain period has elapsed: Off • Cranking: On • Idle: On	• Fuel pump relay	1H
FUELPW (Fuel injector duration)	sec	• Idle: Approx. 2.0 ms	• The following PIDs — CPP*1, CPP/PNP*1, ECT, IAT, RPM, TP REL, MAF, O2S11, O2S12, MAP, VSS, TR*2, BOO, AC_REQ, COLP, VPWR • Fuel injector	2BB, 2BC, 2BD, 2AZ
FUELSYS (Fuel system status)	OL/CL/ OL–Drive/ OL–Fault/ CL–Fault	• Idle after warm-up: CL	• The following PIDs — CPP*1, CPP/PNP*1, ECT, IAT, RPM, TP REL, MAF, O2S11, O2S12, MAP, VSS, TR*2, BOO, AC_REQ, COLP, VPWR	—
GENVDSD (Target generator voltage)	V	• Indicate the target generated voltage	• The following PIDs — ECT, IAT, RPM, VSS, ALTT V, VPWR • Generator	—
HTR11 (A/F sensor heater control)	Off/On	• Ignition switch is turned to the ON position: Off • Idle: On	• The following PIDs — ECT, IAT, RPM, TP REL, MAF, MAP, VPWR • A/F sensor heater	2BG
HTR12 (HO2S heater control)	Off/On	• Ignition switch is turned to the ON position: Off • Idle: On	• The following PIDs — ECT, IAT, RPM, TP REL, MAF, MAP, VPWR • HO2S heater	2BE
IAT (Intake air temperature)	°C / °F	• Indicate the IAT	• IAT sensor	1AT
	V	• IAT is 20 °C {68 °F}: Approx. 2.4 V • IAT is 60 °C {140 °F}: Approx. 0.9 V		
IMRC (Variable tumble control)	Off/On	• ECT less than 60 °C {142 °F} and engine speed less than 3,750 rpm: On • ECT 60 °C {142 °F} or more and engine speed 3,750 rpm or more: Off	• The following PIDs — ECT, RPM, TP REL • Variable sllenoid valve	2I
IMTV (Variable intake air control)	Off/On	• Engine speed is less than 4,750 rpm: On • Engine speed is 4,750 rpm or more: Off	• The following PIDs — RPM • Variadle intake air solenoid valve	2J
INGEAR (Gears are engaged)	Off/On	**MT** • When the following conditions are satisfied: On — Other than neutral — Clutch pedal released • Except above: Off	• CPP switch • Neutral switch	1D,1X
		AT • Driving range: On • Except above: Off	• TR switch	1X
IVS (CTP condition)	Idle/Off Idle	• Idle: Idle • Other than idle: Off Idle	• The following PIDs — TP REL	—
KNOCKR (Knocking retard)	°	• Ignition switch is turned to the ON position: 0 ° • Idle: 0 °	• KS	2U, 2V
LOAD (Engine load)	%	• Idle after warm-up: Approx. 23%	• The following PIDs — MAP, IAT, MAF, RPM	—
LONGFT1 (Long term fuel trim)	%	• Idle after warm-up: Approx. –15—+15%	• The following PIDs — CPP*1, CPP/PNP*1, ECT, IAT, RPM, TP REL, MAF, O2S11, O2S12, MAP, VSS, TR*2, BOO, AC_REQ, COLP, VPWR	—

CONTROL SYSTEM [L8, LF]

Item (definition)	Unit/Condition	Condition/Specification (Reference)	Inspection item(s)	PCM terminal
MAF (Mass air flow)	g/sec	• Indicate the MAF	• MAF sensor	1AK
	V	• Ignition switch is turned to the ON position: Approx. 0.7 V • Idle: Approx. 1.4 V		
MAP (Manifold absolute pressure)	Pa	• Indicate the MAP	• MAP sensor	2AG
	V	• Ignition switch is turned to the ON position (at sea level): 4.1 V • Idle after warm-up: Approx. 1.2 V		
MIL (Malfunction indicator lamp)	Off/On	• Idle, MIL illuminate: On • Idle, MIL not illuminate: Off	• MIL	—
MIL_DIS (Travelled distance since MIL illuminated)	km / mile	Travelled distance since MIL illuminated		—
O2S11 (A/F sensor)	A	• Idle after warm-up: Approx. 0 mA	• A/F sensor	2AD
O2S12 (HO2S)	V	• Idle after warm-up: Alternates between 0 and 1.0 V	• HO2S	2Q
PSP (PSP switch)	Low/High	• Steering wheel at straight ahead position: Low • While turning steering wheel: High	• PSP switch	2T
RO2FT1 (HO2S fuel trim)	—	• Idle after warm-up: Approx. 0	• The following PIDs — O2S12	—
RPM (Engine speed)	RPM	• When the engine is running: Indicate the engine speed	• CKP sensor	2W
SCCS*3 (Cruise control switch)	V	• ON OFF switch pressed in: Approx. 0 V • CANCEL switch pressed in: Approx. 1.1 V • SET/- switch pressed in: Approx. 3.1 V • RES/+ switch pressed in: Approx. 4.2 V • Except above: Approx. 5.0 V	• Cruise control switch	1AQ
SEGRP (EGR control)	—	• Ignition switch is turned to the ON position: 0 Step • Idle: 0 Step • Engine speed is 1,187—4,200 rpm: 0—52 Step	• EGR valve	2K, 2G, 2L, 2H
SEGRP DSD (EGR valve position desired)	%	• Ignition switch is turned to the ON position: 0% • Idle: 0% • Engine speed is 1,187—4,200 rpm: 0—100%	• The following PIDs — MAF, TP REL, ECT, RPM, VSS	—
SHRTFT1 (Short term fuel trim (front))	%	• Idle after warm-up: –25— 25%	• The following PIDs — CPP*1, CPP/PNP*1, ECT, IAT, RPM, TP REL, MAF, O2S11, O2S12, MAP, VSS, TR*2, BOO, AC_REQ, COLP, VPWR	—
SPARKADV (Ignition timing)	°	• Indicate the ignition timing	• The following PIDs — CPP*1, CPP/PNP*1, ECT, IAT, RPM, TP REL, MAF, KNOCKR, TR*2, BOO, AC_REQ, COLP • Ignition coil	2S
test (Test mode)	Off/On	• Test mode On: On • Test mode Off: Off	—	—
TIRESIZE (Tire revolution per mile)	rev/mile	• Indicate the tire revolution per a mile		—
TP REL (Throttle position signal (relative value))	%	• Accelerator pedal released: Approx. 10% • Accelerator pedal depressed: Approx. 81%	• The following PIDs — TP1, TP2	2AK, 2AL

CONTROL SYSTEM [L8, LF]

Item (definition)	Unit/Condition	Condition/Specification (Reference)	Inspection item(s)	PCM terminal
TP1 (TP sensor No.1)	%	• Accelerator pedal released: Approx. 10% • Accelerator pedal depressed: Approx. 90%	• TP sensor	2AK
	V	• Accelerator pedal released: Approx. 0.5 V • Accelerator pedal depressed: Approx. 4.5 V		
TP2 (TP sensor No.2)	%	• Accelerator pedal released: Approx. 10% • Accelerator pedal depressed: Approx. 90%	• TP sensor	2AL
	V	• Accelerator pedal released: Approx. 4.5 V • Accelerator pedal depressed: 0.5 V		
TPCT (TP sensor voltage at CTP)	V	• Ignition switch is turned to the ON position: Approx. 0.5 V	• The following PIDs — TP1, TP2	—
VPWR (Battery positive voltage)	V	• Indicate the battery voltage	• Battery	1BA
VSS (Vehicle speed)	KPH	• Vehicle running: Indicate the vehicle speed	• ABS, DSC HU/CM • TCM*2	—
VT ACT1*4 (Actual valve timing)	°	• Idle: Approx. 0 ° • Racing: 0—25 °	• The following PIDs — ECT, RPM, TP REL, MAF • CMP sensor	2S
VT DIFF1*4 (Difference between target valve timing and actual valve timing)	°	• Idle: 0 °	• The following PIDs — ECT, RPM, TP REL, MAF • OCV	—
VT DUTY1*4 (OCV control)	%	• Idle: Approx. 10%	• The following PIDs — ECT, RPM, TP REL, MAF	2E

*1 : MT
*2 : AT
*3 : With cruise control system
*4 : LF

PCM CONFIGURATION [L8, LF]

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1. Connect the M-MDS to DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select the “Module Programming”.
   - When using the PDS (Pocket PC)
     1. Select “Programming”.
     2. Select “Module Programming”.
3. Then, select items from the screen menu in the following order.
   1. Select “Programmable Module Installation”.
   2. Select “PCM”.
4. Perform the configuration according to the directions on the screen.
5. Retrieve DTCs by the M-MDS, then verify that there is no DTC present.
   - If a DTC(s) is detected, perform the applicable DTC inspection. (See 01-02-12 DTC TABLE [L8, LF])

CONTROL SYSTEM [L8, LF]

NEUTRAL SWITCH INSPECTION [L8, LF]

id0140i7800800

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable.
3. Remove the neutral switch. (See 05-11A-2 NEUTRAL SWITCH REMOVAL/INSTALLATION [M15M-D].) (See 05-11B-2 NEUTRAL SWITCH REMOVAL/INSTALLATION [P66M-D].)
4. Inspect for continuity between the neutral switch terminals using an ohmmeter.
   - If not as specified, replace the neutral switch. (See 05-11A-2 NEUTRAL SWITCH REMOVAL/INSTALLATION [M15M-D].) (See 05-11B-2 NEUTRAL SWITCH REMOVAL/INSTALLATION [P66M-D].)

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Specification

Measured condition	Continuity
Rod pushed	Continuity detected
Except above	No continuity

CLUTCH PEDAL POSITION (CPP) SWITCH INSPECTION [L8, LF]

id0140i7801600

1. Verify that the CPP switch is installed properly.
2. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the negative battery cable.
4. Disconnect the CPP switch connector. (See 05-10-5 CLUTCH PEDAL REMOVAL/INSTALLATION.)
5. Inspect for continuity between the CPP switch terminals using an ohmmeter.
   - If not as specified, replace the CPP switch. (See 05-10-5 CLUTCH PEDAL REMOVAL/INSTALLATION.)

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Specification

Measured condition	Clutch pedal position	Continuity
Rod pushed	Clutch pedal released	Continuity detected
Except above	Clutch pedal depressed	No continuity

POWER STEERING PRESSURE (PSP) SWITCH INSPECTION [L8, LF]

id0140i7803100

1. Inspect the following items:
   - Power steering fluid amount (See 06-14-3 POWER STEERING FLUID INSPECTION.)
   - Power steering-related inspection (See 06-14-2 STEERING LOCATION INDEX.)
2. Disconnect the PSP switch connector.
3. Start the engine.
4. Verify that the continuity between PSP switch terminal A and body ground is as indicated in the table.
   - If not as indicated in the table, replace the PSP switch. (See 06-14-21 POWER STEERING OIL PUMP DISASSEMBLY/ASSEMBLY.)

Specification

Measured condition	Continuity
Steering wheel in straight ahead position	No continuity
While turning sttering wheel	Continuity detected

CONTROL SYSTEM [L8, LF]

ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION [L8, LF]

id0140i7801900

1. Remove the battery cover. (See01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Drain the engine coolant from the radiator. (See 01-12-4 ENGINE COOLANT REPLACEMENT [L8, LF]
4. Remove the service hole cover.
   (1) Remove the suspension tower bar (joint), (right side) and (left side). (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
   (2) Remove the wiper arm. (See 09-19-3 WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
   (3) Remove the cowl grille. (See 09-16-5 COWL GRILLE REMOVAL/INSTALLATION.)
   (4) Remove the side cowl grille. (See 09-16-5 SIDE COWL GRILLE REMOVAL/INSTALLATION.)
   (5) Move the cooler pipe No.3 and heater pipe slightly out of the way. (L.H.D.)

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   (6) Remove the service hole cover.

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5. Disconnect the heater hose and move the heater hose slightly out of the way. (L.H.D.)
6. Disconnect the ECT sensor connector.

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7. Remove the ECT sensor.

Note
- Put the double nut together and install the torque wrench. (See 00-00-11 SERVICE CAUTIONS.)

e5u140zw4853

CONTROL SYSTEM [L8, LF]

8. Install in the reverse order of removal.

   ECT sensor tightening torque
   10—14 N·m {1.1—1.4 kgf·m, 7.4—10.3 ft·lbf}

e5u140zw4854

ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [L8, LF]

id0140i7802000

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the ECT sensor connector.
4. Remove the ECT sensor. (See 01-40-25 ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION [L8, LF].)
5. Place the ECT sensor in the water and while increasing the water temperature, measure the resistance between ECT sensor terminals A and B.
   - If not within the specification, replace the ECT sensor. (See 01-40-25 ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION [L8, LF])

ECT sensor Specification

Water temperature (°C {°F})	Resistance (kilohm)
20 {68}	35.48—39.20
80 {176}	3.65—4.02

MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/INSTALLATION [L8, LF]

id0140i7805500

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect MAF/IAT sensor connector.
4. Remove the MAF/IAT sensor.
5. Install in the reverse order of removal.

   MAF/IAT sensor tightening torque
   0.55—0.82 N·m {5.7—8.3 kgf·cm, 4.9—7.2 in·lbf}

e5u140zw5302

CONTROL SYSTEM [L8, LF]

MASS AIR FLOW (MAF) SENSOR INSPECTION [L8, LF]

id0140i7800700

Visual inspection

1. Visually inspect the MAF sensor for the following:
   - Damage, cracks, soiling
   - Rusted sensor terminal
   - Bent sensor terminal

   —If there is any malfunction, repair or replace the MAF/IAT sensor. (See 01-40-26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/INSTALLATION [L8, LF].)

Voltage Inspection

1. Remove the MAF/IAT sensor without disconnecting the MAF/IAT sensor connector.
2. Connect the M-MDS to the DLC-2.
3. Turn the ignition switch to the ON position.
4. As the air gradually approaches the MAF detection part of the MAF/IAT sensor, verify that the MAF sensor output voltage (M-MDS PID: MAF) varies.
   - If not as verified, replace the MAF/IAT sensor. (See 01-40-26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/INSTALLATION [L8, LF].)

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INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [L8, LF]

id0140i7802200

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the MAF/IAT sensor connector.
4. Verify that the resistance between MAF/IAT sensor terminals D and E is within the specification.
   - If not within the specification, replace the MAF/IAT sensor. (See 01-40-26 MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/INSTALLATION [L8, LF].)

amxzzw0000003

IAT sensor Specification

Ambient temperature (°C {°F})	Resistance (kilohm)
20 {68}	2.21—2.69
60 {140}	0.493—0.667

MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR REMOVAL/INSTALLATION [L8, LF]

id0140i7804300

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF])
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF])
3. Remove the dynamic chamber. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
4. Remove the MAP sensor.
5. Install in the reverse order of removal.

MAP sensor tightening torque
2.7—3.7 N·m {28—37 kgf·cm, 24—32 in·lbf}

e5u140zw5k03

CONTROL SYSTEM [L8, LF]

MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR INSPECTION [L8, LF]

id0140i7800900

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position (Engine off).
3. Select MAP PID on the M-MDS.
4. Verify that the MAP PID (pressure) and barometric pressure are practically equal.
   - If not as specified, replace the MAP sensor. (See 01-40-27 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR REMOVAL/ INSTALLATION [L8, LF].)

amxzzw0000003

BAROMETRIC PRESSURE (BARO) SENSOR INSPECTION [L8, LF]

id0140i7801100

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position.
3. Select BARO PID on the M-MDS.
4. Verify that the BARO PID (pressure) and barometric pressure are practically equal.

Note
- Because the PCM is integrated in the BARO sensor, replacing the BARO sensor includes replacement of the PCM.

- If not as verified, replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)

amxzzw0000004

THROTTLE POSITION (TP) SENSOR INSPECTION [L8, LF]

id0140i7802700

Caution
- **This inspection procedure cannot be completed correctly if the accelerator pedal position sensor has a malfunction. Before performing this procedure, verify that any one of the DTCs related to the accelerator pedal position sensor is not detected.**

1. Verify that no DTC related to APP sensor has been detected.
   - If any DTCs related to APP sensor have been detected, perform the DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
2. Connect the M-MDS to the DLC-2.
3. Turn the ignition switch to the ON position.
4. Select TP1 or TP2 PID (percentage) on the M-MDS.
5. Verify that the TP sensor output voltage (M-MDS PID: TP1, TP2) is within the specification. (See 01-40-9 PCM INSPECTION [L8, LF].)

- If not as specified, replace the throttle body. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [L8, LF].)

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CONTROL SYSTEM [L8, LF]

ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION [L8, LF]

id0140i7803200

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position.
3. Verify that the APP sensor output voltage (PID: APP1, APP2) increases according to the increase in the accelerator opening angle when the accelerator opening angle is gradually increased.
- If verified, go to the next step.
- If not as verified, replace the accelerator pedal. (See 01-13-20 ACCELERATOR PEDAL REMOVAL/INSTALLATION [L8, LF].)
4. Verify that the APP sensor output voltage (PID: APP1, APP2) is within the specification when the accelerator pedal is depressed and not depressed.
- If not as specified, replace the accelerator pedal. (See 01-13-20 ACCELERATOR PEDAL REMOVAL/INSTALLATION [L8, LF].)

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AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF]

id0140i7899700

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Install the **SST** to the A/F sensor.
4. Remove the A/F sensor.
5. Install in the reverse order of removal.

A/F sensor tightening torque
29—49 N·m {3.0—4.9 kgf·m, 22—35 ft·lbf}

amxzzw0000004

AIR FUEL RATIO (A/F) SENSOR INSPECTION [L8, LF]

id0140i7899600

A/F Sensor Current Inspection

1. Warm up the engine to normal operating temperature.
2. Using the M-MDS, monitor the following:
   — Vehicle speed (PID: VSS)
   — Engine speed (PID: RPM)
   — A/F sensor current (PID: O2S11)
3. Drive the vehicle and decelerate the engine speed by releasing the accelerator pedal fully when the engine speed is **3,000 rpm or more**.

CONTROL SYSTEM [L8, LF]

4. Verify that the A/F sensor current (PID: O2S11) is **0.25 mA or more** while decelerating as shown in the figure.

amxzzw0000004

- If not within the specification, replace the A/F sensor. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)

A/F Sensor Heater Resistance Inspection

1. Disconnect the A/F sensor connector.
2. Measure the resistance between A/F sensor terminals C and D.
   - If not within the specification, replace the A/F sensor. (See 01-40-29 AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [L8, LF].)

A/F sensor heater resistance
1—10 ohms [normal temperature]

amxzzw0000004

HEATED OXYGEN SENSOR (HO2S) REMOVAL/INSTALLATION [L8, LF]

id0140i7804000

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Install the **SST** to the HO2S.
4. Remove the HO2S.
5. Install in the reverse order of removal.

HO2S tightening torque
29—49 N·m {3.0—4.9 kgf·m, 22—35 ft·lbf}

amxzzw0000012

CONTROL SYSTEM [L8, LF]

HEATED OXYGEN SENSOR (HO2S) INSPECTION [L8, LF]

id0140i7802300

HO2S Voltage Inspection

1. Warm up the engine to normal operating temperature.
2. Using the M-MDS, monitor the following:
   —Vehicle speed (PID: VSS)
   —Engine speed (PID: RPM)
   —HO2S voltage (PID: O2S12)
3. Drive the vehicle and decelerate the engine speed by releasing the accelerator pedal fully when the engine speed is **3,000 rpm or more**.
4. Verify that the HO2S outputs a voltage of **0.6 V or more**, one time or more, then verify that the HO2S voltage (PID: O2S12) is **0.3 V or less** while decelerating as shown in the figure.

e5u140zw4863

- If not within the specification, replace the HO2S. (See 01-40-30 HEATED OXYGEN SENSOR (HO2S) REMOVAL/INSTALLATION [L8, LF].)

HO2S Heater Resistance Inspection

1. Disconnect the HO2S connector.
2. Measure the HO2S resistance between terminals C and D.
   - If not within the specification, replace the HO2S. (See 01-40-30 HEATED OXYGEN SENSOR (HO2S) REMOVAL/INSTALLATION [L8, LF].)

HO2S heater resistance
2—50 ohms [normal temperature]

amxzzw0000004

CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [L8, LF]

id0140i7800600

Removal

1. Remove the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the air cleaner. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
3. Remove the drive belt. (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].)
4. Remove the under cover. (See 02-13-19 TRANSVERSE MEMBER REMOVAL/INSTALLATION.)
5. Disconnect the CKP sensor connector.
6. Remove the installation bolts to remove the CKP sensor.

CONTROL SYSTEM [L8, LF]

Installation

Caution
- **When foreign material, such as an iron chips, gets on the CKP sensor, it can cause abnormal output from the sensor because of flux turbulence and adversely affect engine control. Be sure there is no foreign material on the CKP sensor when replacing.**

1. Perform the following procedure so that piston No.1 is at the top dead center.
   (1) Move the ATF hose slightly out of the way. (AT)

e5u140zw4858

   (2) Remove the cylinder block lower blind plug and install the **SST**.
   (3) Turn the crankshaft pulley to the clockwise until it stops.

amxzzw0000145

2. Using a straight edge, draw a straight line directly in the center of the 5th tooth of the crankshaft pulley pulse wheel (counting counterclockwise from the empty space).

   Caution
   - **If the line is not accurately drawn, ignition timing, fuel injection and other engine control systems will be adversely effected. Draw the straight line carefully using a straight edge.**

e5u140zw4856

3. Align the center line of the CKP sensor and the line drawn in Step 2, then install the CKP sensor.
4. Install the CKP sensor fitting bolts.

   Tightening torque
   5.5—7.5 N·m {56—76 kgf·cm, 49—66 in·lbf}

5. Remove the **SST** then install the cylinder block lower blind plug.

   Tightening torque
   18—22 N·m {1.9—2.2 kgf·m, 14—16 ft·lbf}

6. Install in the reverse order of removal.

CONTROL SYSTEM [L8, LF]

CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [L8, LF]

id0140i7800500

Air Gap Inspection

1. Verify that the CKP sensor is securely installed.
2. Using a thickness gauge, measure the air gap between the plate projections at the back of crankshaft pulley and the CKP sensor.
   - If not within the specification, inspect the plate projections for cracks or bending.
     —If there is any malfunction, replace the crankshaft pulley. (See 01-10-35 ENGINE REMOVAL/INSTALLATION [L8, LF].)

Air gap
0.5—1.5 mm {0.02—0.05 in}

e5u140zw5503

Visual inspection

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the CKP sensor. (See 01-40-31 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
4. Verify that there are no metal shavings on the sensor.
   - Remove any metal shavings that are adhering.

Voltage Inspection

1. Idle the engine.
2. Measure the CKP sensor output wave pattern using an oscilloscope. (See 01-40-9 PCM INSPECTION [L8, LF].)
   - If not within the specification, replace the CKP sensor. (See 01-40-31 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [L8, LF].)

CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [L8, LF]

id0140i7801500

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the plug hole plate. (See 01-10-4 PLUG HOLE PLATE REMOVAL/INSTALLATION [L8, LF].)
4. Remove the front suspention tower bar (joint).(See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)

Caution
- **When replacing the camshaft position sensor, make sure there are no metal shavings adhering as they can cause the sensor output signal to malfunction from fluctuation in magnetic flux resulting in a deterioration in engine control. Cover a removed CMP sensor in plastic to protect it from foreign material adhering to it.**

5. Disconnect the CMP sensor connector.
6. Remove the CMP sensor installation bolt.
7. Remove the CMP sensor from the cylinder head cover.
8. Install in the reverse order of removal.

CMP sensor tightening torque
5.5—7.5 N·m {56—76 kgf·cm, 49—66 in·lbf}

e5u140zw4860

CONTROL SYSTEM [L8, LF]

CAMSHAFT POSITION (CMP) SENSOR INSPECTION [L8, LF]

id0140i7801400

Visual Inspection

1. Remove the battery cover. (See01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the CMP sensor. (See 01-40-33 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
4. Verify that there are no metal shavings on the sensor.
   - Remove any metal shavings that are adhering.

Voltage inspection

1. Idle the engine.
2. Measure the CMP sensor output wave pattern using an oscilloscope. (See 01-40-9 PCM INSPECTION [L8, LF].)
   - If not within the specification, replace the CMP sensor. (See 01-40-33 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION [L8, LF].)

KNOCK SENSOR (KS) REMOVAL/INSTALLATION [L8, LF]

id0140i7802900

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the dynamic chamber. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
4. Disconnect the KS connector.
5. Remove the KS installation bolt, then remove the KS.
6. Install in the reverse order of removal.

KS tightening torque
16—24 N·m {1.7—2.4 kgf·m, 12—17 ft·lbf}

e5u140zw5k01

KNOCK SENSOR (KS) INSPECTION [L8, LF]

id0140i7802800

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the KS connector.
4. Measure resistance between KS terminals A and B.
   - If not within the specification, replace the KS. (See 01-40-34 KNOCK SENSOR (KS) REMOVAL/INSTALLATION [L8, LF].)

KS Specification
Approx. 4.87 megohms [normal temperature]

01-50 TECHNICAL DATA [L8, LF]

ENGINE TECHNICAL DATA [L8, LF] . . . 01-50–1

TECHNICAL DATA [L8, LF]

ENGINE TECHNICAL DATA [L8, LF]

id0150a5800100

Item	Specification
Ignition timing	Approx. BTDC 8 °
Idle speed	No load: 670—770 rpm (MT), 700—800 rpm (AT) Electrical loads (38—48 A): 700—800 rpm Electrical loads (more than 48 A): 800—900 rpm P/S ON: 700—800 rpm (MT), 750—850 rpm (AT) A/C ON: 825—925 rpm (MT), 775—875 rpm (AT)
Idle mixture	HC concentration: Within the regulation CO concentration: Within the regulation
Valve clearance [Engine cold]	IN: 0.22—0.28 mm {0.0087—0.0110 in} EX: 0.27—0.33 mm {0.0107—0.0129 in}
Compression [L8]	Standard: 1,750 kPa {17.845 kgf/cm^2, 253.816 psi}[300 rpm] Minimum: 1,225 kPa {12.492 kgf/cm^2, 177.64 psi}[300 rpm] Maximum difference between cylinders: 196.1 kPa {2.0 kgf/cm^2, 28.5 psi}
Compression [LF]	Standard: 1,720 kPa {17.5391 kgf/cm^2, 249.465 psi}[300 rpm] Minimum: 1,204 kPa {12.277 kgf/cm^2, 174.58 psi}[300 rpm] Maximum difference between cylinders: 196.1 kPa {2.0 kgf/cm^2, 28.5 psi}
Oil control valve resistance	6.9—7.9 ohms [20°C {68°F}]
Cylinder Head Bolt Length L	145.2—145.8 mm {5.72—5.74 in}
Cylinder Head Bolt Maximum	146.5 mm {5.77 in}
Engine oil capacity (approx. quantity)	Oil replacement: 4.05 L {4.28 US qt, 3.56 Imp qt} Oil and oil filter replacement: 4.55 L {4.81 US qt, 4.00 Imp qt} Total (dry engine): 4.85 L {5.12 US qt, 4.27 Imp qt}
Oil pressure (reference value) [oil temperature: 100 °C {212 °F}]	L8: 234—521 kPa {2.39—5.31 kgf/cm^2, 33.9—75.5 psi}[3,000 rpm] LF: 337—591 kPa {3.44—6.03 kgf/cm^2, 49.0—85.8 psi}[3,000 rpm]
Engine coolant capacity (approx. quantity)	7.5 L {7.9 US qt, 6.6 Imp qt}
Cooling system cap valve opening pressure	93.2—122.6 kPa {0.95—1.25 kgf/cm^2, 13.5—17.8 psi}
Thermostat initial-opening temperature	80—84 °C {176—183 °F}
Thermostat full-open temperature	97 °C {207 °F}
Thermostat full-open lift	More than 8.0 mm {0.31 in}
Cooling fan motor standard current [12 V]	High: 9.0—12.0 A Middle: 6.4—9.4 A Low: 4.8—7.8 A
Fuel line pressure (Reference)	375—450 kPa {3.83—4.58 kgf/cm^2, 54.4—65.2 psi}
Fuel hold pressure (Reference)	200 kPa {2.04 kgf/cm^2, 29.0 psi} or more
Fuel injector resistance	11.4—12.6 ohms [20 °C {68 °F}]
Battery electrolyte specific gravity [20 °C {68 °F}]	1.22—1.29
Battery load test current	46B24L (36): 135 A
Battery back-up current (When the ignition switch is off, the ignition key is removed, and all doors are closed.)	25—45 mA
Battery slow charge current	46B24L (36): 3.5—4.5 A
Battery quick charge current [30 min]	46B24L (36): 25 A
Generator standard voltage [IG-ON]	Terminal B: B+ Terminal P: Approx. 1 V or less Terminal D: Approx. 0 V

TECHNICAL DATA [L8, LF]

Item	Specification
Generator standard voltage [Idle, 20 °C {68 °F}]	Terminal B: 13—15 V Terminal P: Approx. 3—8 V Terminal D: Turn the electrical loads (headlights, blower motor, rear window defroster, brake lights, etc.) on and verify that the voltage reading increases.
Generator generated current minimum value	70 % of the nominal output current (nominal output current: 100 A) [Ambient temp. 20 °C {68 °F}, voltage 13.0—15.0 V, both engine and generator are hot]
Generator rotor resistance (between slip rings) [20 °C {68 °F}]	1.9—2.2 ohm
Generator brush length	Standard: 22.5 mm {0.89 in} Minimum: 5.0 mm {0.20 in}
Generator brush spring force	Standard: 4.1—5.3 N {0.42—0.54 kgf, 0.92—1.19 lbf} Minimum: 1.7 N {0.17 kgf, 0.38 lbf}
Firing order	1—3—4—2 (all cylinders independent firing)
Spark plug type	L8: L303 18 110 (ITR5F13) LF: L3G2 18 110, L3Y1 18 110
Spark plug gap	Standard: 1.25—1.45 mm {0.050—0.057 in} New spark plug (reference): 1.25—1.35 mm {0.050—0.053 in}
Spark plug resistance [25 °C {77 °F}]	3.0—7.5 kilohms
Starter no-load test voltage	11 V
Starter no-load test current	90 A or less
Starter pinion gap	0.5—2.0 mm {0.02—0.07 in}
Starter armature runout	0.1 mm {0.004 in} max.
Starter commutator diameter	Standard: 29.4 mm {1.16 in} Minimum: 28.8 mm {1.13 in}
Segment groove depth of starter commutator	Standard: 0.5 mm {0.02 in} Minimum: 0.2 mm {0.008 in}
Starter brush length	Standard: 12.3 mm {0.48 in} Minimum: 5.5 mm {0.22 in}
Starter brush spring force	Standard: 15.0—20.4 N {1.53—2.08 kgf, 3.38—4.58 lbf} Minimum: 2.75 N {0.28 kgf, 0.62 lbf}

Recommended engine oil

Item	Specifications		
Grade	API SL or ACEA A3/A5	API SL or ACEA A3	API SL/SM or ACEA A3/A5
Viscosity (SAE)	5W–30	10W–40	5W–30, 5W–20, 10W–40
Remarks	**Mazda genuine Dexelia oil e.g.**		—

01-60 SERVICE TOOLS [L8, LF]

ENGINE SST [L8, LF] 01-60–1

SERVICE TOOLS [L8, LF]

ENGINE SST [L8, LF]

1: Mazda **SST** number
2: Global **SST** number
Example

1:49 UN20 5072 2:205–072 Holder	

1:49 JE01 061 2:303–507 Crankshaft TDC setting peg (Except LF MT)		1:49 N010 101 2: — Crankshaft TDC setting peg (LF MT)		1:49 UN20 507202 2: 205–072–02 Crankshaft holding tool pins	
1:49 D032 316 2: — Protractor		1:49 JE01 054 2: — Camshaft alignment timing Tool (Europe)		1:49 UN30 3376 2: 303–376 Camshaft Alignment Timing Tool (Except Europe)	
1:49 G028 205 2:— Oil seal installer		1:49 0187 280A 2: — Oil pressure gauge		1:49 E019 001 2: — Adapter	
1:49 N013 001 2:— Wrench		1:49 E017 5A0 2: — Engine support		1:49 N013 1A0D 2:— Fuel pressure gauge set	
1:49 N013 103A 2:— Remover (Part of 49 N013 1A0D)		1:49 L018 001 2: — O2 sensor wrench		1:49 UN30 3328 2: 303–328 Rear oil seal replacer	

SERVICE TOOLS [L8, LF]

1:49 G040 002 2:– Installer 	1:49 D019 908 2:– Gauge (Part of 49 D019 9A2) 	1:49 D019 909 2:– Hose (Part of 49 D019 9A2)
1:49 D019 910 2:– Adapter (Part of 49 D019 9A2) 	1:49 D019 911 2:– Adapter (Part of 49 D019 9A2) 	1:49 D019 914 2:– Adapter (Part of 49 D019 9A2)
1:49 9200 146 2:– Adapter hose (Part of 49 9200 145) 	1:49 9200 147 2:– Adapter (Part of 49 9200 145) 	1:49 UN20 5072 2:205–072 Holder
1:49 E042 001 2:— Remover 	—	—

SUSPENSION

02
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02-02 ON-BOARD DIAGNOSTIC

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ON-BOARD DIAGNOSTIC

TIRE PRESSURE MONITORING SYSTEM (TPMS) WIRING DIAGRAM

id020200800100

amxzzw0000038

ON-BOARD DIAGNOSTIC

TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS

id020200800200

On-Board Diagnostic (OBD) Test Description

- The OBD test inspects the integrity and function of the TPMS and outputs the results when requested by the specific tests.
- On-board diagnostic test also:
  —Provides a quick inspection of the TPMS usually performed at the start of each diagnostic procedure.
  —Provides verification after repairs to ensure that no other faults occurred during service.
- The OBD test is divided into 3 tests:
  —Read/clear diagnostic results, PID monitor and active command mode.

Read/clear diagnostic results

- This function allows you to read or clear DTCs in the TPMS control module memory.

PID/Data monitor and record

- This function allows you to access certain data values, input signals, calculated values, and system status information.

Active command modes

- This function allows you to control devices through the M-MDS.

Reading DTCs Procedure

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “Self Test”.
     2. Select “Modules”.
     3. Select “IC”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “IC”.
     3. Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
   - If any DTCs are displayed, perform troubleshooting according to the corresponding DTC inspection.
4. After completion of repairs, clear all DTCs stored in the TPMS. (See 02-02-2 Clearing DTCs Procedure.)

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Clearing DTCs Procedure

Note

- If the DTC clearing procedure is implemented, the TPMS warning light and flat tire warning light turn off.

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “Self Test”.
     2. Select “Modules”.
     3. Select “IC”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “IC”.
     3. Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
4. Press the clear button on the DTC screen to clear the DTC.
5. Verify that no DTCs are displayed.

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ON-BOARD DIAGNOSTIC

PID/Data Monitor and Record Procedure

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “DataLogger”.
     2. Select “Modules”.
     3. Select “IC”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “IC”.
     3. Select “DataLogger”.
3. Select the applicable PID from the PID table.
4. Verify the PID data according to the directions on the screen.

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Note

- The PID data screen function is used for monitoring the calculated value of input/output signals in the module. Therefore, if the monitored value of the output parts is not within the specification, it is necessary to inspect the monitored value of input parts corresponding to the applicable output part control. In addition, because the system does not display an output part malfunction as an abnormality in the monitored value, it is necessary to inspect the output parts individually.

Active Command Modes Procedure

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “DataLogger”.
     2. Select “Modules”.
     3. Select “IC”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “IC”.
     3. Select “DataLogger”.
3. Select the active command modes from the PID table.
4. Perform the active command modes, inspect the operations for each parts.
   - If the operation of output parts cannot be verified after the active command mode inspection is performed, this could indicate the possibility of an open or short circuit, sticking, or operation malfunction in the output parts.

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Freeze Frame PID Data Access Procedure

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - This function is available for only the IDS (laptop PC)
     1. Select “Body”.
     2. Select “TPMS Functions”.
     3. Select “Freeze Frame Data”.

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ON-BOARD DIAGNOSTIC

DTC Table

DTC No. M-MDS	Description	Page
B1342	Instrument cluster internal malfunction	(See 09-02B-3 DTC B1342 [INSTRUMENT CLUSTER].)
B2143	ID registration failure	(See 02-02-6 DTC B2143.)
B2477	Instrument cluster configuration not performed	(See 09-02B-3 DTC B2477 [INSTRUMENT CLUSTER].)
B2868	Wheel unit No.1 internal malfunction	(See 02-02-7 DTC B2868, B2869, B2870, B2871.)
B2869	Wheel unit No.2 internal malfunction	
B2870	Wheel unit No.3 internal malfunction	
B2871	Wheel unit No.4 internal malfunction	
U0127	Communication error between instrument cluster and keyless receiver	(See 02-02-8 DTC U0127.)
U2616	Wheel unit No.1 (No response)	(See 02-02-11 DTC U2616, U2617, U2618, U2619.)
U2617	Wheel unit No.2 (No response)	
U2618	Wheel unit No.3 (No response)	
U2619	Wheel unit No.4 (No response)	

PID/Data Monitor Table

PID Name (Definition)	Unit/ Condition	Condition/Specification	Action
AI_WU1_ID AI_WU2_ID AI_WU3_ID AI_WU4_ID (Wheel unit ID code (during ID registration))	—	Indicates the wheel unit ID code. (During wheel unit ID registration.)	• Replace the wheel unit. (See 02-12-5 WHEEL UNIT REMOVAL/INSTALLATION.) • Perform the wheel unit ID registration. (See 02-12-4 WHEEL UNIT ID REGISTRATION.)
AI_WU1_P AI_WU2_P AI_WU3_P AI_WU4_P (Tire pressure value (during ID registration))	Pa, psi	Indicates the tire pressure. (During ID registration.)	• Adjust tire pressure. (See 02-12-3 TIRE PRESSURE ADJUSTMENT (WITH TPMS).) • Replace the wheel unit. (See 02-12-5 WHEEL UNIT REMOVAL/INSTALLATION.) • Perform the wheel unit ID registration. (See 02-12-4 WHEEL UNIT ID REGISTRATION.)
FFD1_WU1_P FFD1_WU2_P FFD1_WU3_P FFD1_WU4_P (Tire pressure value (freeze frame PID data 1))	Pa, psi	Indicates the tire pressure. (Freeze frame PID data 1)	Adjust tire pressure. (See 02-12-3 TIRE PRESSURE ADJUSTMENT (WITH TPMS).)
FFD2_WU1_P FFD2_WU2_P FFD2_WU3_P FFD2_WU4_P (Tire pressure value (freeze frame PID data 2))	Pa, psi	Indicates the tire pressure. (Freeze frame PID data 2)	Adjust tire pressure. (See 02-12-3 TIRE PRESSURE ADJUSTMENT (WITH TPMS).)
FFD1_WU1_T FFD1_WU2_T FFD1_WU3_T FFD1_WU4_T (Internal tire air temperature value (freeze frame PID data 1))	°C, °F	Indicates the internal tire air temperature. (Freeze frame PID data 1)	Adjust tire pressure. (See 02-12-3 TIRE PRESSURE ADJUSTMENT (WITH TPMS).)

ON-BOARD DIAGNOSTIC

PID Name (Definition)	Unit/ Condition	Condition/Specification	Action
FFD2_WU1_T FFD2_WU2_T FFD2_WU3_T FFD2_WU4_T (Internal tire air temperature value (freeze frame PID data 2))	°C, °F	Indicates the internal tire air temperature. (Freeze frame PID data 2)	Adjust tire pressure. (See 02-12-3 TIRE PRESSURE ADJUSTMENT (WITH TPMS).)
FFD1_MLG (Wheel unit mileage value (freeze frame PID data 1))	m, mi (ft)	Indicates the mileage. (Freeze frame PID data 1)	Adjust tire pressure. (See 02-12-3 TIRE PRESSURE ADJUSTMENT (WITH TPMS).)
FFD2_MLG (Wheel unit mileage value (freeze frame PID data 2))	m, mi (ft)	Indicates the mileage. (Freeze frame PID data 2)	Adjust tire pressure. (See 02-12-3 TIRE PRESSURE ADJUSTMENT (WITH TPMS).)
FFD1_SPD (Wheel unit speed value (freeze frame PID data 1))	KPH, MPH	Indicates the speed. (Freeze frame PID data 1)	Adjust tire pressure. (See 02-12-3 TIRE PRESSURE ADJUSTMENT (WITH TPMS).)
FFD2_SPD (Wheel unit speed value (freeze frame PID data 2))	KPH, MPH	Indicates the speed. (Freeze frame PID data 2)	Adjust tire pressure. (See 02-12-3 TIRE PRESSURE ADJUSTMENT (WITH TPMS).)
IC_DTC_CNT (Number of continuous DTCs)	—	• DTCs detected: **1—255** • No DTCs detected: **0**	Perform the DTC inspection. (See 02-02-2 Reading DTCs Procedure.)
ID_LAST* (Last received tire transmitter ID code value)	—	Indicates the last ID that is transmitted from the wheel unit.	• Replace the wheel unit. (See 02-12-5 WHEEL UNIT REMOVAL/INSTALLATION.) • Perform the configuration.
ID_WU1* ID_WU2* ID_WU3* ID_WU4* (Registered wheel unit ID code)	—	Indicates the registered ID that is transmitted from the wheel unit.	• Replace the wheel unit. (See 02-12-5 WHEEL UNIT REMOVAL/INSTALLATION.) • Perform the wheel unit ID registration. (See 02-12-4 WHEEL UNIT ID REGISTRATION.)
WU1_P* WU2_P* WU3_P* WU4_P* (Tire pressure value)	Pa, psi	Indicates the tire pressure. (See 02-50-1 SUSPENSION TECHNICAL DATA.)	• Adjust tire pressure. (See 02-12-3 TIRE PRESSURE ADJUSTMENT (WITH TPMS).) • Replace the wheel unit. (See 02-12-5 WHEEL UNIT REMOVAL/INSTALLATION.)
WU1_T* WU2_T* WU3_T* WU4_T* (Internal tire air temperature value)	°C, °F	Indicates the internal tire air temperature.	Replace the wheel unit. (See 02-12-5 WHEEL UNIT REMOVAL/INSTALLATION.)

* : Data transmission from the wheel unit occurs when the vehicle speed is **25 km/h {15.5 mph} or more**. Due to this, the current air pressure and temperature data can only be displayed after the vehicle is driven at **25 km/h {15.5 mph} or more**. Also, the ID_LAST, and tire pressure and internal tire air temperature data are erased when the instrument cluster connector and the battery terminal are disconnected. If the instrument cluster is replaced or the battery terminals are disconnected, drive the vehicle at **25 km/h {15.5 mph} or more** and display the tire pressure PID after the data transmission.

Active Command Modes Table

Command Name	Definition	Operation	Note
IDR_MODE	Wheel unit ID registration mode	ON/OFF	Ignition switch at ON position

ON-BOARD DIAGNOSTIC

MALFUNCTIONING WHEEL UNIT IDENTIFICATION

id020200800300

Note

- The tire pressure monitoring system (TPMS) does not identify the location of the malfunctioning wheel unit on the vehicle (LF, RF, LR, RR). The TPMS identifies each wheel unit as No.1, No.2, No.3 and No.4. In order to identify the location of the wheel unit, perform the following procedure.

1. Adjust the air pressure as follows:
   —RF: **220 kPa {2.2 kgf/cm^2, 32 psi}**
   —LF: **240 kPa {2.4 kgf/cm^2, 35 psi}**
   —LR: **260 kPa {2.6 kgf/cm^2, 38 psi}**
   —RR: **280 kPa {2.8 kgf/cm^2, 40 psi}**
2. Turn the ignition switch off.
3. Connect the M-MDS to the DLC-2.
4. Turn the ignition switch to the ON position.
5. Drive the vehicle at a speed of **25 km/h {15.5 mph} or more** for **2 min or more**.
6. Select the following PIDs using the M-MDS, and monitor them. (See 02-02-2 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.)
   —WU1_P
   —WU2_P
   —WU3_P
   —WU4_P
7. Determine which wheel unit identification code matches which wheel and tire by comparing the PID monitor values with the air pressure values set in Step 1.
8. Select the ID_LAST PID using the M-MDS, and take a note of four displayed identification codes.
9. Inspect the DTCs using the M-MDS. (See 02-02-2 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.)

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DTC B2143

id020200800400

DESCRIPTION	ID registration failure
DETECTION CONDITION	• Two or more codes are overlapping.
POSSIBLE CAUSE	• ID registration procedure has not been performed properly.

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY PROGRAMMED ID** • Turn the ignition switch off. • Connect the M-MDS to the DLC-2. • Perform the PID/Data Monitor and Record Procedure and select the following PIDs using the M-MDS: (See 02-02-2 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.) —ID_WU1 —ID_WU2 —ID_WU3 —ID_WU4 • Turn the ignition switch to the ON position. • Is the same code in the output ID?	Yes	Perform the instrument cluster configuration, register the wheel unit ID, and then go to the next step. (See 09-22-3 INSTRUMENT CLUSTER CONFIGURATION.) (See 02-12-4 WHEEL UNIT ID REGISTRATION.)
		No	Go to the next step.
2	**VERIFY TROUBLESHOOTING COMPLETED** • Perform the Clearing DTCs Procedure. (See 02-02-2 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.) • Drive the vehicle at a speed of **25 km/h {15.5 mph} or more** for **10 min or more**. • Perform the Reading DTCs Procedure. (See 02-02-2 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.) • Is the same DTC present?	Yes	Repeat the inspection from Step 1. If the malfunction recurs: • Replace the instrument cluster and/or wheel unit, then go to the next step. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.) (See 02-12-5 WHEEL UNIT REMOVAL/INSTALLATION.)
		No	Go to the next step.
3	**VERIFY AFTER REPAIR PROCEDURE** • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 02-02-2 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.)
		No	DTC troubleshooting completed.

DTC B2868, B2869, B2870, B2871

id020200800500

DESCRIPTION	**B2868**	**Wheel unit No.1 internal malfunction**
	B2869	**Wheel unit No.2 internal malfunction**
	B2870	**Wheel unit No.3 internal malfunction**
	B2871	**Wheel unit No.4 internal malfunction**
DETECTION CONDITION	• The instrument cluster receives error signal from the each wheel unit.	
POSSIBLE CAUSE	• Internal malfunction of wheel unit	

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**IDENTIFY MALFUNCTIONING WHEEL UNIT** • Identify the malfunctioning wheel unit. (See 02-02-6 MALFUNCTIONING WHEEL UNIT IDENTIFICATION.) • Is there any malfunctioning wheel unit?	Yes	Replace and register the malfunctioning wheel unit, then go to the next step. (See 02-12-5 WHEEL UNIT REMOVAL/INSTALLATION.) (See 02-12-4 WHEEL UNIT ID REGISTRATION.)
		No	Go to the next step.
2	**VERIFY TROUBLESHOOTING COMPLETED** • Perform the Clearing DTCs Procedure. (See 02-02-2 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.) • Drive the vehicle at a speed of **25 km/h {15.5 mph} or more** for **10 min or more**. • Perform the Reading DTCs Procedure. (See 02-02-2 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.) • Is the same DTC present?	Yes	Repeat the inspection from Step 1.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC

STEP	INSPECTION		ACTION
3	**VERIFY AFTER REPAIR PROCEDURE** • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 02-02-2 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.)
		No	DTC troubleshooting completed.

DTC U0127

id020200800600

DESCRIPTION	Communication error between instrument cluster and keyless receiver
DETECTION CONDITION	• The instrument cannot receive a signal from the keyless receiver.
POSSIBLE CAUSE	• Keyless receiver connector or terminals malfunction • Keyless control module connector or terminals malfunction • Instrument cluster connector or terminals malfunction • Short to ground in the wiring harness between the following terminals: — Keyless control module terminal 3R—Instrument cluster terminal 2V — Keyless control module terminal 3S—Keyless receiver terminal A — Keyless control module terminal 3U—Keyless receiver terminal C • Short to power supply in the wiring harness between the following terminals: — Keyless control module terminal 3R—Instrument cluster terminal 2V — Keyless control module terminal 3S—Keyless receiver terminal A — Keyless control module terminal 3U—Keyless receiver terminal C • Open circuit in the wiring harness between the following terminals: — Keyless control module terminal 3R—Instrument cluster terminal 2V — Keyless control module terminal 3S—Keyless receiver terminal A — Keyless control module terminal 3U—Keyless receiver terminal C • Keyless receiver malfunction • Keyless control module malfunction • Instrument cluster malfunction

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT KEYLESS RECEIVER CONNECTOR AND TERMINALS** • Turn the ignition switch off. • Disconnect the negative battery cable. • Disconnect the keyless receiver connector. • Inspect the connector and terminals (corrosion, damage, pin disconnection). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
2	**INSPECT KEYLESS CONTROL MODULE CONNECTOR AND TERMINALS** • Disconnect the keyless control module connector. • Inspect the connector and terminals (corrosion, damage, pin disconnection). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
3	**INSPECT INSTRUMENT CLUSTER CONNECTOR AND TERMINALS** • Disconnect the instrument cluster connector. • Inspect the connector and terminals (corrosion, damage, pin disconnection). • Is there any malfunction?	Yes	Repair or replace the connector or terminals, then go to Step 9.
		No	Go to the next step.
4	**INSPECT WHEEL UNIT SIGNAL CIRCUIT FOR SHORT TO GROUND** • Keyless receiver, keyless control module and instrument cluster connectors are disconnected. • Inspect for continuity between the following terminal (wiring harness-side) and body ground: — Keyless control module terminal 3R — Keyless control module terminal 3S — Keyless control module terminal 3U • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground, then go to Step 9.
		No	Go to the next step.
5	**INSPECT WHEEL UNIT SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY** • Keyless receiver, keyless control module and instrument cluster connectors are disconnected. • Reconnect the negative battery cable. • Turn the ignition switch to the ON position. • Measure the voltage at the following terminal (wiring harness-side): — Keyless control module terminal 3R — Keyless control module terminal 3S — Keyless control module terminal 3U • Is there any voltage?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 9.
		No	Go to the next step.
6	**INSPECT WHEEL UNIT SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Keyless receiver, keyless control module and instrument cluster connectors are disconnected. • Turn the ignition switch to off position. • Disconnect the negative battery cable. • Inspect for continuity between the following terminals (wiring harness-side): — Keyless control module terminal 3R— Instrument cluster terminal 2V — Keyless control module terminal 3S— Keyless receiver terminal A — Keyless control module terminal 3U— Keyless receiver terminal C • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 9.

ON-BOARD DIAGNOSTIC

STEP	INSPECTION		ACTION
7	**INSPECT KEYLESS RECEIVER** • Reconnect the keyless receiver, keyless control module and instrument cluster connectors. • Inspect the keyless receiver. (See 09-14-21 KEYLESS RECEIVER INSPECTION.) • Is there any malfunction?	Yes	Replace the keyless receiver, then go to Step 9. (See 09-14-20 KEYLESS RECEIVER REMOVAL/ INSTALLATION.)
		No	Go to the next step.
8	**INSPECT KEYLESS CONTROL MODULE** • Inspect the keyless control module. (See 09-14-17 KEYLESS CONTROL MODULE INSPECTION.) • Is there any malfunction?	Yes	Replace the keyless control module, then go to the next step. (See 09-14-14 KEYLESS CONTROL MODULE REMOVAL/ INSTALLATION.)
		No	Go to the next step.
9	**VERIFY TROUBLESHOOTING COMPLETED** • Make sure to reconnect the disconnected connectors. • Reconnect the negative battery cable. • Perform the Clearing DTCs Procedure. (See 02-02-2 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.) • Turn the ignition switch to the ON position and wait for **30 s or more**. • Perform the Reading DTCs Procedure. (See 02-02-2 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.) • Is the same DTC present?	Yes	Repeat the inspection from Step 1. If the malfunction recurs: • Replace the instrument cluster, then go to the next step. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Drive the vehicle at a speed of **25 km/h {15.5 mph} or more** for **10 min or more**. • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 02-02-2 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC

DTC U2616, U2617, U2618, U2619

id020200800700

DESCRIPTION	**U2616**	**Wheel unit No.1 (No response)**
	U2617	**Wheel unit No.2 (No response)**
	U2618	**Wheel unit No.3 (No response)**
	U2619	**Wheel unit No.4 (No response)**
DETECTION CONDITION	• The keyless receiver has continuously not received a signal from the wheel unit for a certain period.	
POSSIBLE CAUSE	• Mis-installation of wheel unit • Wheel unit malfunction — No signal is received from the wheel unit. • Instrument cluster malfunction — Wheel unit identification code is not registered in the instrument cluster.	

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY WHEEL UNIT IS INSTALLED TO EACH WHEEL** • Visually inspect the wheel unit. • Are all four wheels equipped with a wheel unit?	Yes	Go to the next step.
		No	Install and register the wheel unit, then go to Step 4. (See 02-12-5 WHEEL UNIT REMOVAL/INSTALLATION.) (See 02-12-4 WHEEL UNIT ID REGISTRATION.)
2	**IDENTIFY MALFUNCTIONING WHEEL UNIT** • Identify the malfunctioning wheel unit. (See 02-02-6 MALFUNCTIONING WHEEL UNIT IDENTIFICATION.) • Is there any malfunctioning wheel unit?	Yes	Replace and register the malfunctioning wheel unit, then go to the next step. (See 02-12-5 WHEEL UNIT REMOVAL/INSTALLATION.) (See 02-12-4 WHEEL UNIT ID REGISTRATION.)
		No	Go to the next step.
3	**VERIFY TROUBLESHOOTING COMPLETED** • Perform the Clearing DTCs Procedure. (See 02-02-2 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.) • Drive the vehicle at a speed of **25 km/h {15.5 mph} or more** for **10 min or more**. • Perform the Reading DTCs Procedure. (See 02-02-2 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.) • Is the same DTC present?	Yes	Repeat the inspection from Step 1. If the malfunction recurs: • Replace the instrument cluster, then go to the next step. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
		No	Go to the next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 02-02-2 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.)
		No	DTC troubleshooting completed.

Note

- If the installed wheel unit ID number is known, verification of whether the instrument cluster is receiving data from the wheel unit can be easily confirmed using the following procedure:
  1. Drive the vehicle at **25 km/h {15.5 mph} or more**, and send data from the wheel unit.
  2. Select ID_LAST PID and monitor the data. (See 02-02-2 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.)
  3. Verification that the instrument cluster is receiving data is possible if the monitored ID number matches the installed wheel unit ID number.
- If the wheel unit has been newly replaced, the TPMS warning light may flashes before the ID registration is complete, and DTC U2616, U2617, U2618 and U2619 may be stored in the memory. In this case, re-implement the wheel unit ID registration, and after confirming that the TPMS warning light is no longer flashing, erase the DTC. If the TPMS warning light does not go out, a malfunction on any one of the wheel units may have occurred and the ID registration will not have been correctly performed. Repeat the diagnostic procedure from Step 1 and perform and inspection.

02-03 SYMPTOM TROUBLESHOOTING

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SYMPTOM TROUBLESHOOTING

SYSTEM WIRING DIAGRAM

id020300801100

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FOREWORD

id020300800200

- Before performing the steps in Symptom Troubleshooting, perform the On-board Diagnostic Inspection. To check the DTC, follow the DTC Inspection steps. (See 02-02-2 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.)

PRECAUTION

id020300800300

Intermittent Concern Troubleshooting
Vibration method

- If malfunction occurs or becomes worse while driving on a rough road or when the engine is vibrating, perform the steps below.

Note

- There are several reasons why vehicle or engine vibration could cause an electrical malfunction. Some of the things to check for are:
  — Connectors not fully seated.
  — Wire harnesses not having full play.
  — Wires laying across brackets or moving parts.
  — Wires routed too close to hot parts.
- An improperly routed, improperly clamped, or loose harness can cause wiring to become pinched between parts.
- The connector joints, points of vibration, and places where wire harnesses pass through the firewall, body panels and other panels are the major areas to be checked.

SYMPTOM TROUBLESHOOTING

Inspection method for switch and/or sensor connectors or wires

1. Connect M-MDS to DLC-2.
2. Turn the ignition switch to the ON position (engine off).

Note
- If engine starts and runs, perform the following steps at idle.

3. Access PIDs for the switch you are inspecting.
4. Turn switch on manually.
5. Shake each connector or wire harness a bit vertically and horizontally while monitoring the PID.
   - If PID value is unstable, check for poor connection.

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Inspection method for sensors

1. Connect M-MDS to DLC-2.
2. Turn the ignition switch to the ON position (engine off).

Note
- If engine starts and runs, perform the following steps at idle.

3. Access PIDs for the switch you are inspecting.
4. Vibrate the sensor slightly with your finger.
   - If PID value is unstable or malfunction occurs, check for poor connection and/or poorly mounted sensor.

Connector terminal check method

1. Check the connection condition of each female terminal.
2. Insert male terminal; fit the female terminal side to female terminal and check to see whether the malfunction is in the female terminal or not.

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SYMPTOM TROUBLESHOOTING

id020300800400

NO.	TROUBLESHOOTING ITEM	PAGE
1	TPMS warning light illuminates continuously	(See 02-03-3 NO.1 TPMS WARNING LIGHT ILLUMINATES CONTINUOUSLY.)
2	TPMS warning light (low pressure warning) illuminates after engine start and turns off after driving for a period of time	(See 02-03-3 NO.2 TPMS WARNING LIGHT (LOW PRESSURE WARNING) ILLUMINATES AFTER ENGINE START AND TURNS OFF AFTER DRIVING FOR PERIOD OF TIME.)
3	Wheel unit ID registration cannot be performed (TPMS warning light flashes)	(See 02-03-4 NO.3 WHEEL UNIT ID REGISTRATION CANNOT BE PERFORMED (TPMS WARNING LIGHT FLASHES).)

SYMPTOM TROUBLESHOOTING

NO.1 TPMS WARNING LIGHT ILLUMINATES CONTINUOUSLY

id020300800500

Caution

- **The tire pressure cannot be measured accurately after driving for a long period due to the internal temperature and pressure. Stop the vehicle for approx. 1 hour and then perform the tire pressure measurement and adjustment.**
- **Use a high accuracy digital gauge for measurement of the tire pressure.**

Note

- If the DTC clearing procedure is implement, the TPMS warning light turns off.

1	**TPMS warning light illuminates continuously**
POSSIBLE CAUSE	• Tire pressure is lower than the specification (such as loss of air pressure due to puncture).

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT TIRE** • Visually inspect the tire. • Is there any foreign object adhering to the tire?	Yes	Remove any foreign object. Replace the tire if necessary, then go to the next step.
		No	Go to the next step.
2	**INSPECT TIRE PRESSURE** • Measure the tire pressure when the tires are cold. • Is the tire pressure lower than the specification?	Yes	Adjust the tire pressure to the specification when the tires are cold, then go to the next step.
		No	Go to the next step.
3	**VERIFY TPMS WARNING LIGHT** • Dose the TPMS warning light turn off?	Yes	Symptom troubleshooting completed. Explain to the customer what has been repaired.
		No	Go to the next step.
4	**VERIFY TPMS WARNING LIGHT AGAIN** • Drive the vehicle at **25 km/h {15.5 mph}** for **10 min**. • Does the TPMS warning light turn off?	Yes	Symptom troubleshooting completed. Explain to the customer what has been repaired.
		No	Adjust the tire pressure to the specification while the tires are cold, then return to Step 1. **Note** • If the TPMS warning light does not turn off after repeating this step, the tire may be flat.

NO.2 TPMS WARNING LIGHT (LOW PRESSURE WARNING) ILLUMINATES AFTER ENGINE START AND TURNS OFF AFTER DRIVING FOR PERIOD OF TIME

id020300800600

Caution

- **The tire pressure cannot be measured accurately after driving for a long period due to increased internal temperature and pressure. Stop the vehicle for approx. 1 hour and then perform the tire pressure measurement and adjustment.**
- **Use a high accuracy digital gauge for measurement of the tire pressure.**

Note

- The tire pressure normally decreases by **approx. 7 kPa {0.07 kgf/cm^2, 1.02 psi}** per month even if the tire is normal.
- The snapshot (temperature and pressure) stored when the TPMS warning light is turned on and off can be verified by operating the M-MDS.

2	**TPMS warning light (low pressure warning) illuminates after engine start and turns off after driving for a period of time**
POSSIBLE CAUSE	• The tire pressure decreases (approaches value to illuminate TPMS warning light) when the internal temperature of the tire is low.

SYMPTOM TROUBLESHOOTING

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT TIRE** • Visually inspect the tire. • Is there any foreign object adhering to the tire?	Yes	Remove any foreign object. Replace the tire if necessary, then go to the next step.
		No	Go to the next step.
2	**INSPECT TIRE PRESSURE** • Measure the tire pressure when the tires are cold. • Has the tire pressure decreased (approaches value to illuminate TPMS warning light)?	Yes	Adjust the tire pressure to the specification when the tires are cold, then go to the next step.
		No	Go to the next step.
3	**VERIFY MALFUNCTION** • Is the malfunction corrected?	Yes	Symptom troubleshooting completed.
		No	Verify the symptom troubleshooting again and return to Step 1, if the malfunction recurs.

NO.3 WHEEL UNIT ID REGISTRATION CANNOT BE PERFORMED (TPMS WARNING LIGHT FLASHES)

id020300800900

Caution

- **Activate the wheel unit ID registration mode using the M-MDS, and perform the following steps if the TPMS warning light does not turn off after driving at 25 km/h {15.5 mph} or more for 10 min or more.**

3	**Wheel unit ID registration cannot be performed (TPMS warning light flashes)**
POSSIBLE CAUSE	• New wheel unit malfunction (caused when installing to wheel). • Any malfunction on an old wheel unit which has not been replaced.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM WHEEL UNIT ID REGISTRATION** • Connect the M-MDS to the DLC-2. • Display the wheel unit ID registration condition (ID and tire pressure table) using the M-MDS. (See 02-02-2 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.) • Temporarily remove the battery and reinstall it immediately. **Note** • If the battery is removed, the tire pressure data for WU1_P to WU4_P stored in the instrument cluster is reset. • Tire pressure is **0 kPa {0 kgf/cm^2, 0 psi}** when it is displayed again using the M-MDS. • Set the tire pressure for the four wheels separately. • Perform the wheel unit ID registration using the M-MDS. (See 02-12-4 WHEEL UNIT ID REGISTRATION.) • Can the ID be registered?	Yes	Symptom troubleshooting completed. Adjust the tire pressure on four wheels, and then return the vehicle to the customer.
		No	Go to the next step.
2	**IDENTIFY UNREGISTERED WHEEL UNIT** • Identify the malfunctioning wheel unit. (See 02-02-6 MALFUNCTIONING WHEEL UNIT IDENTIFICATION.) • Is the wheel unit for which the ID could not be registered a new wheel unit?	Yes	Replace with a new wheel unit, then go to Step 4. (See 02-12-5 WHEEL UNIT REMOVAL/INSTALLATION.)
		No	Go to the next step.
3	Replace the old wheel unit, then go to the next step (any malfunction on an old wheel unit which has not been replaced). (See 02-12-5 WHEEL UNIT REMOVAL/INSTALLATION.)		

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION		ACTION
4	**PERFORM WHEEL UNIT ID REGISTRATION** • Perform the wheel unit ID registration using the M-MDS again. (See 02-12-4 WHEEL UNIT ID REGISTRATION.) • Can the ID be registered?	Yes	Symptom troubleshooting completed.
		No	Verify the symptom troubleshooting again and return to Step 1, if the malfunction recurs.

02-10 GENERAL PROCEDURES

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Connector Disconnection **02-10–1**

GENERAL PROCEDURES

GENERAL PROCEDURES (SUSPENSION)

id021000800300

Wheel And Tire Installation

1. When installing the wheels and tires, tighten the wheel nuts in a criss-cross pattern to the following tightening torque.

   Tightening torque
   88—118 N·m {9.0—12.0 kgf·m, 65.0—87.0 ft·lbf}

Suspension Links Removal/Installation

1. For the joint sections with rubber bushings, raise the vehicle using a lift, and then temporarily tighten the installation bolts and nuts. Lower the vehicle to the ground and tighten them completely with the specified torque.

Connector Disconnection

1. Disconnect the negative battery cable before performing any work that requires handling of connectors. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)

02-11 WHEEL ALIGNMENT

WHEEL ALIGNMENT
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WHEEL ALIGNMENT

WHEEL ALIGNMENT PRE-INSPECTION

id021100119800

1. Park the vehicle on level ground, in an unloaded condition*, and with the wheels straight forward.
2. Inspect the tire pressure.
   - Adjust to the recommended pressure if necessary. (See 02-50-1 SUSPENSION TECHNICAL DATA.)
3. Inspect the wheel bearing play.
   - Correct if necessary. (See 03-11-1 WHEEL HUB, STEERING KNUCKLE INSPECTION.) (See 03-12-2 WHEEL HUB, REAR KNUCKLE INSPECTION.)
4. Inspect the wheel runout.
   - Correct if necessary. (See 02-50-1 SUSPENSION TECHNICAL DATA.)
5. Rock the vehicle, and verify that there is no looseness in the steering wheel joint and suspension ball joint.
6. Rock the vehicle, and verify that the shock absorber operates properly.
7. Measure height H from the center of the wheel to the fender brim.
8. Verify that the difference between the left and right dimension H is within the specification.
   - If it exceeds the specification, repeat the Step 2—7.

Standard
10 mm {0.39 in} or less

*: Unloaded vehicle.....Fuel tank is full. Engine coolant and engine oil are at specified level. Jack and tools are in designated position.

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WHEEL ALIGNMENT

FRONT WHEEL ALIGNMENT

id021100800200

Front wheel alignment [16-inch wheel]

Item			Specification
Total toe-in	Tire [Tolerance ±4 mm {0.15 in}]	(mm {in})	1.6 {0.063}
	Rim inner	(mm {in})	1.1±2.6 {0.04±0.10}
		degree	0°09′±22′
Steering angle [Tolerance ±3°]		Inner	38°42′
		Outer	32°54′
Steering axis inclination (Reference value)			10°57′
Camber [Tolerance ±1°]	Vehicle height: From the end of the front fender to the center of the wheel (mm {in})	356—365 {14.1—14.3}	-0°34′
		366—375 {14.5—14.7}	-0°19′
		376—385 {14.8—15.1}	-0°07′
		386—395 {15.2—15.5}	0°04′
		396—405 {15.6—15.9}	0°12′
Caster [Tolerance ±1°]	Vehicle height: From the end of the rear fender to the center of the wheel (mm {in})	354—363 {14.0—14.2}	6°32′
		364—373 {14.4—14.6}	6°17′
		374—383 {14.8—15.0}	6°02′
		384—393 {15.2—15.4}	5°47′
		394—403 {15.6—15.8}	5°32′

Front wheel alignment [17-inch wheel]

Item			Specification
Total toe-in	Tire [Tolerance ±4 mm {0.15 in}]	(mm {in})	1.6 {0.063}
	Rim inner	(mm {in})	1.1±2.8 {0.04±0.11}
		degree	0°09′±22′
Steering angle [Tolerance ±3°]		Inner	38°42′
		Outer	32°54′
Steering axis inclination (Reference value)			11°04′
Camber [Tolerance ±1°]	Vehicle height: From the end of the front fender to the center of the wheel (mm {in})	351—360 {13.8—14.1}	-0°42′
		361—370 {14.3—14.5}	-0°26′
		371—380 {14.7—14.9}	-0°13′
		381—390 {15.0—15.3}	-0°01′
		391—400 {15.4—15.7}	0°08′
Caster [Tolerance ±1°]	Vehicle height: From the end of the rear fender to the center of the wheel (mm {in})	349—358 {13.8—14.0}	6°40′
		359—368 {14.2—14.4}	6°25′
		369—378 {14.6—14.8}	6°10′
		379—388 {15.0—15.2}	5°55′
		389—398 {15.4—15.6}	5°40′

Note

- Unloaded vehicle: Fuel tank is full. Engine coolant and engine oil are at specified level. Jack and tools are in designated position.
- Difference between the left and right dimension for camber and caster is within **1**°.

WHEEL ALIGNMENT

Steering Angle Adjustment

1. Loosen the locknut of the tie-rod end.
2. Remove the rack boot clamp.
3. Rotate the tie rod and adjust the steering angle.

Standard steering angle
Inner: 38°42′±3°
Outer: 32°54′±3°

Note
- Rotate and adjust the tie rod. The difference between the right and left dimension L shown in the figure should be within the specification.

Standard
3 mm {0.12 in} or less

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4. Tighten the locknut of the tie-rod end.

Tightening torque
68.6—98.0 N·m {7.00—9.99 kgf·m, 50.6—72.2 ft·lbf}

5. Correct the rack boot deformation.
6. Install and fix the rack boot clamp.
7. After adjusting the steering angle, always inspect and adjust the total toe-in. (See 02-11-5 Total Toe-in Adjustment.)

Camber Adjustment

Caution
- **Adjust the camber before adjusting the caster.**

1. Loosen the fixing nut of the adjusting cam bolt (front lower arm front side).

chu0211w006

WHEEL ALIGNMENT

2. Rotate the adjusting cam bolt in either direction to adjust the camber.

e5u211zw5001

Vehicle equipped with 16-inch wheel

Vehicle height*	Camber
356—365 {14.1—14.3}	-0°34′
366—375 {14.5—14.7}	-0°19′
376—385 {14.8—15.1}	-0°07′
386—395 {15.2—15.5}	0°04′
396—405 {15.6—15.9}	0°12′

Vehicle equipped with 17-inch wheel

Vehicle height*	Camber
351—360 {13.8—14.1}	-0°42′
361—370 {14.3—14.5}	-0°26′
371—380 {14.7—14.9}	-0°13′
381—390 {15.0—15.3}	0°01′
391—400 {15.4—15.7}	0°08′

* : From the end of the front fender to the center of the wheel (mm {in})

	Left wheel	Right wheel
Positive direction	Clockwise	Counterclockwise
Negative direction	Counterclockwise	Clockwise

3. Tighten the nut.

Tightening torque
117.7—137.3 N·m {12.1—14.0 kgf·m, 86.9—101.2 ft·lbf}

4. Adjust the total toe-in. (See 02-11-5 Total Toe-in Adjustment.)

Caster Adjustment

Caution
- **Adjust the caster after adjusting the camber.**

1. Loosen the installation nut of the adjusting cam bolt (front lower arm rear side).

chu0211w027

WHEEL ALIGNMENT

2. Rotate the adjusting cam bolt in either direction to adjust the caster.

Vehicle equipped with 16-inch wheel

Vehicle height*	Caster
354—363 {14.0—14.2}	6°32′
364—373 {14.4—14.6}	6°17′
374—383 {14.8—15.0}	6°02′
384—393 {15.2—15.4}	5°47′
394—403 {15.6—15.8}	5°32′

Vehicle equipped with 17-inch wheel

Vehicle height*	Caster
349—358 {13.8—14.0}	6°40′
359—368 {14.2—14.4}	6°25′
369—378 {14.6—14.8}	6°10′
379—388 {15.0—15.2}	5°55′
389—398 {15.4—15.6}	5°40′

* : From the end of the rear fender to the center of the wheel (mm {in})

chu0211w022

	Left wheel	Right wheel
Increase	Counterclockwise	Clockwise
Decrease	Clockwise	Counterclockwise

3. Tighten the nut.

   Tightening torque
   117.7—137.3 N·m {12.1—14.0 kgf·m, 86.9—101.2 ft·lbf}

4. Adjust the camber and total toe-in. (See 02-11-5 Total Toe-in Adjustment.)

Total Toe-in Adjustment

1. Loosen the locknut of the tie-rod end.
2. Remove the rack boot clamp.
3. Adjust the total toe-in by rotating each tie rod (left and right) in the opposite directions by the same amount respectively.

   Total Toe-in Standard
   1.6±4 mm {0.063±0.15 in} (0°09′±22′)

   Note
   - Toe angle changes by **approx. 3.3 mm {0.13 in}** per one rotation of the tie rod for one wheel.
   - Each tie rod has a left-hand thread. When increasing the toe-in angle, rotate the right tie rod toward the rear of the vehicle, and rotate the left tie rod toward the front of the vehicle by the same amount.

4. Tighten the locknut of the tie-rod end.

   Tightening torque
   68.6—98.0 N·m {7.00—9.99 kgf·m, 50.6—72.2 ft·lbf}

5. Verify that the rack boot does not have any twisting, and install the rack boot clamp.

WHEEL ALIGNMENT

REAR WHEEL ALIGNMENT

id021100800300

Rear wheel alignment [16-inch wheel]

Item			Specification
Total toe-in	Tire [Tolerance ±4 mm {0.15 in}] (mm {in})		3 {0.12}
	Rim inner (mm {in})		1.8±2.4 {0.071±0.094}
	degree		0°17′±22′
Camber [Tolerance ±1°]	Vehicle height: From the end of the rear fender to the center of the wheel (mm {in})	354—363 {14.0—14.2}	-1°33′
		364—373 {14.4—14.6}	-1°18′
		374—383 {14.8—15.0}	-1°04′
		384—393 {15.2—15.4}	-0°54′
		394—403 {15.6—15.8}	-0°45′

Rear wheel alignment [17-inch wheel]

Item			Specification
Total toe-in	Tire [Tolerance ±4 mm {0.15 in}] (mm {in})		3 {0.12}
	Rim inner (mm {in})		2.2±2.8 {0.083±0.110}
	degree		0°17′±22′
Camber [Tolerance ±1°]	Vehicle height: From the end of the rear fender to the center of the wheel (mm {in})	349—358 {13.8—14.0}	-1°42′
		359—368 {14.2—14.4}	-1°25′
		369—378 {14.6—14.8}	-1°11′
		379—388 {15.0—15.2}	-0°59′
		389—398 {15.4—15.6}	-0°49′

Note

- Unloaded vehicle: Fuel tank is full. Engine coolant and engine oil are at specified level. Jack and tools are in designated position.
- Difference between the left and right camber angle is within **1**°.

Camber Adjustment

1. Loosen the fixing nut of the adjusting cam bolt (rear lateral link (lower)).

chu0211w008

2. Rotate the adjusting cam bolt in either direction to adjust the camber.

e5u211zw5004

Vehicle equipped with 16-inch wheel

Vehicle height*	Camber
354—363 {14.0—14.2}	-1°33′
364—373 {14.4—14.6}	-1°18′
374—383 {14.8—15.0}	-1°04′
384—393 {15.2—15.4}	-0°54′
394—403 {15.6—15.8}	-0°45′

Vehicle equipped with 17-inch wheel

Vehicle height*	Camber
349—358 {13.8—14.0}	-1°42′
359—368 {14.2—14.4}	-1°25′

WHEEL ALIGNMENT

Vehicle height*	Camber
369—378 {14.6—14.8}	-1°11′
379—388 {15.0—15.2}	-0°59′
389—398 {15.4—15.6}	-0°49′

*: From the end of the rear fender to the center of the wheel (mm {in})

	Left wheel	Right wheel
Positive direction	Counterclockwise	Clockwise
Negative direction	Clockwise	Counterclockwise

Note
- Refer to the figure for the adjusting angle per one graduation.

3. Tighten the nut.

Tightening torque
117.7—137.3 N·m {12.1—14.0 kgf·m, 86.9—101.2 ft·lbf}

chu0211w010

Total Toe-in Adjustment

1. Loosen the installation nut of the adjusting cam bolt.

e5u211zw5003

2. Rotate the adjusting cam bolt in either direction to adjust the toe-in.

Standard
3±4 mm {0.08±0.15 in} (0°17′±22′)

chu0211w012

Note
- Refer to the following figure for the adjusting angle per one graduation of the toe-in gauge.

3. Tighten the nut.

Tightening torque
70—95 N·m {7.2—9.6 kgf·m, 52—70 ft·lbf}

chu0211w013

02-12 WHEEL AND TIRES

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WHEEL AND TIRES

WHEEL AND TIRE SPECIFICATION

Wheel and tire

Item			Specification		
Standard tire and wheel					
Wheel	Size		16 × 6 1/2JJ	16 × 6 1/2J	17 × 7J
	Offset	(mm {in})	55 {2.17}		
	Pitch circle diameter	(mm {in})	114.3 {4.50}		
	Material		Steel	Aluminum alloy	
Tire	Size		205/50R16 87V		205/45R17 84W
	Air pressure (kPa {kgf/cm^2, psi})	Front	200 {2.0, 29}		
		Rear	200 {2.0, 29}		
	Remaining tread	(mm {in})	1.6 {0.06}		
Wheel and tire	Wheel and tire runout (mm {in})	Radial direction	1.5 {0.06} max.		
		Lateral direction	2.5 {0.10} max.	2.0 {0.08} max.	
	Wheel imbalance	(g {oz})	9 {0.3} max.	Adhesive-type*1: 14 {0.49} max. Knock-type*2: 9 {0.3} max	Adhesive-type*1: 13 {0.46} max Knock-type*2: 8 {0.28} max

*1 : Total weight exceeds **160 g {5.65 oz}**.
*2 : One balance weight: **60 g {2.12 oz}** max. If the total weight exceeds **100 g {3.53 oz}** on one side, rebalance after moving the tire around on the rim. Do not use three or more balance weights.

WHEEL AND TIRES

WHEEL BALANCE ADJUSTMENT (ALUMINUM ALLOY WHEEL)

id021200104300

Caution
- **Adjust the outer wheel balance first, then the inner wheel balance.**
- **Be careful not to scratch the wheels.**

Adhesive-type Balance Weight (Outer)

1. Remove the old balance weight from the wheel.
2. Remove the double-sided adhesive tape remaining on the wheel, then clean and degrease the bonding area.
3. Set the wheel on a wheel balancer, measure the amount of unbalance and the position with the mode set for knock-type balance weight.
4. Multiply the amount of unbalance by **1.6** to obtain the balance weight value.
5. Select a balance weight closest to the weight value and attach the balance weight on the position (outer) indicated by the wheel balancer.

   Example calculation of balance weight value
   Indicated amount of unbalance: 23 g {0.81 oz}
   23 g {0.81 oz}×1.6 = 36.8 g {1.30 oz}
   Selected balance weight value: 35 g {1.24 oz}

   Note
   - When selecting a balance weight, select one closest to the calculated value.
     Example: **32.4 g {1.14 oz} = 30 g {1.06 oz}**

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   Caution
   - **Use a genuine balance weight or equivalent (steel).**
   - **When attaching the weight, press the weight with a force of 25 N {2.5 kgf, 5.5 lbf} per 5 g for 2 s or more.**

6. If attaching tow balance weights, position them so that each is on either side of the position indicated by the wheel balancer.

   Caution
   - **Do not attach weight balances in a row.**
   - **Do not overlap the balance weights.**
   - **Total weight must not exceed 160 g {5.65 oz}.**

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WHEEL AND TIRES

Knock-type Balance Weight (Inner)

1. Measure the amount of unbalance with a wheel balancer.
2. Attach a weight corresponding to the measured weight value on the position (inner) indicated by the wheel balancer.

Caution

- **Do not attach three or more balance weights.**
- **One balance weight must not exceed 60 g {2.12 oz}, and a total of tow balance weights must not exceed 100 g {3.53 oz}.**

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Remaining Amount of Unbalance Confirmation

1. After installing the outer and inner balance weights, operate the wheel balancer again.
2. Confirm that the remaining unbalance does not exceed the following on either side.
   - If the remaining unbalance exceeds the specifications, adjust the wheel balance again.

Specifications

	Outer (Adhesive-type)	Inner (Knock-type)
16 inch wheel	14 g {0.49 oz}	9 g {0.3 oz}
17 inch wheel	13 g {0.46 oz}	8 g {0.28 oz}

TIRE PRESSURE ADJUSTMENT (WITH TPMS)

id021200800300

1. Use of a digital gauge is recommended for accurate measurement of the air pressure.
2. Tire pressure lowers gradually as time passes. Due to this, monthly air pressure inspection is recommended.
3. Perform tire pressure adjustment before driving. (When tires are cold.)
   - Tire pressure will increase after driving because the internal temperature of the tire is high. If tire pressure is adjusted to specifications when the internal temperature of the tire is high, tire pressure will decrease when the internal temperature of the tire decreases to the same level as ambient temperature. If the tire pressure is lower than the lower-limit pressure, the TPMS warning light may illuminate.
   - Even though the air pressure is adjusted to specifications, the indicated air pressure may be higher than the specified value when the internal temperature of the tire is higher than ambient temperature. (Example: Air pressure changes approx.**10 kPa {0.1 kgf/cm^2, 1.5 psi}** when the temperature changes **10 degrees**)

Caution

- **In an area or a season with varying temperatures, tire pressure will change due to ambient temperature change. If the tire pressure is lower than the lower-limit pressure due to low ambient temperature, the TPMS warning light may illuminate. Adjust the pressure when the TPMS warning light illuminates.**
- **Do not tilt or use excessive side force when checking air pressure or inflating the tire with air. Which can provide enough leverage to easily bend or break the wheel unit.**
- **To prevent damage to the valve area of the wheel unit or pressure loss during air pressure adjustment, use a type B tool with a round end as shown in the figure, not a type A tool.**

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WHEEL AND TIRES

REPAIR AGENT REMOVAL

id021200121100

Caution
- **Be careful not to spill the repair agent from inside of the tire.**

1. Remove the flat tire from the vehicle, and let the air out of the tire.
2. Remove the wheel unit nut and push the remaining part of the wheel valve into the tire (with TPMS). Cut the tire valve by the root and push the remaining part of the wheel into the tire (without TPMS).

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3. Insert the hose through the valve and into the tire. Stand the tire up so that the hose end sinks into the repair agent.
4. Pump out the repair agent.

Note
- Place the tire on a higher stand than the pumping bottle. This will make the operation easier.

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5. Repeat the pumping procedure, changing the position of the hose end, until there is no repair agent left in the tire.
6. Remove the tire from the wheel and pick the wheel unit pushed in at Step 2 out.
7. Wipe off the repair agent remaining on the wheel, wheel unit and tire.

Note
- Dispose of waste repair agent according to local disposal law.
- The repair agent is composed of the following:
  - — Deproteinized natural rubber latex
  - — Emulsified adhesive resin
  - — Propylene glycol
- The tire must be replaced with a new one and clean all tire repair agent off to the wheel.
- Use compressed air to clean out TPMS style valve.

WHEEL UNIT ID REGISTRATION

id021200800400

Note
- After the wheel unit replacement, registration of the wheel unit identification codes must be performed.
- ID registration can be done using the M-MDS, or not using the M-MDS.
- Use the IDS (laptop PC) because the PDS (Plcket PC) does not support the wheel unit ID registration and monitoring wheel unit ID.

Using M-MDS

1. Connect the M-MDS to DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - This function is available for only the IDS (notebook PC).
     1. Select the “Body”.
     2. Select the “TPMS Functions”.
     3. Select the “Wheel Unit ID Registration”.
3. Select an item from the screen menu.
   - — Wheel unit ID registration: WU ID Registration
   - — Monitoring wheel unit ID: Monitor WU ID Registration

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WHEEL AND TIRES

4. Leave the vehicle with the ignition to off for **15 min or more**.
5. Turn the ignition switch to the ON position.
6. Verify that the TPMS warning light turns on and off in **0.5 s** cycles repeatedly.
7. Drive the vehicle at a speed of **25 km/h {15.5 mph} or more** for **10 min** to implement the wheel unit ID registration.

Note
- If the ID registration is not completed even after driving the vehicle for **10 min** or more at a speed of **25 km/h {15.5 mph} or more**, the TPMS warning light flashes.

8. Verify that the TPMS warning light turns off.

Note
- If the wheel unit ID registration cannot be performed after driving **10 min** or more, refer to the symptom troubleshooting procedure.

Without Using M-MDS
1. Turn the ignition switch to the ON, then turn it off.
2. Leave the vehicle with the engine off for **15 min or more**.
3. Drive the vehicle at a speed of **25 km/h {15.5 mph} or more** for **10 min or more**.
4. After driving for **10 min**, verify that the TPMS warning light does not flash and is not illuminated.

WHEEL UNIT REMOVAL/INSTALLATION

id021200800600

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. When replacing wheel unit (s), register the new wheel unit ID (s). (See 02-12-4 WHEEL UNIT ID REGISTRATION.)

Note
- If the wheel unit is replaced with a new one, the ID registration must be performed. When the ID registration is finished, the data for the new wheel unit is displayed on the M-MDS.

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WHEEL AND TIRES

1	Valve cap
2	Valve core (See 02-12-6 Valve Core Removal Note.)
3	Valve nut and washer

4	Wheel unit (See 02-12-6 Wheel Unit Removal Note.) (See 02-12-6 Wheel Unit Installation Note.)
5	Seal washer
6	Seal

Valve Core Removal Note

1. Remove the valve core of the wheel unit, and bleed the air from the tire.

Wheel Unit Removal Note

1. Push the tire valve completely into the tire.

   Caution
   - **Breaking the tire bead with the wheel unit installed normally could damage the unit. Be sure to always push the wheel unit so that it is completely inside the tire to prevent any damage.**

2. Position the shoe (bead breaker) of the tire changer **10—20 mm {0.40—0.78 in}** from the outer edge of the wheel, and break both tire beads.
3. Remove the bead from one side of the wheel.
4. Remove the wheel unit.

Wheel Unit Installation Note

1. Insert the wheel unit valve into the valve hole so that the polyurethane foam side faces the rim.

   Note
   - Maintain the wheel unit in contact with the rim, then start manually to screw the valve nut for a few turns.

2. Install the nut from the outer side of the wheel.
3. Tighten the valve nut slowly **(15 rpm max.)** to **8.0 N·m {82 kgf·cm, 71 in·lbf}** in one rotation.

   Caution
   - **Do not retighten the valve nut after the initial operation.**

4. Set the tire changer so that it is **45°** away (point A) from the valve hole.

   Caution
   - **Do not position the tire changer near the tire valve to avoid any damage to the wheel unit.**

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WHEEL AND TIRES

5. Fill the tire with air and verify the valve nut tightening torque.

Caution

- **To prevent damage to the valve area of the wheel unit or charging loss during air pressure adjustment, use a type B tool with a round end as shown in the figure, not a type A tool.**

amxuuw0000041

02-13 FRONT SUSPENSION

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FRONT SUSPENSION

FRONT SUSPENSION LOCATION INDEX

id021300800100

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1	Front shock absorber and coil spring (See 02-13-3 FRONT SHOCK ABSORBER AND COIL SPRING REMOVAL/INSTALLATION.) (See 02-13-4 FRONT SHOCK ABSORBER AND COIL SPRING DISASSEMBLY/ASSEMBLY.)
2	Front shock absorber (See 02-13-6 FRONT SHOCK ABSORBER INSPECTION.) (See 02-13-6 FRONT SHOCK ABSORBER DISPOSAL.)
3	Front upper arm (See 02-13-6 FRONT UPPER ARM REMOVAL/ INSTALLATION.) (See 02-13-8 FRONT UPPER ARM INSPECTION.)
4	Front lower arm (See 02-13-8 FRONT LOWER ARM REMOVAL/ INSTALLATION.) (See 02-13-13 FRONT LOWER ARM INSPECTION.)

5	Front stabilizer (See 02-13-14 FRONT STABILIZER REMOVAL/ INSTALLATION.)
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7	Front crossmember (See 02-13-15 FRONT CROSSMEMBER REMOVAL/INSTALLATION.)
8	Transverse member (See 02-13-19 TRANSVERSE MEMBER REMOVAL/INSTALLATION.)
9	Front suspension tower bar (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)

FRONT SUSPENSION

FRONT SHOCK ABSORBER AND COIL SPRING REMOVAL/INSTALLATION

id021300801400

Caution

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the wiring harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled while servicing the vehicle.**

1. For 6MT vehicles, perform the following procedures.
   (1) Disconnect the purge solenoid valve connector wiring harness from the bracket.
   (2) Remove the bracket from the air intake hose and move the purge solenoid valve component out of the way. (See 01-16-7 PURGE SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].)
   (3) Remove the following parts as a single unit. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
   —Air intake hose
   —Resonance chamber No. 2
   —Resonance duct No. 1
   —Resonance duct No. 2
2. Remove the front suspension tower bar. (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.
5. Inspect the front wheel alignment, and adjust it if necessary. (See 02-11-2 FRONT WHEEL ALIGNMENT.)

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1	Brake hose bracket
2	Front upper arm ball joint (See 02-13-8 FRONT LOWER ARM REMOVAL/INSTALLATION.)
3	Front shock absorber, coil spring and front upper arm
4	Front shock absorber and coil spring

FRONT SUSPENSION

FRONT SHOCK ABSORBER AND COIL SPRING DISASSEMBLY/ASSEMBLY

id021300801300

Warning
- **Removing/installing the shock absorber and coil spring is dangerous. The shock absorber and coil spring could fly off and cause serious injury or death, and damage the vehicle.**

1. For 6MT vehicles, perform the following procedures.
   (1) Disconnect the purge solenoid valve connector wiring harness from the bracket.
   (2) Remove the bracket from the air intake hose and move the purge solenoid valve component out of the way. (See 01-16-7 PURGE SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].)
   (3) Remove the following parts as a single unit. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
   —Air intake hose
   —Resonance chamber No. 2
   —Resonance duct No. 1
   —Resonance duct No. 2
2. Remove the front suspension tower bar. (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
3. Remove the front shock absorber and coil spring. (See 02-13-3 FRONT SHOCK ABSORBER AND COIL SPRING REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.

e5u213zw5013

1	Piston rod nut (See 02-13-4 Piston Rod Nut Disassembly Note.)
2	Retainer
3	Bushing
4	Upper spring seat (See 02-13-5 Upper Spring Seat Assembly Note.)
5	Dust boot
6	Spacer

7	Bushing
8	Stopper casing and bound stopper
9	Bound stopper
10	Stopper casing
11	Coil spring (See 02-13-5 Coil Spring Assembly Note.)
12	Front shock absorber

Piston Rod Nut Disassembly Note

Warning
- **Before removing the piston rod nut, secure the shock absorber and spring in the SSTs. Otherwise, the shock absorber and spring could fly off under tremendous pressure and cause serious injury or death, or damage to vehicle parts.**

FRONT SUSPENSION

1. Install the front shock absorber and coil spring to the **SSTs** according to the following procedures.

Note
- Install the SST using a piece of clean rag to prevent the coil spring from being scratched.

(1) Set the SST attachments (tabs) to the positions shown in the figure.

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(2) Install the front shock absorber and coil spring to the SST so that the coil spring is set to the position shown in the figure.
2. Compress the coil spring using the **SSTs**.
3. Remove the piston rod nut.

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Coil Spring Assembly Note
1. Protect the coil spring from scratches using a piece of clean rag and install the **SSTs**.
2. Compress the coil spring using the **SSTs**.
3. Install the shock absorber so that the lower end of the coil spring is seated on the step of the lower spring seat.

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Upper Spring Seat Assembly Note
1. Align the mark on the upper spring seat with the dust boot projection.

chu0213w028

FRONT SUSPENSION

2. Install the upper spring seat so that the upper spring seat stud is at a **27°—33°** angle to the shock absorber installation shaft (lower side).

chu0213w003

FRONT SHOCK ABSORBER INSPECTION

id021300104400

1. Remove the front shock absorber.
2. Inspect for damage and oil leakage.
3. Compress and extend the shock absorber piston rod at least three times at a steady speed. From the fourth compression stroke, verify that the operational force does not change and that there is no unusual noise.
   - If there is any malfunction, replace the shock absorber.

FRONT SHOCK ABSORBER DISPOSAL

id021300104500

Warning
- **Whenever drilling into a shock absorber, wear protective eye wear. The gas in the shock absorber is pressurized, and could spray metal chips into the eyes and face when drilling.**

1. Clamp the shock absorber on a flat surface.
2. Drill a **2—3 mm {0.08—0.12 in}** hole at a point **25 mm {0.98 in}** from the bottom of the tube, so that the gas can escape.
3. Turn the hole downwards.
4. The oil can be collected by moving the piston rod several times up and down and cutting the tube at the end.
5. Dispose of waste oil according to local waste disposal law.

Note
- Shock absorber gas contains nitrogen gas.
- Shock absorber oil contains mineral oil.

chu0213w021

FRONT UPPER ARM REMOVAL/INSTALLATION

id021300801900

Caution
- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the wiring harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled while servicing the vehicle.**

1. For 6MT vehicles, perform the following procedures.
   (1) Disconnect the purge solenoid valve connector wiring harness from the bracket.
   (2) Remove the bracket from the air intake hose and move the purge solenoid valve component out of the way. (See 01-16-7 PURGE SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].)
   (3) Remove the following parts as a single unit. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
   — Air intake hose
   — Resonance chamber No. 2
   — Resonance duct No. 1
   — Resonance duct No. 2
2. Remove the front suspension tower bar. (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

FRONT SUSPENSION

5. Inspect the front wheel alignment and adjust it if necessary. (See 02-11-2 FRONT WHEEL ALIGNMENT.)

e5u213zw5004

1	Brake hose bracket
2	Front upper arm ball joint (See 02-13-7 Front Upper Arm Ball Joint Removal Note.)
3	Front shock absorber, coil spring and front upper arm (See 02-13-7 Front Shock Absorber, Coil Spring And Front Upper Arm Removal Note.)
4	Front upper arm (See 02-13-7 Front Upper Arm Removal Note.)

Front Upper Arm Ball Joint Removal Note

1. Remove the front upper arm ball joint from the steering knuckle using the **SST**.

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Front Shock Absorber, Coil Spring And Front Upper Arm Removal Note

1. Loosen the shock absorber upper nuts.
2. Remove the front shock absorber lower bolt and nut.

Front Upper Arm Removal Note

1. Remove the front upper arm bolts.
2. Push down the front lower arm, and then remove the front upper arm from the gap between the shock absorber lower end and the front lower arm.

FRONT SUSPENSION

FRONT UPPER ARM INSPECTION

id021300801800

1. Remove the front upper arm from the vehicle. (See 02-13-6 FRONT UPPER ARM REMOVAL/INSTALLATION.)
2. Inspect the front upper arm for bending or damage. If there is any malfunction, replace it.
3. Inspect the ball joint for excessive play, and if there is any malfunction, replace the front upper arm.
4. Rotate the ball joint **5 times**.
5. Measure the ball-joint rotational torque using an Allen wrench and a torque wrench.

   Front upper arm ball joint rotational torque
   0.3—2.2 N·m {4—22 kgf·cm, 3—19 in·lbf}

   - If not within the specification, replace the front upper arm. (See 02-13-6 FRONT UPPER ARM REMOVAL/INSTALLATION.)

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FRONT LOWER ARM REMOVAL/INSTALLATION

id021300800600

Caution

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the wiring harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled while servicing the vehicle.**

1. When working on the left side of the vehicle, disconnect the front auto leveling sensor link. (Vehicle with discharge headlight system) (See 09-18-29 FRONT AUTO LEVELING SENSOR REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.
4. Inspect the front wheel alignment. (See 02-11-2 FRONT WHEEL ALIGNMENT.)

FRONT SUSPENSION

e5u213si9001

1	Brake caliper component (See 02-13-9 Brake Caliper Component Removal Note.)
2	Front lower arm ball joint (See 02-13-10 Front Lower Arm Ball Joint Removal Note.)
3	Tie-rod end (See 06-14-8 STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION.)
4	Front upper arm ball joint (See 02-13-10 Upper Arm Ball Joint Removal Note.)
5	Front hub, steering knuckle component
6	Stabilizer control link nut (front lower arm side)
7	Front lower arm
8	Clip (See 02-13-13 Clip Installation Note.)

9	Dust boot
10	Bushing (rear side) (See 02-13-10 Bushing (Rear Side) Removal Note.) (See 02-13-12 Bushing (Rear Side) Installation Note.)
11	Bushing (front side) (See 02-13-11 Bushing (Front Side) Removal Note.) (See 02-13-12 Bushing (Front Side) Installation Note.)
12	Bushing (shock absorber lower side connecting part) (See 02-13-11 Bushing (Shock Absorber Lower Side Connecting Part) Removal Note.) (See 02-13-12 Bushing (Shock Absorber Lower Side Connecting Part) Installation Note.)

Brake Caliper Component Removal Note

1. Remove the brake caliper component and suspend it out of the way using a cable.

FRONT SUSPENSION

Front Lower Arm Ball Joint Removal Note

1. Disconnect the front lower arm ball joint from the steering knuckle using the **SST**.

   Note
   - When removing the front lower arm ball joint, the steering knuckle bushing may also come off. If it comes off, replace the steering knuckle.

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Upper Arm Ball Joint Removal Note

1. Loosen the bolts on the vehicle side.
2. Disconnect the upper arm ball joint using the **SST**.

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Bushing (Rear Side) Removal Note

Caution
- **Be careful not to damage the front lower arm. If it is damaged, replace it.**

1. Mark the front upper arm as shown in the figure.

e5u213zw5006

2. Remove the bushing using the **SSTs**.

amxzzw0000007

FRONT SUSPENSION

Bushing (Front Side) Removal Note

Caution
- **Be careful not to damage the front lower arm. If it is damaged, replace it.**

1. Cut off the stopper plate rubber using a razor.

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2. Cut off **5—6 mm {0.20—0.23 in}** from each side of the knob end of the bushing using a hacksaw.

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3. Remove the bushing using the **SSTs**.

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Bushing (Shock Absorber Lower Side Connecting Part) Removal Note

Caution
- **Be careful not to damage the front lower arm. If it is damaged, replace it.**

1. Remove the bushing using the **SSTs**.

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FRONT SUSPENSION

Bushing (Shock Absorber Lower Side Connecting Part) Installation Note

1. Press the bushing in using the **SSTs**.

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Bushing (Front Side) Installation Note

1. Press the bushing in using the **SSTs**.

chu0213w023

2. Insert the stopper plate rubber into the inner pipe of the bushing (front side).

chu0213w024

Bushing (Rear Side) Installation Note

1. Align the marks placed during removal and install the bushing.

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FRONT SUSPENSION

2. Press the bushing in using the **SSTs**.

chu0213w014

Clip Installation Note

1. Wipe the grease off the ball joint stud.
2. Fill the inside of the new dust boot with grease.
3. Install the dust boot to the ball joint.
4. Install the clip using the **SST**.
5. Verify that the clip is installed securely to the groove.
6. Wipe off any excess grease.

amxzzw0000007

Front Lower Arm Installation Note

1. Install the front lower arm rear side bushing part horizontally.
2. Install the front lower arm front side bushing part.

FRONT LOWER ARM INSPECTION

id021300800700

1. Remove the front lower arm from the vehicle. (See 02-13-8 FRONT LOWER ARM REMOVAL/INSTALLATION.)
2. Inspect the front lower arm for bending or damage. If there is any malfunction, replace it.
3. Inspect the ball joint for excessive play. If there is any malfunction, replace the front lower arm.
4. Rotate the ball joint **5 times**.
5. Measure the ball-joint rotational torque using an Allen wrench and a torque wrench.

   Front lower arm ball joint rotational torque
   0.4—2.9 N·m {5—29 kgf·cm, 4—25 in·lbf}

   - If not within the specification, replace the front lower arm. (See 02-13-8 FRONT LOWER ARM REMOVAL/INSTALLATION.)

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FRONT SUSPENSION

FRONT STABILIZER REMOVAL/INSTALLATION

id021300800400

Caution

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the wiring harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled while servicing the vehicle.**

1. Remove the splash shield A. (See 09-16-20 SPLASH SHIELD REMOVAL/INSTALLATION.)
2. Remove the front under cover. (See 09-16-20 FRONT UNDER COVER REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

e5u213zw5008

1	Radiator mount bracket
2	Stabilizer control link
3	Stabilizer bracket (See 02-13-14 Stabilizer Bracket Installation Note.)

4	Stabilizer bushing
5	Front stabilizer

Stabilizer Bracket Installation Note

1. Apply rubber grease to the inner side of the stabilizer bushing.
2. Align the outer side of the stabilizer slide stopper with the stabilizer bushing.

3. Install the stabilizer bracket.

e5u213zw5009

FRONT STABILIZER CONTROL LINK INSPECTION

id021300802700

1. Remove the stabilizer control link from the vehicle. (See 02-13-14 FRONT STABILIZER REMOVAL/INSTALLATION.)
2. Inspect the stabilizer control link for bending or damage. If there is any malfunction, replace it.
3. Rotate the ball joint stud **10 times**, and then rock it side to side **10 times**.
4. Measure the ball-joint rotational torque using an Allen wrench and a torque wrench.

   Stabilizer control link ball joint rotational torque
   0.14—1.04 N·m {1.5—10.6 kgf·cm, 1.3—9.2 in·lbf}

   - If not within the specification, replace the stabilizer control link. (See 02-13-14 FRONT STABILIZER REMOVAL/INSTALLATION.)

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FRONT CROSSMEMBER REMOVAL/INSTALLATION

id021300801000

Caution
- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the wiring harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled while servicing the vehicle.**

1. For 6MT vehicles, perform the following procedures.
   (1) Disconnect the purge solenoid valve connector wiring harness from the bracket.
   (2) Remove the bracket from the air intake hose and move the purge solenoid valve component out of the way. (See 01-16-7 PURGE SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].)
   (3) Remove the following parts as a single unit. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
   —Air intake hose
   —Resonance chamber No. 2
   —Resonance duct No. 1
   —Resonance duct No. 2
2. Remove the splash shield A. (See 09-16-20 SPLASH SHIELD REMOVAL/INSTALLATION.)
3. Remove the front under cover. (See 09-16-20 FRONT UNDER COVER REMOVAL/INSTALLATION.)
4. Remove the front suspension tower bar. (See 02-13-17 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
5. Remove the front auto leveling sensor. (Vehicle with discharge headlight system) (See 09-18-30 REAR AUTO LEVELING SENSOR REMOVAL/INSTALLATION.)
6. Remove the front stabilizer (See 02-13-14 FRONT STABILIZER REMOVAL/INSTALLATION.)
7. Remove the transverse members (See 02-13-19 TRANSVERSE MEMBER REMOVAL/INSTALLATION.)
8. Remove the steering gear and linkage, and suspend it using a cable.
9. Remove in the order indicated in the table.
10. Install in the reverse order of removal.
11. Inspect the front wheel alignment. (See 02-11-2 FRONT WHEEL ALIGNMENT.)

FRONT SUSPENSION

amxzzw0000007

1	Brake hose
2	Caliper and mounting support
3	Disc plate
4	Tie-rod end (See 06-14-8 STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION.)
5	Shock absorber bolt (lower)
6	Front lower arm boll joint (See 02-13-8 FRONT LOWER ARM REMOVAL/ INSTALLATION.)

7	Front upper arm ball joint (See 02-13-6 FRONT UPPER ARM REMOVAL/ INSTALLATION.)
8	Axle and hub component (See 02-13-16 Axle and Hub Component Removal Note.)
9	Front crossmember component (See 02-13-17 Front Crossmember Component Removal Note.)
10	Front upper arm
11	Front lower arm
12	Front crossmember

Axle and Hub Component Removal Note

1. Loosen the front upper arm inner bolts.
2. Remove the axle and hub component.

FRONT SUSPENSION

Front Crossmember Component Removal Note

1. Secure the chain to install the **SST** to the position shown in the figure using the bolts (**M10 x 1.5**, length **30 mm {1.18 in}**).

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2. Suspend the engine.

e5u213zw5015

3. Support the front crossmember using a jack.

   Warning
   - **Verify that the crossmember component is securely supported by a jack. If the crossmember component falls, it could cause serious injury or death, or damage to the vehicle.**

4. Lower the front crossmember component slightly.
5. Remove the engine mounting rubber, pipes and hoses installed to the front crossmember.
6. Remove the front crossmember component.

chu0213w026

FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION

id021300802800

Vehicle With 16-Inch Wheel

1. For 6MT vehicles, perform the following procedures.
   (1) Disconnect the purge solenoid valve connector wiring harness from the bracket.
   (2) Remove the bracket from the air intake hose and move the purge solenoid valve component out of the way. (See 01-16-7 PURGE SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].)
   (3) Remove the following parts as a single unit. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
   — Air intake hose
   — Resonance chamber No. 2
   — Resonance duct No. 1
   — Resonance duct No. 2

FRONT SUSPENSION

2. Remove the plate.
3. Install the plate. (See 02-13-19 Plate Installation Note.)

amxzzw0000111

Vehicle With 17-Inch Wheel

1. For 6MT vehicles, perform the following procedures.
   (1) Disconnect the purge solenoid valve connector wiring harness from the bracket.
   (2) Remove the bracket from the air intake hose and move the purge solenoid valve component out of the way. (See 01-16-7 PURGE SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].)
   (3) Remove the following parts as a single unit. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
   — Air intake hose
   — Resonance chamber No. 2
   — Resonance duct No. 1
   — Resonance duct No. 2
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

amxzzw0000007

1	Front suspension tower bar (joint)
2	Front suspension tower bar (right side)

3	Front suspension tower bar (left side)
4	Plate (See 02-13-19 Plate Installation Note.)

FRONT SUSPENSION

Plate Installation Note

1. Install the plates with the identification marks facing upward.

chu0213w027

TRANSVERSE MEMBER REMOVAL/INSTALLATION

id021300801100

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.

e5u213zw5011

1	Under cover (See 02-13-20 Under Cover Installation Note.)

2	Transverse member (See 02-13-19 Transverse Member Removal Note.)

Transverse Member Removal Note

1. Support the crossmember using a jack.
2. Remove the transverse member.

FRONT SUSPENSION

Under Cover Installation Note

1. Align projection A with the transverse member opening to temporarily support the under cover.

e5u213zw5017

2. Tighten the bolts in the order of A, B and C.

e5u213zw5018

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REAR SUSPENSION

REAR SUSPENSION LOCATION INDEX

id021400800400

e5u214zw5001

1	Rear shock absorber and coil spring (See 02-14-3 REAR SHOCK ABSORBER AND COIL SPRING REMOVAL/INSTALLATION.) (See 02-14-4 REAR SHOCK ABSORBER AND COIL SPRING DISASSEMBLY/ASSEMBLY.)
2	Rear shock absorber (See 02-14-6 REAR SHOCK ABSORBER INSPECTION.) (See 02-14-6 REAR SHOCK ABSORBER DISPOSAL.)
3	Rear trailing link (See 02-14-13 REAR TRAILING LINK (UPPER) REMOVAL/INSTALLATION.) (See 02-14-14 REAR TRAILING LINK (UPPER) INSPECTION.) (See 02-14-14 REAR TRAILING LINK (LOWER) REMOVAL/INSTALLATION.)

4	Rear lateral link (See 02-14-6 REAR LATERAL LINK (UPPER) REMOVAL/INSTALLATION.) (See 02-14-9 REAR LATERAL LINK (UPPER) INSPECTION.) (See 02-14-8 REAR LATERAL LINK (LOWER) REMOVAL/INSTALLATION.) (See 02-14-9 REAR LATERAL LINK (LOWER) INSPECTION.)
5	Toe control link (See 02-14-10 TOE CONTROL LINK REMOVAL/INSTALLATION.) (See 02-14-11 TOE CONTROL LINK INSPECTION.)
6	Rear stabilizer (See 02-14-11 REAR STABILIZER REMOVAL/INSTALLATION.)
7	Stabilizer control link (See 02-14-12 REAR STABILIZER CONTROL LINK INSPECTION.)
8	Rear crossmember (See 02-14-15 REAR CROSSMEMBER REMOVAL/INSTALLATION.)

REAR SUSPENSION

REAR SHOCK ABSORBER AND COIL SPRING REMOVAL/INSTALLATION

id021400802600

Caution

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the wiring harness if it is pulled by mistake. Before operations, remove the ABS wheel-speed sensor (axle side), and move the sensor away from the harnesses.**

1. When working on the left side, remove the fuel tank protector. (See 01-14-8 FUEL TANK REMOVAL/ INSTALLATION [L8, LF].)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

amxzzw0000111

1	Parking brake cable
2	Brake caliper component (See 02-14-3 Brake Caliper Component Removal Note.)

3	Rear lateral link (upper) bolt
4	Stabilizer control link upper nut
5	Rear shock absorber lower bolt
6	Rear shock absorber and coil spring

Brake Caliper Component Removal Note

1. Remove the brake caliper component and suspend it out of the way using a cable.

REAR SUSPENSION

REAR SHOCK ABSORBER AND COIL SPRING DISASSEMBLY/ASSEMBLY

id021400802700

Warning
- **Removing/installing the shock absorber and coil spring is dangerous. The shock absorber and coil spring could fly off and cause injury or death, and damage the vehicle.**

1. Remove the rear shock absorber and coil spring. (See 02-14-3 REAR SHOCK ABSORBER AND COIL SPRING REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

e5u214zw5013

1	Piston rod nut (See 02-14-4 Piston Rod Nut Removal Note.)
2	Retainer
3	Bushing
4	Upper spring seat (See 02-14-6 Upper Spring Seat Installation Note.)
5	Spring seat rubber (See 02-14-6 Spring Seat Rubber Installation Note.)
6	Spacer

7	Bushing
8	Bound stopper and stopper casing
9	Bound stopper
10	Collar (See 02-14-5 Collar Installation Note.)
11	Stopper casing
12	Coil spring (See 02-14-5 Coil Spring Installation Note.)
13	Rear shock absorber

Piston Rod Nut Removal Note

Warning
- **Before removing the piston rod nut, secure the shock absorber and spring in the SSTs. Otherwise, the shock absorber and spring could fly off under tremendous pressure and cause serious injury or death, or damage to the vehicle.**

1. Install the shock absorber and coil spring to the **SSTs** according to the following procedures.

Note
- Install the SST using a piece of clean rag to prevent the coil spring from being scratched.

REAR SUSPENSION

(1) Set the **SST** attachments (tabs) to the positions shown in the figure.

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(2) Install the rear shock absorber and coil spring to the **SST** so that the coil spring is set to the position shown in the figure.

2. Compress the coil spring using the **SSTs**.
3. Remove the piston rod nut.

amxzzw0000175

Coil Spring Installation Note

1. Set the coil spring to the **SSTs** using cloth.
2. Compress the coil spring using the **SSTs**.
3. Install the shock absorber so that the lower end of the coil spring is seated on the step of the lower spring seat.

amxuuw0000043

Collar Installation Note

1. Install the collar so that the tapered side is facing downward as shown in the figure.

e5u214zw5014

REAR SUSPENSION

Spring Seat Rubber Installation Note

1. Install the spring seat rubber to the upper spring seat as shown in the figure.

chu0214w003

Upper Spring Seat Installation Note

1. Install the coil spring with the lead lower end of the lower spring seat facing the direction shown in the figure.

e5u214zw5005

REAR SHOCK ABSORBER INSPECTION

id021400801400

1. Inspect the rear shock absorber in the same way as the front shock absorber. (See 02-13-6 FRONT SHOCK ABSORBER INSPECTION.)

REAR SHOCK ABSORBER DISPOSAL

id021400801500

1. Dispose of the rear shock absorber in the same way as the front shock absorber. (See 02-13-6 FRONT SHOCK ABSORBER DISPOSAL.)

REAR LATERAL LINK (UPPER) REMOVAL/INSTALLATION

id021400803200

Caution

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the wiring harness if it is pulled by mistake. Before operations, remove the ABS wheel-speed sensor (axle side) and move the sensor away from the harnesses.**

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. Inspect the rear wheel alignment. (See 02-11-6 REAR WHEEL ALIGNMENT.)

REAR SUSPENSION

e5u214zw5008

1	Rear lateral link (upper) ball joint (See 02-14-7 Rear Lateral Link (Upper) Ball Joint Removal Note.)
2	Rear lateral link (upper)
3	Dust boot (See 02-14-7 Dust Boot Installation Note.)

Rear Lateral Link (Upper) Ball Joint Removal Note

1. Disconnect the rear lateral link (upper) ball joint using the **SST**.

Note

- When removing the rear lateral link (upper) ball joint, the rear knuckle bushing may also come off. If it comes off, replace the rear knuckle.

amxzzw0000008

Dust Boot Installation Note

1. Wipe the grease off the ball joint stud.
2. Fill the inside of the new dust boot with grease.
3. Install the dust boot to the ball joint using the **SST**.
4. Wipe off the excess grease.

amxzzw0000008

REAR SUSPENSION

REAR LATERAL LINK (LOWER) REMOVAL/INSTALLATION

id021400803300

1. When working on the left side of the vehicle, disconnect the rear auto leveling sensor link. (Vehicle with discharge headlight system) (See 09-18-30 REAR AUTO LEVELING SENSOR REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.
4. Inspect the rear wheel alignment. (See 02-11-6 REAR WHEEL ALIGNMENT.)

e5u214zw5009

1	Stabilizer control link lower nut
2	Rear lateral link (lower) ball joint (See 02-14-8 Rear Lateral Link (Lower) Ball Joint Removal Note.)
3	Rear lateral link (lower)
4	Dust boot (See 02-14-9 Dust Boot Installation Note.)

Rear Lateral Link (Lower) Ball Joint Removal Note

1. Disconnect the ball joint using the **SST**.

Note

- When removing the rear lateral link (lower) ball joint, the rear knuckle bushing may also come off. If it comes off, replace the rear knuckle.

amxzzw0000008

REAR SUSPENSION

Dust Boot Installation Note

1. Wipe the grease off the ball joint stud.
2. Fill the inside of the new dust boot with grease.
3. Install the dust boot to the ball joint using the **SST**.
4. Wipe off the excess grease.

amxzzw0000008

REAR LATERAL LINK (UPPER) INSPECTION

id021400803400

1. Remove the rear lateral link (upper) from the vehicle. (See 02-14-6 REAR LATERAL LINK (UPPER) REMOVAL/INSTALLATION.)
2. Inspect the link for bending or damage. If there is any malfunction, replace the link.
3. Inspect the ball joint for looseness. If there is any malfunction, replace the ball joint.
4. Rotate the ball joint **5 times**.
5. Measure the ball-joint rotational torque using an Allen wrench and a torque wrench.

   Rear lateral link (upper) ball joint rotational torque
   0.4—2.8 N·m {5—28 kgf·cm, 4—24 in·lbf}

   - If not within the specification, replace the rear lateral link (upper). (See 02-14-6 REAR LATERAL LINK (UPPER) REMOVAL/INSTALLATION.)

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REAR LATERAL LINK (LOWER) INSPECTION

id021400803500

1. Remove the rear lateral link (lower) from the vehicle. (See 02-14-8 REAR LATERAL LINK (LOWER) REMOVAL/INSTALLATION.)
2. Inspect the link for bending or damage. If there is any malfunction, replace the link.
3. Inspect the ball joint for looseness. If there is any malfunction, replace the ball joint.
4. Rotate the ball joint **5 times**.
5. Measure the ball-joint rotational torque using an Allen wrench and a torque wrench.

   Rear lateral link (lower) ball joint rotational torque
   0.4—2.8 N·m {5—28 kgf·cm, 4—24 in·lbf}

   - If not within the specification, replace the rear lateral link (lower). (See 02-14-8 REAR LATERAL LINK (LOWER) REMOVAL/INSTALLATION.)

BHJ0214W010

REAR SUSPENSION

TOE CONTROL LINK REMOVAL/INSTALLATION

id021400803600

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. Inspect the rear wheel alignment. (See 02-11-6 REAR WHEEL ALIGNMENT.)

amxzzw0000008

1	Toe control link ball joint (See 02-14-10 Toe Control Link Ball Joint Installation Note.)
2	Toe control link
3	Dust boot (See 02-14-10 Dust Boot Installation Note.)

Dust Boot Installation Note

1. Wipe the grease off the ball joint stud.
2. Fill the inside of the new dust boot with grease.
3. Install the dust boot to the ball joint using the **SST**.
4. Wipe off the excess grease.

amxzzw0000008

Toe Control Link Ball Joint Installation Note

1. Install the toe control link ball joint so that the ball joint stud projection is within **-2—4 mm {-0.08—0.15 in}**.

chu0214w011

REAR SUSPENSION

TOE CONTROL LINK INSPECTION

id021400803700

1. Remove the toe control link from the vehicle. (See 02-14-10 TOE CONTROL LINK REMOVAL/INSTALLATION.)
2. Inspect the lateral link for bending or damage. If there is any malfunction, replace the lateral link.
3. Inspect the ball joint for looseness. If there is any malfunction, replace the ball joint.
4. Rotate the ball joint **5 times**.
5. Install the **SST** to the ball stud, and measure the ball joint rotational torque using a pull scale.

   Toe control link ball joint rotational torque
   0.3—2.2 N·m {4—22 kgf·cm, 3—19 in·lbf}
   Pull scale reading: 3—22 N {0.3—2.2 kgf, 0.7—4.9 lbf}

   - If not within the specification, replace the toe control link. (See 02-14-10 TOE CONTROL LINK REMOVAL/INSTALLATION.)

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REAR STABILIZER REMOVAL/INSTALLATION

id021400800500

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.

e5u214zw5011

1	Stabilizer control link (See 02-14-12 Stabilizer Control Link Installation Note.)
2	Stabilizer bracket
3	Bushing
4	Rear stabilizer (See 02-14-11 Rear Stabilizer Installation Note.)

Rear Stabilizer Installation Note

1. Install the rear stabilizer so that the identification mark is on the right side of the vehicle.

e5u214zw5015

REAR SUSPENSION

Stabilizer Control Link Installation Note

1. Install the stabilizer control link in the proper angle as shown in the figure.

   Caution
   - **Be sure to install the stabilizer control link in the proper position. If it is not installed properly, the stabilizer control link may interfere with peripheral components when driving, causing damage to each other.**

chu0214w033

2. Place the vehicle on the ground and verify that the stabilizer control link is installed in the angle shown in the figure.

chu0214w034

REAR STABILIZER CONTROL LINK INSPECTION

id021400803900

1. Remove the stabilizer control link from the vehicle. (See 02-14-11 REAR STABILIZER REMOVAL/ INSTALLATION.)
2. Inspect the link for bending or damage. If there is any malfunction, replace the link.
3. Rotate the ball joint **10 times**, and rock the ball joint **10 times**.
4. Measure the ball-joint rotational torque using an Allen wrench and a torque wrench.

   Stabilizer control link ball joint rotational torque
   0.23—0.47 N·m {2.35—4.79 kgf·cm, 2.04—4.15 in·lbf}

   - If not within the specification, replace the stabilizer control link ball joint. (See 02-14-11 REAR STABILIZER REMOVAL/ INSTALLATION.)

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REAR SUSPENSION

REAR TRAILING LINK (UPPER) REMOVAL/INSTALLATION

id021400802800

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. Inspect the rear wheel alignment. (See 02-11-6 REAR WHEEL ALIGNMENT.)

e5u214zw5006

1	Rear trailing link (upper) ball joint (See 02-14-13 Rear Trailing Link (Upper) Ball Joint Removal Note.)
2	Rear trailing link (upper)
3	Dust boot (See 02-14-13 Dust Boot Installation Note.)

Rear Trailing Link (Upper) Ball Joint Removal Note

1. Disconnect the ball joint using the **SST**.

Note

- When removing the rear trailing link (upper) ball joint, the rear knuckle bushing may also come off. If it comes off, replace the rear knuckle.

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Dust Boot Installation Note

1. Wipe the grease off the ball joint stud.
2. Fill the inside of the new dust boot with grease.
3. Install the dust boot to the ball joint using the **SST**.
4. Wipe off the excess grease.

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REAR SUSPENSION

REAR TRAILING LINK (LOWER) REMOVAL/INSTALLATION

id021400802900

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. Inspect the rear wheel alignment. (See 02-11-6 REAR WHEEL ALIGNMENT.)

e5u214si9001

1	Toe control link outer bolt
2	Rear trailing link (lower) outer bolt

3	Rear trailing link (lower) inner bolt
4	Rear trailing link (lower)

REAR TRAILING LINK (UPPER) INSPECTION

id021400803100

1. Remove the rear trailing link (upper) from the vehicle. (See 02-14-13 REAR TRAILING LINK (UPPER) REMOVAL/INSTALLATION.)
2. Inspect the link or bending or damage. If there is any malfunction, replace the rear trailing link (upper).
3. Inspect the ball joint for looseness. If there is any malfunction, replace the ball joint.
4. Rotate the ball joint **5 times**.
5. Measure the ball-joint rotational torque using an Allen wrench and a torque wrench.

   Rear trailing link (upper) ball joint rotational torque
   0.4—3.3 N·m {5—33 kgf·cm, 4—29 in·lbf}

   - If not within the specification, replace the rear trailing link (upper). (See 02-14-13 REAR TRAILING LINK (UPPER) REMOVAL/INSTALLATION.)

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REAR SUSPENSION

REAR CROSSMEMBER REMOVAL/INSTALLATION

id021400801000

Caution

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the wiring harness if it is pulled by mistake. Before operations, remove the ABS wheel-speed sensor (axle side) and move the sensor away from the harnesses.**

1. Remove the rear auto leveling sensor. (Vehicle with discharge headlight system) (See 09-18-30 REAR AUTO LEVELING SENSOR REMOVAL/INSTALLATION.)
2. Remove the exhaust pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
3. Remove the propeller shaft. (See 03-15-2 PROPELLER SHAFT REMOVAL/INSTALLATION.)
4. Remove the power plant frame. (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].) (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].) (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)
5. Remove the rear drive shaft. (See 03-13-2 REAR DRIVE SHAFT REMOVAL/INSTALLATION.)
6. Remove the rear differential. (See 03-14-5 REAR DIFFERENTIAL REMOVAL/INSTALLATION.)
7. Remove in the order indicated in the table.
8. Install in the reverse order of removal.
9. Inspect the rear wheel alignment. (See 02-11-6 REAR WHEEL ALIGNMENT.)

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REAR SUSPENSION

1	Rear stabilizer (See 02-14-11 REAR STABILIZER REMOVAL/ INSTALLATION.)
2	Rear axle component (See 02-14-16 Rear Axle Component Removal Note.)
3	Parking brake cable
4	Stopper plate
5	Rear crossmember component (See 02-14-17 Rear Crossmember Component Removal Note.)
6	Rear trailing link (upper)
7	Rear trailing link (lower)
8	Rear lateral link (upper)
9	Rear lateral link (lower)
10	Toe control link
11	Rear crossmember

Rear Axle Component Removal Note

Note

- When removing the ball joints, the rear knuckle bushings may also come off. If they come off, replace the rear knuckle.

1. Support the knuckle using a jack.
2. Disconnect the rear trailing link (upper) ball joint using the **SST**.
3. Remove the rear trailing link (lower) outer bolt.

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4. Disconnect the rear lateral link (upper) ball joint using the **SST**.

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5. Disconnect the rear lateral link (lower) ball joint using the **SST**.
6. Remove the toe control link outer bolt.
7. Remove the shock absorber lower bolt.
8. Remove the rear axle component.

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REAR SUSPENSION

Rear Crossmember Component Removal Note

Warning

- **Be sure that the crossmember component is securely supported by the jack.If not securely supported, the crossmember component could fall, resulting in serious injury or death, and damage to the vehicle.**

1. Support the rear crossmember with the jack, and remove the bolt.
2. Remove the rear crossmember component.

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TECHNICAL DATA

02-50 TECHNICAL DATA

SUSPENSION TECHNICAL DATA 02-50–1

TECHNICAL DATA

SUSPENSION TECHNICAL DATA

id025000800100

Front wheel alignment [16-inch wheel]

Item			Specification
Total toe-in	Tire [Tolerance ±4 mm {0.15 in}]	(mm {in})	1.6 {0.063}
	Rim inner	(mm {in})	1.1±2.6 {0.04±0.10}
		degree	0°09′±22′
Steering angle [Tolerance ±3°]		Inner	38°30′
		Outer	32°30′
Steering axis inclination (Reference value)			10°57′
Camber [Tolerance ±1°]	Vehicle height: From the end of the front fender to the center of the wheel (mm {in})	356—365 {14.1—14.3}	-0°34′
		366—375 {14.5—14.7}	-0°19′
		376—385 {14.8—15.1}	-0°07′
		386—395 {15.2—15.5}	0°04′
		396—405 {15.6—15.9}	0°12′
Caster [Tolerance ±1°]	Vehicle height: From the end of the rear fender to the center of the wheel (mm {in})	354—363 {14.0—14.2}	6°32′
		364—373 {14.4—14.6}	6°17′
		374—383 {14.8—15.0}	6°02′
		384—393 {15.2—15.4}	5°47′
		394—403 {15.6—15.8}	5°32′

Note

- Unloaded vehicle: Fuel tank is full. Engine coolant and engine oil are at specified level. Jack and tools are in designated position.
- Difference between the left and right dimension for camber and caster is within **1**°.

Front wheel alignment [17-inch wheel]

Item			Specification
Total toe-in	Tire [Tolerance ±4 mm {0.15 in}]	(mm {in})	1.6 {0.063}
	Rim inner	(mm {in})	1.1±2.8 {0.04±0.11}
		degree	0°09′±22′
Steering angle [Tolerance ±3°]		Inner	38°30′
		Outer	32°30′
Steering axis inclination (Reference value)			11°04′
Camber [Tolerance ±1°]	Vehicle height: From the end of the front fender to the center of the wheel (mm {in})	351—360 {13.8—14.1}	-0°42′
		361—370 {14.3—14.5}	-0°26′
		371—380 {14.7—14.9}	-0°13′
		381—390 {15.0—15.3}	-0°01′
		391—400 {15.4—15.7}	0°08′
Caster [Tolerance ±1°]	Vehicle height: From the end of the rear fender to the center of the wheel (mm {in})	349—358 {13.8—14.0}	6°40′
		359—368 {14.2—14.4}	6°25′
		369—378 {14.6—14.8}	6°10′
		379—388 {15.0—15.2}	5°55′
		389—398 {15.4—15.6}	5°40′

Note

- Unloaded vehicle: Fuel tank is full. Engine coolant and engine oil are at specified level. Jack and tools are in designated position.
- Difference between the left and right dimension for camber and caster is within **1**°.

TECHNICAL DATA

Rear wheel alignment [16-inch wheel]

Item			Specification
Total toe-in	Tire [Tolerance ±4 mm {0.15 in}] (mm {in})		3 {0.12}
	Rim inner (mm {in})		1.8±2.4 {0.071±0.094}
	degree		0°17′±22′
Camber [Tolerance ±1°]	Vehicle height: From the end of the rear fender to the center of the wheel (mm {in})	354—363 {14.0—14.2}	-1°33′
		364—373 {14.4—14.6}	-1°18′
		374—383 {14.8—15.0}	-1°04′
		384—393 {15.2—15.4}	-0°54′
		394—403 {15.6—15.8}	-0°45′

Note
- Unloaded vehicle: Fuel tank is full. Engine coolant and engine oil are at specified level. Jack and tools are in designated position.
- Difference between the left and right camber angle is within **1**°.

Rear wheel alignment [17-inch wheel]

Item			Specification
Total toe-in	Tire [Tolerance ±4 mm {0.15 in}] (mm {in})		3 {0.12}
	Rim inner (mm {in})		2.2±2.8 {0.083±0.110}
	degree		0°17′±22′
Camber [Tolerance ±1°]	Vehicle height: From the end of the rear fender to the center of the wheel (mm {in})	349—358 {13.8—14.0}	-1°42′
		359—368 {14.2—14.4}	-1°25′
		369—378 {14.6—14.8}	-1°11′
		379—388 {15.0—15.2}	-0°59′
		389—398 {15.4—15.6}	-0°49′

Note
- Unloaded vehicle: Fuel tank is full. Engine coolant and engine oil are at specified level. Jack and tools are in designated position.
- Difference between the left and right camber angle is within **1**°.

Wheel and tire

Item			Specification		
Standard tire and wheel					
Wheel	Size		16 × 6 1/2JJ	16 × 6 1/2J	17 × 7J
	Offset (mm {in})		50 {2.0}	55 {2.17}	
	Pitch circle diameter (mm {in})		114.3 {4.50}		
	Material		Steel	Aluminum alloy	
Tire	Size		205/50R16 87V		205/45R17 84W
	Air pressure (kPa {kgf/cm^2, psi})	Front	200 {2.0, 29}		
		Rear	200 {2.0, 29}		
	Remaining tread (mm {in})		1.6 {0.06}		
Wheel and tire	Wheel and tire runout (mm {in})	Radial direction	1.5 {0.06} max.		
		Lateral direction	2.5 {0.10} max.	2.0 {0.08} max.	
	Wheel imbalance (g {oz})		9 {0.3} max.	Adhesive-type*1: 14 {0.49} max. Knock-type*2: 9 {0.3} max	Adhesive-type*1: 13 {0.46} max Knock-type*2: 8 {0.28} max

*1 : Total weight exceeds **160 g {5.65 oz}**.
*2 : One balance weight: **60 g {2.12 oz}** max. If the total weight exceeds **100 g {3.53 oz}** on one side, rebalance after moving the tire around on the rim. Do not use three or more balance weights.

TECHNICAL DATA

Item	Specification
Front upper arm ball joint rotational torque	0.3—2.2 N·m {4—22 kgf·cm, 3—19 in·lbf}
Front lower arm ball joint rotational torque	0.4—2.9 N·m {5—29 kgf·cm, 4—25 in·lbf}
Stabilizer control link ball joint rotational torque	0.14—1.04 N·m {1.5—10.6 kgf·cm, 1.3—9.2 in·lbf}
Rear trailing link (upper) ball joint rotational torque	0.4—3.3 N·m {5—33 kgf·cm, 4—29 in·lbf}
Rear lateral link (upper) ball joint rotational torque	0.4—2.8 N·m {5—28 kgf·cm, 4—24 in·lbf}
Rear lateral link (lower) ball joint rotational torque	0.4—2.8 N·m {5—28 kgf·cm, 4—24 in·lbf}
Toe control link ball joint rotational torque	0.3—2.2 N·m {4—22 kgf·cm, 3—19 in·lbf} Pull scale reading: 3—22 N {0.3—2.2 kgf, 0.7—4.9 lbf}
Stabilizer control link ball joint rotational torque	0.23—0.47 N·m {2.35—4.79 kgf·cm, 2.04—4.15 in·lbf}

SERVICE TOOLS

02-60 SERVICE TOOLS

SUSPENSION 02-60–1

SERVICE TOOLS

SUSPENSION

id026000800200

49 T034 1A0 Coil spring compressor set 	49 T028 3A0 Ball joint puller set 	49 T034 202A Clip guide
49 D034 202 Support block 	49 U034 204 Dust boot installer 	49 S010 301 Oil seal installer
49 S032 333 Bearing installer 	49 W027 003 Bearing installer 	49 E017 5A0 Engine support
49 D034 201 Dust boot installer 	49 H028 301 Dust boot installer 	49 T028 302 Dust boot installer
49 0180 510B Preload measuring attachment 	49 W017 101 Clutch hub remover 	49 UN30 3050 Engine lifting bracket

DRIVELINE/AXLE

03
SECTION

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03-10 GENERAL PROCEDURES

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GENERAL PROCEDURES

GENERAL PROCEDURES (FRONT AND REAR AXLES)

id031000800100

Wheel And Tire Installation

1. When installing the wheels and tires, tighten the wheel nuts in a criss-cross pattern to the following tightening torque.

   Tightening torque
   88—118 N·m {9.00—12.0 kgf·m, 65.0—87.0 ft·lbf}

Connector Disconnection

1. Disconnect the negative battery cable before performing any work that requires handling of connectors. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)

Suspension Links Removal/Installation

1. For the joint sections with rubber bushings, raise the vehicle using a lift, and then temporarily tighten the installation bolts and nuts. Lower the vehicle to the ground and tighten them completely with the specified torque.

03-11 FRONT AXLE

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FRONT AXLE

FRONT AXLE LOCATION INDEX

id031100800100

amxzzw0000123

1	Wheel hub, steering knuckle (See 03-11-1 WHEE HUB, STEERING KNUCKLE INSPECTION.) (See 03-11-2 WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION.)
2	Wheel hub bolt (See 03-11-4 FRONT WHEEL HUB BOLT REPLACEMENT.)

WHEEL HUB, STEERING KNUCKLE INSPECTION

id031100800300

Wheel Bearing Looseness Inspection

1. Install the magnetic vase and dial gauge as shown in the figure, and inspect the wheel bearing for axial looseness.
   - If it exceeds the maximum specification, replace the wheel hub component.

   Maximum front wheel bearing play
   0.05 mm {0.002 in}

amxzzw0000123

FRONT AXLE

WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION

id031100800400

Caution

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the wiring harness if it is pulled by mistake. Before performing the following procedures, disconnect the ABS wheel-speed sensor harness connector (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.**

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. After installation, inspect front wheel alignment. (See 02-11-2 FRONT WHEEL ALIGNMENT.)

amxzzw0000123

1	ABS wheel-speed sensor
2	Brake calliper component (See 03-11-3 Brake Caliper Component Removal Note.)
3	Disc plate
4	Tie-rod end (See 06-14-8 STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION.)
5	Stabilizer control link nut (lower)

6	Front upper arm ball joint (See 02-13-6 FRONT UPPER ARM REMOVAL/INSTALLATION.)
7	Front upper arm bolt
8	Front lower arm ball joint (See 02-13-8 FRONT LOWER ARM REMOVAL/INSTALLATION.)
9	Steering knuckle component
10	Steering knuckle

FRONT AXLE

11	Dust cover
12	Wheel hub bolt (See 03-11-3 Wheel Hub Bolt Removal Note.) (See 03-11-3 Wheel Hub Bolt Installation Note.)
13	Wheel hub component

Brake Caliper Component Removal Note

1. Suspend the brake calliper component using a cable or equivalent.

amxzzw0000123

Wheel Hub Bolt Removal Note

Note

- Remove the dust cover only if there is an abnormality.

1. Remove the wheel hub bolts from the wheel hub using a press.

amxzzw0000123

Wheel Hub Bolt Installation Note

1. Press in new wheel hub bolts into the wheel hub using a press.

amxzzw0000123

FRONT AXLE

FRONT WHEEL HUB BOLT REPLACEMENT

id031100800200

1. Remove the brake calliper component and disc plate.
2. Remove the wheel hub bolt using the **SST** as shown in the figure.
3. Place a new wheel hub bolt in the wheel hub.

amxzzw0000123

4. Install the wheel hub bolt by placing a proper sized washer on the hub, and tightening the nut as shown in the figure.

amxzzw0000123

03-12 REAR AXLE

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REAR AXLE

REAR AXLE LOCATION INDEX

id031200800100

amxzzw0000123

1	Wheel hub, rear knuckle (See 03-12-2 WHEEL HUB, REAR KNUCKLE INSPECTION.) (See 03-12-2 WHEEL HUB, REAR KNUCKLE REMOVAL/INSTALLATION.)

REAR AXLE

WHEEL HUB, REAR KNUCKLE INSPECTION

id031200802900

Wheel Bearing Looseness Inspection

1. Install the magnetic vase and dial gauge as shown in the figure, and inspect the wheel bearing for axial looseness.
   - If it exceeds the maximum specification, replace the wheel hub component.

   Maximum rear wheel bearing play
   0.05 mm {0.002 in}

amxzzw0000123

WHEEL HUB, REAR KNUCKLE REMOVAL/INSTALLATION

id031200803000

Caution

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the wiring harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.**

1. When working on the left side of the vehicle, disconnect the rear auto leveling sensor link. (Vehicle with discharge headlight system) (See 09-18-30 REAR AUTO LEVELING SENSOR REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.
4. After installation, inspect rear wheel alignment. (See 02-11-6 REAR WHEEL ALIGNMENT.)

amxzzw0000124

REAR AXLE

1	ABS wheel-speed sensor
2	Locknut (See 03-12-3 Locknut Removal Note.) (See 03-12-7 Locknut Installation Note.)
3	Parking brake cable
4	Brake calliper component (See 03-12-3 Brake Caliper Component Removal Note.)
5	Disc plate (See 04-11-16 FRONT BRAKE (DISC) REMOVAL/INSTALLATION.) (See 04-11-16 FRONT BRAKE (DISC) REMOVAL/INSTALLATION.)
6	Rear lateral link (upper) ball joint (See 02-14-8 REAR LATERAL LINK (LOWER) REMOVAL/INSTALLATION.)
7	Stabilizer control link nut (lower) (See 02-14-11 REAR STABILIZER REMOVAL/INSTALLATION.)
8	Rear lateral link (lower) ball joint (See 02-14-8 REAR LATERAL LINK (LOWER) REMOVAL/INSTALLATION.)
9	Shock absorber bolt (lower)
10	Toe control link ball joint
11	Rear trailing link (upper) ball joint (See 02-14-13 REAR TRAILING LINK (UPPER) REMOVAL/INSTALLATION.)
12	Rear trailing link (lower) outside bolt
13	Rear drive shaft (See 03-12-4 Rear Drive shaft Removal Note.)
14	Rear knuckle component
15	Wheel hub component (See 03-12-4 Wheel Hub Component Removal Note.) (See 03-12-7 Wheel Hub Component Installation Note.)
16	Retaining ring
17	Wheel bearing (See 03-12-5 Wheel Bearing Removal Note.) (See 03-12-7 Wheel Bearing Installation Note.)
18	Dust cover (See 03-12-5 Dust Cover Removal Note.) (See 03-12-6 Dust Cover Installation Note.)
19	Bushing (See 03-12-5 Bushing Removal Note.) (See 03-12-6 Bushing Installation Note.)
20	Rear knuckle
21	Wheel hub bolt (See 03-12-6 Wheel Hub Bolt Removal Note.) (See 03-12-6 Wheel Hub Bolt Installation Note.)

Locknut Removal Note

1. Lock the disc plate by applying the brakes.
2. Knock the crimped portion of the locknut outward using a chisel and a hammer.
3. Remove the locknut.

amxzzw0000124

Brake Caliper Component Removal Note

1. Suspend the brake calliper component using a cable or equivalent.

amxzzw0000124

REAR AXLE

Rear Drive shaft Removal Note

1. Temporarily install a spare nut onto the end of the rear drive shaft.
2. Tap the nut with a copper hammer to loosen the drive shaft from the wheel hub.
3. Separate the rear drive shaft from the wheel hub.

amxzzw0000124

Wheel Hub Component Removal Note

1. Wind the **SST** and backing plate contact area with packing tape two times.
2. Remove the wheel hub component using the **SSTs**.

amxzzw0000124

3. If the bearing inner race remains on the wheel hub component, use a chisel to secure a sufficient space for installing the **SST** between wheel hub component and bearing inner race.

amxzzw0000124

4. Remove the bearing inner race using the **SST**.
5. After removing the bearing, repair any backing plate deformation.

amxzzw0000124

REAR AXLE

Wheel Bearing Removal Note

1. Wind the **SST** and backing plate contact area with packing tape two times.
2. Remove the wheel bearing from the rear knuckle using the **SSTs**.
3. After removing the bearing, repair any backing plate deformation.

amxzzw0000124

Dust Cover Removal Note

Note
- Remove the dust cover only if there is an abnormality.

1. Place an alignment mark on the dust cover and rear knuckle for proper installation.

chu0312w011

2. Remove the dust cover using a chisel.

amxzzw0000124

Bushing Removal Note

1. Remove the bushing from the rear knuckle using the **SSTs**.

amxzzw0000124

REAR AXLE

Wheel Hub Bolt Removal Note

Note
- Remove the dust cover only if there is an abnormality.

1. Remove the wheel hub bolts from the wheel hub using a press.

amxzzw0000125

Wheel Hub Bolt Installation Note

1. Press in new wheel hub bolts into the wheel hub using a press.

amxzzw0000125

Bushing Installation Note

1. Press the new bushing into the rear knuckle using the **SSTs**.

chu0312w016

Dust Cover Installation Note

1. Align the new and old dust covers and place alignment marks on the new dust cover.
2. Align the marks on the new dust cover and rear knuckle.

chu0312w017

REAR AXLE

3. Press the new dust cover onto the rear knuckle using the **SSTs**.

amxzzw0000125

Wheel Bearing Installation Note

1. Install a new wheel bearing using the **SSTs**.

amxzzw0000125

Wheel Hub Component Installation Note

1. Install the wheel hub component using the **SSTs**.

amxzzw0000125

Locknut Installation Note

1. Tighten a new locknut.
2. Install a new locknut and indent as shown to crimp the locknut, using a chisel and hammer.

chu0312w002

03-13 DRIVE SHAFT

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DRIVE SHAFT

REAR DRIVE SHAFT LOCATION INDEX

id031300802000

amxzzw0000126

1	Rear drive shaft (See 03-13-2 REAR DRIVE SHAFT INSPECTION.) (See 03-13-2 REAR DRIVE SHAFT REMOVAL/ INSTALLATION.) (See 03-13-5 REAR DRIVE SHAFT DISASSEMBLY/ASSEMBLY.)

DRIVE SHAFT

REAR DRIVE SHAFT INSPECTION

id031300801300

1. Verify that the drive shaft is not twisted or damaged.
   - If there is any malfunction, replace the applicable part.
2. Inspect the dust boot for damage and cracks.
   - If there is any malfunction, replace the applicable part.
3. Move the spline and joint up and down, left and right by hand and verify that there is no roughness.
   - If there is any malfunction, replace the applicable part.

REAR DRIVE SHAFT REMOVAL/INSTALLATION

id031300800600

Caution

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the wiring harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.**

1. When working on the left side of the vehicle, disconnect the rear auto leveling sensor link. (Vehicle with discharge headlight system) (See 09-18-30 REAR AUTO LEVELING SENSOR REMOVAL/INSTALLATION.)
2. Drain the rear differential oil.
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.
5. Add rear differential oil. (See 03-14-3 DIFFERENTIAL OIL REPLACEMENT.)

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1	ABS wheel-speed sensor
2	Locknut (See 03-13-3 Locknut Removal Note.) (See 03-13-4 Locknut Installation Note.)

3	Parking brake cable
4	Brake caliper component (See 03-13-3 Brake Caliper Component Removal Note.)

DRIVE SHAFT

5	Disc plate (See 04-11-22 REAR BRAKE (DISC) REMOVAL/INSTALLATION.)
6	Rear lateral link (upper) ball joint (See 02-14-6 REAR LATERAL LINK (UPPER) REMOVAL/INSTALLATION.)
7	Stabilizer control link (lower) (See 02-14-11 REAR STABILIZER REMOVAL/INSTALLATION.)
8	Rear lateral link (lower) ball joint (See 02-14-8 REAR LATERAL LINK (LOWER) REMOVAL/INSTALLATION.)
9	Shock absorber bolt (lower)
10	Toe control link ball joint
11	Rear trailing link (upper) ball joint (See 02-14-13 REAR TRAILING LINK (UPPER) REMOVAL/INSTALLATION.)
12	Rear trailing link (lower) outside bolt
13	Rear drive shaft (See 03-13-3 Rear Drive Shaft Removal Note.) (See 03-13-4 Rear Drive Shaft Installation Note.)
14	Rear knuckle component
15	Clip (See 03-13-4 Clip Installation Note.)

Locknut Removal Note

1. Lock the disc plate by applying the brakes.
2. Knock the crimped portion of the locknut outward using a chisel and a hammer.
3. Remove the locknut.

amxzzw0000125

Brake Caliper Component Removal Note

1. Suspend the brake calliper component using a cable or equivalent.
2. Temporarily tighten the wheel nut to prevent the disc plate from falling off.

amxzzw0000125

Rear Drive Shaft Removal Note

1. Temporarily install a spare nut to the end of the rear drive shaft.
2. Knock the nut with copper hammer lightly and remove the rear drive shaft from the wheel hub.
3. Separate the rear drive shaft from the wheel hub.

amxzzw0000125

DRIVE SHAFT

4. Insert a tire lever or equivalent between the rear differential and differential side outer ring, and then remove the rear drive shaft.

   Caution
   - **The sharp edges of the drive shaft can slice or puncture the oil seal. Be careful not to damage the oil seal when removing the drive shaft from the differential.**

amxzzw0000125

5. Pull the rear drive shaft to the outer side of the vehicle and disconnect it from the rear differential.
6. To hold the rear knuckle component, install the rear lateral link (upper) to the rear knuckle temporarily after disconnecting the rear drive shaft.

Clip Installation Note

1. Point the opening of the new drive shaft clip upward, install it to the clip groove at the end of the rear drive shaft with the installation width within the specification.

   Standard
   31.2 mm {1.23 in}

2. After installing the clip, measure the outer diameter. If it exceeds the specification, reinstall the new clip.

amxzzw0000126

Rear Drive Shaft Installation Note

1. Apply differential oil to the differential oil seal lip.

   Caution
   - **The sharp edges of the rear drive shaft can slice or puncture the oil seal. Be careful not to damage the oil seal when installing the rear drive shaft from the rear differential.**

2. Insert the rear drive shaft into the rear differential with the clip opening facing upward.
3. After installation, verify that the rear drive shaft is securely held by the clip by pulling the outer ring on the differential side towards the axle.

Locknut Installation Note

1. Tighten a new locknut.
2. Crimp the locknut, using a chisel and hammer.

chu0312w002

DRIVE SHAFT

REAR DRIVE SHAFT DISASSEMBLY/ASSEMBLY

id031300800700

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

amxzzw0000126

1	Boot band (axle side) (See 03-13-5 Boot Band (Axle Side) Disassembly Note.) (See 03-13-8 Boot Band (Axle Side) Assembly Note.)
2	Boot band (differential side) (See 03-13-6 Boot Band (Differential Side) Disassembly Note.) (See 03-13-8 Boot Band (Differential Side) Assembly Note.)
3	Tripod joint socket (See 03-13-6 Tripod Joint Socket Disassembly Note.) (See 03-13-7 Tripod Joint Socket Assembly Note.)

4	Snap ring (See 03-13-6 Snap Ring, Tripod Joint Disassembly Note.) (See 03-13-7 Tripod Joint, Snap Ring Assembly Note.)
5	Tripod joint (See 03-13-6 Snap Ring, Tripod Joint Disassembly Note.) (See 03-13-7 Tripod Joint, Snap Ring Assembly Note.)
6	Boot (See 03-13-6 Boot Disassembly Note.) (See 03-13-7 Boot Assembly Note.)
7	Shaft and ball joint component

Boot Band (Axle Side) Disassembly Note

Note

- Remove the boot band only if there is an abnormality.

1. Remove the boot band using end clamp pliers.

amxzzw0000126

DRIVE SHAFT

Boot Band (Differential Side) Disassembly Note

1. Remove the crimp of the clip using a flathead screwdriver.

amxzzw0000126

Tripod Joint Socket Disassembly Note

1. Place an alignment mark on the drive shaft and the outer ring.
2. Remove the outer ring.

chu0313w005

Snap Ring, Tripod Joint Disassembly Note

1. Place an alignment mark on the shaft and tripod joint.
2. Remove the snap ring using a snap ring plier.
3. Remove the tripod joint from the shaft.

Caution

- **To prevent damage to the component, do not use a hammer when removing it.**

chu0313w006

Boot Disassembly Note

Note

- Remove the axle side boot only if there is an abnormality.

1. Wrap the shaft spline with vinyl tape.
2. Remove the boot.

chu0313w007

DRIVE SHAFT

Boot Assembly Note

Note
- The boot shapes on the axle side and the differential side are different so do not miss install them.

1. Fill the inside of the new dust boot (wheel side) with grease.

Note
- Do not touch the grease with your hand. Apply it from the tube to prevent foreign matter from entering the boot.

Grease amount
90—110 g {3.18—3.88 oz}

2. Install the boot with the drive shaft spline still wrapped with vinyl tape.
3. Remove the vinyl tape.

Tripod Joint, Snap Ring Assembly Note

1. Align the tripod joint with the shaft mark and insert it using a brass bar.

Caution
- **To prevent damage to the component, do not tap the roller part when installing.**

2. Install the new snap ring to the shaft installation slot securely using a snap ring pliers.

chu0313w008

Tripod Joint Socket Assembly Note

1. Fill the outer ring and boot (differential side) with the repair kit grease.

Note
- Do not touch the grease with your hand. Apply it from the tube to prevent foreign matter from entering the boot.

Grease amount
135—155 g {4.77—5.46 oz}

2. Assemble the outer ring.
3. Release any trapped air from the boots by carefully lifting up the small end of each boot with a cloth wrapped screwdriver.

Caution
- **Do not let the grease leak.**
- **Do not damage the boot.**

4. Set the drive shaft length to the specification when the inside of the boots is at ambient pressure.

Rear drive shaft standard length
Left side: 778.5—788.5 mm {30.65—31.04 in}
Right side: 818.5—828.5 mm {32.22—32.62 in}

5. After installation, verify that there is no boot damage or grease leakage.

amxzzw0000126

DRIVE SHAFT

Boot Band (Differential Side) Assembly Note

1. Using pliers, pull the boot band around the boot slot in opposite direction of drive shaft forward rotation direction and tighten.
2. Insert the end of the boot band between the boot band clip and fold back the clip tabs using a flathead screwdriver to secure the boot band.
3. Verify that the boot band is installed to the boot slot securely.

amxzzw0000126

Boot Band (Axle Side) Assembly Note

1. Turn the adjusting bolt of the **SST** and adjust the opening size to the specification A.

   Specification A
   2.9 mm {0.11 in}

chu0313w009

2. Crimp the boot band (small-size) using the **SST**.
3. Verify that the crimp value B is within the specification.
   - If the crimp value B exceeds the specification, reduce opening length A of the **SST** and recrimp the boot band.
   - If the crimp value B is less than the specification, increase opening length A of the **SST** and crimp the new boot band.

   Specification B
   2.4—2.8 mm {0.095—0.110 in}

amxzzw0000126

4. Verify that the boot band does not protrude from the boot band installation area.
   - If the boot band protrudes from the installation area, replace it with a new band and repeat Step 2—4.
5. Fill the boot with the repair kit grease.
6. Adjust opening length A of the **SST** to the specification.

   Specification A
   3.2 mm {0.13 in}

7. Crimp the boot band (large-size) using the **SST**.
8. Verify that the boot band crimp value B is within the specification.
   - If crimp value B exceeds the specification, reduce opening length A of the **SST** and recrimp the boot band.
   - If the crimp value B is less than the specification, replace the boot band, increase opening length A of the **SST**, and then recrimp the new boot band.

   Specification B
   2.4—2.8 mm {0.095—0.110 in}

9. Verify that the boot band does not protrude from the boot band installation area.
   - If the boot band protrudes from the installation area, replace it with a new band and repeat Step 7—9.

03-14 DIFFERENTIAL

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DIFFERENTIAL

REAR DIFFERENTIAL LOCATION INDEX

id031400800300

amxzzw0000135

1	Differential oil, oil-fill plug and drain plug (See 03-14-2 DIFFERENTIAL OIL INSPECTION.) (See 03-14-3 DIFFERENTIAL OIL REPLACEMENT.)
2	Oil seal (side gear) (See 03-14-4 OIL SEAL (SIDE GEAR) REPLACEMENT.)

3	Oil seal (companion flange) (See 03-14-4 OIL SEAL (COMPANION FLANGE) REPLACEMENT.)
4	Rear differential (See 03-14-5 REAR DIFFERENTIAL REMOVAL/ INSTALLATION.) (See 03-14-10 REAR DIFFERENTIAL DISASSEMBLY.) (See 03-14-14 REAR DIFFERENTIAL ASSEMBLY.)

DIFFERENTIAL OIL INSPECTION

id031400800100

1. Park the vehicle on level ground for **approx. 5 min** to stabilize the differential oil.
2. Remove the oil-fill plug and the washer.

chu0314w015

DIFFERENTIAL

3. Inspect if the oil level is close to the rim of the oil-fill plug hole.

   Note
   - Each vehicle is filled with a specified amount of oil (0.7±0.1 L) when it is delivered, therefore, the oil level is lower than the lower end of the plug hole as shown in the figure. However, this has no affect on the differential function.

amxzzw0000135

4. If the oil level is lower than **approx. 12 mm {0.47 in}** from the lower end of the oil-fill plug hole, inspect for oil leakage and add the specified oil.

   Differential oil
   Grade: API service GL-5
   Viscosity: SAE 90

5. Install the oil-fill plug with a new washer and tighten.

   Tightening torque
   39.2—53.9 N·m {4.00—5.49 kgf·m, 29.0—39.7 ft·lbf}

DIFFERENTIAL OIL REPLACEMENT

id031400800200

1. Park the vehicle on level ground.
2. Remove the oil-fill plug.
3. Remove the drain plug and drain the oil.
4. Install the drain plug with a new washer and tighten.

   Tightening torque
   39.2—53.9 N·m
   {4.00—5.49 kgf·m, 29.0—39.7 ft·lbf}

chu0314w002

5. Add the specified oil from the oil-fill plug hole until the oil level reaches the lower end of the plug hole.

   Differential oil
   Grade: API service GL-5
   Viscosity: SAE 90
   Capacity (approx. quantity): 0.6—0.8 L
   {0.63— 0.85 US qt, 0.53—0.70 Imp qt}

amxzzw0000135

6. Install the oil-fill plug with a new washer and tighten.

   Tightening torque
   39.2—53.9 N·m
   {4.00—5.49 kgf·m, 29.0—39.7 ft·lbf}

DIFFERENTIAL

OIL SEAL (SIDE GEAR) REPLACEMENT

id031400800700

1. Remove the drain plug and drain the oil.
2. Install the drain plug with a new washer and tighten.

   Tightening torque
   39.2—53.9 N·m {4.00—5.49 kgf·m, 29.0—39.7 ft·lbf}

3. Disconnect the rear drive shaft on the differential side.
   (See 03-13-2 REAR DRIVE SHAFT REMOVAL/INSTALLATION.)
4. Remove the clip from the rear drive shaft.

   Caution
   - **To prevent damaging the inside of the differential casing, wrap cloth on the end of the flathead screwdriver.**

5. Remove the oil seal from the differential carrier using a flathead screwdriver.
6. Apply differential oil to the lip of a new oil seal.

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7. Tap in the new oil seal until it reaches the differential carrier using the **SSTs**.

   Note
   - Install the oil seal at a straight angle.

8. After installing a new clip to the rear drive shaft, insert it into the rear differential.
   (See 03-13-2 REAR DRIVE SHAFT REMOVAL/INSTALLATION.)
9. Verify that the rear drive shaft is held securely by the clip by pulling the outer ring on the differential side towards the axle.

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10. Add differential oil.
11. After adding the oil, perform the oil level inspection. (See 03-14-2 DIFFERENTIAL OIL INSPECTION.)
12. Install the oil-fill plug with a new washer and tighten.

    Tightening torque
    39.2—53.9 N·m {4.00—5.49 kgf·m, 29.0—39.7 ft·lbf}

OIL SEAL (COMPANION FLANGE) REPLACEMENT

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1. Remove the rear differential. (See 03-14-5 REAR DIFFERENTIAL REMOVAL/INSTALLATION.)
2. Replace the oil seal (companion flange) referring to the rear differential disassembly/assembly procedure. (See 03-14-10 REAR DIFFERENTIAL DISASSEMBLY.) (See 03-14-14 REAR DIFFERENTIAL ASSEMBLY.)
3. Install the rear differential. (See 03-14-5 REAR DIFFERENTIAL REMOVAL/INSTALLATION.)

DIFFERENTIAL

REAR DIFFERENTIAL REMOVAL/INSTALLATION

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Caution

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the wiring harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.**

1. Drain the rear differential oil.
2. Remove the insulator. (LF (MT)) (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].) (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)
3. Remove the tunnel member. (MT) (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].) (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)
4. Remove the tunnel member component. (AT) (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)
5. Remove the middle pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
6. Remove the propeller shaft. (See 03-15-2 PROPELLER SHAFT REMOVAL/INSTALLATION.)
7. Disconnect the rear auto leveling sensor link. (Vehicle with discharge headlight system) (See 09-18-30 REAR AUTO LEVELING SENSOR REMOVAL/INSTALLATION.)
8. Remove in the order indicated in the table.
9. Install in the reverse order of removal.
10. Add rear differential oil. (See 03-14-3 DIFFERENTIAL OIL REPLACEMENT.)

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DIFFERENTIAL

1	ABS wheel-speed sensor
2	Parking brake cable
3	Brake caliper component (See 03-14-6 Brake Caliper Component Removal Note.)
4	Rear lateral link (upper) ball joint (See 02-14-13 REAR TRAILING LINK (UPPER) REMOVAL/INSTALLATION.)
5	Stabilizer control link (lower) (See 02-14-11 REAR STABILIZER REMOVAL/ INSTALLATION.)
6	Rear lateral link (lower) ball joint (See 02-14-8 REAR LATERAL LINK (LOWER) REMOVAL/INSTALLATION.)
7	Shock absorber bolt (lower)
8	Toe control link ball joint

9	Rear trailing link (upper) ball joint (See 02-14-13 REAR TRAILING LINK (UPPER) REMOVAL/INSTALLATION.)
10	Rear trailing link (lower)
11	Rear drive shaft, rear knuckle component (See 03-14-6 Rear Drive Shaft, Rear Knuckle Component Removal Note.) (See 03-14-9 Rear Drive Shaft, Rear Knuckle Component Installation Note.)
12	Power plant frame (See 03-14-7 Power Plant Frame Removal Note.) (See 03-14-7 Rear Differential, Power Plant Frame Installation Note.)
13	Rear differential (See 03-14-7 Rear Differential Removal Note.) (See 03-14-7 Rear Differential, Power Plant Frame Installation Note.)
14	Differential mount

Brake Caliper Component Removal Note

1. Suspend the brake calliper component using a cable or equivalent.
2. Temporarily tighten the wheel nut to prevent the disc plate from falling off.

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Rear Drive Shaft, Rear Knuckle Component Removal Note

1. Insert a tire lever or equivalent between the rear differential and differential side outer ring, and remove the rear drive shaft.

   Caution
   - **The sharp edges of the drive shaft can slice or puncture the oil seal. Be careful not to damage the oil seal when removing the drive shaft from the differential.**

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2. Pull the rear drive shaft and rear knuckle component to the outer side, and detach the rear drive shaft from the rear differential.
3. To hold the rear drive shaft and rear knuckle component, install the rear lateral link (upper) to the rear knuckle temporarily after disconnecting the rear drive shaft.

DIFFERENTIAL

Power Plant Frame Removal Note

1. Support the transmission using a transmission jack.

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2. Remove the power plant frame.

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Rear Differential Removal Note

Warning
- **If the rear differential falls off, it can cause serious injuries or death, and damage to the vehicle. When removing the rear differential, verify that it is supported securely with a jack.**

1. Remove the rear differential, while supporting it securely with a jack, and moving the jack gradually.

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Rear Differential, Power Plant Frame Installation Note

Warning
- **If the rear differential falls off, it can cause serious injuries or death, and damage to the vehicle. When removing the rear differential, verify that it is supported securely with a jack.**

Caution
- **Tighten the differential mounting installation bolts completely only after performing the power plant frame installation and adjustment. If the differential mounting bracket is installed at an incorrect angle, the differential mounting bracket bushings will twist and cause an abnormal noise while the vehicle moving.**

DIFFERENTIAL

1. Support the rear differential using the jack.
2. Temporarily tighten the differential mounting installation bolts.

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3. Support the transmission and differential so that they are level using a transmission jack.

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4. Install the power plant frame.

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5. Temporarily tighten the nuts 1, 2, 3 in order shown in the figure.
6. Tighten nut 2 until the power plant frame is seated in the rear differential.
7. Temporarily tighten the nuts 4, 5 in order shown in the figure.
8. Install the tunnel member (MT) or tunnel member component (AT). (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].) (See 05-11B-4 TRANSMISSION REMOVAL/ INSTALLATION [P66M-D].) (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/ INSTALLATION [SJ6A-EL].)
9. Raise the front end of the power plant frame (transmission side) or the transmission with the transmission jack, and adjust dimension A to **26.7—34.7 mm {1.06—1.36 in}** (lower surface of power plant frame-upper surface of the tunnel member) as shown in the figure.

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e5u513zw5024

Note

- If there is the possibility of age-related bending/deterioration of the mount, adjust dimension A to **approx. 15 mm {0.59 in}** higher than the adjustment value to facilitate obtaining the specification.

DIFFERENTIAL

10. Tighten the power plant frame installation nuts.

    Tightening torque
    126—154 N·m {12.9—15.7 kgf·m, 93.0—113.5 ft·lbf}

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11. Verify that dimension A is within the specification with the transmission jack and the adjustment bolt removed.
    - If not within the specification, adjust dimension A again.

    Standard dimension A
    26.7—34.7 mm {1.06—1.36 in}

12. Remove the tunnel member (MT) or tunnel member component (AT).
13. Temporarily loosen the differential mounting installation bolts, straighten the differential mounting bracket bushings, and then tighten the differential mounting installation bolts again to the specified torque.

    Caution
    - **Never support the rear differential using a jack when tightening the differential mounting installation bolts. Otherwise, the differential mounting bracket bushings will twist and cause an abnormal noise while the vehicle is moving.**

    Tightening torque
    74.5—105.0 N·m {7.60—10.70 kgf·m, 55.0—77.44 ft·lbf}

Rear Drive Shaft, Rear Knuckle Component Installation Note

1. Install a new drive shaft clip to the clip groove at the top of the rear drive shaft with the clip opening facing upward and the clip width within the specification.

   Standard
   31.2 mm {1.23 in}

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2. After installing the clip, measure the outer diametric if it exceeds the specification, reinstall a new clip.
3. Apply differential oil to the differential oil seal lip.

   Caution
   - **The sharp edges of the rear drive shaft can slice or puncture the oil seal Be careful not to damage the oil seal when installing the rear drive shaft from the rear differential.**

4. Insert the rear drive shaft into the rear differential with the clip opening facing upward.
5. After installation, verify that the rear drive shaft is securely held by the clip by pulling the outer ring on the differential side towards the axle.

DIFFERENTIAL

REAR DIFFERENTIAL DISASSEMBLY

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Warning

- **The engine stand is equipped with a self-lock mechanism, however, if the rear differential is tilted, the self-lock mechanism could become inoperative. If the rear differential unexpectedly rotates, it could cause injury, therefore do not maintain the rear differential tilted. When turning the rear differential, grasp the rotation handle firmly.**

1. Disassemble in the order indicated in the table.

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1	Breather plug
2	Rear cover
3	Baffle plate
4	Differential component (See 03-14-11 Differential Component Disassembly Note.)
5	Bearing cap (See 03-14-11 Bearing Cap Disassembly Note.)
6	Adjustment shim (See 03-14-11 Adjustment Shim, Side Bearing Outer Race Disassembly Note.)

7	Differential gear case component
8	Side bearing outer race (See 03-14-11 Adjustment Shim, Side Bearing Outer Race Disassembly Note.)
9	Side bearing (See 03-14-12 Side Bearing Disassembly Note.)
10	Ring gear
11	Gear case
12	Roll pin (See 03-14-12 Roll Pin Disassembly Note.)
13	Pinion shaft

DIFFERENTIAL

14	Pinion gear
15	Thrust washer
16	Side gear
17	Washer
18	Locknut (See 03-14-12 Locknut Disassembly Note.)
19	Washer
20	Companion flange (See 03-14-13 Companion Flange Disassembly Note.)
21	Oil seal (companion flange)
22	Spacer
23	Front bearing
24	Drive pinion component (See 03-14-13 Drive Pinion Component Disassembly Note.)

25	Collapsible spacer
26	Rear bearing (See 03-14-13 Rear Bearing Disassembly Note.)
27	Spacer
28	Drive pinion
29	Front bearing outer race (See 03-14-13 Front Bearing Outer Race, Rear Bearing Outer Race Disassembly Note.)
30	Rear bearing outer race (See 03-14-13 Front Bearing Outer Race, Rear Bearing Outer Race Disassembly Note.)
31	Oil seal (side gear)
32	Differential carrier
33	Oil-fill plug
34	Drain plug

Differential Component Disassembly Note

1. Install the differential component to the **SSTs**.

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Bearing Cap Disassembly Note

1. Mark the bearing cap and differential carrier for proper installation.

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Adjustment Shim, Side Bearing Outer Race Disassembly Note

1. Remove the adjustment shim using a flathead screwdriver.

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DIFFERENTIAL

2. Put left and right identification marks on the removed adjustment shims and side bearing outer races.

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Side Bearing Disassembly Note

1. Remove the side bearing using the **SST**.
2. Put left and right identification marks on the removed side bearings.

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Roll Pin Disassembly Note

1. Tap the roll pin out from the direction shown in the figure using a pin punch.

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Locknut Disassembly Note

1. Remove the locknut while fixing the companion flange using the **SST**.

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DIFFERENTIAL

Companion Flange Disassembly Note

1. Remove the companion flange using the **SST**.

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Drive Pinion Component Disassembly Note

1. Install the removed locknut to the drive pinion top to prevent damage to the thread.
2. Remove the drive pinion component by tapping the locknut lightly using a plastic hammer.
3. Remove the locknut installed in Step 1.

amxzzw0000137

Rear Bearing Disassembly Note

Caution

- **The drive pinion could be damaged if it falls off. Support the drive pinion with your hand when removing the rear bearing.**

1. Remove the rear bearing using the **SST** and a press.

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Front Bearing Outer Race, Rear Bearing Outer Race Disassembly Note

1. Remove the bearing outer race by lightly tapping the edge of the bearing outer race using a flathead screwdriver.

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DIFFERENTIAL

REAR DIFFERENTIAL ASSEMBLY

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Warning

- **The engine stand is equipped with a self-lock mechanism, however, if the rear differential is tilted, the self-lock mechanism could become inoperative. If the rear differential unexpectedly rotates, it could cause injury, therefore do not maintain the rear differential tilted. When turning the rear differential, grasp the rotation handle firmly.**

Note

- Clean away the old silicone sealant before applying the new silicone sealant.
- Install the rear cover before the applied sealant starts to harden.
- Allow the sealant to set **at least 30 min or more** after installation before filling the differential with differential oil.

1. Assemble in the order indicated in the table.

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1	Gear case
2	Side gear
3	Thrust washer
4	Pinion gear

5	Pinion shaft
6	Washer (See 03-14-15 Washer Assembly Note.)

DIFFERENTIAL

7	Roll pin (See 03-14-15 Roll Pin Assembly Note.)
8	Ring gear (See 03-14-15 Ring Gear Assembly Note.)
9	Side bearing (See 03-14-16 Side Bearing Assembly Note.)
10	Differential gear case component
11	Differential carrier
12	Oil seal (side gear) (See 03-14-16 Oil Seal (Side Gear) Assembly Note.)
13	Rear bearing outer race (See 03-14-17 Rear Bearing Outer Race Assembly Note.)
14	Front bearing outer race (See 03-14-17 Front Bearing Outer Race Assembly Note.)
15	Spacer (See 03-14-17 Spacer Assembly Note.)
16	Drive pinion
17	Rear bearing (See 03-14-19 Rear Bearing Assembly Note.)
18	Drive pinion component (See 03-14-20 Drive Pinion Component Assembly Note.)

19	Collapsible spacer
20	Front bearing
21	Spacer
22	Oil seal (companion flange) (See 03-14-20 Oil Seal (Companion Flange) Assembly Note.)
23	Companion flange
24	Washer
25	Locknut (See 03-14-21 Locknut Assembly Note.)
26	Adjustment shim (See 03-14-21 Adjustment Shim Assembly Note.)
27	Side bearing race
28	Bearing cap (See 03-14-23 Bearing Cap Assembly Note.)
29	Baffle plate
30	Rear cover
31	Breather plug
32	Oil-level plug
33	Drain plug

Washer Assembly Note

1. Assemble the side gear, thrust washer, pinion gear, and the pinion shaft to the gear case.
2. Install the dial gauge with the measuring probe of the dial gauge attached perpendicularly to the end of one of the pinion gear teeth.
3. Fix either one of the side gears.
4. Move the pinion gear and measure the backlash at the pinion gear top.
   - If it is not within the specification, adjust by choosing the proper washer.

Backlash of pinion gear and side gear
0.1 mm {0.004 in} or less

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Washer table

Identification mark	Part name	Thickness (mm {in})
9	MA29 27 252	0.90 {0.0354}
95	MA29 27 253	0.95 {0.0374}
0	MA29 27 254	1.00 {0.0393}
05	MA29 27 256	1.05 {0.0413}
1	MA29 27 257	1.10 {0.0433}

Roll Pin Assembly Note

1. Align the differential gear case and pinion shaft pin holes.
2. Tap the roll pin in using a pin punch.

Ring Gear Assembly Note

Caution

- **The gear case and ring gear could be damaged if the ring gear is installed with old thread-locking compound remaining on the bolt threads. Before installing the ring gear, completely remove the old thread-locking compound from the bolt threads.**

DIFFERENTIAL

1. Apply a small amount of thread-locking compound to each of points A on the back of the ring gear, and bolt thread areas B (around the entire ring).

   Application thickness
   Back of ring gear points A:
   Approx. 0.4 cm^3 {0.4 cc, 0.024 cu in}
   (1 location approx. 0.04 cm^3 {0.04 cc, 0.0024 cu in})
   Ring gear bolt thread points B:
   Approx. 0.4 cm^3 {0.4 cc, 0.024 cu in}
   (1 location approx. 0.04 cm^3 {0.04 cc, 0.0024 cu in})

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2. Install the ring gear to the differential gear case and tighten the bolts in a criss-cross pattern.

   Tightening torque
   68.6—83.3 N·m
   {7.00—8.49 kgf·m, 50.6—61.4 ft·lbf}

Side Bearing Assembly Note

Note
- When assembling the side bearings, do not mix the left and right side bearings that were identified during disassembly.

1. Press the side bearing in using the **SST** and a press.

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Oil Seal (Side Gear) Assembly Note
1. Apply differential oil to the lip of a new oil seal.
2. Assemble the oil seal using the **SSTs**.

amxzzw0000220

DIFFERENTIAL

Rear Bearing Outer Race Assembly Note

1. Press the rear bearing outer race into the differential carrier using the **SST** and a press.

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Front Bearing Outer Race Assembly Note

1. Press the front bearing outer race into the differential carrier using the **SST** and a press.

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Spacer Assembly Note
Pinion height adjustment

Note
- Use the installed spacer when adjusting.
- Install the spacer with the chamfer on the **SST** side.

1. Assemble the spacer, bearing inner race (rear side), and the **SST** (O-ring) to the **SST** (49 8531 565) as shown in the figure.

amxzzw0000220

DIFFERENTIAL

2. Insert the set assembled in Step 1 from the rear side of the differential carrier.
3. Assemble the **SST** (49 8531 567), front bearing, companion flange, and a washer from the front side of the differential carrier.
4. Tighten the locknut to the extent that the **SST** (49 8531 565) can be turned by hand.
5. Place the **SST** (49 N027 001) on top of the **SST** (49 8531 565).

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6. Place the **SST** on the surface plate and set the dial gauge to zero.

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7. Set the **SSTs** as shown in the figure.
8. Place the measuring probe of the dial gauge at the point where the side bearing is installed in the differential carrier and measure at the lowest position. Measure the left and right sides.

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DIFFERENTIAL

9. Add the two (left and right) values obtained by the measurements taken in Step 8 and then divide the total by **2**. From this sum, subtract the sum of the number inscribed on the end of the drive pinion divided by **100**. (If there is no figure inscribed, use 0.) This is the pinion height adjustment value.

   Differential pinion height
   0.038 mm {0.0015 in} or less

   Note
   - When the values obtained by the measurements taken in Step 8, 9 are 0.06 mm {0.0024 in}, 0.04 mm {0.0016 in} and the tip surface of the drive pinion value is 2, the formula is ((0.06+0.04)/2)-(2/100)=0.03. Therefore, assemble a spacer 0.03 mm {0.0012} thicker than the currently assembled one. The thickness settings are in increments of 0.015 mm {0.0006}, so choose one closest in thickness and install.

amxzzw0000221

Spacer table

Identification mark	Thickness (mm {in})	Identification mark	Thickness (mm {in})
08	3.080 {0.1213}	29	3.290 {0.1295}
09	3.095 {0.1220}	30	3.305 {0.1301}
11	3.110 {0.1224}	32	3.320 {0.1307}
12	3.125 {0.1230}	33	3.335 {0.1313}
14	3.140 {0.1234}	35	3.350 {0.1319}
15	3.155 {0.1242}	36	3.365 {0.1325}
17	3.170 {0.1248}	38	3.380 {0.1331}
18	3.185 {0.1254}	39	3.395 {0.1337}
20	3.200 {0.1260}	41	3.410 {0.1343}
21	3.215 {0.1266}	42	3.425 {0.1348}
23	3.230 {0.1271}	44	3.440 {0.1354}
24	3.245 {0.1278}	45	3.455 {0.1360}
26	3.260 {0.1283}	47	3.470 {0.1366}
27	3.275 {0.1289}	—	—

Rear Bearing Assembly Note

Note
- Install the spacer with the chamfer on the gear side.

1. Assemble the spacer selected in the pinion height adjustment to the drive pinion.
2. Press the drive pinion into the rear bearing using the **SSTs** and a press.

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DIFFERENTIAL

Drive Pinion Component Assembly Note
Drive pinion preload adjustment

Note
- Perform preload adjustment with the oil seal uninstalled.

1. Assemble the following parts to the drive pinion.
   - New collapsible spacer
   - Front bearing
   - New spacer
   - Companion flange
   - New washer
   - New locknut
2. Turn the serrated part of the drive pinion by hand to seat the bearing.
3. Tighten the locknut temporarily tightened in Step 1 from the lower limit of the specified tightening torque using the **SST**, and obtain the specified preload. Record the tightening torque at this time.

   Tightening torque
   128—284 N·m {13.06—28.96 kgf·m, 94.41—209.4 ft·lbf}

   Drive pinion preload
   1.3—1.8 N·m {14—18 kgf·cm, 12—15 in·lbf}

   - If the specified preload cannot be obtained within the specified tightening torque, replace with a new collapsible spacer and adjust again.
4. Remove the locknut, washer, and companion flange.

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Oil Seal (Companion Flange) Assembly Note
1. Apply differential oil to the lip of a new oil seal.
2. Assemble the oil seal using the **SST**.

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DIFFERENTIAL

Locknut Assembly Note

1. Tighten a new locknut with the torque recorded at the drive pinion preload adjustment using the **SST**.

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2. Verify that the drive pinion preload is within the specification.
   - If not within the specification, perform the preload adjustment again.

   Drive pinion preload
   1.3—1.8 N·m {14—18 kgf·cm, 12—15 in·lbf}

amxzzw0000221

Adjustment Shim Assembly Note
Ring gear backlash adjustment

1. Stack the side bearing race and differential gear case component on the surface plate as shown in the figure, and measure the height using a calliper and a ruler. This is value A.

   Standard Height A
   151.4—152.6 mm {5.961—6.007 in}

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2. Measure the width of the section of the differential gear case component installed in the differential carrier. This is value B.

   Standard width B
   171 mm {6.73 in}

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3. The combined thickness of the left and right adjustment shims is obtained by the following formula.
   Shim thickness (mm {in}) =B-A+ (0.01—0.03 {0.0004—0.0118 in})
4. If the combined thickness of the previously assembled adjustment shims is equal to the calculated thickness, use the shims as they are.
5. If the combined thickness of the previously assembled adjustment shims is not equal to the calculated thickness, or if the adjustment shims have to be replaced, select two appropriate adjustment shims from the table below.

DIFFERENTIAL

Adjustment shim table

Identification mark	Thickness (mm {in})	Identification mark	Thickness (mm {in})
550	5.50 {0.217}	605	6.05 {0.238}
560	5.60 {0.220}	610	6.10 {0.240}
565	5.65 {0.222}	615	6.15 {0.242}
570	5.70 {0.224}	620	6.20 {0.244}
575	5.75 {0.226}	625	6.25 {0.246}
580	5.80 {0.228}	630	6.30 {0.248}
585	5.85 {0.230}	635	6.35 {0.250}
590	5.90 {0.232}	640	6.40 {0.252}
595	5.95 {0.234}	650	6.50 {0.256}
600	6.00 {0.236}	—	—

Note
- If the adjustment shims are to be reused, assemble the left and right shims that were identified during disassembly.
- When assembling the side bearing races, do not mix the left and right side bearings that were identified during disassembly.

6. Assemble the differential gear case component and the side bearing race to the differential carrier.
7. Tap the selected adjustment shim between the differential carrier and the side bearing race with a plastic hammer as shown in the figure.
8. Align the bearing cap alignment marks, assemble the bearing cap, and then temporarily tighten the bolts.

amxzzw0000221

9. Install the dial gauge with the measuring probe of the dial gauge attached perpendicularly to the end of one of the ring gear teeth.
10. Secure the drive pinion and measure the backlash of the ring gear.

Backlash of drive pinion and ring gear
Standard: 0.09—0.11 mm {0.0035—0.0043 in}
Minimum value: 0.05 mm {0.0020 in} or more
Variance: 0.07 mm {0.0028 in} or less

bhe0314w003

Note
- Measure the backlash at 4 locations around the ring gear. Make sure all of the 4 locations are within specification, and the minimum value for the 4 locations is **0.05 mm {0.0020in} or more** and the variance is **0.07 mm {0.0028 in} or less**

11. If the backlash is not within the specification, adjust the gear case component by moving it in the axial direction.

Note
- When moving the gear case component in the axial direction, replace the adjustment shims. If the adjustment shim on the right side is replaced with one that is **0.05 mm {0.0020 in}** thicker, replace the one on the left with one that is **0.05 mm {0.0020 in}** thinner.

amxzzw0000221

DIFFERENTIAL

12. Measure the ring gear preload between the backlash.

    Ring gear preload
    0.49—1.47 N·m {5.0—14.9 kgf·cm, 4.4—13.0 in·lbf}

Bearing Cap Assembly Note

1. Align the bearing cap alignment marks and assemble the bearing cap with the arrow facing outward.

   Tightening torque
   72.6—106.9 N·m {7.41—10.91 kgf·m, 53.5—78.84 ft·lbf}

2. Perform the drive pinion and ring gear tooth contact inspection.

chu0314w014

Drive Pinion, Ring Gear Tooth Contact Inspection

1. Apply tooth marking compound evenly to both surfaces of the ring gear.
2. Rotate the ring gear back and forth for several times.
3. Inspect the tooth contact pattern in 4 locations around the ring gear, and verify that the tooth contact points exhibit the pattern shown in the figure.
   - If the tooth contact points are normal, wipe off the marking compound.
   - If the tooth contact points are not normal, adjust the pinion height, then adjust the backlash.

chu0314w020

4. If the toe and flank contact points appear as shown in the figure after the drive pinion and ring gear teeth contact inspection, replace the spacer with a thinner one, and move the drive pinion outward.

chu0314w021

DIFFERENTIAL

5. If the heel and face contact points appear as shown in the figure after the drive pinion and ring gear teeth contact inspection, replace the spacer with a thicker one, and move the drive pinion inward.

chu0314w022

03-15 PROPELLER SHAFT

PROPELLER SHAFT LOCATION INDEX 03-15–1
PROPELLER SHAFT INSPECTION 03-15–2
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Propeller Shaft Removal Note 03-15–3
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PROPELLER SHAFT

PROPELLER SHAFT LOCATION INDEX

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amxzzw0000130

1	Propeller shaft (See 03-15-2 PROPELLER SHAFT REMOVAL/ INSTALLATION.) (See 03-15-2 PROPELLER SHAFT INSPECTION.)

PROPELLER SHAFT

PROPELLER SHAFT INSPECTION

id031500800500

1. Use a dial gauge to measure the runout of the propeller shaft at each position.
   - If it exceeds the maximum specification, replace the propeller shaft.

   Maximum runout
   0.6 mm {0.024 in}

chu0315w009

2. Inspect the play and rotation of the joint by turning the universal joint in the direction shown by the arrow.

   Initial torque (Reference value)
   0.29—0.98 N·m
   {3.0—10 kgf·cm, 2.7—8.6 in·lbf}

   - If there is excessive play or initial torque, replace the propeller shaft.

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PROPELLER SHAFT REMOVAL/INSTALLATION

id031500800300

1. Remove the member, the exhaust pipe and the main silencer.
   (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
2. Remove in the order indicated in the table.

1	Bolt, nut
2	Propeller shaft (See 03-15-3 Propeller Shaft Removal Note.) (See 03-15-3 Propeller Shaft Installation Note.)

3. Install in the reverse order of removal.

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PROPELLER SHAFT

Propeller Shaft Removal Note

Caution

- **When replacing with a new propeller shaft, mark the companion flange to match the position of the tag on the propeller shaft.**

1. Before removing the propeller shaft, make alignment marks on the yoke and differential companion flange.

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2. Install the **SST** to the extension housing.

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Propeller Shaft Installation Note

1. Align the marks and install the propeller shaft.
2. When installing a new propeller shaft, align the differential companion flange mark with the tag on the propeller shaft and assemble.

chu0315w004

TECHNICAL DATA

03-50 TECHNICAL DATA

DRIVELINE/AXLE
TECHNICAL DATA 03-50–1

TECHNICAL DATA

DRIVELINE/AXLE TECHNICAL DATA

id035000800100

Item	Specification
Maximum front wheel bearing play	0.05 mm {0.002 in}
Maximum rear wheel bearing play	0.05 mm {0.002 in}
Rear drive shaft standard length	Left side: 778.5—788.5 mm {30.65—31.04 in} Right side: 818.5—828.5 mm {32.22—32.62 in}
Differential oil	Grade: API service GL-5 Viscosity: SAE 90 Capacity (approx. quantity): 0.6—0.8 L {0.63— 0.85 US qt, 0.53—0.70 Imp qt}
Backlash of pinion gear and side gear	0.1 mm {0.004 in} or less
Differential pinion height	0.038 mm {0.0015 in} or less
Drive pinion preload	1.3—1.8 N·m {14—18 kgf·cm, 12—15 in·lbf}
Backlash of drive pinion and ring gear	Standard: **0.09—0.11 mm {0.0035—0.0043 in}** Minimum value: **0.05 mm {0.0020 in}** or more Variance: **0.07 mm {0.0028 in}** or less
Ring gear preload	**0.49—2.45 N·m {5.0—24.9 kgf·cm, 4.4—21.6 in·lbf}**
Maximum runout	0.6 mm {0.024 in}
Initial torque (Reference value)	0.29—0.98 N·m {3.0—10 kgf·cm, 2.7—8.6 in·lbf}

SERVICE TOOLS

03-60 SERVICE TOOLS

DRIVELINE/AXLE SST 03-60–1

SERVICE TOOLS

DRIVELINE/AXLE SST

id036000800200

49 T028 3A0 Ball joint puller set 	49 G033 102 handle 	49 G033 105 Attachment
49 H027 002 Bearing remover 	49 F027 007 Attachment ø72 	49 F401 331 Body
49 8531 565 Drive pinion model 	49 F027 004 Attachment ø80 	49 H034 201 Support block
49 F027 009 Attachment ø68&77 	49 T025 001 Boot clamp crimper 	49 F401 337A Attachment IN ø35
49 U027 003 Oil seal installer 	49 S120 710 Coupling flange holder 	49 0839 425C Bearing puller set
49 0107 680A Engine stand 	49 M005 561 Differential carrier hunger 	49 0636 145 Water pump pulley boss puller
49 UB71 525 Bearing installer 	49 8038 785A Dust boot installer 	49 0727 570 Pinion height gauge body
49 S120 440 Mainshaft holder 	49 F026 103 Wheel hub puller 	49 W010 107A Oil seal installer
49 G030 797 Handle 	49 F027 005 Attachment ø62 	49 8531 567 Collar A

SERVICE TOOLS

49 N027 001 Gauge block 	49 H027 001 Collar 	49 0259 440 Mainshaft holder

BRAKES

04
SECTION

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04-02A ON-BOARD DIAGNOSTIC [ABS]

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ON-BOARD DIAGNOSTIC [ABS]

ABS SYSTEM WIRING DIAGRAM [ABS]

id0402a7802300

amxzzn00000488

ON-BOARD DIAGNOSTIC [ABS]

ON-BOARD DIAGNOSIS [ABS]

id0402a7805500

On-Board Diagnostic (OBD) Test Description

- The OBD test inspects the integrity and function of the ABS and outputs the results when requested by the specific tests.
- On-board diagnostic test also:
  —Provides a quick inspection of the ABS usually performed at the start of each diagnostic procedure.
  —Provides verification after repairs to ensure that no other faults occurred during service.
- The OBD test is divided into 3 tests:
  —Read/clear diagnostic results, PID monitor and record and active command modes.

Read/clear diagnostic results

- This function allows you to read or clear DTCs in the ABS HU/CM memory.

PID/Data monitor and record

- This function allows you to access certain data values, input signals, calculated values, and system status information.

Active command modes

- This function allows you to control devices through the M-MDS.

Reading DTCs Procedure

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “Self Test”.
     2. Select “Modules”.
     3. Select “ABS”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “ABS”.
     3. Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
   - If any DTCs are displayed, perform troubleshooting according to the corresponding DTC inspection.
4. After completion of repairs, clear all DTCs stored in the ABS. (See 04-02A-3 Clearing DTCs Procedures.)

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Clearing DTCs Procedures

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “Self Test”.
     2. Select “Modules”.
     3. Select “ABS”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “ABS”.
     3. Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
4. Press the clear button on the DTC screen to clear the DTC.
5. Turn the ignition switch to the LOCK position.
6. Turn the ignition switch to the ON position and wait for **5 s or more**.
7. Perform DTC inspection. (See 04-02A-3 Reading DTCs Procedure.)
8. Verify that no DTCs are displayed.

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ON-BOARD DIAGNOSTIC [ABS]

PID/Data Monitor and Record Procedure

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “DataLogger”.
     2. Select “Modules”.
     3. Select “ABS”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “ABS”.
     3. Select “DataLogger”.
3. Select the applicable PID from the PID table.
4. Verify the PID data according to the directions on the screen.

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Note

- The PID data screen function is used for monitoring the calculated value of input/output signals in the module.Therefore, if the monitored value of the output parts is not within the specification, it is necessary to inspect the monitored value of input parts corresponding to the applicable output part control. In addition, because the system does not display an output part malfunction as an abnormality in the monitored value, it is necessary to inspect the output parts individually.

Active Command Modes Procedure

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “DataLogger”.
     2. Select “Modules”.
     3. Select “ABS”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “ABS”.
     3. Select “DataLogger”.
3. Select the active command modes from the PID table.
4. Perform the active command modes, inspect the operations for each parts.
   - If the operation of output parts cannot be verified after the active command mode inspection is performed, this could indicate the possibility of an open or short circuit, sticking, or operation malfunction in the output parts.

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DTC Table

DTC M-MDS	System malfunction location	Page
B1317	Power supply system	(See 04-02A-7 DTC B1317, B1318 [ABS].)
B1318	Power supply system	(See 04-02A-7 DTC B1317, B1318 [ABS].)
B1342	ABS HU/CM system	(See 04-02A-9 DTC B1342 [ABS].)
B1484	Brake switch system	(See 04-02A-9 DTC B1484 [ABS].)
B2477	ABS HU/CM configuration	(See 04-02A-10 DTC B2477 [ABS].)
C1095	Pump motor, motor relay system	(See 04-02A-11 DTC C1095, C1096 [ABS].)
C1096	Pump motor, motor relay system	(See 04-02A-11 DTC C1095, C1096 [ABS].)
C1141	LF ABS sensor rotor system	(See 04-02A-12 DTC C1141, C1142, C1143, C1144 [ABS].)
C1142	RF ABS sensor rotor system	(See 04-02A-12 DTC C1141, C1142, C1143, C1144 [ABS].)
C1143	LR ABS sensor rotor system	(See 04-02A-12 DTC C1141, C1142, C1143, C1144 [ABS].)
C1144	RR ABS sensor rotor system	(See 04-02A-12 DTC C1141, C1142, C1143, C1144 [ABS].)
C1145	RF ABS wheel-speed sensor system	(See 04-02A-13 DTC C1145, C1155, C1165, C1175 [ABS].)

ON-BOARD DIAGNOSTIC [ABS]

DTC M-MDS	System malfunction location	Page
C1148	RF ABS wheel-speed sensor system	(See 04-02A-15 DTC C1148, C1158, C1168, C1178 [ABS].)
C1155	LF ABS wheel-speed sensor system	(See 04-02A-13 DTC C1145, C1155, C1165, C1175 [ABS].)
C1158	LF ABS wheel-speed sensor system	(See 04-02A-15 DTC C1148, C1158, C1168, C1178 [ABS].)
C1165	RR ABS wheel-speed sensor system	(See 04-02A-13 DTC C1145, C1155, C1165, C1175 [ABS].)
C1168	RR ABS wheel-speed sensor system	(See 04-02A-15 DTC C1148, C1158, C1168, C1178 [ABS].)
C1175	LR ABS wheel-speed sensor system	(See 04-02A-13 DTC C1145, C1155, C1165, C1175 [ABS].)
C1178	LR ABS wheel-speed sensor system	(See 04-02A-15 DTC C1148, C1158, C1168, C1178 [ABS].)
C1186	Fail-safe relay system	(See 04-02A-16 DTC C1186, C1266 [ABS].)
C1194	LF outlet solenoid valve system	(See 04-02A-17 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254 [ABS].)
C1198	LF inlet solenoid valve system	(See 04-02A-17 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254 [ABS].)
C1210	RF outlet solenoid valve system	(See 04-02A-17 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254 [ABS].)
C1214	RF inlet solenoid valve system	(See 04-02A-17 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254 [ABS].)
C1233	LF ABS wheel-speed sensor/ABS sensor rotor system	(See 04-02A-18 DTC C1233, C1234, C1235, C1236 [ABS].)
C1234	RF ABS wheel-speed sensor/ABS sensor rotor system	(See 04-02A-18 DTC C1233, C1234, C1235, C1236 [ABS].)
C1235	RR ABS wheel-speed sensor/ABS sensor rotor system	(See 04-02A-18 DTC C1233, C1234, C1235, C1236 [ABS].)
C1236	LR ABS wheel-speed sensor/ABS sensor rotor system	(See 04-02A-18 DTC C1233, C1234, C1235, C1236 [ABS].)
C1242	LR outlet solenoid valve system	(See 04-02A-17 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254 [ABS].)
C1246	RR outlet solenoid valve system	(See 04-02A-17 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254 [ABS].)
C1250	LR inlet solenoid valve system	(See 04-02A-17 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254 [ABS].)
C1254	RR inlet solenoid valve system	(See 04-02A-17 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254 [ABS].)
C1266	Fail-safe relay system	(See 04-02A-16 DTC C1186, C1266 [ABS].)
C1805	Incorrect ABS HU/CM installed	(See 04-02A-20 DTC C1805 [ABS].)
U0073	CAN system communication error	(See 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].) (See 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
U1900	Communication error to other module	(See 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].) (See 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
U2023	Abnormal message from PCM	(See 04-02A-20 DTC U2023 [ABS].)

PID/DATA Monitor Table

PID name (definition)	Unit/Condition	Operation condition (reference)	Action	ABS HU/CM terminal
ABS_VOLT (System battery voltage value)	V	• Ignition switch at ON position: **Approx. 12.2 V** • Idling: **Approx. 14.1 V**	Inspect the power supply circuit. (See 04-13-3 ABS SYSTEM INSPECTION.)	J
ABSLF_I (Left front inlet solenoid valve output state)	Off/On	• Solenoid valve not activated: Off • Solenoid valve activated: On	Inspect the ABS HU/CM. (See 04-13-6 ABS HU/CM INSPECTION.)	—

ON-BOARD DIAGNOSTIC [ABS]

PID name (definition)	Unit/Condition	Operation condition (reference)	Action	ABS HU/CM terminal
ABSLF_O (Left front outlet solenoid valve output state)	Off/On	• Solenoid valve not activated: Off • Solenoid valve activated: On	Inspect the ABS HU/CM. (See 04-13-6 ABS HU/CM INSPECTION.)	—
ABSLR_I (Left rear inlet solenoid valve output state)	Off/On	• Solenoid valve not activated: Off • Solenoid valve activated: On	Inspect the ABS HU/CM. (See 04-13-6 ABS HU/CM INSPECTION.)	—
ABSLR_O (Left rear outlet solenoid valve output state)	Off/On	• Solenoid valve not activated: Off • Solenoid valve activated: On	Inspect the ABS HU/CM. (See 04-13-6 ABS HU/CM INSPECTION.)	—
ABSPMPRLY (Motor relay output state)	Off/On	• Relay not activated: Off • Relay activated: On	Inspect the ABS HU/CM. (See 04-13-6 ABS HU/CM INSPECTION.)	—
ABSRF_I (Right front inlet solenoid valve output state)	Off/On	• Solenoid valve not activated: Off • Solenoid valve activated: On	Inspect the ABS HU/CM. (See 04-13-6 ABS HU/CM INSPECTION.)	—
ABSRF_O (Right front outlet solenoid valve output state)	Off/On	• Solenoid valve not activated: Off • Solenoid valve activated: On	Inspect the ABS HU/CM. (See 04-13-6 ABS HU/CM INSPECTION.)	—
ABSRR_I (Right rear inlet solenoid valve output state)	Off/On	• Solenoid valve not activated: Off • Solenoid valve activated: On	Inspect the ABS HU/CM. (See 04-13-6 ABS HU/CM INSPECTION.)	—
ABSRR_O (Right rear outlet solenoid valve output state)	Off/On	• Solenoid valve not activated: Off • Solenoid valve activated: On	Inspect the ABS HU/CM. (See 04-13-6 ABS HU/CM INSPECTION.)	—
ABSVLVRLY (Fail-safe relay output state)	Off/On	• Fail-safe relay is deactivated: Off • Fail-safe relay is activated: On	Inspect the ABS HU/CM. (See 04-13-6 ABS HU/CM INSPECTION.)	—
BOO_ABS (Brake pedal switch input)	Off/On	• Brake pedal released: Off • Brake pedal depressed: On	Inspect the brake switch. (See 04-11-7 BRAKE SWITCH INSPECTION.)	N
CCNTABS (Number of continuous codes)	—	• DTCs detected: **1—255** • No DTCs detected: **0**	Perform the DTC inspection. (See 04-02A-3 Reading DTCs Procedure.)	—
LF_WSPD (Left front ABS wheel-speed sensor input)	KPH, MPH	• Vehicle stopped: **0 KPH, 0 MPH** • Vehicle running: Vehicle speed	Inspect the front ABS wheel-speed sensor. (See .04-13-8 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION)	E, F
LR_WSPD (Left rear ABS wheel-speed sensor input)	KPH, MPH	• Vehicle stopped: **0 KPH, 0 MPH** • Vehicle running: Vehicle speed	Inspect the rear ABS wheel-speed sensor. (See .04-13-9 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION)	G, H
PMP_MOTOR (Pump motor output state)	Off/On	• Pump motor not activated: Off • Pump motor activated: On	Inspect the ABS HU/CM. (See 04-13-6 ABS HU/CM INSPECTION.)	—
RF_WSPD (Right front ABS wheel-speed sensor input)	KPH, MPH	• Vehicle stopped: **0 KPH, 0 MPH** • Vehicle running: Vehicle speed	Inspect the front ABS wheel-speed sensor. (See .04-13-8 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION)	M, O
RR_WSPD (Right rear ABS wheel-speed sensor input)	KPH, MPH	• Vehicle stopped: **0 KPH, 0 MPH** • Vehicle running: Vehicle speed	Inspect the rear ABS wheel-speed sensor. (See .04-13-9 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION)	I, L

ON-BOARD DIAGNOSTIC [ABS]

Active Command Modes Table

Command name	Output part	Operation	Operating condition
LF_INLET	LF inlet solenoid valve	Off/On	Ignition switch at ON position
LF_OUTLET	LF outlet solenoid valve		
LR_INLET	LR inlet solenoid valve		
LR_OUTLET	LR outlet solenoid valve		
PMP_MOTOR	Pump motor		
RF_INLET	RF inlet solenoid valve		
RF_OUTLET	RF outlet solenoid valve		
RR_INLET	RR inlet solenoid valve		
RR_OUTLET	RR outlet solenoid valve		

DTC B1317, B1318 [ABS]

id0402a7800300

DTC B1317, B1318	Power supply system
DETECTION CONDITION	• B1317 — The voltage at ABS HU/CM terminal J is **16.8 V** or more. • B1318 — The vehicle speed exceeds **6 km/h {4 mph}** and the voltage at ABS HU/CM terminal J is less than **9.6 V**
POSSIBLE CAUSE	• Battery deterioration • Generator malfunction • ENGINE 15 A fuse malfunction • Open circuit or short to ground in the wiring harness between the ABS HU/CM terminal J and the battery • Open circuit or faulty ground in the wiring harness between the ABS HU/CM terminal D and the body ground • Poor connection at connectors (female terminal)

ABS HU/CM WIRING HARNESS-SIDE CONNECTOR

ON-BOARD DIAGNOSTIC [ABS]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT BATTERY VOLTAGE** • Is the battery terminal voltage normal?	Yes	Make sure that battery terminal connection is normal. Go to the next step.
		No	Charge or replace the battery, then go to Step 6. (See 01-17-4 BATTERY RECHARGING [L8, LF].) (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2	**INSPECT BATTERY GRAVITY** • Is battery specific gravity as specified?	Yes	Go to the next step.
		No	Replace the battery, then go to Step 6. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3	**INSPECT CHARGING SYSTEM** • Are the generator and drive belt tensions normal?	Yes	Go to the next step.
		No	Replace generator and/or drive belt as necessary, then go to Step 6. (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].) (See 01-17-5 GENERATOR REMOVAL/INSTALLATION [L8, LF].)
4	**INSPECT ABS HU/CM POWER SUPPLY FOR OPEN CIRCUIT** • Start the engine. • Measure the voltage between ABS HU/CM terminal J and ground. • Is the voltage **approx. 10 V**?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for open circuit between the ABS HU/CM and ground, then go to Step 6.
5	**INSPECT ABS HU/CM GROUND FOR POOR GROUND OR OPEN CIRCUIT** • Turn the ignition switch to the LOCK position. • Measure the resistance between ground and ABS HU/CM terminal D. • Is the resistance **within 0—1 ohm**?	Yes	Go to the next step.
		No	If there is no continuity: • Repair or replace the wiring harness for open circuit between the ABS HU/CM and ground, then go to the next step. If the resistance is not **within 0—1 ohm**: • Repair or replace harness for poor ground, then go to the next step.
6	**VERIFY TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the memory. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) • Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**. • Is the same DTC present?	Yes	Replace the ABS HU/CM, then go to the next step. (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present?	Yes	Go to the applicable DTC inspection. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [ABS]

DTC B1342 [ABS]

id0402a7809000

DTC B1342	ABS HU/CM system
DETECTION CONDITION	• The ABS HU/CM on-board diagnostic function detects control module malfunction.
POSSIBLE CAUSE	• ABS HU/CM internal malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY CURRENT STATUS OF MALFUNCTION** • Clear the DTC from the memory. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) • Is same DTC present?	Yes	Replace the ABS HU/CM, then go to the next step. (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
2	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present?	Yes	Go to the applicable DTC inspection. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].)
		No	DTC troubleshooting completed.

DTC B1484 [ABS]

id0402a7805400

DTC B1484	Brake switch system
DETECTION CONDITION	• Open circuit in the wiring harness between the ABS HU/CM terminal and the brake switch terminal
POSSIBLE CAUSE	• Open circuit in the wiring harness between the ABS HU/CM terminal N and the brake switch terminal D • Brake switch malfunction

ON-BOARD DIAGNOSTIC [ABS]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT ABS HU/CM TO BRAKE SWITCH FOR OPEN CIRCUIT** • Turn the ignition switch to the LOCK position. • Disconnect the ABS HU/CM and brake switch connector. • Inspect for continuity ABS HU/CM terminal N and brake switch terminal D. • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for open circuit between ABS HU/CM and brake switch, then go to the next step.
2	**INSPECT BRAKE SWITCH** • Inspect the brake switch. (See 04-11-7 BRAKE SWITCH INSPECTION.) • Is the brake switch normal?	Yes	Go to the next step.
		No	Replace the brake switch, then go to the next step. (See 04-11-5 BRAKE PEDAL REMOVAL/INSTALLATION.)
3	**VERIFY TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the memory. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) • Are the same DTCs present?	Yes	Replace the ABS HU/CM, then go to the next step. (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTC present?	Yes	Go to the applicable DTC inspection. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].)
		No	DTC troubleshooting completed.

DTC B2477 [ABS]

id0402a7805600

DTC B2477	ABS HU/CM configuration
DETECTION CONDITION	• Configuration setting failure is detected.
POSSIBLE CAUSE	• Module configuration procedure was not completed properly.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY CONFIGURATION** • Has the ABS HU/CM configuration been performed?	Yes	Go to the next step.
		No	Perform configuration using the M-MDS. (See 04-13-6 ABS CONFIGURATION.)
2	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Clear the DTC from the memory. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) • Is the same DTC present?	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the ABS HU/CM. (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
3	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present?	Yes	Go to the applicable DTC inspection. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [ABS]

DTC C1095, C1096 [ABS]

id0402a7805900

DTC C1095, C1096	Pump motor, motor relay system
DETECTION CONDITION	• C1095 —When the pump motor monitor voltage remains at **2.0 V or more** for **1 s** —ABS motor monitor OFF signal is input within specified time limit when the motor signal is switched from ON to OFF by ABS HU/CM. • C1096 —When the difference between the battery power supply voltage and pump motor power supply voltage remains at **4.0 V or more** for **0.1 s or more** while the pump motor is operating
POSSIBLE CAUSE	• ABS 40 A fuse malfunction • Open or short to ground circuit in the wiring harness between the battery and the ABS HU/CM terminal B • Open circuit in the wiring harness between the ABS HU/CM terminal A and the body ground • Open or short circuit in the ABS HU/CM internal motor relay, or stuck motor relay • Open or short circuit in the ABS HU/CM internal motor, or frozen motor • Fail-safe relay malfunction • Poor connection at connectors (female terminal)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT ABS FUSE CONDITION** • Is the ABS 40A fuse normal?	Yes	Go to the next step.
		No	Replace the fuse, then go to Step 5.
2	**INSPECT MOTOR RELAY POWER SUPPLY FOR OPEN CIRCUIT** • Turn the ignition switch to the LOCK position. • Disconnect ABS HU/CM connector. • Turn the ignition switch to the ON position (engine off). • Measure voltage between ABS HU/CM terminal B (harness-side) and ground. • Is the voltage **B+**?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for open circuit between battery positive terminal and ABS HU/CM terminal B, then go to Step 5.
3	**INSPECT PUMP MOTOR GROUND FOR OPEN CIRCUIT** • Turn the ignition switch to the LOCK position. • Inspect for continuity between ABS HU/CM terminal A (harness-side) and ground. • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for open circuit between ABS HU/CM terminal A and ground, then go to Step 5.
4	**VERIFY PUMP MOTOR OPERATION** • Turn the ignition switch to the LOCK position. • Connect the M-MDS to the DLC-2. • Turn the ignition switch to the ON position (engine off). • Access PMP_MOTOR active command modes using M-MDS. • Does the pump motor operate?	Yes	Go to the next step.
		No	Replace the ABS HU/CM, then go to the next step. (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)

ON-BOARD DIAGNOSTIC [ABS]

STEP	INSPECTION		ACTION
5	**VERIFY TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the memory. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) • Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**. • Gradually slow down and stop the vehicle. • Is the same DTC present?	Yes	Replace the ABS HU/CM, then go to the next step. (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
6	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present?	Yes	Go to the applicable DTC inspection. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].)
		No	DTC troubleshooting completed.

DTC C1141, C1142, C1143, C1144 [ABS]

id0402a7801000

DTC	**C1141** **C1142** **C1143** **C1144**	**LF ABS sensor rotor system** **RF ABS sensor rotor system** **LR ABS sensor rotor system** **RR ABS sensor rotor system**
DETECTION CONDITION	• Periodic abnormality is detected in the signal wave pattern from the ABS wheel-speed sensors.	
POSSIBLE CAUSE	• ABS wheel-speed sensor malfunction • ABS sensor rotor malfunction (foreign material adhering) • Improper installation of ABS wheel-speed sensor and/or sensor rotor • Excessive clearance between the ABS wheel-speed sensor and sensor rotor	

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT PID FOR ABS WHEEL-SPEED SENSOR OUTPUT ERROR USING M-MDS** • Turn the ignition switch to the LOCK position. • Connect the M-MDS to the DLC-2. • Select the following PIDs using the M-MDS: LF_WSPD LR_WSPD RF_WSPD RR_WSPD • Drive the vehicle. • Verify that the vehicle speeds detected by the four ABS wheel-speed sensors are approximately the same. • Are the vehicle speeds approximately the same?	Yes	Go to Step 4.
		No	Go to the next step.
2	**INSPECT IF MALFUNCTION OCCURRED DUE TO IMPROPER SENSOR CLEARANCE.** • Inspect the clearance between the ABS wheel-speed sensor and the ABS sensor rotor. (See 04-13-8 FRONT ABS WHEEL-SPEED SENSOR INSPECTION.) (See 04-13-10 REAR ABS WHEEL-SPEED SENSOR INSPECTION.) • Is the clearance normal? **Clearance** **Front: 0.3—1.0 mm {0.012—0.057 in}** **Rear: 0.8—1.6 mm {0.032—0.062 in}**	Yes	Go to the next step.
		No	Replace the ABS wheel-speed sensor, then go to Step 4. (See 04-13-8 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.) (See 04-13-9 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)
3	**VISUALLY INSPECT ABS SENSOR ROTOR FOR FOREIGN MATERIAL ADHERING OR IMPROPER INSTALLATION** • Is the result normal?	Yes	Go to the next step.
		No	Replace the front wheel hub component or rear drive shaft, then go to the next step. (See 03-11-2 WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION.) (See 03-13-2 REAR DRIVE SHAFT REMOVAL/INSTALLATION.)

ON-BOARD DIAGNOSTIC [ABS]

STEP	INSPECTION		ACTION
4	**VERIFY THAT THE SAME DTC IS NOT PRESENT** • Clear the DTCs from the memory. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) • Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**. • Are the same DTCs present?	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the ABS HU/CM, then go to the next step. (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
5	**VERIFY THAT NO OTHER DTCS ARE PRESENT** • Are any other DTCs output?	Yes	Go to the applicable DTC inspection. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].)
		No	DTC troubleshooting completed.

DTC C1145, C1155, C1165, C1175 [ABS]

id0402a7801100

DTC	**C1145** **C1155** **C1165** **C1175**	**RF ABS wheel-speed sensor (open circuit) system** **LF ABS wheel-speed sensor (open circuit) system** **RR ABS wheel-speed sensor (open circuit) system** **LR ABS wheel-speed sensor (open circuit) system**
DETECTION CONDITION	• Open circuit or short to ground has been detected in the ABS wheel-speed sensor wiring harness on any of the four vehicle wheels.	
POSSIBLE CAUSE	• Open circuit or short to ground in the wiring harness between the following ABS HU/CM terminal and the ABS wheel-speed sensor terminal: — ABS HU/CM terminal M—RF ABS wheel-speed sensor terminal A — ABS HU/CM terminal O—RF ABS wheel-speed sensor terminal B — ABS HU/CM terminal F—LF ABS wheel-speed sensor terminal A — ABS HU/CM terminal E—LF ABS wheel-speed sensor terminal B — ABS HU/CM terminal I—RR ABS wheel-speed sensor terminal B — ABS HU/CM terminal L—RR ABS wheel-speed sensor terminal A — ABS HU/CM terminal G—LR ABS wheel-speed sensor terminal B — ABS HU/CM terminal H—LR ABS wheel-speed sensor terminal A • ABS wheel-speed sensor malfunction • Poor connection at connectors (female terminal)	

ABS WHEEL-SPEED SENSOR WIRING HARNESS-SIDE CONNECTOR

ABS HU/CM WIRING HARNESS-SIDE CONNECTOR

ON-BOARD DIAGNOSTIC [ABS]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT PID TO VERIFY THAT WHEEL SPEED-SIGNALS ARE TRANSMITTED FROM ABS WHEEL- SPEED SENSOR USING M-MDS** • Turn the ignition switch to the LOCK position. • Connect the M-MDS to the DLC-2. • Select the following PIDs using the M-MDS: LF_WSPD LR_WSPD RF_WSPD RR_WSPD • Drive the vehicle. • Verify that the wheel speed-signals are transmitted from each ABS wheel-speed sensor. • Are the wheel-speed signals transmitted?	Yes	Go to Step 3.
		No	Go to the next step.
2	**INSPECT FOR OPEN CIRCUIT IN WIRING HARNESS BETWEEN ABS HU/CM AND ABS WHEEL-SPEED SENSOR** • Turn the ignition switch to the LOCK position. • Disconnect the ABS HU/CM connector and ABS wheel-speed sensor. • Inspect for continuity in the wiring harness between the following ABS wheel-speed sensor connectors on the vehicle wiring harness-side and ABS HU/CM connectors. —RF ABS wheel-speed sensor (+): M—A —RF ABS wheel-speed sensor (–): O—B —LF ABS wheel-speed sensor (+): F—A —LF ABS wheel-speed sensor (–): E—B —RR ABS wheel-speed sensor (+): I—B —RR ABS wheel-speed sensor (–): L—A —LR ABS wheel-speed sensor (+): G—B —LR ABS wheel-speed sensor (–): H—A • Is there continuity?	Yes	Replace the ABS wheel-speed sensor, then go to the next step. (See 04-13-8 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.) (See 04-13-9 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)
		No	Repair or replace the wiring harness, then go to the next step.
3	**VERIFY THAT THE SAME DTC IS NOT PRESENT** • Clear the DTCs from the memory. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) • Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**. • Are the same DTCs present?	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the ABS HU/CM, then go to the next step. (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
4	**VERIFY THAT NO OTHER DTCS ARE PRESENT** • Are any other DTCs output?	Yes	Go to the applicable DTC inspection. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [ABS]

DTC C1148, C1158, C1168, C1178 [ABS]

id0402a7801200

DTC	**C1148** **C1158** **C1168** **C1178**	**RF ABS wheel-speed sensor/ABS sensor rotor system** **LF ABS wheel-speed sensor/ABS sensor rotor system** **RR ABS wheel-speed sensor/ABS sensor rotor system** **LR ABS wheel-speed sensor/ABS sensor rotor system**
DETECTION CONDITION	• Vehicle wheel speed signals of any of the four vehicle wheels indicate abnormal acceleration that exceeds specification. • Vehicle wheel speed signals of any of the four vehicle wheels indicate speed that exceeds specification.	
POSSIBLE CAUSE	• ABS wheel-speed sensor malfunction (low output, metal shavings on sensor) • ABS sensor rotor malfunction (chipping of sensor rotor teeth) • Poor installation of ABS wheel-speed sensor and/or sensor rotor (If the sensor rotor is installed at an angle, it may cause output of abnormal wave pattern at high speeds.) • Excessive clearance between the ABS wheel-speed sensor and sensor rotor	

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT PID FOR ABNORMAL OUTPUT FROM ABS WHEEL-SPEED SENSOR USING M-MDS** • Turn the ignition switch to the LOCK position. • Connect the M-MDS to the DLC-2. • Select the following PIDs using the M-MDS: LF_WSPD LR_WSPD RF_WSPD RR_WSPD • Start the engine and drive the vehicle. • Verify that the PIDs of the four ABS wheel-speed sensors correspond approximately. • Do the vehicle speeds correspond?	Yes	Go to Step 4.
		No	If there is a difference in speeds of the four wheels, go to the next step.
2	**INSPECT IF MALFUNCTION OCCURRED DUE TO IMPROPER SENSOR CLEARANCE** • Inspect the clearance between the ABS wheel-speed sensor and the ABS sensor rotor. **Clearance** **Front: 0.3—1.0 mm {0.012—0.057 in}** **Rear: 0.8—1.6 mm {0.032—0.062 in}**	Yes	Go to the next step.
		No	Replace the rear ABS wheel-speed sensor, then go to Step 4. (See 04-13-8 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.) (See 04-13-9 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)
3	**VISUALLY INSPECT ABS SENSOR ROTOR FOR FOREIGN MATERIAL ADHERING OR IMPROPER INSTALLATION** • Is the result normal?	Yes	Go to the next step.
		No	Replace the front wheel hub component or rear drive shaft, then go to the next step. (See 03-11-2 WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION.) (See 03-13-2 REAR DRIVE SHAFT REMOVAL/INSTALLATION.)
4	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the memory. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) • Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**. • Are the same DTCs present?	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the ABS HU/CM. (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
5	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present?	Yes	Go to the applicable DTC inspection. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [ABS]

DTC C1186, C1266 [ABS]

id0402a7806100

DTC C1186, C1266	Fail-safe relay system
DETECTION CONDITION	• C1186 —ABS HU/CM internal valve relay remains OFF when valve relay ON is commanded. • C1266 —ABS HU/CM internal valve relay remains ON (stuck) when valve relay OFF is commanded.
POSSIBLE CAUSE	• ABS 30 A fuse malfunction • Open circuit or short to ground in the wiring harness between the battery and the ABS HU/CM terminal C • Open or short circuit in the ABS HU/CM internal valve relay, or stuck valve relay • Poor connection at connectors (female terminal)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT ABS FUSE CONDITION** • Is the ABS 30 A fuse normal?	Yes	Go to the next step.
		No	Replace the fuse, then go to Step 3.
2	**INSPECT VALVE RELAY POWER SUPPLY FOR OPEN CIRCUIT** • Turn the ignition switch to the LOCK position. • Disconnect ABS HU/CM connector. • Turn the ignition switch to the ON position (engine off). • Measure voltage between ABS HU/CM terminal C (harness-side) and ground. • Is voltage **B+**?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for open circuit between battery positive terminal and ABS HU/CM terminal C, then go to the next step.
3	**VERIFY TROUBLESHOOTING COMPLETED** • Clear the DTC from the memory. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) • Is the same DTC present?	Yes	Replace the ABS HU/CM, then go to next step. (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present?	Yes	Go to the applicable DTC inspection. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [ABS]

DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254 [ABS]

id0402a7874300

DTC	**C1194** **C1198** **C1210** **C1214** **C1242** **C1246** **C1250** **C1254**	**LF outlet solenoid valve system** **LF inlet solenoid valve system** **RF outlet solenoid valve system** **RF inlet solenoid valve system** **LR outlet solenoid valve system** **RR outlet solenoid valve system** **LR inlet solenoid valve system** **RR inlet solenoid valve system**
DETECTION CONDITION	• Solenoid valve operation does not correspond to solenoid ON/OFF commands from the ABS HU/CM.	
POSSIBLE CAUSE	• Open or short circuit in the ABS HU/CM internal solenoid valves • Solenoid valve malfunction • Poor connection at connectors (female terminal)	

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY SOLENOID VALVE OPERATION** • Turn the ignition switch to the LOCK position. • Connect the M-MDS to the DLC-2. • Turn the ignition switch to the ON position (engine off). • Access the active command mode for the solenoid valve using the M-MDS. • Does the solenoid valve operate?	Yes	Go to the next step.
		No	Replace the ABS HU/CM, then go to the next step. (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)
2	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Clear the DTC from the memory. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) • Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**. • Gradually slow down and stop vehicle. • Are the same DTCs present?	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the ABS HU/CM, then go to the next step. (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
3	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present?	Yes	Go to the applicable DTC inspection. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [ABS]

DTC C1233, C1234, C1235, C1236 [ABS]

id0402a7805800

DTC	C1233 C1234 C1235 C1236	**LF ABS wheel-speed sensor (short to ground) system** **RF ABS wheel-speed sensor (short to ground) system** **RR ABS wheel-speed sensor (short to ground) system** **LR ABS wheel-speed sensor (short to ground) system**
DETECTION CONDITION	• The vehicle wheel speed of any of the four vehicle wheels is **2.75 km/h {1.71 mph} or less** when driving at the specified vehicle speed or more.	
POSSIBLE CAUSE	• Short to ground in the wiring harness between the following ABS HU/CM terminal and the ABS wheel-speed sensor terminal: — ABS HU/CM terminal M—RF ABS wheel-speed sensor terminal A — ABS HU/CM terminal O—RF ABS wheel-speed sensor terminal B — ABS HU/CM terminal F—LF ABS wheel-speed sensor terminal A — ABS HU/CM terminal E—LF ABS wheel-speed sensor terminal B — ABS HU/CM terminal I—RR ABS wheel-speed sensor terminal B — ABS HU/CM terminal L—RR ABS wheel-speed sensor terminal A — ABS HU/CM terminal G—LR ABS wheel-speed sensor terminal B — ABS HU/CM terminal H—LR ABS wheel-speed sensor terminal A • ABS wheel-speed sensor malfunction • Poor connection at connectors (female terminal)	

ABS WHEEL-SPEED SENSOR WIRING HARNESS-SIDE CONNECTOR

ABS HU/CM WIRING HARNESS-SIDE CONNECTOR

ON-BOARD DIAGNOSTIC [ABS]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT PID TO VERIFY THAT WHEEL SPEED-SIGNALS ARE TRANSMITTED FROM ABS WHEEL- SPEED SENSOR USING M-MDS** • Turn the ignition switch to the LOCK position. • Connect the M-MDS to the DLC-2. • Select the following PIDs using the M-MDS: LF_WSPD LR_WSPD RF_WSPD RR_WSPD • Drive the vehicle. • Verify that the wheel speed-signals are transmitted from each ABS wheel-speed sensor. • Are the wheel-speed signals transmitted?	Yes	Go to Step 3.
		No	Go to the next step.
2	**INSPECT A SHORT TO GROUND IN THE WIRING HARNESS BETWEEN THE ABS HU/CM AND THE ABS WHEEL-SPEED SENSOR** • Turn the ignition switch to the LOCK position. • Disconnect the ABS HU/CM connector and the ABS wheel-speed sensor connector. • Inspect for a short to ground in the wiring harness between the following ABS wheel-speed sensor connectors on the vehicle wiring harness-side and ABS HU/CM connectors. —RF ABS wheel-speed sensor (+): M—A —RF ABS wheel-speed sensor (–): O—B —LF ABS wheel-speed sensor (+): F—A —LF ABS wheel-speed sensor (–): E—B —RR ABS wheel-speed sensor (+): I—B —RR ABS wheel-speed sensor (–): L—A —LR ABS wheel-speed sensor (+): G—B —LR ABS wheel-speed sensor (–): H—A • Is there continuity?	Yes	Replace the ABS wheel-speed sensor, then go to the next step. (See 04-13-8 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.) (See 04-13-9 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)
		No	Repair or replace the wiring harness, then go to the next step.
3	**VERIFY THAT THE SAME DTC IS NOT PRESENT** • Clear the DTCs from the memory. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) • Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**. • Are the same DTCs present?	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the ABS HU/CM, then go to the next step. (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
4	**VERIFY THAT NO OTHER DTCS ARE PRESENT** • Are any other DTCs output?	Yes	Go to the applicable DTC inspection. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].)

ON-BOARD DIAGNOSTIC [ABS]

DTC C1805 [ABS]

id0402a7802100

DTC C1805	Incorrect ABS HU/CM installed
DETECTION CONDITION	• The programmed vehicle information and the data received from the CAN do not correspond.
POSSIBLE CAUSE	• The correct ABS HU/CM is not installed.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY THAT THE CORRECT ABS HU/CM IS INSTALLED** • Verify the part number of the ABS HU/CM. • Is the part number correct?	Yes	Go to the next step.
		No	After replacing the ABS, go to Step 3. (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)
2	**PERFORM CONFIGURATION** • Was configuration performed normally?	Yes	Go to the next step.
		No	Replace the ABS HU/CM, then go to the next step. (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)
3	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the memory. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) • Is the same DTC present?	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the ABS HU/CM, then go to the next step. (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present?	Yes	Go to the applicable DTC inspection. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].)
		No	DTC troubleshooting completed.

DTC U2023 [ABS]

id0402a7878000

DTC U2023	Signal error from PCM
DETECTION CONDITION	• Correct data cannot be received from PCM
POSSIBLE CAUSE	• PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT FOR PCM MALFUNCTION** • Switch the ignition to off. • Using the M-MDS, perform the DTC inspection for the PCM. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Are any DTCs detected?	Yes	Go to applicable DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
2	**VERIFY THAT THE SAME DTC IS NOT PRESENT** • Clear the DTCs from the memory. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) • Are the same DTCs present?	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
3	**VERIFY THAT NO OTHER DTCS ARE PRESENT** • Are any other DTCs output?	Yes	Go to the applicable DTC inspection. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].)
		No	DTC troubleshooting completed.

04-02B ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

DYNAMIC STABILITY CONTROL SYSTEM WIRING DIAGRAM [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–2
ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–3
On-Board Diagnostic (OBD) Test Description 04-02B–3
Reading DTCs Procedure 04-02B–3
Clearing DTCs Procedures 04-02B–3
PID/Data Monitor and Record Procedure 04-02B–4
Active Command Modes Procedure 04-02B–4
DTC Table 04-02B–4
PID/DATA Monitor Table. 04-02B–7
Active Command Modes Table 04-02B–9
DTC B1317, B1318 [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–9
DTC B1342 [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–10
DTC B1484, C1954 [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–11
DTC B2477 [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–13
DTC B2741, C2768, U2516 [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–13
DTC C1093 [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–14
DTC C1095, C1096 [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–15
DTC C1141, C1142, C1143, C1144 [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–17
DTC C1145, C1155, C1165, C1175 [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–18
DTC C1148, C1158, C1168, C1178 [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–21
DTC C1186, C1266 [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–23
DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958 [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–24
DTC C1222 [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–25
DTC C1233, C1234, C1235, C1236 [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–27
DTC C1279, C1280, C1281, C1952, C1959 [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–29
DTC C1290, C1953 [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–30
DTC C1295, C1307, C1937, C1938, C1956 [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–31
DTC C1306 [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–32
DTC C1994 [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–32
DTC U0073, U0100, U0101, U0155, U1900 [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–33
DTC U0074, U0123, U1901 [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–33
DTC U2023 [DYNAMIC STABILITY CONTROL (DSC)] 04-02B–34

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

DYNAMIC STABILITY CONTROL SYSTEM WIRING DIAGRAM [DYNAMIC STABILITY CONTROL (DSC)]

id0402b2800100

amxzzw0000012

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)]

id0402b2800200

On-Board Diagnostic (OBD) Test Description

- The OBD test inspects the integrity and function of the DSC and outputs the results when requested by the specific tests.
- On-board diagnostic test also:
  —Provides a quick inspection of the DSC usually performed at the start of each diagnostic procedure.
  —Provides verification after repairs to ensure that no other faults occurred during service.
- The OBD test is divided into 3 tests:
  —Read/clear diagnostic results, PID monitor and record and active command modes.

Read/clear diagnostic results

- This function allows you to read or clear DTCs in the DSC HU/CM memory.

PID/Data monitor and record

- This function allows you to access certain data values, input signals, calculated values, and system status information.

Active command modes

- This function allows you to control devices through the M-MDS.

Reading DTCs Procedure

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “Self Test”.
     2. Select “Modules”.
     3. Select “ABS”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “ABS”.
     3. Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
   - If any DTCs are displayed, perform troubleshooting according to the corresponding DTC inspection.
4. After completion of repairs, clear all DTCs stored in the DSC. (See 04-02B-3 Clearing DTCs Procedures.)

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Clearing DTCs Procedures

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “Self Test”.
     2. Select “Modules”.
     3. Select “ABS”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “ABS”.
     3. Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
4. Press the clear button on the DTC screen to clear the DTC.
5. Turn the ignition switch to the LOCK position.
6. Turn the ignition switch to the ON position and wait for **5 s or more**.
7. Perform DTC inspection. (See 04-02B-3 Reading DTCs Procedure.)
8. Verify that no DTCs are displayed.

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ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

PID/Data Monitor and Record Procedure

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “DataLogger”.
     2. Select “Modules”.
     3. Select “ABS”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “ABS”.
     3. Select “DataLogger”.
3. Select the applicable PID from the PID table.
4. Verify the PID data according to the directions on the screen.

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Note

- The PID data screen function is used for monitoring the calculated value of input/output signals in the module.Therefore, if the monitored value of the output parts is not within the specification, it is necessary to inspect the monitored value of input parts corresponding to the applicable output part control. In addition, because the system does not display an output part malfunction as an abnormality in the monitored value, it is necessary to inspect the output parts individually.

Active Command Modes Procedure

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “DataLogger”.
     2. Select “Modules”.
     3. Select “ABS”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “ABS”.
     3. Select “DataLogger”.
3. Select the active command modes from the PID table.
4. Perform the active command modes, inspect the operations for each parts.
   - If the operation of output parts cannot be verified after the active command mode inspection is performed, this could indicate the possibility of an open or short circuit, sticking, or operation malfunction in the output parts.

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DTC Table

DTC M-MDS	System malfunction location	Page
B1317	Power supply system	(See 04-02B-9 DTC B1317, B1318 [DYNAMIC STABILITY CONTROL (DSC)].)
B1318	Power supply system	(See 04-02B-9 DTC B1317, B1318 [DYNAMIC STABILITY CONTROL (DSC)].)
B1342	DSC HU/CM system	(See 04-02B-10 DTC B1342 [DYNAMIC STABILITY CONTROL (DSC)].)
B1484	Brake switch system	(See 04-02B-11 DTC B1484, C1954 [DYNAMIC STABILITY CONTROL (DSC)].)
B2477	DSC HU/CM configuration	(See 04-02B-13 DTC B2477 [DYNAMIC STABILITY CONTROL (DSC)].)
B2741	Combined sensor system	(See 04-02B-13 DTC B2741, C2768, U2516 [DYNAMIC STABILITY CONTROL (DSC)].)
C1093	DSC OFF switch system	(See 04-02B-14 DTC C1093 [DYNAMIC STABILITY CONTROL (DSC)].)
C1095	Pump motor, motor relay system	(See 04-02B-15 DTC C1095, C1096 [DYNAMIC STABILITY CONTROL (DSC)].)
C1096	Pump motor, motor relay system	(See 04-02B-15 DTC C1095, C1096 [DYNAMIC STABILITY CONTROL (DSC)].)

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

DTC M-MDS	System malfunction location	Page
C1141	LF ABS sensor rotor system	(See 04-02B-17 DTC C1141, C1142, C1143, C1144 [DYNAMIC STABILITY CONTROL (DSC)].)
C1142	RF ABS sensor rotor system	(See 04-02B-17 DTC C1141, C1142, C1143, C1144 [DYNAMIC STABILITY CONTROL (DSC)].)
C1143	LR ABS sensor rotor system	(See 04-02B-17 DTC C1141, C1142, C1143, C1144 [DYNAMIC STABILITY CONTROL (DSC)].)
C1144	RR ABS sensor rotor system	(See 04-02B-17 DTC C1141, C1142, C1143, C1144 [DYNAMIC STABILITY CONTROL (DSC)].)
C1145	RF ABS wheel-speed sensor system	(See 04-02B-18 DTC C1145, C1155, C1165, C1175 [DYNAMIC STABILITY CONTROL (DSC)].)
C1148	RF ABS wheel-speed sensor/ABS sensor rotor system	(See 04-02B-21 DTC C1148, C1158, C1168, C1178 [DYNAMIC STABILITY CONTROL (DSC)].)
C1155	LF ABS wheel-speed sensor system	(See 04-02B-18 DTC C1145, C1155, C1165, C1175 [DYNAMIC STABILITY CONTROL (DSC)].)
C1158	LF ABS wheel-speed sensor/ABS sensor rotor system	(See 04-02B-21 DTC C1148, C1158, C1168, C1178 [DYNAMIC STABILITY CONTROL (DSC)].)
C1165	RR ABS wheel-speed sensor system	(See 04-02B-18 DTC C1145, C1155, C1165, C1175 [DYNAMIC STABILITY CONTROL (DSC)].)
C1168	RR ABS wheel-speed sensor/ABS sensor rotor system	(See 04-02B-21 DTC C1148, C1158, C1168, C1178 [DYNAMIC STABILITY CONTROL (DSC)].)
C1175	LR ABS wheel-speed sensor system	(See 04-02B-18 DTC C1145, C1155, C1165, C1175 [DYNAMIC STABILITY CONTROL (DSC)].)
C1178	LR ABS wheel-speed sensor/ABS sensor rotor system	(See 04-02B-21 DTC C1148, C1158, C1168, C1178 [DYNAMIC STABILITY CONTROL (DSC)].)
C1186	Valve relay system	(See 04-02B-23 DTC C1186, C1266 [DYNAMIC STABILITY CONTROL (DSC)].)
C1194	LF outlet solenoid valve system	(See 04-02B-24 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958 [DYNAMIC STABILITY CONTROL (DSC)].)
C1198	LF inlet solenoid valve system	(See 04-02B-24 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958 [DYNAMIC STABILITY CONTROL (DSC)].)
C1210	RF outlet solenoid valve system	(See 04-02B-24 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958 [DYNAMIC STABILITY CONTROL (DSC)].)
C1214	RF inlet solenoid valve system	(See 04-02B-24 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958 [DYNAMIC STABILITY CONTROL (DSC)].)
C1222	ABS wheel-speed sensor (slip monitor) system	(See 04-02B-25 DTC C1222 [DYNAMIC STABILITY CONTROL (DSC)].)
C1233	LF ABS wheel-speed sensor system	(See 04-02B-27 DTC C1233, C1234, C1235, C1236 [DYNAMIC STABILITY CONTROL (DSC)].)
C1234	RF ABS wheel-speed sensor system	(See 04-02B-27 DTC C1233, C1234, C1235, C1236 [DYNAMIC STABILITY CONTROL (DSC)].)
C1235	RR ABS wheel-speed sensor system	(See 04-02B-27 DTC C1233, C1234, C1235, C1236 [DYNAMIC STABILITY CONTROL (DSC)].)
C1236	LR ABS wheel-speed sensor system	(See 04-02B-27 DTC C1233, C1234, C1235, C1236 [DYNAMIC STABILITY CONTROL (DSC)].)
C1242	LR outlet solenoid valve system	(See 04-02B-24 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958 [DYNAMIC STABILITY CONTROL (DSC)].)
C1246	RR outlet solenoid valve system	(See 04-02B-24 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958 [DYNAMIC STABILITY CONTROL (DSC)].)
C1250	LR inlet solenoid valve system	(See 04-02B-24 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958 [DYNAMIC STABILITY CONTROL (DSC)].)
C1254	RR inlet solenoid valve system	(See 04-02B-24 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958 [DYNAMIC STABILITY CONTROL (DSC)].)

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

DTC M-MDS	System malfunction location	Page
C1266	Valve relay system	(See 04-02B-23 DTC C1186, C1266 [DYNAMIC STABILITY CONTROL (DSC)].)
C1279	Combined sensor system	(See 04-02B-29 DTC C1279, C1280, C1281, C1952, C1959 [DYNAMIC STABILITY CONTROL (DSC)].)
C1280	Combined sensor system	(See 04-02B-29 DTC C1279, C1280, C1281, C1952, C1959 [DYNAMIC STABILITY CONTROL (DSC)].)
C1281	Combined sensor system	(See 04-02B-29 DTC C1279, C1280, C1281, C1952, C1959 [DYNAMIC STABILITY CONTROL (DSC)].)
C1290	Brake fluid pressure sensor system	(See 04-02B-30 DTC C1290, C1953 [DYNAMIC STABILITY CONTROL (DSC)].)
C1295	Steering angle sensor system	(See 04-02B-31 DTC C1295, C1307, C1937, C1938, C1956 [DYNAMIC STABILITY CONTROL (DSC)].)
C1306	Steering angle sensor (abnormal initialization) system	(See 04-02B-32 DTC C1306 [DYNAMIC STABILITY CONTROL (DSC)].)
C1307	Steering angle sensor system	(See 04-02B-31 DTC C1295, C1307, C1937, C1938, C1956 [DYNAMIC STABILITY CONTROL (DSC)].)
C1400	RH traction control solenoid valve system	(See 04-02B-24 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958 [DYNAMIC STABILITY CONTROL (DSC)].)
C1410	LH traction control solenoid valve system	(See 04-02B-24 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958 [DYNAMIC STABILITY CONTROL (DSC)].)
C1937	Steering angle sensor system	(See 04-02B-31 DTC C1295, C1307, C1937, C1938, C1956 [DYNAMIC STABILITY CONTROL (DSC)].)
C1938	Steering angle sensor system	(See 04-02B-31 DTC C1295, C1307, C1937, C1938, C1956 [DYNAMIC STABILITY CONTROL (DSC)].)
C1952	Combined sensor system	(See 04-02B-29 DTC C1279, C1280, C1281, C1952, C1959 [DYNAMIC STABILITY CONTROL (DSC)].)
C1953	Brake fluid pressure sensor system	(See 04-02B-30 DTC C1290, C1953 [DYNAMIC STABILITY CONTROL (DSC)].)
C1954	Brake switch system	(See 04-02B-11 DTC B1484, C1954 [DYNAMIC STABILITY CONTROL (DSC)].)
C1956	Steering angle sensor system	(See 04-02B-31 DTC C1295, C1307, C1937, C1938, C1956 [DYNAMIC STABILITY CONTROL (DSC)].)
C1957	RH stability control solenoid valve system	(See 04-02B-24 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958 [DYNAMIC STABILITY CONTROL (DSC)].)
C1958	LH stability control solenoid valve system	(See 04-02B-24 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958 [DYNAMIC STABILITY CONTROL (DSC)].)
C1959	Combined sensor system	(See 04-02B-29 DTC C1279, C1280, C1281, C1952, C1959 [DYNAMIC STABILITY CONTROL (DSC)].)
C1994	DSC control system	(See 04-02B-32 DTC C1994 [DYNAMIC STABILITY CONTROL (DSC)].)
C2768	Combined sensor system	(See 04-02B-13 DTC B2741, C2768, U2516 [DYNAMIC STABILITY CONTROL (DSC)].)
U0073	CAN system communication error	(See 04-02B-33 DTC U0073, U0100, U0101, U0155, U1900 [DYNAMIC STABILITY CONTROL (DSC)].)
U0074	Combined sensor system (CAN2 line malfunction)	(See 04-02B-33 DTC U0074, U0123, U1901 [DYNAMIC STABILITY CONTROL (DSC)].)
U0100	Communication error to PCM	(See 04-02B-33 DTC U0073, U0100, U0101, U0155, U1900 [DYNAMIC STABILITY CONTROL (DSC)].)
U0101	Communication error to TCM	(See 04-02B-33 DTC U0073, U0100, U0101, U0155, U1900 [DYNAMIC STABILITY CONTROL (DSC)].)
U0123	Combined sensor system (CAN2 line malfunction)	(See 04-02B-33 DTC U0074, U0123, U1901 [DYNAMIC STABILITY CONTROL (DSC)].)
U0155	Communication error to instrument cluster	(See 04-02B-33 DTC U0073, U0100, U0101, U0155, U1900 [DYNAMIC STABILITY CONTROL (DSC)].)
U1900	Communication error to other module	(See 04-02B-33 DTC U0073, U0100, U0101, U0155, U1900 [DYNAMIC STABILITY CONTROL (DSC)].)

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

DTC M-MDS	System malfunction location	Page
U1901	Combined sensor system (CAN2 line malfunction)	(See 04-02B-33 DTC U0074, U0123, U1901 [DYNAMIC STABILITY CONTROL (DSC)].)
U2023	Abnormal message from PCM	(See 04-02B-34 DTC U2023 [DYNAMIC STABILITY CONTROL (DSC)].)
U2516	Combined sensor system	(See 04-02B-13 DTC B2741, C2768, U2516 [DYNAMIC STABILITY CONTROL (DSC)].)

PID/DATA Monitor Table

PID name (definition)	Unit/Condition	Operation condition (reference)	Action	DSC HU/CM terminal
ABS_VOLT (System battery voltage value)	V	• Ignition switch at ON position: **Approx. 12 V** • Idling: **Approx. 14 V**	Inspect power supply circuit. (See 04-15-9 DSC HU/CM INSPECTION.)	J
ABSLF_I (Left front inlet solenoid valve output state)	Off/On	• Solenoid valve not activated: Off • Solenoid valve activated: On	Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.)	—
ABSLF_O (Left front outlet solenoid valve output state)	Off/On	• Solenoid valve not activated: Off • Solenoid valve activated: On	Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.)	—
ABSLR_I (Left rear inlet solenoid valve output state)	Off/On	• Solenoid valve not activated: Off • Solenoid valve activated: On	Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.)	—
ABSLR_O (Left rear outlet solenoid valve output state)	Off/On	• Solenoid valve not activated: Off • Solenoid valve activated: On	Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.)	—
ABSPMPRLY (Motor relay output state)	Off/On	• Relay not activated: Off • Relay activated: On	Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.)	—
ABSRF_I (Right front inlet solenoid valve output state)	Off/On	• Solenoid valve not activated: Off • Solenoid valve activated: On	Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.)	—
ABSRF_O (Right front outlet solenoid valve output state)	Off/On	• Solenoid valve not activated: Off • Solenoid valve activated: On	Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.)	—
ABSRR_I (Right rear inlet solenoid valve output state)	Off/On	• Solenoid valve not activated: Off • Solenoid valve activated: On	Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.)	—
ABSRR_O (Right rear outlet solenoid valve output state)	Off/On	• Solenoid valve not activated: Off • Solenoid valve activated: On	Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.)	—
ABSVLVRLY (Fail-safe relay output state)	Off/On	• Fail-safe relay is deactivated: Off • Fail-safe relay is activated: On	Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.)	—
BOO_ABS (Brake pedal switch input)	Off/On	• Brake pedal released: Off • Brake pedal depressed: On	Inspect the brake switch.	N
CCNTABS (Number of continuous codes)	—	• DTCs detected: **1—255** • No DTCs detected: **0**	Perform the DTC inspection.	—
LAT_ACCL	G	• Vehicle stopped or driving at constant speed: **0 G** • Cornering to right: Changes **0 G—positive** • Cornering to left: Changes **0 G—negative**	Inspect the combined sensor.	—

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

PID name (definition)	Unit/Condition	Operation condition (reference)	Action	DSC HU/CM terminal
LF_WSPD (Left front ABS wheel-speed sensor input)	KPH, MPH	• Vehicle stopped: **0 KPH, 0 MPH** • Vehicle running: vehicle speed	Inspect the ABS wheel-speed sensor.	F, E
LR_WSPD (Left rear ABS wheel-speed sensor input)	KPH, MPH	• Vehicle stopped: **0 KPH, 0 MPH** • Vehicle running: Vehicle speed	Inspect the ABS wheel-speed sensor.	G, H
MCYLI P	Pa, psi	• Brake pedal released: **0 Pa, 0 psi** • Brake pedal depressed: Changes according to the brake fluid pressure	Inspect the brake fluid pressure sensor.	—
PMP_MOTOR (Pump motor output state)	Off/On	• Pump motor not activated: Off • Pump motor activated: On	Inspect the DSC HU/CM. (See 04-15-9 DSC HU/CM INSPECTION.)	—
RF_WSPD (Right front ABS wheel-speed sensor input)	KPH, MPH	• Vehicle stopped: **0 KPH, 0 MPH** • Vehicle running: vehicle speed	Inspect the ABS wheel-speed sensor.	M, O
RPM (Engine speed signal input)	RPM	• Engine stopped: **0 RPM** • Engine speed at 3,000 rpm: **3,000 RPM**	Inspect the PCM. Inspect the instrument cluster.	—
RR_WSPD (Right rear ABS wheel-speed sensor input)	KPH, MPH	• Vehicle stopped: **0 KPH, 0 MPH** • Vehicle running: Vehicle speed	Inspect the ABS wheel-speed sensor.	I, L
SWA_POS	°	• Steering wheel in neutral position (not turned): **0°** • Steering wheel turned to left: Changes **0°—negative** • Steering wheel turned to right: Changes **0°—positive**	Inspect the steering angle sensor.	—
TPI	%	• Closed throttle position: **0%** • Wide open throttle: Changes according to throttle valve opening angle	Inspect the throttle position sensor.	—
V_STB_L (LH stability control solenoid valve output state)	Off/On	• Solenoid valve not activated: Off • Solenoid valve activated: On	Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.)	—
V_STB_R (RH stability control solenoid valve output state)	Off/On	• Solenoid valve not activated: Off • Solenoid valve activated: On	Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.)	—
V_TRC_L (LH traction control solenoid valve output state)	Off/On	• Solenoid valve not activated: Off • Solenoid valve activated: On	Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.)	—
V_TRC_R (RH traction control solenoid valve output state)	Off/On	• Solenoid valve not activated: Off • Solenoid valve activated: On	Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.)	—
YAW_RATE	°/s	• Vehicle stopped or driving straight: **0 °/s** • Cornering to left: Changes **0 °/s—negative** • Cornering to right: Changes **0 °/s—positive**	Inspect the combined sensor.	—

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

Active Command Modes Table

Command name	Output part	Operation	Operating condition
LATACCEL	Combined sensor (lateral acceleration) initialization	FALSE/TRUE	Ignition switch at ON position
LF_INLET	LF inlet solenoid valve	Off/On	
LF_OUTLET	LF outlet solenoid valve		
LR_INLET	LR inlet solenoid valve		
LR_OUTLET	LR outlet solenoid valve		
PMP_MOTOR	Pump motor		
RF_INLET	RF inlet solenoid valve		
RF_OUTLET	RF outlet solenoid valve		
RR_INLET	RR inlet solenoid valve		
RR_OUTLET	RR outlet solenoid valve		
SAS_CAL	Steering angle sensor initialization	FALSE/TRUE	
STAB_IND	DSC indicator light	Off/On	
TRAC OFF	DSC OFF light		
V_STB_L	LH stability control solenoid valve		
V_STB_R	RH stability control solenoid valve		
V_TRC_L	LH traction control solenoid valve		
V_TRC_R	RH traction control solenoid valve		
YAWRATE	Combined sensor (yaw rate) initialization		

DTC B1317, B1318 [DYNAMIC STABILITY CONTROL (DSC)]

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DTC B1317, B1318	Power supply system
DETECTION CONDITION	• B1317 — Voltage at DSC HU/CM terminal J is more than **16.8 V**. • B1318 — While the vehicle is driven at a speed of **15 km/h {9.3 mph}** or higher, voltage at DSC HU/CM terminal J is less than **9.6 V** (less than **9.3 V** during control).
POSSIBLE CAUSE	• Battery deterioration • Generator malfunction • ENGINE 15A fuse malfunction • Open circuit or short to ground in the wiring harness between the DSC HU/CM terminal J and the battery • Open circuit or faulty ground in the wiring harness between the DSC HU/CM terminal D and the body ground • Poor connection at connectors (female terminal)

DSC HU/CM WIRING HARNESS-SIDE CONNECTOR

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT BATTERY VOLTAGE** • Is the battery terminal voltage normal?	Yes	Make sure that battery terminal connection is normal. Go to the next step.
		No	Charge or replace the battery, then go to Step 6. (See 01-17-4 BATTERY RECHARGING [L8, LF].) (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2	**INSPECT BATTERY GRAVITY** • Is battery specific gravity as specified?	Yes	Go to the next step.
		No	Replace the battery, then go to Step 6. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3	**INSPECT CHARGING SYSTEM** • Are the generator and drive belt tensions normal?	Yes	Go to the next step.
		No	Replace generator and/or drive belt as necessary, then go to Step 6. (See 01-17-5 GENERATOR REMOVAL/INSTALLATION [L8, LF].) (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].)
4	**INSPECT DSC HU/CM POWER SUPPLY FOR OPEN CIRCUIT** • Start the engine. • Measure the voltage between DSC HU/CM terminal J and ground. • Is the voltage **approx. 10 V**?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for open circuit between the DSC HU/CM and ground, then go to Step 6.
5	**INSPECT DSC HU/CM GROUND FOR POOR GROUND OR OPEN CIRCUIT** • Turn the ignition switch off. • Measure the resistance between ground and DSC HU/CM terminal D. • Is the resistance **within 0—1 ohm**?	Yes	Go to the next step.
		No	If there is no continuity: • Repair or replace the wiring harness for open circuit between the DSC HU/CM and ground, then go to the next step. If the resistance is not **within 0—1 ohm**: • Repair or replace the wiring harness for poor ground, then go to the next step.
6	**VERIFY TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the memory. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Start the engine and drive the vehicle at **15 km/h {9.3 mph} or more**. • Is the same DTC present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Go to the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	DTC troubleshooting completed.

DTC B1342 [DYNAMIC STABILITY CONTROL (DSC)]

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DTC B1342	DSC HU/CM system
DETECTION CONDITION	• The DSC HU/CM on-board diagnostic function detects control module malfunction.
POSSIBLE CAUSE	• DSC HU/CM internal malfunction

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY CURRENT STATUS OF MALFUNCTION** • Clear the DTC from the memory. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**. • Is the same DTC present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
2	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Go to the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	DTC troubleshooting completed.

DTC B1484, C1954 [DYNAMIC STABILITY CONTROL (DSC)]

id0402b2800500

DTC B1484, C1954	Brake switch system
DETECTION CONDITION	• B1484 — Open circuit is detected in wiring harness between DSC HU/CM—brake switch (Voltage at the DSC HU/CM terminal N is more than **40%** and less than **67%** of the voltage at the DSC HU/CM terminal J for **0.5 s** continuously.). • C1954 — Brake switch ON signal is input even though signal from brake fluid pressure sensor is lower than specified value (While vehicle is driven at a speed of **10.8 km/h {6.7 mph}** or more, brake switch is continuously ON for **60 s** with accelerator pedal ON and brake fluid pressure **500 kPa {5.10 kgf/cm^2, 72.5 psi}** or lower, not operated). — Brake fluid pressure sensor signal value is continuously more than **1,000 kPa {10.20 kgf/cm^2, 145.0 psi}** for **1 s** with brake switch signal OFF.
POSSIBLE CAUSE	• STOP 10A fuse malfunction • Brake switch malfunction • Open circuit or short to ground in the wiring harness between the DSC HU/CM terminal N and the brake switch terminal D • Brake fluid pressure sensor malfunction in DSC HU/CM

DSC HU/CM WIRING HARNESS-SIDE CONNECTOR

BRAKE SWITCH WIRING HARNESS-SIDE CONNECTOR

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT BRAKE PEDAL POSITION SIGNAL INPUT TO DSC HU/CM USING M-MDS** • Connect the M-MDS to the DLC-2. • Select the “BOO_ABS” PID and verify that the display is switched as follows according to the brake pedal condition: — Brake pedal released: Off — Brake pedal depressed: On • Does the “BOO_ABS” PID change normally?	Yes	Go to Step 6.
		No	Go to the next step.
2	**INSPECT STOP LIGHT FUSE CONDITION** • Turn the ignition switch to the LOCK position. • Inspect the STOP 10A fuse. • Is the STOP 10A fuse normal?	Yes	Go to the next step.
		No	Replace the fuse, then go to Step 6.
3	**INSPECT BRAKE SWITCH** • Inspect the brake switch. (See 04-11-7 BRAKE SWITCH INSPECTION.) • Is the brake switch normal?	Yes	Go to the next step.
		No	Replace the brake switch, then go to Step 6. (See 04-11-5 BRAKE PEDAL REMOVAL/INSTALLATION.)
4	**INSPECT FOR OPEN CIRCUIT IN WIRING HARNESS BETWEEN DSC HU/CM AND STOP LIGHT FUSE** • Disconnect the DSC HU/CM and brake switch connectors. • Inspect the vehicle wiring harness-side connectors for continuity between the following terminals: — STOP 10A fuse—brake switch terminal B — Brake switch terminal D—DSC HU/CM terminal N • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for open circuit between brake switch and DSC HU/CM, then go to Step 6.
5	**INSPECT BRAKE FLUID PRESSURE SENSOR** • Inspect the brake fluid pressure sensor. (See 04-15-13 BRAKE FLUID PRESSURE SENSOR INSPECTION.) • Is the brake fluid pressure sensor normal?	Yes	Go to the next step.
		No	Replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)
6	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the memory. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Start the engine and drive the vehicle at **20 km/h {13 mph} or more for 60 s or more**. • Are the same DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Go to the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

DTC B2477 [DYNAMIC STABILITY CONTROL (DSC)]

id0402b2805600

DTC B2477	DSC HU/CM configuration
DETECTION CONDITION	• Condition 1 — Configuration data is not within the specification. • Condition 2 — Configuration data cannot be read. • Condition 3 — Configuration data is at an unused value.
POSSIBLE CAUSE	• Module configuration procedure was not completed properly. • DSC HU/CM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY CONFIGURATION** • Has the DSC HU/CM configuration been performed?	Yes	Go to the next step.
		No	Perform configuration using the M-MDS. (See 04-15-8 DSC CONFIGURATION.)
2	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Clear the DTC from the memory. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Is the same DTC present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
3	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Go to the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	DTC troubleshooting completed.

DTC B2741, C2768, U2516 [DYNAMIC STABILITY CONTROL (DSC)]

id0402b2886700

DTC B2741, C2768, U2516	Combined sensor system
DETECTION CONDITION	• B2741 — Sensor malfunction signal from combined sensor is detected continuously for **100 ms**. — Type of combined sensor is different from specification, or not within set range. • C2768 — Signal which indicates combined sensor is under initialization is transmitted from combined sensor. • U2516 — Number of signal transmission from combined sensor is wrong. — Check sum error is detected in CAN communication signal between combined sensor.
POSSIBLE CAUSE	• Combined sensor malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM COMBINED SENSOR INITIALIZATION** • Perform the combined sensor initialization using the M-MDS. (See 04-15-13 COMBINED SENSOR INITIALIZATION PROCEDURE.)	After the initialization procedure for the combined sensor has been completed, go to the next step.	
2	**VERIFY THAT SAME DTC IS NOT PRESENT** • Clear the DTCs from the memory. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Are the same DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the combined sensor. (See 04-15-11 COMBINED SENSOR REMOVAL/INSTALLATION.)
		No	Go to the next step.
3	**VERIFY THAT NO OTHER DTCS ARE PRESENT** • Are any other DTCs output? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Go to the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

DTC C1093 [DYNAMIC STABILITY CONTROL (DSC)]

id0402b2800700

DTC C1093	DSC OFF switch system
DETECTION CONDITION	• Continuous ON signal from the DSC OFF switch for **5 s or more** is detected.
POSSIBLE CAUSE	• Short to ground in the wiring harness between the DSC HU/CM terminal P and the DSC OFF switch terminal A (L.H.D.) or C (R.H.D.) • DSC OFF switch malfunction • The driver pressed and held the DSC OFF switch for **5 s or more**.

DSC HU/CM WIRING HARNESS-SIDE CONNECTOR

DSC OFF SWITCH WIRING HARNESS-SIDE CONNECTOR

L.H.D.

R.H.D.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT DSC HU/CM TO DSC OFF SWITCH FOR SHORT TO GROUND** • Turn the ignition switch to the LOCK position. • Disconnect DSC HU/CM and DSC OFF switch connector. • Inspect for continuity between the DSC HU/CM terminal P and ground. • Is there continuity?	Yes	Repair or replace the wiring harness for short to ground between DSC HU/CM terminal P and DSC OFF switch terminal A (L.H.D.) or C (R.H.D.), then go to the next step.
		No	Go to the next step.
2	**INSPECT DSC OFF SWITCH** • Inspect the DSC OFF switch. (See 04-15-17 DSC OFF SWITCH INSPECTION.) • Is the DSC OFF switch normal?	Yes	Go to the next step.
		No	Replace the DSC OFF switch, then go to the next step. (See 04-15-16 DSC OFF SWITCH REMOVAL/INSTALLATION.)
3	**VERIFY TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the memory. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Is the same DTC present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

STEP	INSPECTION		ACTION
4	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Go to the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	DTC troubleshooting completed.

DTC C1095, C1096 [DYNAMIC STABILITY CONTROL (DSC)]

id0402b2805900

DTC C1095, C1096	Pump motor, motor relay system
DETECTION CONDITION	• C1095 — When the motor relay is switched from ON to OFF, the pump motor voltage is turned off within the specified time (Pump motor rotation malfunction (sticking)). — Malfunction is detected in pump motor drive circuit during motor relay test. — Motor relay supply voltage is **40%** of the ignition voltage or lower. — While the pump motor is stopped, pump motor monitor voltage is continuously **2 V** or more for **1 s**. • C1096 — While the pump motor is operated, difference in voltage between ignition and pump motor is continuously more than **4.0 V** for **100 ms**.
POSSIBLE CAUSE	• ABS 40A fuse malfunction • Open or short to ground circuit in the wiring harness between the battery and the DSC HU/CM terminal B • Open circuit in the wiring harness between the DSC HU/CM terminal A and the body ground • Open or short circuit in the DSC HU/CM internal motor relay, or stuck motor relay • Open or short circuit in the DSC HU/CM internal motor, or frozen motor • Poor connection at connectors (female terminal)

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT FUSE CONDITION** • Is the ABS 40A fuse normal?	Yes	Go to the next step.
		No	Replace the fuse, then go to Step 5.
2	**INSPECT MOTOR RELAY POWER SUPPLY FOR OPEN CIRCUIT** • Turn the ignition switch to the LOCK position. • Disconnect DSC HU/CM connector. • Turn the ignition switch to the ON position (engine off). • Measure voltage between DSC HU/CM terminal B (harness-side) and ground. • Is the voltage **B+**?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for open circuit between battery positive terminal and DSC HU/CM terminal B, then go to Step 5.
3	**INSPECT PUMP MOTOR GROUND FOR OPEN CIRCUIT** • Turn the ignition switch to the LOCK position. • Inspect for continuity between DSC HU/CM terminal A (harness-side) and ground. • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for open circuit between DSC HU/CM terminal A and ground, then go to Step 5.
4	**VERIFY PUMP MOTOR OPERATION** • Turn the ignition switch to the LOCK position. • Connect the M-MDS to the DLC-2. • Turn the ignition switch to the ON position (engine off). • Access PMP_MOTOR active command modes using M-MDS. • Does the pump motor operate?	Yes	Go to the next step.
		No	Replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)
5	**VERIFY TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the memory. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**. • Gradually slow down and stop the vehicle. • Is the same DTC present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
6	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Go to the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

DTC C1141, C1142, C1143, C1144 [DYNAMIC STABILITY CONTROL (DSC)]

id0402b2801000

DTC	**C1141** **C1142** **C1143** **C1144**	**LF ABS sensor rotor system** **RF ABS sensor rotor system** **LR ABS sensor rotor system** **RR ABS sensor rotor system**
DETECTION CONDITION	• While the vehicle is driven at a speed of **10—60 km/h {6.3—37 mph}** and the system is not operated, error is detected periodically in wheel speed signals from the ABS wheel-speed sensor.	
POSSIBLE CAUSE	• ABS wheel-speed sensor malfunction • ABS sensor rotor malfunction (foreign material adhering) • Improper installation of ABS wheel-speed sensor and/or sensor rotor • Excessive clearance between the ABS wheel-speed sensor and sensor rotor	

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT PID FOR ABS WHEEL-SPEED SENSOR OUTPUT ERROR USING M-MDS** • Turn the ignition switch to the LOCK position. • Connect the M-MDS to the DLC-2. • Select the following PIDs using the M-MDS: LF_WSPD LR_WSPD RF_WSPD RR_WSPD • Drive the vehicle. • Verify that the vehicle speeds detected by the four ABS wheel-speed sensors are approximately the same. • Are the vehicle speeds approximately the same?	Yes	Go to Step 4.
		No	Go to the next step.
2	**INSPECT IF MALFUNCTION OCCURRED DUE TO IMPROPER SENSOR CLEARANCE.** • Inspect the clearance between the ABS wheel-speed sensor and the ABS sensor rotor. (See 04-15-11 FRONT ABS WHEEL-SPEED SENSOR INSPECTION.) (See 04-15-11 REAR ABS WHEEL-SPEED SENSOR INSPECTION.) • Is the clearance normal? **Clearance** **Front: 0.3—1.0 mm {0.012—0.057 in}** **Rear: 0.8—1.6 mm {0.032—0.062 in}**	Yes	Go to the next step.
		No	Replace the ABS wheel-speed sensor, then go to Step 4. (See 04-15-11 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.) (See 04-15-11 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)
3	**VISUALLY INSPECT ABS SENSOR ROTOR FOR FOREIGN MATERIAL ADHERING OR IMPROPER INSTALLATION** • Is the result normal?	Yes	Go to the next step.
		No	Replace the front wheel hub component or rear drive shaft, then go to the next step. (See 03-11-2 WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION.) (See 03-13-2 REAR DRIVE SHAFT REMOVAL/INSTALLATION.)
4	**VERIFY THAT THE SAME DTC IS NOT PRESENT** • Clear the DTC from the memory. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**. • Are the same DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
5	**VERIFY THAT NO OTHER DTCS ARE PRESENT** • Are any other DTCs output? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Go to the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

DTC C1145, C1155, C1165, C1175 [DYNAMIC STABILITY CONTROL (DSC)]

id0402b2801100

DTC	**C1145** **C1155** **C1165** **C1175**	**RF ABS wheel-speed sensor system** **LF ABS wheel-speed sensor system** **RR ABS wheel-speed sensor system** **LR ABS wheel-speed sensor system**
DETECTION CONDITION	• Open circuit, or short to ground or power supply has been detected in the ABS wheel-speed sensor or ABS wheel-speed sensor wiring harness on any of the four vehicle wheels.	
POSSIBLE CAUSE	• Open circuit, or short to ground or power supply in the wiring harness between the following terminals of the DSC HU/CM and ABS wheel-speed sensor: — DSC HU/CM terminal M—RF ABS wheel-speed sensor terminal A — DSC HU/CM terminal O—RF ABS wheel-speed sensor terminal B — DSC HU/CM terminal F—LF ABS wheel-speed sensor terminal A — DSC HU/CM terminal E—LF ABS wheel-speed sensor terminal B — DSC HU/CM terminal I—RR ABS wheel-speed sensor terminal B — DSC HU/CM terminal L—RR ABS wheel-speed sensor terminal A — DSC HU/CM terminal G—LR ABS wheel-speed sensor terminal B — DSC HU/CM terminal H—LR ABS wheel-speed sensor terminal A • ABS wheel-speed sensor malfunction • Poor connection at connectors (female terminal)	

DSC HU/CM WIRING HARNESS-SIDE CONNECTOR

ABS WHEEL-SPEED SENSOR WIRING HARNESS-SIDE CONNECTOR

FRONT

REAR

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT PID TO VERIFY THAT WHEEL SPEED-SIGNALS ARE TRANSMITTED FROM ABS WHEEL- SPEED SENSOR USING M-MDS** • Turn the ignition switch to the LOCK position. • Connect the M-MDS to the DLC-2. • Select the following PIDs using the M-MDS: LF_WSPD LR_WSPD RF_WSPD RR_WSPD • Drive the vehicle. • Verify that the wheel speed-signals are transmitted from each ABS wheel-speed sensor. • Are the wheel-speed signals transmitted?	Yes	Go to Step 5.
		No	Go to the next step.
2	**INSPECT FOR OPEN CIRCUIT IN WIRING HARNESS BETWEEN DSC HU/CM AND ABS WHEEL-SPEED SENSOR** • Turn the ignition switch to the LOCK position. • Disconnect the DSC HU/CM connector and ABS wheel-speed sensor. • Inspect for continuity in the wiring harness between the following ABS wheel-speed sensor connectors on the vehicle wiring harness-side and DSC HU/CM connectors. — RF ABS wheel-speed sensor (+): M—A — RF ABS wheel-speed sensor (–): O—B — LF ABS wheel-speed sensor (+): F—A — LF ABS wheel-speed sensor (–): E—B — RR ABS wheel-speed sensor (+): I—B — RR ABS wheel-speed sensor (–): L—A — LR ABS wheel-speed sensor (+): G—B — LR ABS wheel-speed sensor (–): H—A • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness, then go to Step 5.
3	**INSPECT WIRING HARNESS BETWEEN DSC HU/CM AND ABS WHEEL-SPEED SENSOR FOR SHORT TO POWER SUPPLY** • Inspect the voltage between the following terminals of the DSC HU/CM connector and body ground: — RF ABS wheel-speed sensor (+): M-body ground — RF ABS wheel-speed sensor (–): O-body ground — LF ABS wheel-speed sensor (+): F-body ground — LF ABS wheel-speed sensor (–): E-body ground — RR ABS wheel-speed sensor (+): I-body ground — RR ABS wheel-speed sensor (–): L-body ground — LR ABS wheel-speed sensor (+): G-body ground — LR ABS wheel-speed sensor (–): H-body ground • Is the voltage **approx. 0 V**?	Yes	Go to the next step.
		No	Repair or replace the wiring harness, then go to Step 5.

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

STEP	INSPECTION		ACTION
4	**INSPECT FOR SHORT TO GROUND IN WIRING HARNESS BETWEEN DSC HU/CM AND ABS WHEEL-SPEED SENSOR** • Inspect for continuity in the wiring harness between the following DSC HU/CM connector terminals on the vehicle wiring harness-side and body ground. —RF ABS wheel-speed sensor (+): M —RF ABS wheel-speed sensor (–): O —LF ABS wheel-speed sensor (+): F —LF ABS wheel-speed sensor (–): E —RR ABS wheel-speed sensor (+): I —RR ABS wheel-speed sensor (–): L —LR ABS wheel-speed sensor (+): G —LR ABS wheel-speed sensor (–): H • Is there continuity?	Yes	Repair or replace the wiring harness, then go to the next step.
		No	Replace the ABS wheel-speed sensor, then go to the next step. (See 04-15-11 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.) (See 04-15-11 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)
5	**VERIFY THAT THE SAME DTC IS NOT PRESENT** • Make sure to reconnect all disconnected connectors. • Clear the DTCs from the memory. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Start the engine and drive the vehicle at **45 km/h {28 mph} or more**. • Are the same DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
6	**VERIFY THAT NO OTHER DTCS ARE PRESENT** • Are any other DTCs output? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Go to the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

DTC C1148, C1158, C1168, C1178 [DYNAMIC STABILITY CONTROL (DSC)]

id0402b2801200

DTC	**C1148** **C1158** **C1168** **C1178**	**RF ABS wheel-speed sensor/ABS sensor rotor system** **LF ABS wheel-speed sensor/ABS sensor rotor system** **RR ABS wheel-speed sensor/ABS sensor rotor system** **LR ABS wheel-speed sensor/ABS sensor rotor system**
DETECTION CONDITION	• Noise is continuously detected in wheel-speed signal for **10 s**.	
POSSIBLE CAUSE	• ABS wheel-speed sensor malfunction (low output, metal shavings on sensor) • ABS sensor rotor malfunction (chipping of sensor rotor teeth) • Poor installation of ABS wheel-speed sensor and/or sensor rotor • Excessive clearance between the ABS wheel-speed sensor and sensor rotor • Poor connection at connectors (female terminal)	

DSC HU/CM WIRING HARNESS-SIDE CONNECTOR

ABS WHEEL-SPEED SENSOR WIRING HARNESS-SIDE CONNECTOR

FRONT

REAR

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT PID FOR ABNORMAL OUTPUT FROM ABS WHEEL-SPEED SENSOR USING M-MDS** • Turn the ignition switch to the LOCK position. • Connect the M-MDS to the DLC-2. • Select the following PIDs using the M-MDS: LF_WSPD LR_WSPD RF_WSPD RR_WSPD • Start the engine and drive the vehicle. • Verify that the PIDs of the four ABS wheel-speed sensors correspond approximately. • Do the vehicle speeds correspond?	Yes	Go to Step 4.
		No	Go to the next step.
2	**INSPECT IF MALFUNCTION OCCURRED DUE TO IMPROPER SENSOR CLEARANCE** • Inspect the clearance between the ABS wheel-speed sensor and the ABS sensor rotor. **Clearance** **Front: 0.3—1.0 mm {0.012—0.057 in}** **Rear: 0.8—1.6 mm {0.032—0.062 in}**	Yes	Go to the next step.
		No	Replace the rear ABS wheel-speed sensor, then go to Step 4. (See 04-15-11 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.) (See 04-15-11 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)
3	**VISUALLY INSPECT ABS SENSOR ROTOR FOR FOREIGN MATERIAL ADHERING OR IMPROPER INSTALLATION** • Is the result normal?	Yes	Go to the next step.
		No	Replace the front wheel hub component or rear drive shaft, then go to the next step. (See 03-11-2 WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION.) (See 03-13-2 REAR DRIVE SHAFT REMOVAL/INSTALLATION.)
4	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the memory. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Start the engine and drive the vehicle. • Are the same DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
5	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Go to the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

DTC C1186, C1266 [DYNAMIC STABILITY CONTROL (DSC)]

id0402b2806100

DTC C1186, C1266	Valve relay system
DETECTION CONDITION	• C1186 — Five or more solenoid valve malfunctions are detected (solenoid valve is determined when the solenoid valve operation does not correspond to the solenoid ON/OFF signals from the DSC HU/CM). — Valve relay voltage is continuously less than **80%** of the ignition voltage for **0.5 s**. — Short circuit to ground is detected in the valve relay power supply circuit and valve relay. — Open circuit is detected in the valve relay power supply circuit, or open circuit or sticking (OFF side) is detected in the valve relay. • C1266 — DSC HU internal valve relay remains ON (stuck) when valve relay OFF is commanded.
POSSIBLE CAUSE	• ABS 30A fuse malfunction • Open circuit or short to ground in the wiring harness between the battery and the DSC HU/CM terminal C • Open or short circuit in the DSC HU/CM internal valve relay, or stuck valve relay (DSC HU/CM malfunction) • Poor connection at connectors (female terminal)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT FUSE CONDITION** • Is the ABS 30A fuse normal?	Yes	Go to the next step.
		No	Replace the fuse, then go to Step 3.
2	**INSPECT VALVE RELAY POWER SUPPLY FOR OPEN CIRCUIT** • Turn the ignition switch to the LOCK position. • Disconnect DSC HU/CM connector. • Turn the ignition switch to the ON position (engine off). • Measure voltage between DSC HU/CM terminal C (harness-side) and ground. • Is voltage **B+**?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for open circuit between battery positive terminal and DSC HU/CM terminal C, then go to the next step.
3	**VERIFY TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the memory. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Start the engine and drive the vehicle. • Is the same DTC present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Replace the DSC HU/CM, then go to next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Go to the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958 [DYNAMIC STABILITY CONTROL (DSC)]

id0402b2801400

DTC	**C1194** **C1198** **C1210** **C1214** **C1242** **C1246** **C1250** **C1254** **C1400** **C1410** **C1957** **C1958**	**LF outlet solenoid valve system** **LF inlet solenoid valve system** **RF outlet solenoid valve system** **RF inlet solenoid valve system** **LR outlet solenoid valve system** **RR outlet solenoid valve system** **LR inlet solenoid valve system** **RR inlet solenoid valve system** **RH traction control solenoid valve system** **LH traction control solenoid valve system** **RH stability control solenoid valve system** **LH stability control solenoid valve system**
DETECTION CONDITION	• Solenoid valve operation does not correspond to solenoid ON/OFF commands from the DSC HU/CM.	
POSSIBLE CAUSE	• Solenoid valve malfunction • Open or short circuit in the DSC HU/CM internal solenoid valves • Poor connection at connectors (female terminal)	

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY SOLENOID VALVE OPERATION** • Turn the ignition switch to the LOCK position. • Connect the M-MDS to the DLC-2. • Turn the ignition switch to the ON position (engine off). • Access the active command mode for the solenoid valve using the M-MDS. • Does the solenoid valve operate?	Yes	Go to the next step.
		No	Replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)
2	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Clear the DTC from the memory. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**. • Gradually slow down and stop vehicle. • Are the same DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
3	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Go to the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

DTC C1222 [DYNAMIC STABILITY CONTROL (DSC)]

id0402b2801500

Note

- DTC C1222 will be detected when a malfunctioning ABS wheel-speed sensor cannot be specified.

DTC C1222	ABS wheel-speed sensor (slip monitor) system
DETECTION CONDITION	• Condition 1 — ABS control for two wheels or more is continued for **60 s** (If accelerator pedal is ON and brake switch is OFF and vehicle speed is more than **50 km/h {31 mph}**, it is detected when **10 s** has elapsed). • Condition 2 — While the vehicle is driven at a speed of **20 km/h {13 mph}** or more, difference in each wheel speed is continuously not within the specification. • Condition 3 — There is difference between yaw rate value calculated based on the ABS wheel-speed sensor and yaw rate value calculated based on the steering angle sensor (abnormal cornering direction is detected).
POSSIBLE CAUSE	• Tire type or size is different between the front and rear wheels. • ABS wheel-speed sensor malfunction (low output, metal shavings on sensor) • ABS sensor rotor malfunction (chipping of sensor rotor teeth) • Poor installation of ABS wheel-speed sensor and/or sensor rotor (If the sensor rotor is installed at an angle, it may cause output of abnormal wave pattern at high speeds.) • Excessive clearance between the ABS wheel-speed sensor and sensor rotor

DSC HU/CM WIRING HARNESS-SIDE CONNECTOR

ABS WHEEL-SPEED SENSOR WIRING HARNESS-SIDE CONNECTOR

FRONT

REAR

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT PID FOR ABNORMAL OUTPUT FROM ABS WHEEL-SPEED SENSOR USING M-MDS** • Turn the ignition switch to the LOCK position. • Connect the M-MDS to the DLC-2. • Select the following PIDs using the M-MDS: LF_WSPD LR_WSPD RF_WSPD RR_WSPD • Drive the vehicle. • Verify that the PIDs of the four ABS wheel-speed sensors correspond approximately. • Do the vehicle speeds correspond?	Yes	Go to Step 5.
		No	If there is a difference in speeds of the four wheels, go to the next step.
2	**INSPECT TIRE SIZE AND PRESSURE** • Inspect the tire size and tire pressure of each wheel. (See 02-12-1 WHEEL AND TIRE SPECIFICATION.) • Is the tire size and tire pressure as specified?	Yes	Go to the next step.
		No	Install the specified tire or adjust the tire pressure, then go to Step 5.
3	**INSPECT IF MALFUNCTION OCCURRED DUE TO IMPROPER SENSOR CLEARANCE** • Inspect the clearance between the ABS wheel-speed sensor and the ABS sensor rotor. **Clearance** **Front: 0.3—1.0 mm {0.012—0.057 in}** **Rear: 0.8—1.6 mm {0.032—0.062 in}**	Yes	Go to the next step.
		No	Replace the rear ABS wheel-speed sensor, then go to Step 5. (See 04-15-11 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.) (See 04-15-11 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)
4	**VISUALLY INSPECT ABS SENSOR ROTOR FOR FOREIGN MATERIAL ADHERING OR IMPROPER INSTALLATION** • Is the result normal?	Yes	Go to the next step.
		No	Replace the front wheel hub component or rear drive shaft, then go to the next step. (See 03-11-2 WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION.) (See 03-13-2 REAR DRIVE SHAFT REMOVAL/INSTALLATION.)
5	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Clear the DTC from the memory. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Start the engine and drive the vehicle at **20 km/h {13 mph} or more**. • Are the same DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
6	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Go to the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

DTC C1233, C1234, C1235, C1236 [DYNAMIC STABILITY CONTROL (DSC)]

id0402b2805800

DTC	**C1233** **C1234** **C1235** **C1236**	**LF ABS wheel-speed sensor system** **RF ABS wheel-speed sensor system** **RR ABS wheel-speed sensor system** **LR ABS wheel-speed sensor system**
DETECTION CONDITION	• Excessively slow wheel speed is detected when the vehicle speed is **12 km/h {7.5 mph}** or more first time after the system is activated or the vehicle is started. • While the vehicle is driven at a speed of **20 km/h {13 mph}** or more, difference in each wheel speed is continuously not within the specification.	
POSSIBLE CAUSE	• Short to ground in the wiring harness between the following DSC HU/CM terminal and the ABS wheel-speed sensor terminal: — DSC HU/CM terminal M—RF ABS wheel-speed sensor terminal A — DSC HU/CM terminal O—RF ABS wheel-speed sensor terminal B — DSC HU/CM terminal F—LF ABS wheel-speed sensor terminal A — DSC HU/CM terminal E—LF ABS wheel-speed sensor terminal B — DSC HU/CM terminal I—RR ABS wheel-speed sensor terminal B — DSC HU/CM terminal L—RR ABS wheel-speed sensor terminal A — DSC HU/CM terminal G—LR ABS wheel-speed sensor terminal B — DSC HU/CM terminal H—LR ABS wheel-speed sensor terminal A • ABS wheel-speed sensor malfunction • Poor connection at connectors (female terminal)	

DSC HU/CM WIRING HARNESS-SIDE CONNECTOR

ABS WHEEL-SPEED SENSOR WIRING HARNESS-SIDE CONNECTOR

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT PID TO VERIFY THAT WHEEL SPEED-SIGNALS ARE TRANSMITTED FROM ABS WHEEL- SPEED SENSOR USING M-MDS** • Turn the ignition switch to the LOCK position. • Connect the M-MDS to the DLC-2. • Select the following PIDs using the M-MDS: LF_WSPD LR_WSPD RF_WSPD RR_WSPD • Drive the vehicle. • Verify that the wheel speed-signals are transmitted from each ABS wheel-speed sensor. • Are the wheel-speed signals transmitted?	Yes	Go to Step 3.
		No	Go to the next step.
2	**INSPECT A SHORT TO GROUND IN THE WIRING HARNESS BETWEEN THE DSC HU/CM AND THE ABS WHEEL-SPEED SENSOR** • Turn the ignition switch to the LOCK position. • Disconnect the DSC HU/CM connector and the ABS wheel-speed sensor connector. • Inspect for a short to ground in the wiring harness between the following ABS wheel-speed sensor connectors on the vehicle wiring harness-side and DSC HU/CM connectors. — RF ABS wheel-speed sensor (+): M—A — RF ABS wheel-speed sensor (–): O—B — LF ABS wheel-speed sensor (+): F—A — LF ABS wheel-speed sensor (–): E—B — RR ABS wheel-speed sensor (+): I—B — RR ABS wheel-speed sensor (–): L—A — LR ABS wheel-speed sensor (+): G—B — LR ABS wheel-speed sensor (–): H—A • Is there continuity?	Yes	Repair or replace the wiring harness, then go to the next step.
		No	Replace the ABS wheel-speed sensor, then go to the next step. (See 04-15-11 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.) (See 04-15-11 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)
3	**VERIFY THAT THE SAME DTC IS NOT PRESENT** • Clear the DTCs from the memory. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**. • Are the same DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Go to the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

DTC C1279, C1280, C1281, C1952, C1959 [DYNAMIC STABILITY CONTROL (DSC)]

id0402b2887300

DTC C1279, C1280, C1281, C1952, C1959	Combined sensor system
DETECTION CONDITION	• C1279 — Variation of the yaw rate value from the combined sensor while the vehicle is stopped or started is not within the specification. • C1280 — Condition 1 • The difference between the yaw rate value calculated by each sensor and the yaw rate value from the combined sensor exceeds the specification. — Condition 2 • While the vehicle is moving forward, one of the yaw rate values is + and the other is - (yaw rate value calculated from steering angle sensor signal and one from the combined sensor). • C1281 — Difference between the two lateral-G values exceeds the specification (one from the combined sensor and one calculated from yaw rate signal from the combined sensor, steering angle sensor signal, and ABS wheel-speed sensor signal). • C1952 — Signal, which indicates low voltage or over voltage, from the combined sensor is continued for **100 ms**. • C1959 — Variation of the lateral-G value from the combined sensor is not within the specification.
POSSIBLE CAUSE	• Poor installation of combined sensor • Open circuit or short to ground in wiring harness between ignition switch—combined sensor terminal A • Open circuit in wiring harness between combined sensor terminal D—ground • Combined sensor malfunction • Poor connection at connectors (female terminal)

DSC HU/CM WIRING HARNESS-SIDE CONNECTOR

COMBINED SENSOR WIRING HARNESS-SIDE CONNECTOR

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT COMBINED SENSOR INSTALLATION CONDITION** • Inspect the installation condition of the combined sensor. • Is the combined sensor installed correctly?	Yes	Go to the next step.
		No	Install the combined sensor correctly, then go to the next step.
2	**INSPECT COMBINED SENSOR POWER SUPPLY FOR OPEN OR SHORT CIRCUIT** • Turn the ignition switch to the ON position. • Measure the voltage between combined sensor terminal A and body ground. • Is the voltage **approx. 12 V**?	Yes	Go to the next step.
		No	Repair or replace the wiring harness, then go to Step 5.
3	**INSPECT COMBINED SENSOR GROUND FOR OPEN CIRCUIT** • Turn the ignition switch to the LOCK position. • Inspect for continuity between combined sensor terminal D and body ground. • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness, then go to Step 5.
4	**INSPECT COMBINED SENSOR** • Inspect the combined sensor. (See 04-15-12 COMBINED SENSOR INSPECTION.) • Is the combined sensor normal?	Yes	Go to the next step.
		No	Replace the combined sensor, then go to the next step. (See 04-15-11 COMBINED SENSOR REMOVAL/INSTALLATION.)
5	**VERIFY DTC TROUBLESHOOTING COMPLETED.** • Clear the DTC from the memory. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Start the engine and drive the vehicle at **10 km/h {6.0 mph} or more**. • Are the same DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
6	**VERIFY AFTER REPAIR PROCEDURE.** • Are any other DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Go to the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	DTC troubleshooting completed.

DTC C1290, C1953 [DYNAMIC STABILITY CONTROL (DSC)]

id0402b2887400

DTC C1290, C1953	Brake fluid pressure sensor system
DETECTION CONDITION	• C1290 — The basic brake fluid pressure value, which is calculated in the DSC HU/CM while the system is not operated and the brake is not applied, exceeds the specified value. • C1953 — The brake fluid pressure sensor signal voltage is continuously more than **3.29 V** or less than **0.13 V** for **100 ms** or more.
POSSIBLE CAUSE	• Brake fluid pressure sensor malfunction in DSC HU/CM • Open or short circuit in the brake fluid pressure sensor circuit in DSC HU/CM

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY NO ABNORMALITY ON BRAKE FLUID PRESSURE SENSOR** • Clear the DTCs from the memory. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**. • Are the same DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
2	**VERIFY THAT NO OTHER DTCS ARE PRESENT** • Are any other DTCs output? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Go to the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	DTC troubleshooting completed.

DTC C1295, C1307, C1937, C1938, C1956 [DYNAMIC STABILITY CONTROL (DSC)]

id0402b2801900

DTC	C1295, C1307, C1937, C1938, C1956	Steering angle sensor system
DETECTION CONDITION	• C1295 — Steering angle sensor malfunction is detected by CAN signal from the steering angle sensor. • C1307 — Steering angle signal error from the steering angle sensor is continuously detected for **100 ms**. • C1937 — The difference between the steering angle calculated by each sensor and the steering angle from the steering angle sensor exceeds the specification. • C1938 — Condition 1 • Variation of the steering angle sensor signal exceeds the specified value, or does not vary at all. — Condition 2 • When comparing the yaw rate value calculated from the ABS wheel-speed sensor signal and steering angle sensor signal with the yaw rate sensor signal, one is + and the other is - while the vehicle is moving forward. • C1956 — There is no signal received from the steering angle sensor.	
POSSIBLE CAUSE	• Deviation of the steering wheel center position due to improper front wheel alignment • Improper installation or positioning of the steering angle sensor • Steering angle sensor malfunction • Poor connection at connectors (female terminal)	

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT STEERING WHEEL FOR OFF-CENTER** • Drive the vehicle and inspect the steering wheel position while driving in a straight line. • Is the steering wheel off-center?	Yes	Go to the next step.
		No	Inspect and adjust the front wheel alignment to correct the steering wheel alignment. (See 02-11-2 FRONT WHEEL ALIGNMENT.) Go to Step 3.
2	**INSPECT STEERING ANGLE SENSOR** • Inspect the steering angle sensor. (See 04-15-15 STEERING ANGLE SENSOR INSPECTION.) • Is the steering angle sensor normal?	Yes	Go to the next step.
		No	Replace the steering angle sensor, then go to the next step. (See 04-15-14 STEERING ANGLE SENSOR REMOVAL/INSTALLATION.)
3	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Clear the DTC from the memory. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Start the engine and drive the vehicle. • Are the same DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the DSC HU/CM.
		No	Go to the next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Go to the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

DTC C1306 [DYNAMIC STABILITY CONTROL (DSC)]

id0402b2802000

Note

- The initialization value of the steering angle sensor is stored using the battery power supply. Therefore, the battery power supply of the steering angle sensor is cut and the stored initialization value is cleared when any of the following items are performed. DTC C1306 is stored in the memory.
  — Negative battery cable disconnection
  — Steering angle sensor connector disconnection
  — Fuse (ROOM 15A) removal
  — Wiring harness disconnection between battery and steering angle sensor connector

DTC C1306	Steering angle sensor (abnormal initialization) system
DETECTION CONDITION	• Signal which indicates that the initialization has not been performed is continuously received from the steering angle sensor for **100 ms**.
POSSIBLE CAUSE	• The initialization procedure for the steering angle sensor has not been performed. • The negative battery cable connector was disconnected previously. • The steering angle sensor connector was disconnected previously. • The fuse (ROOM 15A) was removed previously. • The wiring harness between battery—steering angle sensor connector is disconnected. • Steering angle sensor malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY INITIALIZATION PROCEDURE.** • Has the steering angle sensor initialization procedure been performed?	Yes	Go to the next step.
		No	Perform the steering angle sensor initialization procedure, then go to the next step. (See 04-15-15 STEERING ANGLE SENSOR INITIALIZATION PROCEDURE.)
2	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Clear the DTC from the memory. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Is the same DTC present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Repeat the inspection from Step 1. If the malfunction occurs again, replace the steering angle sensor, then go to the next step. (See 04-15-14 STEERING ANGLE SENSOR REMOVAL/INSTALLATION.)
		No	Go to the next step.
3	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Go to the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	DTC troubleshooting completed.

DTC C1994 [DYNAMIC STABILITY CONTROL (DSC)]

id0402b2802200

DTC C1994	DSC control system
DETECTION CONDITION	• During ABS control, there are two ore more wheels which the wheel speed is **10 km/h {6.2 mph}** or less when pressure reduction or maintain is continuously requested for **0.3 s—3 s** (depending on vehicle driving conditions). • DSC control is performed continuously for **10 s** (**5 s** if the vehicle speed is more than **100 km/h {62.1 mph}**).
POSSIBLE CAUSE	• This does not indicate a malfunction since constant control over extended period of time is inhibited to protect the DSC solenoid valve inside the DSC HU.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Clear the DTC from the memory. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Are the same DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
2	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Go to the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

DTC U0073, U0100, U0101, U0155, U1900 [DYNAMIC STABILITY CONTROL (DSC)]

id0402b2888600

DTC U0073, U0100, U0101, U0155, U1900	CAN line system
DETECTION CONDITION	• U0073 — Communication error with other modules is detected in CAN communication. • U0100 — Error is detected in received data from PCM in CAN communication. • U0101 — Error is detected in received data from TCM in CAN communication. • U0155 — Error is detected in received data from instrument cluster in CAN communication. • U1900 — Error is detected in transmitted data in CAN communication. — CAN initialization is failure. — Data written to CAN main memory and those read from are not consistent.
POSSIBLE CAUSE	• Malfunction in communication line between PCM, TCM, instrument cluster, and steering angle sensor • Malfunction in PCM, TCM, instrument cluster, or steering angle sensor • Poor connection at connectors (female terminal)

Diagnostic procedure

- Inspect according to diagnostic procedure in BODY & ACCESSORIES. (See 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].) (See 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)

DTC U0074, U0123, U1901 [DYNAMIC STABILITY CONTROL (DSC)]

id0402b2887600

DTC U0074, U0123, U1901	Combined sensor system (CAN2 line malfunction)
DETECTION CONDITION	• U0074 — Communication error with combined sensor is detected in CAN communication. • U0123 — Error is detected in received data from combined sensor in CAN communication. • U1901 — Error is detected in transmitted data to combined sensor in CAN communication.
POSSIBLE CAUSE	• Open or short circuit in the CAN2_L wiring harness between combined sensor terminal B and DSC HU/CM terminal AS • Open or short circuit in the CAN2_H wiring harness between combined sensor terminal C and DSC HU/CM terminal AR • Combined sensor malfunction • DSC HU/CM malfunction • Poor connection at connectors (female terminal)

DSC HU/CM WIRING HARNESS-SIDE CONNECTOR

COMBINED SENSOR WIRING HARNESS-SIDE CONNECTOR

ON-BOARD DIAGNOSTIC [DYNAMIC STABILITY CONTROL (DSC)]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT COMBINED SENSOR SIGNAL (CAN2 LINE) FOR OPEN CIRCUIT** • Disconnect the DSC HU/CM connectors. • Disconnect the combined sensor connectors. • Inspect for continuity between the DSC HU/CM connectors (vehicle harness-side) and the following combined sensor connector terminals (vehicle harness-side): — Combined sensor (CAN2_L): B—AS — Combined sensor (CAN2_H): C—AR • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness, then go to Step 4.
2	**INSPECT COMBINED SENSOR SIGNAL (CAN2 LINE) FOR SHORT CIRCUIT** • Inspect for continuity between the following DSC HU/CM connector terminals (vehicle harness-side) and body ground: — Combined sensor (CAN2_L): B — Combined sensor (CAN2_H): C • Is there continuity?	Yes	Repair or replace the wiring harness, then go to Step 4.
		No	Go to the next step.
3	**INSPECT THE COMBINED SENSOR** • Reconnect all disconnected connectors. Inspect the combined sensor. (See 04-15-12 COMBINED SENSOR INSPECTION.) • Is the combined sensor normal?	Yes	Go to the next step.
		No	Replace the combined sensor, then go to the next step. (See 04-15-11 COMBINED SENSOR REMOVAL/INSTALLATION.)
4	**VERIFY THAT THE SAME DTC IS NOT PRESENT** • Make sure to reconnect all disconnected connectors. • Clear the DTCs from the memory. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Are the same DTCs present? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
5	**VERIFY THAT NO OTHER DTCS ARE PRESENT** • Are any other DTCs output? (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)	Yes	Go to the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	DTC troubleshooting completed.

DTC U2023 [DYNAMIC STABILITY CONTROL (DSC)]

id0402b2878000

DTC U2023	Signal error from PCM
DETECTION CONDITION	• Correct data cannot be received from PCM
POSSIBLE CAUSE	• PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT FOR PCM MALFUNCTION** • Switch the ignition to off. • Using the M-MDS, perform the DTC inspection for the PCM. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Are any DTCs detected?	Yes	Go to applicable DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
2	**VERIFY THAT THE SAME DTC IS NOT PRESENT** • Clear the DTCs from the memory. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Are the same DTCs present?	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
3	**VERIFY THAT NO OTHER DTCS ARE PRESENT** • Are any other DTCs output?	Yes	Go to the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	DTC troubleshooting completed.

04-03A SYMPTOM TROUBLESHOOTING [ABS]

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SYMPTOM TROUBLESHOOTING [ABS]

SYSTEM WIRING DIAGRAM [ABS]

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FOREWORD [ABS]

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- Before performing the steps in Symptom Troubleshooting, perform the On-board Diagnostic Inspection. To check the DTC, follow the DTC Inspection steps. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].)

SYMPTOM TROUBLESHOOTING [ABS]

PRECAUTION [ABS]

id0403a5804100

1. Any one or a combination of the ABS warning and brake system warning lights illuminate even when the system is normal.

Warning lights that may illuminate and/or flash	Condition under which the light may illuminate	Conditions under which the light will go out	ABS, EBD control
Any or all the following lights illuminate: • ABS warning light • Brake system warning light*1	Under any of the following conditions: • When the front wheels are jacked up, stuck, or placed on a chassis roller, and only the front wheel ABS wheel speed sensors are spun for **20 s or more**.	After turning ignition switch off, vehicle is driven at speed **greater than 10 km/h {6.2 mph}** and normal operation is confirmed.	• ABS: Disables control • EBD: 1. Disable control, in cases where the light may illuminate, only when ABS HU/CM detects that wheel speed sensors determine that two or more rear wheels are malfunctioning. 2. Enables control, if wheel speed sensors determine that three or more wheels are functioning correctly.
	Parking brake is not fully released while driving.		
	Brake drag.		
	Sudden acceleration/ deceleration		
	Left/right or front/rear tires are different. (Size, radius, tire pressure, or wear is other than that listed on tire label.)		
All the following lights illuminate: • ABS warning light • Brake system warning light	Battery voltage at ABS HU/CM ignition terminal J drops **below approx. 9 to 10 V.***2	Battery voltage rises **above approx. 10 V.** (Only brake system warning light goes out.)	ABS: Enables control EBD: Enables control

*1 : The light will illuminate only when ABS HU/CM detects that a rear wheel-speed sensor is malfunctioning.
*2 : If battery voltage drops **below 9 V** while vehicle speed is **greater than 6 km/h {3.7 mph}**, the ABS HU/CM stores DTC B1318.

2. Precautions during servicing of ABS
The ABS is composed of electrical and mechanical parts. It is necessary to categorize malfunctions as being either electrical or hydraulic when performing troubleshooting.
(1) Malfunctions in electrical system
   - The ABS HU/CM has an on-board diagnostic function. With this function, any one or a combination of the ABS warning light and brake system warning light will illuminate when there is a problem in the electrical system. Also, past and present malfunctions are stored in the ABS HU/CM. This function can find malfunctions that do not occur during periodic inspections. Connect the M-MDS to the DLC-2. Stored malfunctions will be displayed in the order of occurrence. To find out the causes of ABS malfunctions, use these on-board diagnostic results.
   - If a malfunction occurred in the past but is now normal, the cause is likely a temporary poor connection of the wiring harness. The ABS HU/CM usually operates normally. Be careful when searching for the cause of malfunction.
   - After repair, it is necessary to clear the DTC from the ABS HU/CM memory.
     Also, if the ABS related parts have been replaced, verify that no DTC is displayed after repairs.
   - After repairing the ABS wheel-speed sensor or ABS sensor rotor, or after replacing the ABS HU/CM, the ABS warning light may not go out* even when the ignition switch is turned to the ON position. In this case, drive the vehicle at a speed of **10 km/h {6.2 mph} or more**, make sure that ABS warning light goes out, and then clear the DTC.
     *: The brake system warning light also illuminates when there is any rear wheel deformation.
   - When repairing, if the ABS related connectors are disconnected and the ignition switch is turned to the ON position, the ABS HU/CM will mistakenly detect a fault and record it as a malfunction.
   - To protect the ABS HU/CM, make sure the ignition is off before connecting or disconnecting the ABS HU/CM connector.

(2) Malfunctions in hydraulic system
   - Symptoms in a hydraulic system malfunction are similar to those in a conventional brake malfunction. However, it is necessary to determine if the malfunction is in an ABS component or the conventional brake system.
   - The ABS hydraulic unit contains delicate mechanical parts. If foreign material gets into the component, the ABS may fail to operate. Also, it will likely become extremely difficult to find the location of the malfunction in the event that the brakes operate but the ABS does not. Make sure foreign material does not enter when servicing the ABS (e.g. brake fluid replacement, pipe removal).

SYMPTOM TROUBLESHOOTING [ABS]

Intermittent Concern Troubleshooting
Vibration method

- If a malfunction occurs or becomes worse while driving on a rough road or when the engine is vibrating, perform the following steps.

Note

- There are several reasons why vehicle or engine vibration could cause an electrical malfunction. Inspect the following:
  - — Connectors not fully seated.
  - — Wire harnesses not having full play.
  - — Wires laying across brackets or moving parts.
  - — Wires routed too close to hot parts.
- An improperly routed, improperly clamped, or loose harness can cause wiring to become pinched between parts.
- The connector joints, points of vibration, and places where wiring harnesses pass through the firewall, body and other panels are the major areas to be inspected.

Inspection method for switch connectors or wires

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position (engine off).

Note

- If the engine starts and runs, perform the following steps at idle.

3. Access PIDs for the switch you are inspecting.
4. Turn the switch on manually.
5. Slightly shake each connector or wiring harness vertically and horizontally while monitoring the PID.
   - If the PID value is unstable, inspect for poor connection.

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Inspection method for sensor connectors or wires

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position (engine off).

Note

- If the engine starts and runs, perform the following steps at idle.

3. Access PIDs for the switch you are inspecting.
4. Slightly shake each connector or wiring harness vertically and horizontally while monitoring the PID.
   - If the PID value is unstable, inspect for poor connection.

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SYMPTOM TROUBLESHOOTING [ABS]

Inspection method for sensors

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position (engine off).

   Note
   - If engine starts and runs, perform the following steps at idle.

3. Access PIDs for the switch you are inspecting.
4. Vibrate the sensor slightly with your finger.
   - If the PID value is unstable or a malfunction occurs, inspect for poor connection and/or poorly mounted sensor.

Malfunction data monitor method

1. Perform the malfunction reappearance test according to malfunction reappearance mode and malfunction data monitor. The malfunction cause is found in the malfunction data.

Inspection method for connector terminal

1. Inspect the connection condition of each female terminal.
2. Insert the male terminal, and fit the female terminal side to female terminal. Inspect if the malfunction is in the female terminal.

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SYMPTOM TROUBLESHOOTING [ABS]

SYMPTOM TROUBLESHOOTING [ABS]

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- Verify the symptoms, and perform troubleshooting according to the appropriate number.

No.	Symptom
1	Neither ABS warning light nor brake system warning light illuminate when ignition switch turned to ON position
2	ABS warning light does not illuminate when ignition switch turned to ON position
3	Brake system warning light does not illuminate when the ignition switch is turned to the ON position
4	Both ABS warning light and brake system warning light stay on **4 s or more** when the ignition switch is turned to the ON position
5	ABS warning light stays on **4 s or more** when the ignition switch turned to ON position
6	Brake system warning light stays on **4 s or more** when ignition switch turned to ON position (Parking brake is released)

x: Applicable

	Possible factor / Troubleshooting item	ABS HU/CM	Instrument cluster	CAN communication	Battery	Brake fluid	Brake fluid level sensor	Parking brake switch	Charging system	ABS HU/CM power supply system	ABS HU/CM ground system	Instrument cluster power supply system	Instrument cluster ground system	Tire size, tire air pressure	Conventional brakes	Brake pipe routing
1	Neither ABS warning light nor brake system warning light illuminate when ignition switch turned to ON position	X	X									X	X			
2	ABS warning light does not illuminate when ignition switch turned to ON position	X	X													
3	Brake system warning light does not illuminate when the ignition switch is turned to the ON position	X	X													
4	Both ABS warning light and BRAKE system warning light stay on 4 s or more when the ignition switch is turned to the ON position	X	X	X	X				X	X	X					
5	ABS warning light stays on 4 s or more when ignition switch turned to ON position	X	X	X												
6	Brake system warning light stays on 4 s or more when ignition switch turned to ON position	X	X	X		X	X	X								

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SYMPTOM TROUBLESHOOTING [ABS]

NO.1 NEITHER ABS WARNING LIGHT NOR BRAKE SYSTEM WARNING LIGHT ILLUMINATE WHEN IGNITION SWITCH TURNED TO ON POSITION [ABS]

id0403a5161600

1	**Neither ABS warning light nor brake system warning light illuminate when ignition switch turned to ON position**
POSSIBLE CAUSE	• Instrument cluster power supply fuse malfunction — Short to ground in instrument cluster power supply fuse circuit — Instrument cluster power supply fuse malfunction • Open circuit in instrument cluster ground circuit • Instrument cluster malfunction • Network communication for related system malfunction • Improper configuration of instrument cluster • ABS HU/CM malfunction

STEP	INSPECTION		ACTION
1	**VERIFY WHETHER MALFUNCTION IS IN COMMON POWER SUPPLY OF WARNING LIGHTS AND INDICATOR LIGHTS, OR IN OTHER WARNING LIGHTS AND INDICATOR LIGHTS** • Verify other warning and indicator lights illuminate when the ignition switch is turned to the ON position? • Is there any warning and indicator light?	Yes	Go to Step 4.
		No	Go to the next step.
2	**INSPECT INSTRUMENT CLUSTER POWER SUPPLY FUSE** • Inspect the instrument cluster power supply fuse. • Is there any malfunction?	Yes	Inspect the blown fuse related wiring harness for short to ground. Repair or replace the wiring harness for a possible short to ground, if necessary. Install the appropriate amperage fuse.
		No	Go to the next step.
*3	**VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (INSPECT FOR CONTINUITY BETWEEN INSTRUMENT CLUSTER POWER SUPPLY AND INSTRUMENT CLUSTER) OR INSTRUMENT CLUSTER** • Turn the ignition switch to the ON position (engine off). • Measure the voltage at instrument cluster terminal 1G (wiring harness-side). • Is the voltage **approx. 12 V?**	Yes	Replace the instrument cluster (open circuit in instrument cluster internal circuit). (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)
		No	Inspect the wiring harness between the instrument cluster and body ground for open circuit. Repair or replace the wiring harness for a possible open circuit, if necessary.
4	**CONFIRM DTC U1900** • Retrieve the DTC from the PCM, ABS and instrument cluster. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) (See 09-02B-1 DTC INSPECTION [INSTRUMENT CLUSTER].) • Is the DTC U1900 present?	Yes	Go to the next step.
		No	Inspect the instrument cluster. (See 09-22-4 INSTRUMENT CLUSTER INSPECTION.) If the instrument cluster has a malfunction: • Replace the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.) If the instrument cluster is normal: • Go to Step 6.
5	**CONFIRM DTCS U0121, U0100 AND U0214** • Retrieve the DTC from the instrument cluster. (See 09-02B-1 DTC INSPECTION [INSTRUMENT CLUSTER].) • Is the DTC U0121, U0100 or U0214 present?	Yes	Replace the instrument cluster (open circuit in instrument cluster). (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)
		No	Inspect the network communication for related system malfunction. Repair or replace the malfunctioning part according to the inspection results, if necessary.
6	**CONFIRM DTC B2477** • Retrieve the DTC from the instrument cluster. (See 09-02B-1 DTC INSPECTION [INSTRUMENT CLUSTER].) • Is the DTC B2477 present?	Yes	Perform the instrument cluster configuration. (See 09-22-3 INSTRUMENT CLUSTER CONFIGURATION.)
		No	Replace the ABS HU/CM. (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)

SYMPTOM TROUBLESHOOTING [ABS]

STEP	INSPECTION	ACTION
	INSTRUMENT CLUSTER WIRING HARNESS-SIDE CONNECTOR 	

- When performing an asterisked (*) troubleshooting inspection, slightly shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, verify that the connectors, terminals and wiring harness are connected correctly and undamaged.

NO.2 ABS WARNING LIGHT DOES NOT ILLUMINATE WHEN IGNITION SWITCH TURNED TO ON POSITION [ABS]

id0403a5810100

2	ABS warning light does not illuminate when ignition switch turned to ON position
POSSIBLE CAUSE	• Instrument cluster malfunction • Network communication for related system malfunction • ABS HU/CM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CONFIRM DTC U1900** • Retrieve the DTC from the PCM, ABS and instrument cluster. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) (See 09-02B-1 DTC INSPECTION [INSTRUMENT CLUSTER].) • Is the DTC U1900 present?	Yes	Go to the next step.
		No	Inspect the instrument cluster. (See 09-22-4 INSTRUMENT CLUSTER INSPECTION.) If the instrument cluster has a malfunction: • Replace the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.) If the instrument cluster is normal: • Go to the next step.
2	**CONFIRM DTCS U0121, U0100 AND U0214** • Retrieve the DTC from the instrument cluster. (See 09-02B-1 DTC INSPECTION [INSTRUMENT CLUSTER].) • Is the DTC U0121, U0100 or U0214 present?	Yes	Replace the instrument cluster (open circuit in instrument cluster internal circuit). (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)
		No	Inspect the network communication for related system malfunction. Repair or replace the malfunctioning part according to the inspection results, if necessary.

SYMPTOM TROUBLESHOOTING [ABS]

NO.3 BRAKE SYSTEM WARNING LIGHT DOES NOT ILLUMINATE WHEN THE IGNITION SWITCH IS TURNED TO THE ON POSITION [ABS]

id0403a5801900

3	Brake system warning light does not illuminate when the ignition switch is turned to the ON position
POSSIBLE CAUSE	• Instrument cluster malfunction • Network communication for related system malfunction • ABS HU/CM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CONFIRM DTC U1900** • Retrieve the DTC from the PCM, ABS and instrument cluster. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) (See 09-02B-1 DTC INSPECTION [INSTRUMENT CLUSTER].) • Is the DTC U1900 present?	Yes	Go to the next step.
		No	Inspect the instrument cluster. (See 09-22-4 INSTRUMENT CLUSTER INSPECTION.) If the instrument cluster has a malfunction: • Replace the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.) If the instrument cluster is normal: • Go to the next step.
2	**CONFIRM DTCS U0121, U0100 AND U0214** • Retrieve the DTC from the instrument cluster. (See 09-02B-1 DTC INSPECTION [INSTRUMENT CLUSTER].) • Is the DTC U0121, U0100 or U0214 present?	Yes	Replace the instrument cluster (open circuit in instrument cluster internal circuit). (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)
		No	Inspect the network communication for related system malfunction. Repair or replace the malfunctioning part according to the inspection results, if necessary.

NO.4 BOTH ABS WARNING LIGHT AND BRAKE SYSTEM WARNING LIGHT STAY ON 4 S OR MORE WHEN THE IGNITION SWITCH IS TURNED TO THE ON POSITION [ABS]

id0403a5802000

4	Both ABS warning light and brake system warning light stay on 4 s or more when the ignition switch is turned to the ON position
POSSIBLE CAUSE	• ABS HU/CM power supply fuse malfunction — Short to ground in ABS HU/CM power supply circuit — ABS HU/CM power supply fuse malfunction • ABS HU/CM DTC is stored • Instrument cluster malfunction • ABS HU/CM malfunction (open or short circuit in ABS HU/CM internal ground circuit) • Battery malfunction • Charging system malfunction • ABS HU/CM looseness • Open circuit in wiring harness between ABS HU/CM terminal D and body ground • Open circuit in wiring harness between ABS HU/CM terminal Y, Z and DLC-2 • Short to power supply in wiring harness between ABS HU/CM terminal D and body ground • Short to ground in wiring harness between ABS HU/CM terminal D and body ground • ABS HU/CM malfunction (ABS HU/CM internal communication circuit malfunction)

SYMPTOM TROUBLESHOOTING [ABS]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT ABS HU/CM POWER SUPPLY FUSE** • Turn the ignition switch off. • Inspect the ABS HU/CM power supply fuse. • Is there any malfunction?	Yes	Inspect the blown fuse related wiring harness for short to ground. Repair or replace the wiring harness for a possible short to ground, if necessary. Install the appropriate amperage fuse.
		No	Go to the next step.
2	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR CONTINUITY AND SHORTS** • Perform the Reading DTCs Procedure. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) • Is the error message displayed regarding communication between ABS HU/CM and M-MDS?	Yes	If a communication error message is displayed even after inspecting according to the procedure displayed on the M-MDS, go to Step 10.
		No	Go to the next step.
3	**CONFIRM ABS HU/CM DTC** • Perform the Reading DTCs Procedure. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) • Are any DTC present?	Yes	Go to the applicable DTC inspection. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].)
		No	Go to the next step.
4	**INSPECT WARNING LIGHT OPERATION** • Turn on the all warning light on instrument cluster using the instrument cluster input/output check code 26. (See 09-22-6 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.) • Do the ABS and brake system warning light illuminate?	Yes	Go to the next step.
		No	Replace the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
5	**INSPECT ABS HU/CM IGNITION POWER SUPPLY SYSTEM** • Perform the PID/Data Monitor and Record Procedure and access the ABS_VOLT PID. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) • Is the voltage within the specification? **Specification: approx. 10 V**	Yes	Replace the ABS HU/CM (open or short circuit in ABS HU/CM internal ground circuit). (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)
		No	Go to the next step.
6	**INSPECT BATTERY** • Inspect the battery. (See 01-17-3 BATTERY INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Inspect the charging system. (See 01-17-6 GENERATOR INSPECTION [L8, LF].) Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
7	**INSPECT CHARGING SYSTEM** • Start the engine. • Measure the battery voltage with the electrical load (A/C, headlight, etc.) on and the engine idling. • Is the voltage normal?	Yes	Go to the next step.
		No	Inspect the charging system (drive belt tension, generator, etc.). (See 01-17-6 GENERATOR INSPECTION [L8, LF].) Repair or replace the malfunctioning part according to the inspection results.
*8	**INSPECT ABS HU/CM POWER SUPPLY CIRCUIT FOR CONTINUITY** • Turn the ignition switch off. • Disconnect the ABS HU/CM connector. • Turn the ignition switch to the ON position (engine off). • Measure the voltage at ABS HU/CM terminal Z (wiring harness-side). • Is the voltage **approx. 12 V**?	Yes	Go to the next step.
		No	Inspect the ABS HU/CM connector for loose. Reconnect the ABS HU/CM connector properly, if necessary.
*9	**INSPECT ABS HU/CM GROUND CIRCUIT FOR CONTINUITY** • Turn the ignition switch off. • Inspect for continuity between ABS HU/CM terminal D (wiring harness-side) and body ground. • Is there continuity?	Yes	If a malfunction error message is displayed on the M-MDS in Step 1 inspection: • Go to the next step. If a malfunction error message is not displayed on the M-MDS in Step 1 inspection: • Symptom troubleshooting is completed.
		No	Repair or replace the wiring harness for a possible open circuit.

SYMPTOM TROUBLESHOOTING [ABS]

STEP	INSPECTION		ACTION
*10	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR CONTINUITY** • Turn the ignition switch off. • Inspect for continuity between ABS HU/CM terminal Y, Z and DLC-2 (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit.
*11	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the ON position (engine off). • Measure the voltage at ABS HU/CM terminal Y, Z (wiring harness-side). • Is the voltage **approx. 12 V**?	Yes	Repair or replace the wiring harness for a possible short to power supply.
		No	Go to the next step.
*12	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR SHORT TO GROUND** • Turn the ignition switch off. • Inspect for continuity between ABS HU/CM terminal Y, Z (wiring harness-side) and body ground. • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground.
		No	Replace the ABS HU/CM (ABS HU/CM internal communication circuit malfunction). (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)

ABS HU/CM
WIRING HARNESS-SIDE CONNECTOR

- When performing an asterisked (*) troubleshooting inspection, slightly shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, verify that the connectors, terminals and wiring harness are connected correctly and undamaged.

NO.5 ABS WARNING LIGHT STAYS ON 4 S OR MORE WHEN IGNITION SWITCH TURNED TO ON POSITION [ABS]

id0403a5810200

5	ABS warning light stays on 4 s or more when ignition switch turned to ON position
POSSIBLE CAUSE	• ABS HU/CM DTC is stored • ABS HU/CM malfunction (open or short to ground in ABS HU/CM internal circuit) • Open circuit in wiring harness between ABS HU/CM terminal Y, Z and DLC-2 • Short to power supply in wiring harness between ABS HU/CM terminal D and body ground • Short to ground in wiring harness between ABS HU/CM terminal D and body ground • ABS HU/CM malfunction (ABS HU/CM internal communication circuit malfunction)

SYMPTOM TROUBLESHOOTING [ABS]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR CONTINUITY AND SHORTS** • Perform the Reading DTCs Procedure. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) • Is the error message displayed regarding communication between ABS HU/CM and M-MDS?	Yes	If a communication error message is displayed even after inspecting according to the procedure displayed on the M-MDS, go to Step 4.
		No	Go to the next step.
2	**CONFIRM ABS HU/CM DTC** • Perform the Reading DTCs Procedure. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) • Are any DTC present?	Yes	Go to the applicable DTC inspection. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].)
		No	Go to the next step.
3	**INSPECT WARNING LIGHT OPERATION** • Turn on the all warning light on instrument cluster using the instrument cluster input/output check code 26. (See 09-22-6 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.) • Do the ABS and brake system warning light illuminate?	Yes	Replace the ABS HU/CM (open or short to ground in ABS HU/CM internal circuit). (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)
		No	Replace the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
*4	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR CONTINUITY** • Turn the ignition switch off. • Inspect for continuity between ABS HU/CM terminal Y, Z and DLC-2 (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit.
*5	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the ON position (engine off). • Measure the voltage at ABS HU/CM terminal Y, Z (wiring harness-side). • Is the voltage **approx. 12 V**?	Yes	Repair or replace the wiring harness for a possible short to power supply.
		No	Go to the next step.
*6	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR SHORT TO GROUND** • Turn the ignition switch off. • Inspect for continuity between ABS HU/CM terminal Y, Z (wiring harness-side) and body ground. • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground.
		No	Replace the ABS HU/CM (ABS HU/CM internal communication circuit malfunction). (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)

ABS HU/CM
WIRING HARNESS-SIDE CONNECTOR

- When performing an asterisked (*) troubleshooting inspection, slightly shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, verify that the connectors, terminals and wiring harness are connected correctly and undamaged.

SYMPTOM TROUBLESHOOTING [ABS]

NO.6 BRAKE SYSTEM WARNING LIGHT STAYS ON 4 S OR MORE WHEN IGNITION SWITCH TURNED TO ON POSITION [ABS]

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6	**Brake system warning light stays on 4 s or more when ignition switch turned to ON position (Parking brake is released)**
POSSIBLE CAUSE	• Brake fluid amount is low • ABS HU/CM DTC is stored • Instrument cluster malfunction • Parking brake switch, brake fluid level sensor or in some other part malfunction • Short to ground in wiring harness between the following terminals: — Instrument cluster terminal 2M and parking brake switch terminal A — Instrument cluster terminal 1D and brake fluid level sensor terminal A • ABS HU/CM malfunction • Open circuit in wiring harness between ABS HU/CM terminal Y, Z and DLC-2 • Short to power supply in wiring harness between ABS HU/CM terminal D and body ground • Short to ground in wiring harness between ABS HU/CM terminal D and body ground • ABS HU/CM malfunction (ABS HU/CM internal communication circuit malfunction)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT BRAKE FLUID LEVEL** • Inspect the brake fluid level. • Is the brake fluid level normal?	Yes	Go to the next step.
		No	Add the brake fluid.
*2	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR CONTINUITY AND SHORTS** • Perform the Reading DTCs Procedure. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) • Is the error message displayed regarding communication between ABS HU/CM and M-MDS?	Yes	If a communication error message is displayed even after inspecting according to the procedure displayed on the M-MDS, go to Step 6.
		No	Go to the next step.
3	**CONFIRM ABS HU/CM DTC** • Perform the Reading DTCs Procedure. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].) • Are any DTC present?	Yes	Go to the applicable DTC inspection. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].)
		No	Go to the next step.
4	**INSPECT WARNING LIGHT OPERATION** • Turn on the all warning light on instrument cluster using the instrument cluster input/output check code 26. (See 09-22-6 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.) • Do the ABS and brake system warning light illuminate?	Yes	Go to the next step.
		No	Replace the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
5	**VERIFY WHETHER MALFUNCTION IS IN PARKING BRAKE SWITCH OR BRAKE FLUID LEVEL SENSOR, OR IN SOME OTHER PART** • Disconnect the connectors in the following order: 1. Parking brake switch connector 2. Brake fluid level sensor connector • Does the brake system warning light go out with ignition switch turned to the ON position?	Yes	Replace the parking brake switch and/or brake fluid level sensor (short with some internal part). (See 04-11-8 MASTER CYLINDER REMOVAL/INSTALLATION.) (See 04-12-2 PARKING BRAKE LEVER REMOVAL/INSTALLATION.)
		No	Inspect the wiring harness between the following terminals for short to ground: • Instrument cluster terminal 2M (brake system warning light) and parking brake switch terminal A • Instrument cluster terminal 1D (brake system warning light) and brake fluid level sensor terminal A If the wiring harness has a malfunction: • Repair or replace the wiring harness for a possible short to ground. If the wiring harness is normal: • Replace the ABS HU/CM. (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)

SYMPTOM TROUBLESHOOTING [ABS]

STEP	INSPECTION		ACTION
*6	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR CONTINUITY** • Turn the ignition switch off. • Inspect for continuity between ABS HU/CM terminal Y, Z and DLC-2 (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit.
*7	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the ON position (engine off). • Measure the voltage at ABS HU/CM terminal Y, Z (wiring harness-side). • Is the voltage **approx. 12 V**?	Yes	Repair or replace the wiring harness for a possible short to power supply.
		No	Go to the next step.
*8	**INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC-2 FOR SHORT TO GROUND** • Turn the ignition switch off. • Inspect for continuity between ABS HU/CM terminal Y, Z (wiring harness-side) and body ground. • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground.
		No	Replace the ABS HU/CM (ABS HU/CM internal communication circuit malfunction). (See 04-13-4 ABS HU/CM REMOVAL/INSTALLATION.)

- When performing an asterisked (*) troubleshooting inspection, slightly shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, verify that the connectors, terminals and wiring harness are connected correctly and undamaged.

04-03B SYMPTOM TROUBLESHOOTING [DYNAMIC STABILITY CONTROL (DSC)]

SYSTEM WIRING DIAGRAM [DYNAMIC STABILITY CONTROL (DSC)] 04-03B–2
FOREWORD [DYNAMIC STABILITY CONTROL (DSC)] 04-03B–3
PRECAUTION [DYNAMIC STABILITY CONTROL (DSC)] 04-03B–3
Intermittent Concern Troubleshooting 04-03B–4
SYMPTOM TROUBLESHOOTING [DYNAMIC STABILITY CONTROL (DSC)] 04-03B–5
NO.1 ANY OF THE FOLLOWING LIGHTS DO NOT ILLUMINATE WHEN IGNITION SWITCH TURNED TO ON POSITION: (ABS WARNING LIGHT, BRAKE SYSTEM WARNING LIGHT, DSC INDICATOR LIGHT AND/OR DSC OFF LIGHT) [DYNAMIC STABILITY CONTROL (DSC)] 04-03B–6
NO.2 ANY OF THE FOLLOWING LIGHTS REMAIN ON: (ABS WARNING LIGHT, BRAKE SYSTEM WARNING LIGHT, DSC INDICATOR LIGHT AND/OR DSC OFF LIGHT) [DYNAMIC STABILITY CONTROL (DSC)] 04-03B–7
NO.3 THERE IS A MALFUNCTION IN THE SYSTEM EVEN THOUGH ABS WARNING LIGHT, BRAKE SYSTEM WARNING LIGHT, DSC INDICATOR LIGHT AND DSC OFF LIGHT DO NOT ILLUMINATE [DYNAMIC STABILITY CONTROL (DSC)] 04-03B–8
NO.4 ABS OR TCS*1 OPERATES FREQUENTLY/TCS DOES NOT WORK CORRECTLY *1: DSC SYSTEM FUNCTION CONTAINS TRACTION CONTROL FUNCTION, DSC INDICATOR LIGHT GOES ON AND OFF WHILE DSC IS OPERATING [DYNAMIC STABILITY CONTROL (DSC)] 04-03B–8
NO.5 DSC*2 OPERATES FREQUENTLY/DSC DOES NOT WORK CORRECTLY *2: DSC INDICATOR LIGHT GOES ON AND OFF WHILE DSC IS OPERATING [DYNAMIC STABILITY CONTROL (DSC)] 04-03B–9

SYMPTOM TROUBLESHOOTING [DYNAMIC STABILITY CONTROL (DSC)]

SYSTEM WIRING DIAGRAM [DYNAMIC STABILITY CONTROL (DSC)]

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SYMPTOM TROUBLESHOOTING [DYNAMIC STABILITY CONTROL (DSC)]

FOREWORD [DYNAMIC STABILITY CONTROL (DSC)]

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- Before performing the steps in Symptom Troubleshooting, perform the On-board Diagnostic Inspection. To check the DTC, follow the DTC Inspection steps. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)

PRECAUTION [DYNAMIC STABILITY CONTROL (DSC)]

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1. The ABS warning light and/or brake system warning light and/or DSC indicator light and/or DSC OFF light illuminate even when the system is normal.

Warning lights that may illuminate and/or flash	Condition under which the light may illuminate	Conditions under which the light will go out	ABS, EBD, TCS and DSC control
• ABS warning light • Brake system warning light • DSC indicator light	Under any of the following conditions: • When the front wheels are jacked up, struck, or placed on a chassis roller, and only the front wheel ABS wheel speed sensors are spun for **20 s or more.**	After turning ignition switch off, vehicle is driven at speed **greater than 10 km/h {6.2 mph}** and normal operation is confirmed.	• ABS: Disables control • EBD: 1. Disable control, in cases where the light may illuminate, only when DSC HU/CM detects that wheel speed sensors determine that two or more wheels are malfunctioning. 2. Enables control, if wheel speed sensors determine three or more wheels are functioning correctly. • TCS: Disables control • DSC: Disables control
	Parking brake is not fully released while driving.		
	Brake drag.		
	Sudden acceleration/deceleration.		
	Left/right or front/rear tires are different (size, radius, tire pressure, or wear is other than that listed on tire label).		
	Battery voltage at DSC HU/CM ignition terminal drops **below approx. 10 V.**	Battery voltage rises **above approx. 10 V.**	ABS: Disables control EBD: Enables control TCS: Disables control DSC: Disables control
• Brake system warning light	Brake fluid amount is low.	Brake fluid level lower than recommended amount.	ABS: Enables control EBD: Enables control TCS: Enables control DSC: Enables control

2. Precautions during servicing of DSC
   The DSC is composed of electrical and mechanical parts. It is necessary to categorize malfunctions as being either electrical or hydraulic when performing troubleshooting.
   (1) Malfunction in electrical system
   - The control module has an on-board diagnostic function. With this function, the ABS warning light and/or brake system warning light and/or DSC indicator light and/or DSC OFF light will illuminate when there is a problem in the electrical system.
     Also, past and present malfunctions are in the control module. This function can find malfunctions that do not occur during periodic inspections. Connect the M-MDS to the DLC-2, the stored malfunctions will be displayed in the order of occurrence. To find out the causes of DSC malfunctions, use these on-board diagnostic results.
   - If a malfunction occurred in the past but is now normal, the cause is likely a temporary poor connection of the wiring harness.
     The control module usually operates normally. Be careful when searching for the cause of malfunction.
   - After repair, it is necessary to clear the DTC from the control module memory.
     Also, if the DSC related parts have been replaced, verify that no DTC is displayed after repairs.
   - After repairing the ABS wheel-speed sensor or ABS sensor rotor, or after replacing the control module, the ABS warning light may not go out even when the ignition switch is turned to the ON position. In this case, drive the vehicle at a speed of **more than 10 km/h {6.2 mph}**, make sure the ABS warning light goes out, and then clear the DTC.

SYMPTOM TROUBLESHOOTING [DYNAMIC STABILITY CONTROL (DSC)]

- When repairing, if the DSC related connectors are disconnected and the ignition switch is turned to the ON position, the control module will mistakenly detect a fault and record it as a malfunction.

Caution

- **In DSC vehicles, when the DSC HU/CM, steering angle sensor, or combined sensor is replaced, perform the initialization procedure for each sensor. (See 04-15-11 STEERING ANGLE SIGNAL INITIALIZATION PROCEDURE.) (See 04-15-13 COMBINED SENSOR INITIALIZATION PROCEDURE.)**

- To protect the control module, make sure the ignition is off before connecting or disconnecting the control module connector.

(2) Malfunctions in hydraulic system

- Symptoms in a hydraulic system malfunction are similar to those in a conventional brake malfunction. However, it is necessary to determine if the malfunction is in a DSC component or the conventional brake system.
- The DSC HU/CM contains delicate mechanical parts. If foreign material gets into the component, the DSC may fail to operate. Also, it will likely become extremely difficult to find the location of the malfunction in the event that the brakes operate but the DSC does not. Make sure foreign material does not enter when servicing the DSC (e.g.brake fluid replacement, pipe removal).

Intermittent Concern Troubleshooting

Vibration method

- If a malfunction occurs or becomes worse while driving on a rough road or when the engine is vibrating, perform the following steps.

Note

- There are several reasons why vehicle or engine vibration could cause an electrical malfunction. Inspect the following:
  - — Connectors not fully seated.
  - — Wire harnesses not having full play.
  - — Wires laying across brackets or moving parts.
  - — Wires routed too close to hot parts.
- An improperly routed, improperly clamped, or loose harness can cause wiring to become pinched between parts.
- The connector joints, points of vibration, and places where wiring harnesses pass through the firewall, body and other panels are the major areas to be inspected.

Inspection method for switch connectors or wires

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position (engine off).

Note

- If the engine starts and runs, perform the following steps at idle.

3. Access PIDs for the switch you are inspecting.
4. Turn the switch on manually.
5. Slightly shake each connector or wiring harness vertically and horizontally while monitoring the PID.
   - If the PID value is unstable, inspect for poor connection.

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Inspection method for sensor connectors or wires

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position (engine off).

Note

- If the engine starts and runs, perform the following steps at idle.

SYMPTOM TROUBLESHOOTING [DYNAMIC STABILITY CONTROL (DSC)]

3. Access PIDs for the switch you are inspecting.
4. Slightly shake each connector or wiring harness vertically and horizontally while monitoring the PID.
   - If the PID value is unstable, inspect for poor connection.

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Inspection method for sensors

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position (engine off).

Note

- If engine starts and runs, perform the following steps at idle.

3. Access PIDs for the switch you are inspecting.
4. Vibrate the sensor slightly with your finger.
   - If the PID value is unstable or a malfunction occurs, inspect for poor connection and/or poorly mounted sensor.

Malfunction data monitor method

1. Perform the malfunction reappearance test according to malfunction reappearance mode and malfunction data monitor. The malfunction cause is found in the malfunction data.

Inspection method for connector terminal

1. Inspect the connection condition of each female terminal.
2. Insert the male terminal, and fit the female terminal side to female terminal. Inspect if the malfunction is in the female terminal.

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SYMPTOM TROUBLESHOOTING [DYNAMIC STABILITY CONTROL (DSC)]

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- Verify the symptoms, and perform troubleshooting according to the appropriate number.

No.	Symptom
1	Any of the following lights do not illuminate when ignition switch turned to ON position: • ABS warning light • Brake system warning light • DSC indicator light • DSC OFF light
2	Any of the following lights remain on: • ABS warning light • Brake system warning light • DSC indicator light • DSC OFF light
3	There is a malfunction in the system even though ABS warning light, brake system warning light, DSC indicator light and DSC OFF light do not illuminate
4	ABS or TCS*1 operates frequently
	TCS does not work correctly
5	DSC*2 operates frequently
	DSC does not work correctly

SYMPTOM TROUBLESHOOTING [DYNAMIC STABILITY CONTROL (DSC)]

*1 : DSC system function contains traction control function, DSC indicator light goes on and off while DSC is operating
*2 : DSC indicator light goes on and off while DSC is operating

x: Applicable

Troubleshooting item	Possible factor	DSC HU/CM	Instrument cluster	Each sensor installation	Battery	Charging system	Brake fluid	Parking brake	Tire	Tire air pressure	DSC HU/CM power supply system	DSC HU/CM ground system	Instrument cluster power supply system	Instrument cluster ground system	Conventional brake
1	Any of the following lights do not illuminate when ignition switch turned to ON position: (ABS warning light, brake system warning light, DSC indicator light and/or DSC OFF light)	X	X										X	X	
2	Any of the following lights remain on: (ABS warning light, brake system warning light, DSC indicator light and/or DSC OFF light)		X		X	X	X	X			X	X			
3	There is a malfunction in the system even though ABS warning light, DSC indicator light, and DSC OFF light do not illuminate														X
4	ABS or TCS*1 operates frequently/ TCS does not work correctly			X					X	X					
5	DSC*2 operates frequently/ DSC does not work correctly			X					X	X					

*1: DSC system contains traction control function, DSC indicator light goes on and off while DSC is operating
*2: DSC indicator light goes on and off while DSC is operating

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NO.1 ANY OF THE FOLLOWING LIGHTS DO NOT ILLUMINATE WHEN IGNITION SWITCH TURNED TO ON POSITION: (ABS WARNING LIGHT, BRAKE SYSTEM WARNING LIGHT, DSC INDICATOR LIGHT AND/OR DSC OFF LIGHT) [DYNAMIC STABILITY CONTROL (DSC)]

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1	**Any of the following lights do not illuminate when ignition switch turned to ON position: (ABS warning light, brake system warning light, DSC indicator light and/or DSC OFF light)**
POSSIBLE CAUSE	• DSC HU/CM DTC is stored • Instrument cluster malfunction (power supply system, ground system) • Poor connection at DSC HU/CM connector • Poor connection at DSC HU/CM, instrument cluster or related parts connector terminals • DSC HU/CM malfunction

SYMPTOM TROUBLESHOOTING [DYNAMIC STABILITY CONTROL (DSC)]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CONFIRM DSC HU/CM DTC** • Perform the Reading DTCs Procedure. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Are any DTC present?	Yes	Go the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	Go to the next step.
2	**INSPECT WHETHER MALFUNCTION IS IN INSTRUMENT CLUSTER SYSTEM OR OTHER SYSTEM** • Verify other warning and indicator lights illuminate when the ignition switch is turned to the ON position? • Is there any warning and indicator light?	Yes	Go to the next step.
		No	Replace the instrument cluster, if necessary (power supply system, ground system). (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)
3	**INSPECT CONNECTION OF DSC HU/CM CONNECTOR** • Turn the ignition switch off. • Inspect the connection of DSC HU/CM connector. • Is the DSC HU/CM connector securely connected?	Yes	Reconnect the DSC HU/CM connector securely, then go to the next step.
		No	Go to the next step.
4	**INSPECT DSC HU/CM AND RELATED PARTS CONNECTOR TERMINALS** • Inspect the connection of DSC HU/CM, instrument cluster and related parts connector terminal. • Are the terminals securely connected?	Yes	Reconnect the DSC HU/CM, instrument cluster and related connector terminals securely.
		No	Replace the DSC HU/CM. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)

NO.2 ANY OF THE FOLLOWING LIGHTS REMAIN ON: (ABS WARNING LIGHT, BRAKE SYSTEM WARNING LIGHT, DSC INDICATOR LIGHT AND/OR DSC OFF LIGHT) [DYNAMIC STABILITY CONTROL (DSC)]

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2	**Any of the following lights remain on: (ABS warning light, brake system warning light, DSC indicator light and/or DSC OFF light)**
POSSIBLE CAUSE	• Brake fluid amount is low • Parking brake lever does not release • DSC HU/CM DTC is stored • Battery malfunction • Charging system malfunction • Poor connection at DSC HU/CM connector • Poor connection at DSC HU/CM, instrument cluster or related parts connector terminals • DSC HU/CM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT BRAKE FLUID LEVEL** • Inspect the brake fluid level. • Is the brake fluid level normal?	Yes	Go to the next step.
		No	Add brake fluid.
2	**INSPECT PARKING BRAKE** • Verify the parking brake lever. • Is the parking brake lever released?	Yes	Go to the next step.
		No	Release the parking brake lever.
3	**INSPECT DSC HU/CM DTC** • Perform the Reading DTCs Procedure. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Are any DTC present?	Yes	Go to the appropriate DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	Go to the next step.
4	**INSPECT WHETHER MALFUNCTION IS IN CONTROL MODULE CONNECTOR, TERMINAL OR OTHER** • Verify the ABS warning light and brake system warning light. • Do the ABS warning light and brake system warning light go off after **4 s** when the ignition switch is turned to the ON position?	Yes	Temporary poor connection in control module connector. Inspect the DSC HU/CM connector: • Go to Step 7. Inspect the DSC HU/CM connector terminal: • Go to Step 8.
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [DYNAMIC STABILITY CONTROL (DSC)]

STEP	INSPECTION		ACTION
5	**INSPECT BATTERY** • Inspect the battery. (See 01-17-3 BATTERY INSPECTION [L8, LF].) • Is there any malfunction?	Yes	Inspect the charging system. (See 01-17-6 GENERATOR INSPECTION [L8, LF].) Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
6	**INSPECT CHARGING SYSTEM** • Start the engine. • Measure the battery voltage with the electrical load (A/C, headlight, etc.) on and the engine idling. • Is the voltage normal?	Yes	Go to the next step.
		No	Inspect the charging system (drive belt tension, generator, etc.). (See 01-17-6 GENERATOR INSPECTION [L8, LF].) Repair or replace the malfunctioning part according to the inspection results.
7	**INSPECT CONNECTION OF DSC HU/CM CONNECTOR** • Turn the ignition switch off. • Inspect the connection of DSC HU/CM connector. • Is the DSC HU/CM connector securely connected?	Yes	Reconnect the DSC HU/CM connector securely, then go to the next step.
		No	Go to the next step.
8	**INSPECT DSC HU/CM AND RELATED PARTS CONNECTOR TERMINALS** • Inspect the connection of DSC HU/CM, instrument cluster and related parts connector terminal. • Are the terminals securely connected?	Yes	Reconnect the DSC HU/CM, instrument cluster and related connector terminals securely.
		No	Replace the DSC HU/CM. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)

NO.3 THERE IS A MALFUNCTION IN THE SYSTEM EVEN THOUGH ABS WARNING LIGHT, BRAKE SYSTEM WARNING LIGHT, DSC INDICATOR LIGHT AND DSC OFF LIGHT DO NOT ILLUMINATE [DYNAMIC STABILITY CONTROL (DSC)]

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3	**There is a malfunction in the system even though ABS warning light, brake system warning light, DSC indicator light and DSC OFF light do not illuminate**
POSSIBLE CAUSE	• There is a mechanical malfunction in system — DSC HU/CM DTC is stored — DSC system malfunction — Conventional brake system malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CONFIRM DSC HU/CM DTC** • Perform the Reading DTCs Procedure. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Are any DTC present?	Yes	Go the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	Go to the next step.
2	**INSPECT DSC SYSTEM** • Perform “DSC SYSTEM INSPECTION”. (See 04-15-4 DSC SYSTEM INSPECTION.) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Inspect the conventional brake system. Repair or replace the malfunctioning part according to the inspection results, if necessary.

NO.4 ABS OR TCS*1 OPERATES FREQUENTLY/TCS DOES NOT WORK CORRECTLY *1: DSC SYSTEM FUNCTION CONTAINS TRACTION CONTROL FUNCTION, DSC INDICATOR LIGHT GOES ON AND OFF WHILE DSC IS OPERATING [DYNAMIC STABILITY CONTROL (DSC)]

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4	**ABS or TCS*1 operates frequently/ TCS does not work correctly *1: DSC system function contains traction control function, DSC indicator light goes on and off while DSC is operating**
POSSIBLE CAUSE	• DSC HU/CM DTC is stored — There is a malfunction in the engine control system (TCS malfunction) • Tire size or tire pressure malfunction — There is a difference in size or air pressure between the front and rear tires • Incorrect ABS wheel-speed signal is input to DSC HU/CM

SYMPTOM TROUBLESHOOTING [DYNAMIC STABILITY CONTROL (DSC)]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT DSC HU/CM DTC** • Perform the Reading DTCs Procedure. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Are any DTC present?	Yes	Go to the appropriate DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	Go to the next step.
2	**INSPECT TIRE SIZE AND TIRE PRESSURE** • Inspect the tire size and the tire pressure. (See 02-12-1 WHEEL AND TIRE SPECIFICATION.) • Is there any malfunction?	Yes	Replace with specified tires and adjust tire pressure. (See 02-12-3 TIRE PRESSURE ADJUSTMENT (WITH TPMS).)
		No	Go to the next step.
3	**INSPECT PID FOR ABNORMAL OUTPUT FROM ABS WHEEL-SPEED SENSOR USING M-MDS** • Turn the ignition switch off. • Connect the M-MDS to the DLC-2. • Perform the PID/Data Monitor and Record Procedure and access the following PIDs: (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) — LF_WSPD (LF ABS wheel-speed sensor) — LR_WSPD (LR ABS wheel-speed sensor) — RF_WSPD (RF ABS wheel-speed sensor) — RR_WSPD (RR ABS wheel-speed sensor) • Start the engine and drive the vehicle. • Verify that the PIDs of the four ABS wheel-speed sensors correspond approximately. • Do the vehicle speeds correspond?	Yes	Perform the “Intermittent Concern Troubleshooting”. (See 04-03B-3 PRECAUTION [DYNAMIC STABILITY CONTROL (DSC)].)
		No	ABS wheel-speed sensor installation inspection: • Inspect the ABS wheel-speed sensor for looseness and verify that it is securely installed. Sensor rotor installation inspection: • Inspect the ABS wheel-speed sensor rotor for poor installation and chipping of sensor rotor teeth. (If sensor rotor is installed poorly, it may cause output of abnormal wave form at high speed.) Repair or replace the malfunctioning part according to the inspection results.

NO.5 DSC*2 OPERATES FREQUENTLY/DSC DOES NOT WORK CORRECTLY *2: DSC INDICATOR LIGHT GOES ON AND OFF WHILE DSC IS OPERATING [DYNAMIC STABILITY CONTROL (DSC)]

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5	**DSC*2 operates frequently/ DSC does not work correctly *2: DSC indicator light goes on and off while DSC is operating**
POSSIBLE CAUSE	• DSC HU/CM DTC is stored (input and output device malfunction) • Poor installation of combined sensor and/or steering angle sensor (DSC operates intermittently) • DSC HU/CM, combined sensor or steering angle sensor initialization is not performed after replacement (DSC does not work correctly)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT DSC HU/CM DTC** • Perform the Reading DTCs Procedure. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].) • Are any DTC present?	Yes	Go to the appropriate DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
		No	Go to the next step.
2	**INSPECT INSTALLATION OF COMBINED SENSOR AND STEERING ANGLE SENSOR** • Inspect the installation of combined sensor and steering angle sensor. • Are the sensors securely installed?	Yes	Go to the next step.
		No	Install the combined sensor and steering angle sensor securely.
3	**VERIFY THAT COMBINED SENSOR AND STEERING ANGLE SENSOR IS INITIALIZED** • Verify that combined sensor and steering angle sensor was initialized after replacement. • Was the initialization performed?	Yes	Perform the “Intermittent Concern Troubleshooting”. (See 04-03B-3 PRECAUTION [DYNAMIC STABILITY CONTROL (DSC)].)
		No	Perform the initialization procedure. (See 04-15-13 COMBINED SENSOR INITIALIZATION PROCEDURE.) (See 04-15-15 STEERING ANGLE SENSOR INITIALIZATION PROCEDURE.)

04-10 GENERAL PROCEDURES

GENERAL PROCEDURES (BRAKE) . . . 04-10–1
Wheel and Tire Installation **04-10–1**
Brake Lines Disconnection. **04-10–1**
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GENERAL PROCEDURES

GENERAL PROCEDURES (BRAKE)

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Wheel and Tire Installation

1. When installing the wheels and tires, tighten the wheel nuts in a criss-cross pattern to the following tightening torque.

   Tightening torque
   88—118 N·m {9.0—12.0 Kgf·m, 65.0—87.0 ft·lbf}

Brake Lines Disconnection

1. If any brake line has been disconnected anytime during the procedures, add brake fluid, bleed the brakes, and inspect for leakage after the procedure has been completed.

   Caution
   - **Brake fluid will damage painted surfaces. Be careful not to spill any on painted surfaces. If it is spilled, wipe it off immediately.**

Brake Pipe Flare Nut Tightening

1. Tighten the brake pipe flare nut using the commercially available flare nut wrench.

Connector Disconnection

1. Disconnect the negative battery cable before performing any work that requires handling of connectors. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)

ABS/DSC Related Parts

1. Make sure that there are no DTCs in the ABS/DSC memory after working on ABS/DSC related parts. If there are any codes in the memory, clear them.

DSC Related Part Sensor Initialization Procedure

Warning
- **If the initialization procedure is not completed, the DSC will not operate properly and it might cause an unexpected accident. Therefore, when replacing or removing the following parts, make sure to perform the initialization procedure to insure proper DSC operation.**

1. When replacing or removing the following parts, perform the initialization procedure. (See 04-15-13 COMBINED SENSOR INITIALIZATION PROCEDURE.) (See 04-15-15 STEERING ANGLE SENSOR INITIALIZATION PROCEDURE.) (See 04-15-11 STEERING ANGLE SIGNAL INITIALIZATION PROCEDURE.)
   — DSC HU/CM
   — Combined sensor
   — Steering angle sensor

GENERAL PROCEDURES

Steering Angle Sensor Initialization Procedure

Warning

- **Unless the initialization procedure of the steering angle sensor is completed, the DSC will not operate, causing an unexpected accident. Therefore, always perform the initialization procedure to ensure DSC operation if the power supply to the steering angle sensor has been cut off due to disconnection of the steering angle sensor connector or negative battery cable, or any other cause.**

Note

- The initialization value of the steering angle sensor is stored using the battery power supply. Therefore, the battery power supply of the steering angle sensor is cut and the stored initialization value is cleared when any of the following items are performed.
  —Negative battery cable disconnection
  —Steering angle sensor connector disconnection
  —Fuse (ROOM 15A) removal
  —Wiring harness disconnection between battery and steering angle sensor connector

1. When replacing or removing the following parts, perform the initialization procedure. (See 04-15-15 STEERING ANGLE SENSOR INITIALIZATION PROCEDURE.)
   - Negative battery cable disconnection
   - Steering angle sensor connector disconnection
   - Fuse (ROOM 15A) removal
   - Wiring harness disconnection between battery and steering angle sensor connector

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CONVENTIONAL BRAKE SYSTEM

CONVENTIONAL BRAKE SYSTEM LOCATION INDEX

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1	Brake fluid (See 04-11-3 AIR BLEEDING.)
2	Vacuum line (See 04-11-4 VACUUM LINE INSPECTION.)
3	Brake pedal (See 04-11-4 BRAKE PEDAL INSPECTION.) (See 04-11-5 BRAKE PEDAL REMOVAL/ INSTALLATION.)
4	Brake switch (See 04-11-7 BRAKE SWITCH INSPECTION.)
5	Master cylinder (See 04-11-8 MASTER CYLINDER REMOVAL/ INSTALLATION.) (See 04-11-10 BRAKE FLUID LEVEL SENSOR INSPECTION.)
6	Power brake unit (See 04-11-10 POWER BRAKE UNIT INSPECTION.) (See 04-11-12 POWER BRAKE UNIT REMOVAL/ INSTALLATION.)

7	Front brake (disc) (See 04-11-13 FRONT BRAKE (DISC) INSPECTION.) (See 04-11-16 FRONT BRAKE (DISC) REMOVAL/ INSTALLATION.) (See 04-11-17 DISC PAD (FRONT) REPLACEMENT.) (See 04-11-18 CALIPER (FRONT) DISASSEMBLY/ ASSEMBLY.) (See 04-11-19 BRAKE HOSE (FRONT) REMOVAL/ INSTALLATION.)
8	Rear brake (disc) (See 04-11-19 REAR BRAKE (DISC) INSPECTION.) (See 04-11-22 REAR BRAKE (DISC) REMOVAL/ INSTALLATION.) (See 04-11-24 DISC PAD (REAR) REPLACEMENT.) (See 04-11-25 CALIPER (REAR) DISASSEMBLY/ ASSEMBLY.) (See 04-11-26 BRAKE HOSE (REAR) REMOVAL/ INSTALLATION.)

CONVENTIONAL BRAKE SYSTEM

AIR BLEEDING

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Caution
- **Brake fluid will damage painted surfaces. Be careful not to spill any on painted surfaces. If it is spilled, wipe it off immediately.**
- **During air bleeding, brake fluid could splatter out from the brake fluid reserve tank and cause damage to the painted surfaces. When performing air bleeding, always perform it with the brake fluid reserve tank filter set to prevent brake fluid from splattering.**

Note
- Keep the fluid level in the reserve tank at 3/4 full or more during the air bleeding.
- Begin air bleeding with the brake caliper that is furthest from the master cylinder.

Brake fluid type
SAE J1703, FMVSS 116 DOT-3 or DOT-4

1. Remove the cap from the brake fluid reserved tank and add brake fluid.
2. Remove the bleeder cap from the brake caliper, and connect a vinyl tube to the bleeder screw.
3. Place the other end of the vinyl tube in a clear container, and fill the container with fluid during air bleeding.
4. Working with two people, one should depress the brake pedal a few times and then depress and hold the pedal down.
5. While the brake pedal is being held down, the other person should loosen the bleeder screw using the commercially available flare nut wrench, and bleed any fluid containing air bubbles. Once completed, tighten the bleeder screw.

Tightening torque
Front: 6.9—9.8 N·m {71—99 Kgf·cm, 62—86 in·lbf}
Rear: 6.0—8.0 N·m {62—81 Kgf·cm, 54—70 in·lbf}

6. Repeat Steps 3 and 4 until no air bubbles are seen.
7. Perform air bleeding as described in the above procedures for all brake calipers.
8. After air bleeding, inspect the following:
   - Brake operation
   - Fluid leakage
   - Fluid level

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CONVENTIONAL BRAKE SYSTEM

VACUUM LINE INSPECTION

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1. Remove the vacuum hose between the power brake unit and the intake manifold using pliers.
2. Verify that air can be blown from the power brake unit side of the vacuum hose towards the intake manifold side, and that air cannot be blown in the opposite direction.
   - If there is any malfunction of the inner check valve, replace it together with the vacuum hose as a single unit.

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BRAKE PEDAL INSPECTION

id041100801100

Brake Pedal Height Inspection

1. Measure the distance from the center of the upper surface of the pedal pad to the insulator and verify that it is as specified.
   - If not within the specification, adjust the pedal height.

   Brake pedal height (reference value)
   167 mm {6.57 in}

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Brake Pedal Height Adjustment

Caution

- **The brake switch may not operate normally after adjusting the pedal height. Whenever adjusting the pedal height, replace the brake switch with a new one.**
- **The interlock cable may not operate normally after adjusting the pedal height. Whenever adjusting the pedal height, refer to the interlock cable installation note. (See 05-14-9 SELECTOR LEVER REMOVAL/INSTALLATION.)**

CONVENTIONAL BRAKE SYSTEM

1. Loosen the locknut and turn the push rod to adjust the pedal height.
2. Tighten the locknut.

   Tightening torque
   20.4—30.6 N·m {2.09—3.12 Kgf·m, 15.0—22.5 ft·lbf}

3. After adjustment, inspect the pedal play.

chu0411w011

Brake Pedal Play Inspection

1. Depress the pedal several times to release the vacuum in the power brake unit.
2. Gently depress the pedal by hand, and measure the pedal play.
   - If not within the specification, inspect the wear of the clevis pin and replace it if there is any malfunction.

   Brake pedal play
   2—5 mm {0.08—0.19 in}

   Note
   - If there is no malfunction in the clevis pin, there is a possibility that the power brake unit has some malfunction. Verify that there are no malfunctions, and replace it if necessary.

Pedal-to-floor Clearance Inspection

1. Start the engine and depress the pedal with a pedal force of **147 N {15.0 Kgf, 33.0 lbf}**.
2. Measure the distance between the pedal pad center and the insulator, and verify that it is as specified.
   - If the pedal-to-floor clearance is less than the specification, check for air in the brake system.

   Brake pedal-to-floor clearance (Brake pedal when depressed at 147 N {15.0 Kgf, 33.0 lbf}
   106.9 mm {4.209 in} or more

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BRAKE PEDAL REMOVAL/INSTALLATION

id0411008012001

Caution

- **The clearance between the brake switch and the brake pedal is automatically adjusted to the correct amount when the brake switch connector is connected after the brake switch has been properly installed. If the brake switch is not properly installed or the connector is connected before installation, the clearance may be incorrect, causing a brake light malfunction. Therefore, always verify that the brake switch is properly installed before connecting the connector.**
- **Once the brake switch clearance has automatically been adjusted, it cannot be adjusted again. Therefore, replace the switch with a new one when replacing the power brake unit or the pedal, or performing any procedure that changes the pedal stroke.**
- **When replacing the brake pedal (AT), it is possible that the installation of the interlock cable could become defective. Always refer to the interlock cable installation note when replacing the brake pedal. (See 05-14-9 SELECTOR LEVER REMOVAL/INSTALLATION.)**

Note

- When the brake switch connector is connected to the brake switch, the clearance between the pedal and the brake switch is adjusted automatically. However, this mechanism will only function one time.

CONVENTIONAL BRAKE SYSTEM

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.

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1	Brake switch connector (See 04-11-7 Brake Switch Connector Installation Note.)
2	Brake switch (See 04-11-7 Brake Switch Installation Note.)
3	Snap pin
4	Clevis pin

5	Interlock cable (AT) (See 05-14-9 SELECTOR LEVER REMOVAL/ INSTALLATION.)
6	Brake pedal (See 04-11-6 Brake Pedal Removal Note.)
7	Pedal pad

Brake Pedal Removal Note

1. Move the power brake unit to the vehicle front where the power brake unit fork does not interfere with the brake pedal arm.
2. Remove the brake pedal.

CONVENTIONAL BRAKE SYSTEM

Brake Switch Installation Note

1. Install the new brake switch to the brake pedal (MT) or the interlock cable (AT), and secure it by turning it counterclockwise **45**° (MT) or clockwise **45**° (AT).

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Brake Switch Connector Installation Note

1. Inspect the brake pedal. (See 04-11-4 BRAKE PEDAL INSPECTION.)
2. With the brake pedal in its original position, install the brake switch to the brake switch connector.

BRAKE SWITCH INSPECTION

id041100801900

Caution

- **If the brake switch is removed from the brake pedal (MT) or the interlock unit (AT), its proper functioning cannot be guaranteed when reinstalled. Therefore, inspect the brake switch with it still installed, or replace the brake switch if it is removed.**

1. Verify continuity as indicated in the table.
   - If not as indicated in the table, replace the brake switch.

○—○ : Continuity

Condition	Terminal			
	A	B	C	D
When the brake pedal is depressed		○		○
When the brake pedal is not depressed (With cruise control system)	○		○	

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CONVENTIONAL BRAKE SYSTEM

MASTER CYLINDER REMOVAL/INSTALLATION

id041100801300

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.

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1	Brake fluid level sensor connector
2	Hose (MT)
3	Brake pipe
4	Nut
5	Master cylinder (See 04-11-9 Master Cylinder Installation Note.)

6	O-ring
7	Cap
8	Filter
9	Reserve tank
10	Cylinder component

CONVENTIONAL BRAKE SYSTEM

Master Cylinder Installation Note

Caution

- **If the master cylinder is installed at an angle, the master cylinder piston may push against the push rod retainer of the power brake unit causing poor air bleeding, brake drag, or other malfunctions. Be sure to install the master cylinder at a perpendicular angle to the power brake unit.**

1. Install the **SST** to the power brake unit and tighten to the specified torque.

   Tightening torque
   13.7—21.6 N·m {1.4—2.2 kgf·m, 10.2—15.9 ft·lbf}

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2. Apply a vacuum of **66.7 kPa {500 mmHg, 19.7 inHg}** to the power brake unit using a vacuum gauge.

   Note

   - Use any commercially available vacuum gauge.

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3. Using calipers, measure dimension L as shown in the figure.

   Standard L dimension
   30.4—30.6 mm {1.197—1.204 in}

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CONVENTIONAL BRAKE SYSTEM

4. If dimension L is not within the standard, remove the **SST** (49 G043 001) and, while stopping the push rod rotation with the **SST** (49 E043 003A), adjust the push rod length with the **SST** (49 B043 004).
5. Switch the **SSTs** and remeasure dimension L.
6. Install the master cylinder to the power brake unit.

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BRAKE FLUID LEVEL SENSOR INSPECTION

id041100801400

1. Disconnect the brake fluid level sensor connector from the master cylinder.
2. Inspect for continuity according to fluid level between the brake fluid level sensor terminals.
   - If not as indicated in the table, replace the reserve tank.

○—○: Continuity

Condition	Terminal	
	A	B
Above MIN		
Below MIN	○	○

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POWER BRAKE UNIT INSPECTION

id041100801700

Note
- The following inspection methods are simple inspection methods to judge the function of the power brake unit.
- If there is any malfunction in the power brake unit, replace the power brake unit as a single unit.

Without Using SST

Operation inspection
1. With the engine stopped, depress the brake pedal several times.
2. With the brake pedal depressed, start the engine.
3. If the brake pedal moves down slightly immediately after starting the engine, the unit is normal.

Vacuum function inspection
1. Start the engine.
2. After driving the vehicle for **1—2 min**, stop the engine.
3. Depress the brake pedal with normal force.
4. If the first pedal stroke is long and becomes shorter with subsequent strokes, the unit is normal.
   - If a problem is found, inspect for damage to or improper installation of the check valve and vacuum hose. After repairing, inspect again.

Vacuum loss function inspection
1. Start the engine.
2. Depress the brake pedal with normal force.
3. With the brake pedal depressed, stop the engine.
4. Maintain the brake pedal depressed for **approx. 30 s**.
5. If the brake pedal height does not change during this time, the unit is normal.

Using SST

Note
- When performing the inspection using the **SST**, inspect the brake pipe on the left or right front wheel.
- The following procedure and figures show the inspection for the brake pipe on the left front wheel.

CONVENTIONAL BRAKE SYSTEM

Preparation before inspection

1. Loosen the brake pipe flare nut using the commercially available flare nut wrench.
2. Disconnect the brake pipe.
3. Remove the bolt and disconnect the brake hose.

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4. Install the **SSTs** to the brake pipe as shown in the figure.
5. Perform air bleeding of the **SST** and brake line from bleeder screw A.
6. Install the pedal force gauge to the brake pedal.
7. Connect the vacuum piping to the vacuum gauge.

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Checking for vacuum loss (loaded condition)

1. Start the engine.
2. Depress the brake pedal with a force of **200 N {20.4 kgf, 44.9 lbf}**.
3. Stop the engine when the vacuum gauge reading reaches **68 kPa {510 mmHg, 20.1 inHg}** with the brake pedal depressed.
4. Measure the amount of vacuum decrease for **15 s** immediately after stopping the engine.
5. If the amount of vacuum decrease is **3.3 kPa {25 mmHg, 1.0 inHg}** or less, the power brake unit is normal.

Lack of hydraulic pressure inspection

1. With the engine stopped and the vacuum amount at **0 kPa {0 mmHg, 0 inHg}** if the pedal force and fluid pressure correlation is within the specification, the system is normal.

Power brake unit fluid pressure

Vacuum amount at o kPa {0 mmHg, 0 inHg}	
Pedal force (N {kgf, lbf})	**Fluid pressure (kPa {kgf/cm^2, psi})**
200 {20.4, 44.9}	620 {6.33, 90.0} or more

Hydraulic pressure inspection

1. Start the engine and when the vacuum amount reaches **66.7 kPa {500 mmHg, 19.7 inHg}**, depress the brake pedal.
2. At this time, apply the indicated pedal force and if the fluid pressure is within the specification, the unit is normal.

CONVENTIONAL BRAKE SYSTEM

Power brake unit fluid pressure

Vacuum amount at o 66.7 kPa {500 mmHg, 19.7 inHg}	
Pedal force (N {kgf, lbf})	**Fluid pressure (kPa {kgf/cm^2, psi})**
200 {20.4, 44.9}	6,340 {64.65, 919.6} or more

Procedure after inspection

1. Remove the **SSTs** after the inspection and install the brake hose, bolt and brake pipe to their original positions.
2. Perform air bleeding of the brake line. (See 04-11-3 AIR BLEEDING.)

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POWER BRAKE UNIT REMOVAL/INSTALLATION

id041100801800

1. For 6MT vehicles (L.H.D.), perform the following procedures.
   (1) Disconnect the purge solenoid valve connector wiring harness from the bracket.
   (2) Remove the bracket from the air intake hose and move the purge solenoid valve component out of the way. (See 01-16-7 PURGE SOLENOID VALVE REMOVAL/INSTALLATION [L8, LF].)
   (3) Remove the following parts as a single unit. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
   — Air intake hose
   — Resonance chamber No. 2
   — Resonance duct No. 1
   — Resonance duct No. 2
2. Remove the master cylinder. (See 04-11-8 MASTER CYLINDER REMOVAL/INSTALLATION.)
3. For MT vehicles (L.H.D.), remove the clutch pipe as shown in the figure.

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CONVENTIONAL BRAKE SYSTEM

4. For L.H.D., remove the nut as shown in the figure, then remove the cooler hose (LO) bracket from the vehicle.
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.
7. After installation, perform brake pedal inspection. (See 04-11-4 BRAKE PEDAL INSPECTION.)

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1	Vacuum hose
2	Snap pin
3	Clevis pin
4	Nut

5	Power brake unit
6	Gasket
7	Fork
8	Locknut

FRONT BRAKE (DISC) INSPECTION

id041100800800

Brake Judder Repair Hints

Description

1. Brake judder concern has the following 3 characteristics:

Steering wheel vibration

1. Steering wheel vibrates in the rotation direction. This characteristic is most noticeable when applying brakes at a vehicle speed of **100—140 km/h {62.1—86.8 mph}**.

Floor vibration

1. When applying the brakes, the vehicle body shakes back and forth. The seriousness of the shaking is not influenced by vehicle speed.

Brake pedal vibration

1. When applying brakes, a pulsating force tries to push the brake pad back. The pulsation is transmitted to the brake pedal.
2. The following are the main possible causes of brake judder:

CONVENTIONAL BRAKE SYSTEM

Due to an excessive runout (side-to-side wobble) of the disc plate, the thickness of the disc plate is uneven.

1. If the runout is **more than 0.05 mm {0.002 in}** at the position **10 mm {0.39 in}** from the disc plate edge, uneven wear occurs on the disc plate because the pad contacts the plate unevenly.
2. If the runout is **less than 0.05 mm {0.002 in}**, uneven wear does not occur.

The disc plate is deformed by heat.

1. Repeated panic braking may raise the temperature in some portions of disc plate by **approx. 1,000 °C {1,832 °F}**. This results in a deformed disc plate.

Due to corrosion, the thickness and friction coefficient of disc plate change.

1. If a vehicle is parked in damp conditions for a long time, corrosion occurs on the friction surface of disc plate.
2. The thickness of corrosion is uneven and sometimes appears like a wave pattern, which changes the friction coefficient and causes a reaction force.

Inspection and repair procedure

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Lateral runout inspection

1. To secure the disc plate and the hub, insert the washer (thickness **10 mm {0.39 in}**, inner diameter **more than 12 mm {0.47 in}**) between each hub bolt and the hub nut, then tighten all the hub nuts.

Note

- The component parts of the **SST** (49 B017 001 or 49 G019 003) can be used as a suitable washer.

CONVENTIONAL BRAKE SYSTEM

2. After tightening all the hub nuts to the same torque, put the dial gauge on the friction surface of disc plate **10 mm {0.12—0.28 in}** from the disc plate edge.
3. Rotate the disc plate one time and measure the runout.

   Front disc plate runout limit
   0.05 mm {0.002 in}

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Thickness variation inspection

1. Clean the disc plate-to-pad friction surface using a brake cleaner.
2. Measure the points indicated in the illustration using a caliper (micrometer).
3. Subtract the minimum value from the maximum, and if the result is not within specification, machine the disc plate using a lathe.

   Thickness variation limit
   0.015 mm {0.00059 in}

   Warning
   - **Do not exceed minimum disc plate thickness.**

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Disc Plate Thickness Inspection

Caution
- **Excessive runout may result if the disc plate is removed from the vehicle then machined. Machine the disc plate while installed on the vehicle.**

1. Measure the thickness of the disc plate.
   - If the thickness is not within the specification, replace the disc plate.

   Minimum front disc plate thickness
   20 mm {0.79 in}

   Minimum front disc plate thickness after machining using a brake lathe on-vehicle
   20.8 mm {0.82 in}

Disc Pad Thickness Inspection

1. Jack up the front of the vehicle and support it with safety stands.
2. Remove the wheel and tires.
3. Verify the remaining thickness of the pads.

   Minimum front disc pad thickness
   2.0 mm {0.079 in} min.

4. Replace the pads as a set (right and left wheels) if either one is at or less than the minimum thickness.

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CONVENTIONAL BRAKE SYSTEM

FRONT BRAKE (DISC) REMOVAL/INSTALLATION

id041100800900

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. After installation, depress the brake pedal a few times, then verify that the brakes do not drag.

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1	Brake hose
2	Bolt
3	Caliper (See 04-11-17 Caliper Installation Note.)
4	Disc pad
5	Shim

6	Guide plate
7	Bolt
8	Mounting support
9	Screw
10	Disc plate

CONVENTIONAL BRAKE SYSTEM

Caliper Installation Note

1. Clean the exposed area of the piston.
2. Install the piston using the **SST**.
3. Install the caliper.

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DISC PAD (FRONT) REPLACEMENT

id041100800700

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. After installation, depress the brake pedal a few times, then verify that the brakes do not drag.

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1	Bolt
2	Caliper (See 04-11-16 FRONT BRAKE (DISC) REMOVAL/ INSTALLATION.)

3	Disc pad
4	Shim
5	Guide plate

CONVENTIONAL BRAKE SYSTEM

CALIPER (FRONT) DISASSEMBLY/ASSEMBLY

id041100801000

1. Disassemble in the order indicated in the table.

1	Bleeder cap
2	Bleeder screw
3	Bolt
4	Sleeve
5	Piston (See 04-11-18 Piston Disassembly Note.)
6	Dust seal
7	Piston seal
8	Caliper body

2. Assemble in the reverse order of disassembly.

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Piston Disassembly Note

Caution

- **The piston could be damaged if blown out with great force. Blow the compressed air slowly to prevent the piston from suddenly popping out.**

1. Insert a piece of wood in the caliper as shown in the figure, and then blow compressed air through the bleeder screw hole to remove the piston from the caliper body.

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CONVENTIONAL BRAKE SYSTEM

BRAKE HOSE (FRONT) REMOVAL/INSTALLATION

id041100805000

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. After installation, add brake fluid, bleed the air, and inspect for fluid leakage. (See 04-11-3 AIR BLEEDING.)

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1	Brake pipe
2	Connector bolt
3	Gasket

4	Bolt
5	Brake hose

REAR BRAKE (DISC) INSPECTION

id041100800400

Brake Judder Repair Hints

Description

1. Brake judder concern has the following 3 characteristics:

Steering wheel vibration

1. Steering wheel vibrates in the rotation direction. This characteristic is most noticeable when applying brakes at a vehicle speed of **100—140 km/h {62.1—86.8 mph}**.

Floor vibration

1. When applying the brakes, the vehicle body shakes back and forth. The seriousness of the shaking is not influenced by vehicle speed.

Brake pedal vibration

1. When applying brakes, a pulsating force tries to push the brake pad back. The pulsation is transmitted to the brake pedal.
2. The following are the main possible causes of brake judder:

Due to an excessive runout (side-to-side wobble) of the disc plate, the thickness of the disc plate is uneven.

1. If the runout is **more than 0.05 mm {0.002 in}** at the position **10 mm {0.39 in}** from the disc plate edge, uneven wear occurs on the disc plate because the pad contacts the plate unevenly.
2. If the runout is **less than 0.05 mm {0.002 in}**, uneven wear does not occur.

CONVENTIONAL BRAKE SYSTEM

The disc plate is deformed by heat.

1. Repeated panic braking may raise the temperature in some portions of disc plate by **approx. 1,000 °C {1,832 °F}**. This results in a deformed disc plate.

Due to corrosion, the thickness and friction coefficient of disc plate change.

1. If a vehicle is parked in damp conditions for a long time, corrosion occurs on the friction surface of disc plate.
2. The thickness of corrosion is uneven and sometimes appears like a wave pattern, which changes the friction coefficient and causes a reaction force.

Inspection and repair procedure

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Lateral runout inspection

1. To secure the disc plate and the hub, insert the washer (thickness **10 mm {0.39 in}**, inner diameter **more than 12 mm {0.47 in}**) between each hub bolt and the hub nut, then tighten all the hub nuts.

   Note
   - The component parts of the **SST** (49 B017 001 or 49 G019 003) can be used as a suitable washer.

2. After tightening all the hub nuts to the same torque, put the dial gauge on the friction surface of disc plate **10 mm {0.39 in}** from the disc plate edge.
3. Rotate the disc plate one time and measure the runout.

   Rear disc plate runout limit
   0.05 mm {0.002 in}

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CONVENTIONAL BRAKE SYSTEM

Thickness variation inspection

1. Clean the disc plate-to-pad friction surface using a brake cleaner.
2. Measure the points indicated in the illustration using a caliper (micrometer).
3. Subtract the minimum value from the maximum, and if the result is not within specification, machine the disc plate using a lathe.

   Thickness variation limit
   0.015 mm {0.00059 in}

   Warning
   - **Do not exceed minimum disc plate thickness.**

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Disc Plate Thickness Inspection

Caution
- **Excessive runout may result if the disc plate is removed from the vehicle then machined. Machine the disc plate while installed on the vehicle.**

1. Measure the thickness of the disc plate.
   - If the thickness is not within the specification, replace the disc plate.

   Minimum rear disc plate thickness
   8 mm {0.31 in}

   Minimum rear disc plate thickness after machining using a brake lathe on-vehicle
   8.8 mm {0.35 in}

Disc Pad Thickness Inspection

1. Jack up the front of the vehicle and support it with safety stands.
2. Remove the wheel and tires.
3. Verify the remaining thickness of the pads.

   Minimum rear disc pad thickness
   2.0 mm {0.079 in} min.

4. Replace the pads as a set (right and left wheels) if either one is at or less than the minimum thickness.

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CONVENTIONAL BRAKE SYSTEM

REAR BRAKE (DISC) REMOVAL/INSTALLATION

id041100800500

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. After installation, depress the brake pedal a few times, and inspect the following.
   —□The disc pad projection is securely installed to the piston groove
   —□Parking brake lever stroke
   —□Brake drag

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1	Parking brake cable (See 04-11-23 Parking Brake Cable Installation Note.)
2	Brake hose
3	Bolt
4	Caliper (See 04-11-23 Caliper Installation Note.)

5	Disc pad
6	Shim
7	Guide plate
8	Bolt
9	Mounting support
10	Disc plate

CONVENTIONAL BRAKE SYSTEM

Caliper Installation Note

1. Clean the exposed area of the piston.
2. Rotate the piston clockwise slowly using the **SST** and push the piston completely until the piston grooves are in the position shown in the figure.
3. Install the caliper.

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Parking Brake Cable Installation Note

1. After installing the parking brake cable, verify that the operating lever returns to the stopper nut with the parking brake lever released.

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CONVENTIONAL BRAKE SYSTEM

DISC PAD (REAR) REPLACEMENT

id041100800300

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. After installation, depress the brake pedal a few times, and inspect the following.
   —The disc pad projection is securely installed to the piston groove
   —Parking brake lever stroke
   —Brake drag

e5u411zw5018

1	Parking brake cable (See 04-12-2 PARKING BRAKE LEVER REMOVAL/ INSTALLATION.)
2	Bolt

3	Caliper (See 04-11-24 Caliper Installation Note.)
4	Disc pad
5	Shim
6	Guide plate

Caliper Installation Note

1. Clean the exposed area of the piston.
2. Rotate the piston clockwise slowly using the **SST** and push in the piston completely until the piston grooves are in the position shown in the figure.
3. Install the caliper.

chu0411w002

CONVENTIONAL BRAKE SYSTEM

CALIPER (REAR) DISASSEMBLY/ASSEMBLY

1. Disassemble in the order indicated in the table.

1	Bleeder cap
2	Bleeder screw
3	Bolt
4	Sleeve
5	Piston (See 04-11-25 Piston Disassembly Note.) (See 04-11-25 Dust Seal, Piston Assembly Note.)
6	Dust seal (See 04-11-25 Dust Seal, Piston Assembly Note.)
7	Piston seal
8	Caliper body

2. Assemble in the reverse order of disassembly.

id0411008006001

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Piston Disassembly Note

1. Rotate the piston counter-clockwise using the **SST**, remove the piston from the caliper body.

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Dust Seal, Piston Assembly Note

1. Assemble the dust seal to the piston.
2. Assemble the lip of the dust seal to the groove of the caliper body with the dust seal is assembled to the piston as shown in the figure.

chu0411w006

3. Rotate the piston clockwise using the **SST** slowly and push the piston inwards completely.
4. Verify that the dust seal is installed into the groove of the piston securely.

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CONVENTIONAL BRAKE SYSTEM

BRAKE HOSE (REAR) REMOVAL/INSTALLATION

id041100805100

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. After installation, add brake fluid, bleed the air, and inspect for fluid leakage. (See 04-11-3 AIR BLEEDING.)

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1	Brake pipe
2	Clip
3	Connector bolt

4	Gasket
5	Brake hose

04-12 PARKING BRAKE SYSTEM

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PARKING BRAKE SYSTEM LOCATION INDEX

id041200800100

amxzzw0000025

1	Parking brake lever (See 04-12-1 PARKING BRAKE LEVER INSPECTION.) (See 04-12-2 PARKING BRAKE LEVER ADJUSTMENT.) (See 04-12-2 PARKING BRAKE LEVER REMOVAL/INSTALLATION.)
2	Parking brake switch (See 04-12-3 PARKING BRAKE SWITCH INSPECTION.)

PARKING BRAKE LEVER INSPECTION

id041200800900

Stroke Inspection

1. Depress the brake pedal several times.
2. Pull the parking brake lever **2—3 times**.
3. Inspect the parking brake stroke by slowly pulling at point A **50 mm {1.97 in}** from the end of the parking brake lever with a force of **98 N {10 kgf, 22 lbf}** and counting the number of notches (clicking sound).
   - If not within the specification, adjust the parking brake lever.

   Parking brake lever stroke when pulled at 98 N {10 kgf, 22 lbf}
   1—3 notches

e5u412zw5002

PARKING BRAKE SYSTEM

PARKING BRAKE LEVER ADJUSTMENT

id041200801500

1. Depress the brake pedal several times.
2. Remove the parking brake lever boot. (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
3. Turn the adjusting nut and adjust the parking brake lever.
4. After adjustment, pull the parking brake lever one notch and verify that the parking brake warning light illuminates.
5. Verify that the rear brakes do not drag.

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PARKING BRAKE LEVER REMOVAL/INSTALLATION

id041200801600

1. Remove the middle pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
2. Remove the propeller shaft. (See 03-15-2 PROPELLER SHAFT REMOVAL/INSTALLATION.)
3. Remove the console. (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. After installation, inspect the parking brake stroke and adjust if necessary.

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PARKING BRAKE SYSTEM

1	Parking brake switch connector
2	Adjusting nut
3	Parking brake lever (See 04-12-3 Parking Brake Lever Removal Note.)
4	Parking brake switch
5	Clip
6	Rear parking brake cable (LH)
7	Rear parking brake cable (RH)
8	Front parking brake cable

Parking Brake Lever Removal Note

1. Partially peel back the floor mat and remove the bolt shown in the figure.
2. Remove the two bolts.
3. Remove the parking brake lever.

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PARKING BRAKE SWITCH INSPECTION

id041200800700

1. Disconnect the parking brake switch connector.
2. Verify that the continuity is as indicated in the table.
   - If not as indicated in the table, replace the parking brake switch.

○—○: Continuity

Condition	Terminal	
	A	Body ground
Parking brake lever pulled	○———○	
Parking brake lever released		

CHU0412W003

BHJ0412W007

04-13 ANTILOCK BRAKE SYSTEM

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ANTILOCK BRAKE SYSTEM

ABS LOCATION INDEX

id041300801100

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ANTILOCK BRAKE SYSTEM

1	ABS HU/CM (See 04-13-2 ABS SYSTEM WIRING DIAGRAM.) (See 04-13-3 ABS SYSTEM INSPECTION.) (See 04-13-4 ABS HU/CM REMOVAL/ INSTALLATION.) (See 04-13-6 ABS CONFIGURATION.) (See 04-13-6 ABS HU/CM INSPECTION.)

2	Front ABS wheel-speed sensor (See 04-13-8 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.) (See 04-13-8 FRONT ABS WHEEL-SPEED SENSOR INSPECTION.)
3	Rear ABS wheel-speed sensor (See 04-13-9 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.) (See 04-13-10 REAR ABS WHEEL-SPEED SENSOR INSPECTION.)

ABS SYSTEM WIRING DIAGRAM

id041300805000

amxzzn00000488

ANTILOCK BRAKE SYSTEM

ABS SYSTEM INSPECTION

id041300800200

ABS Hydraulic Unit On-vehicle Inspection

Preparation

1. Verify that battery is fully charged.
2. Turn the ignition switch to the ON position and verify that the ABS warning light goes out after **approx. 3 s**.
3. Turn the ignition switch to the LOCK position.
4. Jack up the vehicle and support it evenly on safety stands.
5. Shift to neutral.
6. Release the parking brake.
7. Verify that all four wheels rotate.
8. Rotate the wheels by hand, and verify there is no brake drag.
   - If there is any brake drag, perform regular brake inspection.
   - If there is no brake drag, perform ABS HU/CM operation inspection.

Operation inspection

1. Perform “Preparation”.
2. Connect the M-MDS to the DLC-2.
3. Set up an active command mode inspection according to the combination of commands below.

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Operation condition	Command name			Command transmission type
	PMP_MOTOR	RF_OUTLET	RF_INLET	
Brake pressure retention	Off	Off	On	Manual
Brake pressure reduction	On	On	On	

The chart above shows an example of a right front wheel inspection.

Caution

- **To protect the ABS HU/CM, the solenoid valve and the pump motor used during active command mode stay on for only 10 s or less each time they are switched on.**

Note

- When working with two people, one should press on the brake pedal, and the other should attempt to rotate the wheel being inspected.

4. Send the command while depressing the brake pedal and attempting to rotate the wheel being inspected.
5. Performing the inspection above determines the following:
   - The ABS HU/CM brake lines are normal.
   - The ABS HU/CM hydraulic system is not significantly abnormal (including inside ABS HU/CM).
   - The ABS HU/CM internal electrical parts (solenoid, motor and other parts) are normal.
   - The ABS HU/CM output system wiring harnesses (solenoid valve, relay system) are normal.
     — However, the following items cannot be verified.
       - Malfunction of ABS HU/CM input system wiring harnesses and parts
       - Extremely small leaks in the ABS HU/CM internal hydraulic system
       - Malfunction with intermittent occurrence of the above items

ANTILOCK BRAKE SYSTEM

ABS HU/CM REMOVAL/INSTALLATION

id041300801400

Caution

- **When replacing the ABS HU/CM with a new one, configuration procedure must be performed before removing the ABS HU/CM. If configuration is not completed before removing the ABS HU/CM, DTC B2477 will be detected.**
- **The internal parts of the ABS HU/CM could be damaged if dropped. Be careful not to drop the ABS HU/CM. Replace the ABS HU/CM if it is subjected to an impact.**

1. Perform ABS configuration. (See 04-13-6 ABS CONFIGURATION.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

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1	ABS HU/CM connector (See 04-13-5 ABS HU/CM Connector Removal Note.) (See 04-13-5 ABS HU/CM Connector Installation Note.)
2	Brake pipe (See 04-13-5 Brake Pipe Removal Note.) (See 04-13-5 Brake Pipe Installation Note.)

3	Nut
4	ABS HU/CM, brake pipe
5	Brake pipe (ABS HU/CM—brake pipe joint) (See 04-13-5 Brake Pipe (ABS HU/CM—brake pipe joint) Installation Note.)
6	ABS HU/CM

ANTILOCK BRAKE SYSTEM

ABS HU/CM Connector Removal Note

1. Pull the lock lever up in the direction of the arrow.
2. Pull the connector toward the vehicle rear and remove it.

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Brake Pipe Removal Note

1. Place an alignment mark on the brake pipe and ABS HU/CM.
2. Apply protective tape to the connector to prevent brake fluid from entering.
3. Remove the brake pipe.

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Brake Pipe (ABS HU/CM—brake pipe joint) Installation Note

1. Align with the mark made before removing the brake pipe and temporarily install the brake pipe to the ABS HU/CM.

Caution

- **If the brake pipe is tightened to the specified torque, it may be difficult to install it to the vehicle. Therefore, only temporarily tighten the brake pipe so that it can still be moved.**

Brake Pipe Installation Note

1. Align the marks made before removal and install the brake pipe to the ABS HU/CM and brake pipe joint referring to the figure.
2. Tighten the brake pipe to the specified torque.

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ABS HU/CM Connector Installation Note

1. After connecting the connector, verify that the lock lever is completely pushed in.

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ANTILOCK BRAKE SYSTEM

ABS CONFIGURATION

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1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “Module Programming”.
   - When using the PDS (Pocket PC)
     1. Select “Programming”.
     2. Select “Module Programming”.
3. Then, select items from the screen menu in the following order.
   1. Select “Programmable Module Installation”.
   2. Select “ABS”.
4. Perform the configuration according to the directions on the screen.
5. Retrieve DTCs by the M-MDS, then verify that there is no DTC present.
   - If a DTC (s) is detected, perform the applicable DTC inspection. (See 04-02A-3 ON-BOARD DIAGNOSIS [ABS].)

ABS HU/CM INSPECTION

id041300801000

1. Disconnect the ABS HU/CM connector.
2. Connect the negative battery cable.
3. Attach the tester lead to the ABS HU/CM harness side connector, then inspect voltage, continuity or resistance according to the standard (reference value) on the table.

Standard (Reference Value)

ABS HU/CM WIRING HARNESS-SIDE CONNECTOR

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Terminal	Signal name	Connected to	Measured item	Measured terminal (measured condition)	Standard	Inspection item(s)
A	Ground (ABS motor)	Ground point	Continuity	A—ground point	Continuity detected	• Wiring harness (A—ground point)
B	Power supply (ABS motor operation)	Battery	Voltage	Under any condition	B+	• Wiring harness (B—battery)
C	Power supply (solenoid)	Battery	Voltage	Under any condition	B+	• Wiring harness (C—battery)
D	Ground (ABS system)	Ground point	Continuity	D—ground point	Continuity detected	• Wiring harness (D—ground point)
E	LF wheel-speed sensor (–)	LF ABS wheel-speed sensor	Continuity	E—LF ABS wheel-speed sensor connector terminal B	Continuity detected	• Wiring harness (E—LF ABS wheel-speed sensor connector terminal B)
F	LF wheel-speed sensor (+)	LF ABS wheel-speed sensor	Continuity	F—LF ABS wheel-speed sensor connector terminal A	Continuity detected	• Wiring harness (F—LF ABS wheel-speed sensor connector terminal A)
G	LR wheel-speed sensor (+)	LR ABS wheel-speed sensor	Continuity	G—LR ABS wheel-speed sensor connector terminal B	Continuity detected	• Wiring harness (G—LR ABS wheel-speed sensor connector terminal B)

ANTILOCK BRAKE SYSTEM

Terminal	Signal name	Connected to	Measured item	Measured terminal (measured condition)	Standard	Inspection item(s)
H	LR wheel-speed sensor (–)	LR ABS wheel-speed sensor	Continuity	H—LR ABS wheel-speed sensor connector terminal A	Continuity detected	• Wiring harness (H—LR ABS wheel-speed sensor connector terminal A)
I	RR wheel-speed sensor (+)	RR ABS wheel-speed sensor	Continuity	I—RR ABS wheel-speed sensor connector terminal B	Continuity detected	• Wiring harness (I—RR ABS wheel-speed sensor connector terminal B)
J	Power supply (system)	Ignition switch	Voltage	Ignition switch at ON position	B+	• Wiring harness (J—ignition switch)
				Ignition switch is LOCK position.	1 V or less	
K	—	—	—	—	—	—
L	RR wheel-speed sensor (–)	RR ABS wheel-speed sensor	Continuity	L—RR ABS wheel-speed sensor connector terminal A	Continuity detected	• Wiring harness (L—RR ABS wheel-speed sensor connector terminal A)
M	RF wheel-speed sensor (+)	RF ABS wheel-speed sensor	Continuity	M—RF ABS wheel-speed sensor connector terminal A	Continuity detected	• Wiring harness (M—RF ABS wheel-speed sensor connector terminal A)
N	Brake switch	Brake switch	Voltage	N—brake switch (Brake pedal depressed)	B+	• Wiring harness (N—brake switch) • Brake switch
				Y—brake switch (Brake pedal not depressed)	1 V or less	
O	RF wheel-speed sensor (–)	RF ABS wheel-speed sensor	Continuity	O—RF ABS wheel-speed sensor connector terminal B	Continuity detected	• Wiring harness (O—RF ABS wheel-speed sensor connector terminal B)
P	—	—	—	—	—	—
Q	—	—	—	—	—	—
R	—	—	—	—	—	—
S	—	—	—	—	—	—
T	—	—	—	—	—	—
U	—	—	—	—	—	—
V	—	—	—	—	—	—
W	—	—	—	—	—	—
X	—	—	—	—	—	—
Y	CAN_L	DLC-2 (CAN_L)	This terminal is used for communication and cannot be used for malfunction determination during terminal voltage inspection. Perform a DTC inspection.			
Z	CAN_H	DLC-2 (CAN_H)	This terminal is used for communication and cannot be used for malfunction determination during terminal voltage inspection. Perform a DTC inspection.			

ANTILOCK BRAKE SYSTEM

FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION

id041300800700

1. Remove the mudguard.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

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1	Connector
2	Bolt
3	Front ABS wheel-speed sensor

FRONT ABS WHEEL-SPEED SENSOR INSPECTION

id041300801300

Installation Visual Inspection

1. Inspect the following items:
   - If there is any malfunction, replace the applicable part.
   (1) Excessive play of the front ABS wheel-speed sensor
   (2) Deformation of the front ABS wheel-speed sensor

Clearance Inspection

1. Remove the front ABS wheel-speed sensor.
2. Measure the distance between the front ABS wheel-speed sensor installation surface and the front ABS sensor rotor. This is dimension A.
3. Measure the distance between the front ABS wheel-speed sensor installation surface and the tip of front ABS wheel-speed sensor. This is dimension B.
4. Calculate the clearance between the front ABS wheel-speed sensor and the front ABS sensor rotor using the following formula:
   Clearance (mm {in}) = A – B
5. Verify that the clearance between the front ABS sensor rotor and the front ABS wheel-speed sensor is as indicated below.
   - If there is any malfunction, replace it.

   Clearance
   0.3—1.0 mm {0.012—0.057 in}

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ANTILOCK BRAKE SYSTEM

Sensor Output Value Inspection

Caution
- **Resistance inspection using other testers may cause damage to the ABS wheel-speed sensor internal circuit. Be sure to use the M-MDS to inspect the ABS wheel-speed sensor.**

1. Turn the ignition switch to the LOCK position.
2. Connect the M-MDS to the DLC-2.
3. Select the following PIDs using the M-MDS:
   - LF_WSPD
     (LF wheel-speed sensor)
   - RF_WSPD
     (RF wheel-speed sensor)
4. Start the engine and drive the vehicle.
5. Verify that the display of the M-MDS shows the same value as the speedometer.
   - If there is any malfunction, replace the front ABS wheel-speed sensor.

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REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION

id041300800500

1. Remove the trunk end trim. (See 09-17-12 TRUNK END TRIM REMOVAL/INSTALLATION.)
2. Remove the partition board. (See 09-17-23 PARTITION BOARD REMOVAL/INSTALLATION.)
3. Remove the trunk side trim. (See 09-17-11 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
4. Remove the fuel-filler pipe protector. (See 01-14-8 FUEL TANK REMOVAL/INSTALLATION [L8, LF].)
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.

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1	Connector
2	Bolt
3	Rear ABS wheel-speed sensor

ANTILOCK BRAKE SYSTEM

REAR ABS WHEEL-SPEED SENSOR INSPECTION

id041300801200

Installation Visual Inspection

1. Inspect the following items:
   - If there is any malfunction, replace the applicable part.
   (1) Excessive looseness or play of the rear ABS wheel-speed sensor
   (2) Deformation of the rear ABS wheel-speed sensor
   (3) Deformation or damage of the rear ABS sensor rotor

Clearance Inspection

1. Verify the clearance between the rear ABS sensor rotor and the rear ABS wheel-speed sensor.
   - If there is any malfunction, check for improper installation, and replace if necessary.

Clearance
0.8—1.6 mm {0.032—0.062 in}

amxzzw0000025

Sensor Output Value Inspection

1. Turn the ignition switch to the LOCK position.
2. Connect the M-MDS to the DLC-2.
3. Select the following PIDs using the M-MDS:
   - LR_WSPD
     (LR wheel-speed sensor)
   - RR_WSPD
     (RR wheel-speed sensor)
4. Start the engine and drive the vehicle.
5. Verify that the display of the M-MDS shows the same value as the speedometer.
   - If there is any malfunction, replace the rear ABS wheel-speed sensor.

amxzzw0000012

04-15 DYNAMIC STABILITY CONTROL

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DYNAMIC STABILITY CONTROL

DYNAMIC STABILITY CONTROL LOCATION INDEX

id041500800500

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1	DSC HU/CM (See 04-15-3 DSC SYSTEM WIRING DIAGRAM.) (See 04-15-4 DSC SYSTEM INSPECTION.) (See 04-15-6 DSC HU/CM REMOVAL/ INSTALLATION.) (See 04-15-8 DSC CONFIGURATION.) (See 04-15-9 DSC HU/CM INSPECTION.) (See04-15-11 STEERING ANGLE SIGNAL INITIALIZATION PROCEDURE.)
2	Front ABS wheel-speed sensor (See 04-15-11 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.) (See 04-15-11 FRONT ABS WHEEL-SPEED SENSOR INSPECTION.)
3	Rear ABS wheel-speed sensor (See 04-15-11 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.) (See 04-15-11 REAR ABS WHEEL-SPEED SENSOR INSPECTION.)

4	Combined sensor (See 04-15-11 COMBINED SENSOR REMOVAL/ INSTALLATION.) (See 04-15-12 COMBINED SENSOR INSPECTION.) (See 04-15-13 COMBINED SENSOR INITIALIZATION PROCEDURE.)
5	Brake fluid pressure sensor (built-into DSC HU/CM) (See 04-15-13 BRAKE FLUID PRESSURE SENSOR INSPECTION.)
6	Steering angle sensor (See 04-15-14 STEERING ANGLE SENSOR REMOVAL/INSTALLATION.) (See 04-15-15 STEERING ANGLE SENSOR INSPECTION.) (See 04-15-15 STEERING ANGLE SENSOR INITIALIZATION PROCEDURE.)
7	DSC OFF switch (See 04-15-16 DSC OFF SWITCH REMOVAL/ INSTALLATION.) (See 04-15-17 DSC OFF SWITCH INSPECTION.)

DYNAMIC STABILITY CONTROL

DSC SYSTEM WIRING DIAGRAM

id041500800600

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DYNAMIC STABILITY CONTROL

DSC SYSTEM INSPECTION

id041500800700

Preparation

1. Verify that battery is fully charged.
2. Turn the ignition switch to the ON position, and verify that the ABS warning light goes out after **approx. 3 s**.
3. Turn the ignition switch to the LOCK position.
4. Jack up the vehicle and support it evenly on safety stands.
5. Shift to the N position.
6. Verify that all four wheels rotate.
7. Rotate the inspected wheels by hand, and verify there is no brake drag.
   - If there is any brake drag, perform regular brake inspection.
   - If there is no brake drag, perform DSC HU/CM operation inspection.

ABS Control Inspection

1. Perform “Preparation”.
2. Connect the M-MDS to the DLC-2.
3. Set up an active command mode inspection according to the combination of commands below.

amxzzw0000012

Brake pressure retention

<table>
<tr><th rowspan="2">Command name</th><th colspan="4">Inspected wheels</th></tr>
<tr><th>LF</th><th>RF</th><th>LR</th><th>RR</th></tr>
<tr><td>V_TRC_L</td><td colspan="4" rowspan="4">Off</td></tr>
<tr><td>V_TRC_R</td></tr>
<tr><td>V_STB_L</td></tr>
<tr><td>V_STB_R</td></tr>
<tr><td>LF_INLET</td><td>On</td><td rowspan="3">Off</td><td>Off</td><td rowspan="5">Off</td></tr>
<tr><td>LF_OUTLET</td><td rowspan="8">Off</td><td>On</td></tr>
<tr><td>LR_INLET</td><td rowspan="4">Off</td></tr>
<tr><td>LR_OUTLET</td><td rowspan="3">On</td><td rowspan="5">Off</td></tr>
<tr><td>RF_INLET</td></tr>
<tr><td>RF_OUTLET</td><td rowspan="4">Off</td></tr>
<tr><td>RR_INLET</td><td>On</td></tr>
<tr><td>RR_OUTLET</td><td rowspan="2">Off</td></tr>
<tr><td>PMP_MOTOR</td></tr>
</table>

Brake pressure reduction

<table>
<tr><th rowspan="2">Command name</th><th colspan="4">Inspected wheels</th></tr>
<tr><th>LF</th><th>RF</th><th>LR</th><th>RR</th></tr>
<tr><td>V_TRC_L</td><td colspan="4" rowspan="4">Off</td></tr>
<tr><td>V_TRC_R</td></tr>
<tr><td>V_STB_L</td></tr>
<tr><td>V_STB_R</td></tr>
<tr><td>LF_INLET</td><td rowspan="2">On</td><td rowspan="3">Off</td><td>Off</td><td rowspan="5">Off</td></tr>
<tr><td>LF_OUTLET</td></tr>
<tr><td>LR_INLET</td><td rowspan="6">Off</td><td rowspan="2">On</td></tr>
<tr><td>LR_OUTLET</td></tr>
<tr><td>RF_INLET</td><td rowspan="2">On</td><td rowspan="4">Off</td></tr>
<tr><td>RF_OUTLET</td></tr>
<tr><td>RR_INLET</td><td rowspan="2">Off</td><td rowspan="2">On</td></tr>
<tr><td>RR_OUTLET</td></tr>
<tr><td>PMP_MOTOR</td><td colspan="4">On</td></tr>
</table>

DYNAMIC STABILITY CONTROL

Caution
- **To protect the DSC HU/CM, the solenoid valve and the pump motor used during active command mode stay on for only 10 s or less each time they are switched on.**

Note
- When working with two people, one should press on the brake pedal, and the other should attempt to rotate the wheel being inspected.

4. Send the command while depressing on the brake pedal and attempting to rotate the wheel being inspected.
5. While brake pressure is maintained and a DSC HU/CM operation click sound is heard, confirm that the wheel does not rotate. While brake pressure is being reduced and an DSC HU/CM operation click sound is heard, confirm that the wheel rotates.
   - Performing the inspection above determines the following:
     — The DSC HU/CM brake lines are normal.
     — The DSC HU/CM hydraulic system is not significantly abnormal (including DSC HU/CM).
     — The DSC HU/CM internal electrical parts (solenoid, motor and other parts) are normal.
     — The DSC unit and DSC HU/CM output system wiring harnesses (solenoid valve, relay system) are normal.
   - However, the following items cannot be verified.
     — Malfunction with intermittent occurrence of the above items
     — Malfunction of DSC HU/CM input system wiring harnesses and parts
     — Extremely small leaks in the DSC HU/CM internal hydraulic system

DSC Control Inspection
1. Perform “Preparation”.
2. Connect the M-MDS to the DLC-2.
3. Set up an active command mode inspection according to the combination of commands below.

Caution
- **To protect the DSC HU/CM, the solenoid valve and the pump motor used during active command mode stay on for only 10 s or less each time they are switched on.**

amxzzw0000012

Command name	Inspected wheels			
	Understeer control inhibited		Oversteer control inhibited	
	LF	RF	LR	RR
V_TRC_L	On	Off		On
V_TRC_R	Off	On		Off
V_STB_L	Off			
V_STB_R				
LF_INLET	Off	Off	Off	On
LF_OUTLET				Off
LR_INLET		On		
LR_OUTLET		Off		
RF_INLET			On	
RF_OUTLET			Off	
RR_INLET	On			
RR_OUTLET	Off			
PMP_MOTOR	On			

4. Send the command while rotating the wheel being inspected by hand in a forward direction.

DYNAMIC STABILITY CONTROL

5. Confirm that the wheel does not rotate easily while a DSC HU/CM operation click sound is heard.
   - Performing the inspection above determines the following:
     —The DSC HU/CM brake lines are normal.
     —The DSC HU/CM hydraulic system is not significantly abnormal (including DSC HU/CM).
     —The DSC HU/CM internal electrical parts (solenoid, motor and other parts) are normal.
     —The DSC unit and DSC HU/CM output system wiring harnesses (solenoid valve, relay system) are normal.
   - However, the following items cannot be verified.
     —Malfunction with intermittent occurrence of the above items
     —Malfunction of DSC HU/CM input system wiring harnesses and parts
     —Extremely small leaks in the DSC HU/CM internal hydraulic system

DSC HU/CM REMOVAL/INSTALLATION

id041500801000

Caution

- **When replacing the DSC HU/CM with a new one, configuration procedure must be performed before removing the DSC HU/CM. If configuration is not completed before removing the DSC HU/CM, DTC B2477 will be detected.**
- **The internal parts of the DSC HU/CM could be damaged if dropped. Be careful not to drop the DSC HU/CM. Replace the DSC HU/CM if it is subjected to an impact.**
- **The DSC may not function normally when the DSC HU/CM is replaced. After installation, always perform the initialization procedures for the DSC HU/CM, combined sensor and the steering angle sensor. (See 04-15-13 COMBINED SENSOR INITIALIZATION PROCEDURE.) (See 04-15-15 STEERING ANGLE SENSOR INITIALIZATION PROCEDURE.) (See 04-15-11 STEERING ANGLE SIGNAL INITIALIZATION PROCEDURE.)**

1. Perform DSC configuration. (See 04-15-8 DSC CONFIGURATION.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.
4. After installation, perform the combined sensor initialization procedure. (See 04-15-13 COMBINED SENSOR INITIALIZATION PROCEDURE.)
5. After installation, perform the steering angle sensor initialization procedure. (See 04-15-15 STEERING ANGLE SENSOR INITIALIZATION PROCEDURE.)
6. After installation, perform the steering angle signal initialization procedure. (See 04-15-11 STEERING ANGLE SIGNAL INITIALIZATION PROCEDURE.)

DYNAMIC STABILITY CONTROL

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1	DSC HU/CM connector (See 04-15-7 DSC HU/CM Connector Removal Note.) (See 04-15-8 DSC HU/CM Connector Installation Note.)
2	Brake pipe (See 04-15-8 Brake Pipe Removal Note.) (See 04-15-8 Brake Pipe Installation Note.)

3	Nut
4	DSC HU/CM, brake pipe
5	Brake pipe (DSC HU/CM—brake pipe joint) (See 04-15-8 Brake Pipe (DSC HU/CM—brake pipe joint) Installation Note.)
6	DSC HU/CM

DSC HU/CM Connector Removal Note

1. Pull the lock lever up in the direction of the arrow.
2. Pull the connector toward the vehicle rear and remove it.

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DYNAMIC STABILITY CONTROL

Brake Pipe Removal Note

1. Place an alignment mark on the brake pipe and DSC HU/CM.
2. Apply protective tape to the connector to prevent brake fluid from entering.
3. Remove the brake pipe.

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Brake Pipe (DSC HU/CM—brake pipe joint) Installation Note

1. Align with the mark made before removing the brake pipe and temporarily install the brake pipe to the DSC HU/CM.

Caution

- **If the brake pipe is tightened to the specified torque, it may be difficult to install it to the vehicle. Therefore, only temporarily tighten the brake pipe so that it can still be moved.**

Brake Pipe Installation Note

1. Align the marks made before removal and install the brake pipe to the DSC HU/CM and brake pipe joint referring to the figure.
2. Tighten the brake pipe to the specified torque.

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DSC HU/CM Connector Installation Note

1. After connecting the connector, verify that the lock lever is completely pushed in.

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DSC CONFIGURATION

id041500800800

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “Module Programming”.
   - When using the PDS (Pocket PC)
     1. Select “Programming”.
     2. Select “Module Programming”.
3. Then, select items from the screen menu in the following order.
   1. Select “Programmable Module Installation”.
   2. Select “ABS”.
4. Perform the configuration according to the directions on the screen.

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DYNAMIC STABILITY CONTROL

5. Retrieve DTCs by the M-MDS, then verify that there is no DTC present.
   - If a DTC (s) is detected, perform the applicable DTC inspection. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)

DSC HU/CM INSPECTION

id041500801100

1. Disconnect the DSC HU/CM connector. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)
2. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Attach the tester lead to the DSC HU/CM harness side connector, then inspect voltage, continuity or resistance according to the standard (reference value) on the table.

Standard (Reference Value)

amxzzw0000027

Terminal	Signal name	Connected to	Measured item	Measured terminal (measured condition)	Standard	Inspection item(s)
A	Ground (ABS motor)	Ground point	Continuity	A—ground point	Continuity detected	• Wiring harness (A—ground point)
B	Power supply (ABS motor operation)	Battery	Voltage	Under any condition	B+	• Wiring harness (B—battery)
C	Power supply (solenoid operation)	Battery	Voltage	Under any condition	B+	• Wiring harness (C—battery)
D	Ground (DSC system)	Ground point	Continuity	D—ground point	Continuity detected	• Wiring harness (D—ground point)
E	LF wheel-speed sensor (–)	LF ABS wheel-speed sensor	Continuity	E—LF ABS wheel-speed sensor connector terminal B	Continuity detected	• Wiring harness (E—LF ABS wheel-speed sensor connector terminal B)
F	LF wheel-speed sensor (+)	LF ABS wheel-speed sensor	Continuity	F—LF ABS wheel-speed sensor connector terminal A	Continuity detected	• Wiring harness (F—LF ABS wheel-speed sensor connector terminal A)
G	LR wheel-speed sensor (+)	LR ABS wheel-speed sensor	Continuity	G—LR ABS wheel-speed sensor connector terminal B	Continuity detected	• Wiring harness (G—LR ABS wheel-speed sensor connector terminal B)
H	LR wheel-speed sensor (–)	LR ABS wheel-speed sensor	Continuity	H—LR ABS wheel-speed sensor connector terminal A	Continuity detected	• Wiring harness (H—LR ABS wheel-speed sensor connector terminal A)
I	RR wheel-speed sensor (+)	RR ABS wheel-speed sensor	Continuity	I—RR ABS wheel-speed sensor connector terminal B	Continuity detected	• Wiring harness (I—RR ABS wheel-speed sensor connector terminal B)
J	Power supply (system)	Ignition switch	Voltage	Ignition switch at ON position	B+	• Wiring harness (J—ignition switch)
				Ignition switch is LOCK position	1 V or less	
K	—	—	—	—	—	—
L	RR wheel-speed sensor (–)	RR ABS wheel-speed sensor	Continuity	L—RR ABS wheel-speed sensor connector terminal A	Continuity detected	• Wiring harness (L—RR ABS wheel-speed sensor connector terminal A)

DYNAMIC STABILITY CONTROL

Terminal	Signal name	Connected to	Measured item	Measured terminal (measured condition)	Standard	Inspection item(s)
M	RF wheel-speed sensor (+)	RF ABS wheel-speed sensor	Continuity	M—RF ABS wheel-speed sensor connector terminal A	Continuity detected	• Wiring harness (M—RF ABS wheel-speed sensor connector terminal A)
N	Brake switch	Brake switch	Voltage	N—ground point (Brake pedal depressed)	B+	• Wiring harness (N—brake switch) • Brake switch
				N—ground point (Brake pedal not depressed)	1 V or less	
O	RF wheel-speed sensor (–)	RF ABS wheel-speed sensor	Continuity	O—RF ABS wheel-speed sensor connector terminal B	Continuity detected	• Wiring harness (O—RF ABS wheel-speed sensor connector terminal B)
P	DSC OFF switch	DSC OFF switch	Continuity	P—DSC OFF switch connector terminal A (L.H.D) or C (R.H.D.)	Continuity detected	• Wiring harness (P—DSC OFF switch connector terminal A (L.H.D.) or C (R.H.D.))
Q	—	—	—	—	—	—
R	—	—	—	—	—	—
S	—	—	—	—	—	—
T	—	—	—	—	—	—
U	—	—	—	—	—	—
V	—	—	—	—	—	—
W	CAN_L	DLC-2 (CAN_L)	This terminal is used for communication and cannot be used for malfunction determination during terminal voltage inspection. Perform a DTC inspection.			
X	CAN_H	DLC-2 (CAN_H)	This terminal is used for communication and cannot be used for malfunction determination during terminal voltage inspection. Perform a DTC inspection.			
Y	—	—	—	—	—	—
Z	—	—	—	—	—	—
AA	—	—	—	—	—	—
AB	—	—	—	—	—	—
AC	—	—	—	—	—	—
AD	—	—	—	—	—	—
AE	—	—	—	—	—	—
AF	—	—	—	—	—	—
AG	—	—	—	—	—	—
AH	—	—	—	—	—	—
AI	—	—	—	—	—	—
AJ	—	—	—	—	—	—
AK	—	—	—	—	—	—
AL	—	—	—	—	—	—
AM	—	—	—	—	—	—
AN	—	—	—	—	—	—
AO	—	—	—	—	—	—
AP	—	—	—	—	—	—
AQ	—	—	—	—	—	—
AR	CAN2_H	Combined sensor	Continuity	AR—combined sensor connector terminal C	Continuity detected	• Wiring harness (AR—combined sensor connector terminal C)
AS	CAN2_L	Combined sensor	Continuity	AS—combined sensor connector terminal B	Continuity detected	• Wiring harness (AS—combined sensor connector terminal B)
AT	—	—	—	—	—	—

DYNAMIC STABILITY CONTROL

STEERING ANGLE SIGNAL INITIALIZATION PROCEDURE

id041500800900

Warning

- **If the initialization procedure of the steering angle signal is not completed, the DSC will not operate properly and may cause an accident. Therefore, always perform initialization of the DSC HU/CM steering angle signal to ensure proper DSC operation when any of the following items are performed.**
  —Steering angle sensor replacement
  —DSC HU/CM replacement

1. Inspect the wheel alignment and inflation pressure.
   - If there is any malfunction, adjust the applicable part.
2. Park the vehicle on level ground.
3. Turn the ignition switch to the LOCK position.
4. Connect the M-MDS to the DLC-2.
5. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “Chassis”.
     2. Select “ABS/DSC”.
     3. Select “Sensor Initialization”.
   - When using the PDS (Pocket PC)
     1. Select “All Tests and Calibrations”.
     2. Select “Sensor Initialization”.
6. Perform the initialization procedure according to the directions on the screen.
7. Drive the vehicle forward.
8. After 5 min of driving, verify that the DSC system is normal.

amxzzw0000012

FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION

id041500800300

1. Remove or install the front ABS wheel-speed sensor in the same order of vehicles with ABS. (See 04-13-8 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)

FRONT ABS WHEEL-SPEED SENSOR INSPECTION

id041500800400

1. Inspect the front ABS wheel-speed sensor in the same order of vehicles with ABS. (See 04-13-8 FRONT ABS WHEEL-SPEED SENSOR INSPECTION.)

REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION

id041500800100

1. Remove or install the rear ABS wheel-speed sensor in the same order of vehicles with ABS. (See 04-13-9 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)

REAR ABS WHEEL-SPEED SENSOR INSPECTION

id041500800200

1. Inspect the rear ABS wheel-speed sensor in the same order of vehicles with ABS. (See 04-13-10 REAR ABS WHEEL-SPEED SENSOR INSPECTION.)

COMBINED SENSOR REMOVAL/INSTALLATION

id041500801200

Caution

- **The internal parts of the combined sensor could be damaged if dropped. Be careful not to drop the combined sensor. Replace the combined sensor if it is subjected to an impact. Also, do not use an impact wrench or other similar air tools when removing/installing the sensor.**

1. Remove the console. (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)

DYNAMIC STABILITY CONTROL

2. Remove in the order indicated in the table.

1	Combined sensor connector (See 04-15-12 Combined Sensor Connector Installation Note.)
2	Nut
3	Combined sensor
4	Bracket

3. Install in the reverse order of removal.
4. After installation, perform the combined sensor initialization procedure. (See 04-15-15 STEERING ANGLE SENSOR INITIALIZATION PROCEDURE.)

amxzzw0000202

Combined Sensor Connector Installation Note

1. Connect the combined sensor connector to the combined sensor until a click is heard.

COMBINED SENSOR INSPECTION

id041500801300

1. Turn the ignition switch to the LOCK position.
2. Connect the M-MDS to the DLC-2.
3. Select the following PIDs, then inspect the lateral acceleration speed and the yaw rate.
   —LAT_ACCL: (lateral acceleration speed)
   —YAW_RATE: (yaw rate)
   (1) Lateral acceleration speed inspection

amxzzw0000012

1) Verify the LAT_ACCL change when the combined sensor is tilted to the left and right.
   - If there is any malfunction, replace the combined sensor.

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Standard
When the sensor is tilted to the right (A):
LAT_ACCL changes negatively.
When the sensor is tilted to the left (B):
LAT_ACCL changes positively.

(2) Yaw rate inspection

DYNAMIC STABILITY CONTROL

1) Verify the YAW_RATE change when the combined sensor is rotated to the left and right.
   - If there is any malfunction, replace the combined sensor.

Standard
When the sensor is rotated to the right (A):
YAW_RATE changes negatively.
When the sensor is rotated to the left (B):
YAW_RATE changes positively.

amxzzw0000027

COMBINED SENSOR INITIALIZATION PROCEDURE

id041500801400

Warning
- **Unless the initialization procedure of the combined sensor is completed, the DSC will not operate, causing an unexpected accident. Therefore, always perform the initialization procedure to ensure DSC operation if the combined sensor and DSC HU/CM have been removed or replaced.**

1. Inspect the wheel alignment and inflation pressure.
   - If there is any malfunction, adjust the applicable part.
2. Park the vehicle on level ground.
3. Turn the ignition switch to the LOCK position.
4. Connect the M-MDS to the DLC-2.
5. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “Chassis”.
     2. Select “ABS/DSC”.
     3. Select “Sensor Initialization”.
   - When using the PDS (Pocket PC)
     1. Select “All Tests and Calibrations”.
     2. Select “Sensor Initialization”.
6. Perform the initialization procedure according to the directions on the screen.
7. Drive the vehicle forward.
8. After 5 min of driving, verify that the DSC system is normal.

amxzzw0000012

BRAKE FLUID PRESSURE SENSOR INSPECTION

id041500801500

Note
- The brake fluid pressure sensor is integrated into the DSC HU/CM and installed to the brake line of LF—RR brake system. Therefore, perform the brake fluid pressure sensor inspection with the SST installed to the brake pipe on the left front wheel.

1. Turn the ignition switch to the LOCK position.
2. Loosen the brake pipe flare nut using the commercially available flare nut wrench.
3. Disconnect the brake pipe.
4. Remove the bolt and disconnect the brake hose.

amxzzw0000112

DYNAMIC STABILITY CONTROL

5. Install the **SSTs** to the brake pipe as shown in the figure.
6. Perform air bleeding of the **SST** and brake line from bleeder screw A.

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7. Connect the M-MDS to the DLC-2.
8. Select the “MCYLI P” PID. (See 04-02B-3 ON-BOARD DIAGNOSIS [DYNAMIC STABILITY CONTROL (DSC)].)
9. Start the engine.
10. Depress the brake pedal, and verify that the fluid pressure value of the **SST** (gauge) and the value shown on the M-MDS are equal.
    - If the fluid pressure values are different, replace the DSC HU/CM. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)

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11. Remove the **SSTs** after the inspection and install the brake hose, bolt and brake pipe to their original positions.
12. Perform air bleeding of the brake line. (See 04-11-3 AIR BLEEDING.)

amxzzw0000112

STEERING ANGLE SENSOR REMOVAL/INSTALLATION

id041500801600

Note

- The steering angle sensor is integrated into the combination switch to ensure sensor performance. Replace the steering angle sensor and combination switch as a single unit. (See 09-18-21 COMBINATION SWITCH REMOVAL/INSTALLATION.)

DYNAMIC STABILITY CONTROL

STEERING ANGLE SENSOR INSPECTION

id041500801700

1. Remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.)
2. Measure the voltage between steering angle sensor terminal B and ground.
   - If there is any malfunction, inspect the wiring harness between steering angle sensor terminal B and battery, then repair or replace if necessary.

   Standard voltage
   B+

amxzzw0000027

3. Turn the ignition switch to the ON position, then measure the voltage between steering angle sensor terminal A and ground.
   - If there is any malfunction, inspect the wiring harness between steering angle sensor terminal A and ignition switch, then repair or replace if necessary.

   Standard voltage
   B+

4. Measure the voltage between steering angle sensor terminal H and the ground.
   - If there is any malfunction, inspect the wiring harness between steering angle sensor terminal H and ground point, then repair or replace if necessary.

   Standard voltage
   0 V

5. Turn the ignition switch to the LOCK position.
6. Connect the M-MDS to the DLC-2.
7. Select the “SWA_POS” PID.
8. Verify the SWA_POS changes when the steering wheel is turned to the left and right.
   - If there is any malfunction, replace the steering angle sensor.

   Standard
   When the steering wheel is turned to the right: SWA_POS changes positively.
   When the steering wheel is turned to the left: SWA_POS changes negatively.

amxzzw0000012

STEERING ANGLE SENSOR INITIALIZATION PROCEDURE

id041500801800

Warning
- **Unless the initialization procedure of the steering angle sensor is completed, the DSC will not operate, causing an unexpected accident. Therefore, always perform the initialization procedure to ensure DSC operation if the power supply to the steering angle sensor has been cut off due to disconnection of the steering angle sensor connector or negative battery cable, or any other cause.**

Note
- The initialization value of the steering angle sensor is stored using the battery power supply. Therefore, the battery power supply of the steering angle sensor is cut and the stored initialization value is cleared when any of the following items are performed.
  — Negative battery cable disconnection
  — Steering angle sensor connector disconnection
  — Fuse (ROOM 15A) removal
  — Wiring harness disconnection between battery and steering angle sensor connector

1. Inspect the wheel alignment, inflation pressure, and the installation condition of the steering wheel.
   - If there is any malfunction, adjust the applicable part.
2. Connect the negative battery cable.

DYNAMIC STABILITY CONTROL

3. Turn the ignition switch to the ON position.
4. Confirm that the DSC indicator light illuminates and that the DSC OFF light flashes.
5. Turn the steering wheel to full right lock, then turn it to full left lock.
6. Confirm that the DSC OFF light goes out.
7. Turn the ignition switch to the LOCK position.
8. Turn the ignition switch to the ON position again, and confirm that the DSC indicator light goes out.
   - If the DSC indicator light does not go out, disconnect the negative battery cable, and perform the procedure again starting from step 2 shown above.
9. Drive the vehicle for **approx. 10 min**, and confirm that the ABS warning and DSC indicator lights do not illuminate.

DSC OFF SWITCH REMOVAL/INSTALLATION

id041500801900

1. For L.H.D., remove the side panel. (See 09-17-10 SIDE PANEL REMOVAL/INSTALLATION.)
2. For R.H.D., remove the lower panel. (See 09-17-8 LOWER PANEL REMOVAL/INSTALLATION.)
3. For R.H.D., remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

1	DSC OFF switch connector (See 04-15-16 DSC OFF Switch Connector Removal Note.)
2	DSC OFF switch (See 04-15-16 DSC OFF Switch Removal Note.)

5. Install in the reverse order of removal.

amxzzw0000027

DSC OFF Switch Connector Removal Note

1. Access the DSC OFF switch connector from behind of the dashboard, and squeeze the tabs of the switch connector.
2. Disconnect the DSC OFF switch connector from the DSC OFF switch.

DSC OFF Switch Removal Note

1. Access the DSC OFF switch from behind of the dashboard, and squeeze the tabs of the switch.
2. Pull the DSC OFF switch towards the driver's side to remove it.

DYNAMIC STABILITY CONTROL

DSC OFF SWITCH INSPECTION

id041500802000

L.H.D.

1. Remove the DSC OFF switch. (See 04-15-16 DSC OFF SWITCH REMOVAL/INSTALLATION.)
2. Verify that the continuity is as indicated in the table.
   - If not as indicated in the table, replace the DSC OFF switch. (See 04-15-16 DSC OFF SWITCH REMOVAL/INSTALLATION.)

: Bulb : Continuity

Condition	Terminal			
	A	C	E	F
Switch pressed	○—○		○—⊗—○	
Switch released			○—⊗—○	

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amxzzw0000223

R.H.D.

1. Remove the DSC OFF switch. (See 04-15-16 DSC OFF SWITCH REMOVAL/INSTALLATION.)
2. Verify that the continuity is as indicated in the table.
   - If not as indicated in the table, replace the DSC OFF switch. (See 04-15-16 DSC OFF SWITCH REMOVAL/INSTALLATION.)

: Bulb : Continuity

Condition	Terminal			
	A	B	C	D
Switch pressed	○—⊗—○		○—○	
Switch released	○—⊗—○			

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amxzzw0000223

TECHNICAL DATA

04-50 TECHNICAL DATA

BRAKES TECHNICAL DATA 04-50–1

BRAKES TECHNICAL DATA

id045000800100

Item	Specification
Brake fluid type	SAE J1703, FMVSS 116 DOT-3 or DOT-4
Brake pedal height (reference value)	167 mm {6.57 in}
Brake pedal play	2—5 mm {0.08—0.19 in}
Brake pedal-to-floor clearance (Brake pedal when depressed at 147 N {15.0 Kgf, 33.0 lbf}	106.9 mm {4.209 in} or more
Front disc plate runout limit	0.05 mm {0.002 in}
Minimum front disc plate thickness	20 mm {0.79 in}
Minimum front disc plate thickness after machining using a brake lathe on-vehicle	20.8 mm {0.82 in}
Minimum front disc pad thickness	2.0 mm {0.079 in} min.
Rear disc plate runout limit	0.05 mm {0.002 in}
Minimum rear disc plate thickness	8 mm {0.31 in}
Minimum rear disc plate thickness after machining using a brake lathe on-vehicle	8.8 mm {0.35 in}
Minimum rear disc pad thickness	2.0 mm {0.079 in} min.
Parking brake lever stroke when pulled at 98 N {10 kgf, 22 lbf}	1—3 notches

Power brake unit fluid pressure

Vacuum amount at o kPa {0 mmHg, 0 inHg}	
Pedal force (N {kgf, lbf})	**Fluid pressure (kPa {kgf/cm^2, psi})**
200 {20.4, 44.9}	620 {6.33, 90.0} or more

Power brake unit fluid pressure

Vacuum amount at o 66.7 kPa {500 mmHg, 19.7 inHg}	
Pedal force (N {kgf, lbf})	**Fluid pressure (kPa {kgf/cm^2, psi})**
200 {20.4, 44.9}	6,340 {64.65, 919.6} or more

SERVICE TOOLS

04-60 SERVICE TOOLS

BRAKES SST 04-60–1

SERVICE TOOLS

BRAKES SST

id046000800100

49 G043 001 Adjust gauge	49 B043 004 Socket wrench	49 E043 003A Turning lock tool
49 U043 004A Oil pressure gauge (Part of 49 U043 0A0A)	49 U043 005 Joint (Part of 49 U043 0A0A)	49 U043 006 Hose (Part of 49 U043 0A0A)
49 0221 600C Disc brake piston wrench	49 F043 002 Wrench	—

TRANSMISSION/TRANSAXLE

05
SECTION

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ON-BOARD DIAGNOSTIC [SJ6A-EL]

AUTOMATIC TRANSMISSION CONTROL SYSTEM WIRING DIAGRAM [SJ6A-EL]

id050208811000

amxzzw0000016

ON-BOARD DIAGNOSTIC [SJ6A-EL]

FOREWORD [SJ6A-EL]

id050208800200

- When the customer reports vehicle malfunction, check the malfunction indicator lamp (MIL) indication, AT warning indication, and diagnostic trouble code (DTC), then diagnose the malfunction according to following flowchart.
  —If a DTC exists, diagnose the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
  — If a DTC does not exist and the MIL and AT warning lights do not illuminate, diagnose the applicable symptom troubleshooting. (See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE [SJ6A-EL].)

amxzzw0000017

*: Malfunction Indicator Lamp (MIL), AT warning light

AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL]

id050208811100

Reading DTCs Procedure

1. Connect the M-MDS to the DLC-2.

L.H.D.

amxzzw0000086

ON-BOARD DIAGNOSTIC [SJ6A-EL]

R.H.D.

2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
- When using the IDS (laptop PC)
  1. Select "Self Test".
  2. Select "Modules".
  3. Select "TCM".
- When using the PDS (Pocket PC)
  1. Select "Module Tests".
  2. Select "TCM".
  3. Select "Self Test".

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Note
- Freeze frame data appears at the top of the help screen when the displayed DTC is selected.
- The freeze frame data consists of data for vehicle and transmission control system operation conditions when malfunctions in the transmission control system are detected and stored in the TCM.
- There are modes 2 and 12 in the freeze frame data.

  Freeze frame data (mode 2)
  — Freeze frame data is stored at the instant the malfunction indicator lamp illuminates, and only a part of the DTC data is stored.
  — For the freeze frame data, if there are several malfunctions in the engine control system, the data for the malfunction which occurred initially is stored. Thereafter, if a misfire or fuel injection control malfunction occurs, data from the misfire or fuel injection control malfunction is written over the initially stored data. However, if the initially stored freeze frame data is a misfire or fuel injection control malfunction, it is not overwritten.

  Freeze frame data (mode 12)
  — The data for DTCs currently detected is stored.
  — The DTC recording timing differs depending on the number of DTC drive cycles.
    - For a DTC with a drive cycle number 1, only the malfunction determination data is recorded.
    - For a DTC with a drive cycle number 2, both the malfunction determination and undetermined data is recorded.

3. Verify the DTC according to the directions on the M-MDS screen.

Freeze frame data table (mode2, mode12) table

Note
- Refer to PID monitor table for confirm the engine control system operation status while the PCM does not store the DTC.
- Freeze frame data items are not displayed, according to detected DTC.

Freeze frame data item	Definition	Unit	Corresponding PID data monitor item	Description
LOAD	Engine load	%	—	Ratio of current intake air amount to wide-open throttle engine operation intake air amount
ECT	Engine coolant temperature	°C	ECT TCM	Engine coolant temperature
RPM	Engine speed	Rpm	RPM TCM	Engine speed
VS	Vehicle speed	KPH	VSS	Vehicle speed input from ABS/ DSC HU/CM
TP	Throttle valve position No.1	%	THOP	TP sensor No.1 value
RUNTM	Time from engine start	hh:mm:ss	—	Time from engine start
VPWR	Module supply voltage	V	VPWR_TCM	PCM power supply voltage

Clearing DTCs Procedure
1. Connect the M-MDS to the DLC-2.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

L.H.D.

amxzzw0000086

R.H.D.

2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
- When using the IDS (laptop PC)
  1. Select "Self Test".
  2. Select "Modules".
  3. Select "TCM".
- When using the PDS (Pocket PC)
  1. Select "Module Tests".
  2. Select "TCM".
  3. Select "Self Test".
3. Verify the DTC according to the directions on the M-MDS screen.
4. Press the clear button on the DTC screen to clear the DTC.

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DTC TABLE [SJ6A-EL]

id050208800500

X: Available
–: N/A

DTC No.	Condition	MIL	AT warning light	DC	Memory function	Page
P0601	Flash ROM malfunction	X	X	1	X	(See 05-02-7 DTC P0601 [SJ6A-EL])
P0603	EEPROM malfunction	X	X	1	X	(See 05-02-8 DTC P0603 [SJ6A-EL])
P0604	RAM malfunction	X	X	1	X	(See 05-02-9 DTC P0604 [SJ6A-EL])
P0707	Transmission range (TR) switch circuit low input (short to ground)	X	X	1	X	(See 05-02-10 DTC P0707 [SJ6A-EL])
P0708	Transmission range (TR) switch circuit high input (open circuit)	X	X	2	X	(See 05-02-12 DTC P0708 [SJ6A-EL])
P0711	Transmission fluid temperature (TFT) sensor malfunction (stuck)	X	X	2	X	(See 05-02-15 DTC P0711 [SJ6A-EL])
P0712	Transmission fluid temperature (TFT) sensor circuit malfunction (short to ground)	X	X	1	X	(See 05-02-17 DTC P0712 [SJ6A-EL])
P0713	Transmission fluid temperature (TFT) sensor circuit malfunction (short to power/open circuit)	X	X	1	X	(See 05-02-19 DTC P0713 [SJ6A-EL])
P0717	Turbine sensor circuit malfunction (open circuit/ short circuit)	X	X	1	X	(See 05-02-21 DTC P0717 [SJ6A-EL])
P0722	Vehicle speed sensor (VSS) circuit malfunction (open circuit/short circuit)	X	X	1	X	(See 05-02-23 DTC P0722 [SJ6A-EL])
P0751	Shift solenoid A malfunction (stuck off)	X	X	2	X	(See 05-02-25 DTC P0751 [SJ6A-EL])
P0752	Shift solenoid A malfunction (stuck on)	X	X	2	X	(See 05-02-26 DTC P0752 [SJ6A-EL])
P0756	Shift solenoid B malfunction (stuck off)	X	X	2	X	(See 05-02-28 DTC P0756 [SJ6A-EL])

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC No.	Condition	MIL	AT warning light	DC	Memory function	Page
P0757	Shift solenoid B malfunction (stuck on)	X	X	2	X	(See 05-02-29 DTC P0757 [SJ6A-EL])
P0761	Shift solenoid C malfunction (stuck off)	X	X	2	X	(See 05-02-31 DTC P0761 [SJ6A-EL])
P0762	Shift solenoid C malfunction (stuck on)	X	X	2	X	(See 05-02-32 DTC P0762 [SJ6A-EL])
P0766	Shift solenoid D malfunction (stuck off)	X	X	2	X	(See 05-02-34 DTC P0766 [SJ6A-EL])
	Shift solenoid G malfunction (stuck on)	X	X	2	X	(See 05-02-34 DTC P0766 [SJ6A-EL])
P0781	1-2 shift valve malfunction	X	X	2	X	(See 05-02-35 DTC P0781 [SJ6A-EL])
P0813	Reverse sequence valve malfunction	X	X	2	X	(See 05-02-37 DTC P0813 [SJ6A-EL])
P0819	Manual switch/up switch/down switch circuit malfunction (open circuit/short circuit)	–	X	1	X	(See 05-02-39 DTC P0819 [SJ6A-EL])
P0826	Steering shift switch circuit malfunction (open circuit/short to ground)	X	X	1	X	(See 05-02-42 DTC P0826 [SJ6A-EL])
P0882	TCM B+ low (less than 9 V)	X	X	1	X	(See 05-02-44 DTC P0882 [SJ6A-EL])
P0961	Line pressure control solenoid range/ performance (stuck)	X	X	1	X	(See 05-02-45 DTC P0961 [SJ6A-EL])
P0962	Line pressure control solenoid circuit malfunction (short to ground/open circuit)	X	X	1	X	(See 05-02-47 DTC P0962 [SJ6A-EL])
P0963	Line pressure control solenoid circuit malfunction (short to power)	X	X	1	X	(See 05-02-50 DTC P0963 [SJ6A-EL])
P0969	Shift solenoid F range/performance (stuck)	X	X	1	X	(See 05-02-52 DTC P0969 [SJ6A-EL])
P0970	Shift solenoid F circuit malfunction (short to ground/open circuit)	X	X	1	X	(See 05-02-53 DTC P0970 [SJ6A-EL])
P0971	Shift solenoid F circuit malfunction (short to power)	X	X	1	X	(See 05-02-56 DTC P0971 [SJ6A-EL])
P0973	Shift solenoid A circuit malfunction (short to ground)	X	X	1	X	(See 05-02-58 DTC P0973 [SJ6A-EL])
P0974	Shift solenoid A circuit malfunction (short to power/open circuit)	X	X	1	X	(See 05-02-60 DTC P0974 [SJ6A-EL])
P0976	Shift solenoid B circuit malfunction (short to ground)	X	X	1	X	(See 05-02-63 DTC P0976 [SJ6A-EL])
P0977	Shift solenoid B circuit malfunction (short to power/open circuit)	X	X	1	X	(See 05-02-65 DTC P0977 [SJ6A-EL])
P0979	Shift solenoid C circuit malfunction (short to ground)	X	X	1	X	(See 05-02-68 DTC P0979 [SJ6A-EL])
P0980	Shift solenoid C circuit malfunction (short to power/open circuit)	X	X	1	X	(See 05-02-70 DTC P0980 [SJ6A-EL])
P0982	Shift solenoid D circuit malfunction (short to ground)	X	X	1	X	(See 05-02-73 DTC P0982 [SJ6A-EL])
P0983	Shift solenoid D circuit malfunction (short to power/open circuit)	X	X	1	X	(See 05-02-75 DTC P0983 [SJ6A-EL])
P0985	Shift solenoid E circuit malfunction (short to ground)	X	X	1	X	(See 05-02-78 DTC P0985 [SJ6A-EL])
P0986	Shift solenoid E circuit malfunction (short to power/open circuit)	X	X	1	X	(See 05-02-80 DTC P0986 [SJ6A-EL])
P2719	Shift solenoid G range/performance (stuck)	X	X	1	X	(See 05-02-82 DTC P2719 [SJ6A-EL])
P2720	Shift solenoid G circuit malfunction (short to ground/open circuit)	X	X	1	X	(See 05-02-84 DTC P2720 [SJ6A-EL])
P2721	Shift solenoid G circuit malfunction (short to power)	X	X	1	X	(See 05-02-87 DTC P2721 [SJ6A-EL])
P2757	Torque converter clutch (TCC) stuck off	X	X	2	X	(See 05-02-89 DTC P2757 [SJ6A-EL])

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC No.	Condition	MIL	AT warning light	DC	Memory function	Page
P2758	Torque converter clutch (TCC) stuck on	X	X	2	X	(See 05-02-90 DTC P2758 [SJ6A-EL])
P2762	TCC control solenoid range/performance (stuck)	X	X	1	X	(See 05-02-91 DTC P2762 [SJ6A-EL])
P2763	TCC control solenoid circuit malfunction (short to power)	X	X	1	X	(See 05-02-93 DTC P2763 [SJ6A-EL])
P2764	TCC control solenoid circuit malfunction (short to ground/open circuit)	X	X	1	X	(See 05-02-95 DTC P2764 [SJ6A-EL])
U0073	CAN BUS OFF	(See 09-02F-3 DTC TABLE [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]) (See 09-02G-3 DTC TABLE [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)])				
U0100	TCM cannot receive any signals from PCM	(See 09-02F-3 DTC TABLE [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]) (See 09-02G-3 DTC TABLE [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)])				
U0121	Lost communication with ABS HU/CM or DSC HU/CM	(See 09-02F-3 DTC TABLE [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]) (See 09-02G-3 DTC TABLE [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)])				

MIL: Malfunction Indicator Lamp
DC: Drive Cycle
– : N/A

DTC P0601 [SJ6A-EL]

id050208800600

DTC P0601	Flash ROM malfunction
DETECTION CONDITION	• Flash ROM (in TCM) internal circuit malfunction is detected. **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during the first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
3	**VERIFY TROUBLESHOOTING OF DTC P0601 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
4	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

DTC P0603 [SJ6A-EL]

id050208800700

DTC P0603	EEPROM malfunction
DETECTION CONDITION	• Different numeric values for EEPROM and RAM (in TCM) are detected. **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during the first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
3	**VERIFY TROUBLESHOOTING OF DTC P0603 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
4	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0604 [SJ6A-EL]

id050208800800

DTC P0604	RAM malfunction
DETECTION CONDITION	• RAM (in TCM) read/write error is detected. **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during the first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
3	**VERIFY TROUBLESHOOTING OF DTC P0604 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
4	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0707 [SJ6A-EL]

id050208801000

DTC P0707	Transmission range (TR) switch circuit low input (short to ground)
DETECTION CONDITION	• A signal input from the TR switch to the TCM corresponds to two contact points or more. **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during the first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TR switch misadjustment • TCM connector or terminal malfunction • Short to power supply in wiring harness between TR switch terminal B and TCM terminal 2O • Short to power supply in wiring harness between TR switch terminal C and TCM terminal 2M • Short to power supply in wiring harness between TR switch terminal H and TCM terminal 2N • Short to power supply in wiring harness between TR switch terminal D and TCM terminal 2K • TR switch connector or terminal malfunction • TCM malfunction

TCM
HARNESS-SIDE CONNECTOR

	1AF	1AA		1Y	1R		1P		1H		1D
1AG	1AC	1AB	1Z	1V	1S	1Q	1O	1L	1I	1E	1A
1AH	1AD			1W	1T			1M	1J	1F	1B
1AI	1AE			1X	1U			1N	1K	1G	1C

2AF	2AB		2R	2O		2J		2F	
2AG	2AC	2Y	2V	2S	2P	2M	2K	2G	2C	
2AH	2AD	2Z	2W	2T	2Q	2N	2L	2H	2D	2A
2AI	2AE	2AA	2X	2U				2I	2E	2B

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT TR SWITCH CIRCUIT** • Connect the TCM connector. • Turn the ignition switch to the ON position. (engine off) • Inspect the voltage between TCM terminal (wiring harness-side) and body GND. —TCM terminal 2O • P position: B+ • Other positions and all ranges: 0V —TCM terminal 2M • R position: B+ • Other position and all ranges: 0V —TCM terminal 2N • N position: B+ • Other position and all range: 0V —TCM terminal 2K • D range: B+ • Other ranges and all positions: 0V • Are any of following terminal voltage turned on for even a moment while shifting selector lever slowly from P position to D range?	Yes	Go to Step 8.
		No	Go to the next step.
4	**INSPECT TR SWITCH CIRCUIT** • Are all terminal voltage **0 V** in Step 3?	Yes	Go to Step 8.
		No	Go to the next step.
5	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminals 2O, 2K, 2M and 2N (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector and/or terminal, then go to Step 8.
		No	Go to the next step.
6	**INSPECT TR SWITCH CONNECTOR FOR POOR CONNECTION** • Disconnect the TR switch connector. • Inspect for poor connection at TR switch terminals B, C, D and H (part-side) (such as damaged/pulled-out pins, corrosion) • Are TR switch terminals normal?	Yes	Go to the next step.
		No	Repair terminals or replace the TR switch, then go to Step 8. (See 05-13-19 TRANSMISSION RANGE (TR) SWITCH REMOVAL/INSTALLATION [SJ6A-EL].)
7	**INSPECT TR SWITCH** • Inspect the TR switch. (See 05-13-14 TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL].) • Is the TR switch normal?	Yes	Repair or replace the wiring harness for open circuit, then go to the next step.
		No	Replace the TR switch, then go to the next step. (See 05-13-19 TRANSMISSION RANGE (TR) SWITCH REMOVAL/INSTALLATION [SJ6A-EL].)
8	**VERIFY TROUBLESHOOTING OF DTC P0707 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine to normal operating temperature. 3. Depress the brake pedal, and shift the selector lever from P to D for 2 s or more. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
9	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

DTC P0708 [SJ6A-EL]

id050208801100

DTC P0708	Transmission range (TR) switch circuit high input (open circuit)
DETECTION CONDITION	• Vehicle speed is **30 km/h {18.6 mph} or more**, and no range signal is input from the TR switch. **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition in two consecutive drive cycles. • The AT warning light illuminates if the TCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TR switch misadjustment • TCM connector or terminal malfunction • Short to GND in wiring harness between TR switch terminal B and TCM terminal 2O • Short to GND in wiring harness between TR switch terminal C and TCM terminal 2M • Short to GND in wiring harness between TR switch terminal H and TCM terminal 2N • Short to GND in wiring harness between TR switch terminal D and TCM terminal 2K • TR switch connector or terminal malfunction • Open circuit in wiring harness between TR switch terminal B and TCM terminal 2O • Open circuit in wiring harness between TR switch terminal C and TCM terminal 2M • Open circuit in wiring harness between TR switch terminal H and TCM terminal 2N • Open circuit in wiring harness between TR switch terminal D and TCM terminal 2K • TR switch malfunction • Open circuit in wiring harness between TR switch terminal E and ignition switch (IG1) • TCM malfunction

TCM
HARNESS-SIDE CONNECTOR

	1AF	1AA		1Y	1R		1P		1H		1D
1AG	1AC	1AB	1Z	1V	1S	1Q	1O	1L	1I	1E	1A
1AH	1AD			1W	1T			1M	1J	1F	1B
1AI	1AE			1X	1U			1N	1K	1G	1C

2AF	2AB		2R		2O		2J		2F	
2AG	2AC	2Y	2V	2S	2P	2M	2K	2G	2C	
2AH	2AD	2Z	2W	2T	2Q	2N	2L	2H	2D	2A
2AI	2AE	2AA	2X	2U				2I	2E	2B

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT TR SWITCH CIRCUIT** • Connect the TCM connector. • Turn the ignition switch to the ON position. (engine off) • Inspect the voltage between TCM terminal (wiring harness-side) and body GND. — TCM terminal 2O • P position: B+ • Other positions and all ranges: 0V — TCM terminal 2M • R position: B+ • Other position and all ranges: 0V — TCM terminal 2N • N position: B+ • Other position and all range: 0V — TCM terminal 2K • D range: B+ • Other ranges and all positions: 0V • Are any of following terminal voltage turned on for even a moment while shifting selector lever slowly from P position to D range?	Yes	Go to Step 13.
		No	Go to the next step.
4	**INSPECT TR SWITCH CIRCUIT** • Are all terminal voltage **0 V** in Step 3?	Yes	Go to Step 10.
		No	Go to the next step.
5	**INSPECT TR SWITCH CIRCUIT** • Are there two or more terminals where the voltage is abnormal in Step 3?	Yes	Adjust the TR switch, then go to Step 13. (See 05-13-16 TRANSMISSION RANGE (TR) SWITCH ADJUSTMENT [SJ6A-EL].)
		No	Go to the next step.
6	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminals 2O, 2K, 2M and 2N (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector and/or terminal, then go to Step 13.
		No	Go to the next step.
7	**INSPECT TR SWITCH SIGNAL CIRCUIT FOR SHORT TO GND** • Inspect for continuity between TR switch terminals (wiring harness-side) and body GND. — P position: B and body GND — R position: C and body GND — N position: H and body GND — D range: D and body GND • Is there continuity?	Yes	Repair or replace the wiring harness for short to GND, go to Step 12.
		No	Go to the next step.
8	**INSPECT TR SWITCH CONNECTOR FOR POOR CONNECTION** • Disconnect the TR switch connector. • Inspect for poor connection at TR switch terminals B, C, D and H (part-side) (such as damaged/pulled-out pins, corrosion) • Are TR switch terminals normal?	Yes	Go to the next step.
		No	Repair terminals or replace the TR switch, then go to Step 13. (See 05-13-19 TRANSMISSION RANGE (TR) SWITCH REMOVAL/INSTALLATION [SJ6A-EL].)
9	**INSPECT TR SWITCH** • Inspect the TR switch. (See 05-13-14 TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL].) • Is the TR switch normal?	Yes	Repair or replace the wiring harness for open circuit, then go to Step 13.
		No	Replace the TR switch, then go to Step 13. (See 05-13-19 TRANSMISSION RANGE (TR) SWITCH REMOVAL/INSTALLATION [SJ6A-EL].)

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
10	**INSPECT TR SWITCH POWER CIRCUIT FOR OPEN CIRCUIT** • Turn the ignition switch to the LOCK position. • Disconnect the TR switch connector. • Turn the ignition switch to the ON position (engine off). • Inspect the voltage at TR switch (wiring harness-side) terminal E. • Is there **B+** at TR switch (wiring harness-side) terminal E?	Yes	Go to the next step.
		No	Inspect the METER 15 A fuse. • If normal, repair or replace the wiring harness, then go to Step 13.
11	**INSPECT TR SWITCH CONNECTOR FOR POOR CONNECTION** • Disconnect the TR switch connector. • Inspect for poor connection at TR switch terminal E (part-side) (such as damaged/ pulled-out pins, corrosion) • Are TR switch terminals normal?	Yes	Go to the next step.
		No	Repair terminals or replace the TR switch, then go to Step 13. (See 05-13-19 TRANSMISSION RANGE (TR) SWITCH REMOVAL/INSTALLATION [SJ6A-EL].)
12	**INSPECT TR SWITCH** • Inspect the TR switch. (See 05-13-14 TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL].) • Is the TR switch normal?	Yes	Go to the next step.
		No	Replace the TR switch, then go to the next step. (See 05-13-19 TRANSMISSION RANGE (TR) SWITCH REMOVAL/INSTALLATION [SJ6A-EL].)
13	**VERIFY TROUBLESHOOTING OF DTC P0708 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine to normal operating temperature. 3. Depress the brake pedal, and shift the selector lever from P to D for 2 s or more. 4. Turn the ignition switch to the LOCK position. 5. Start the engine. 6. Depress the brake pedal, and shift the selector lever from P to D for 2 s or more. • Is the PENDING CODE same as the DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
14	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0711 [SJ6A-EL]

id050208801200

DTC P0711	Transmission fluid temperature (TFT) sensor malfunction (stuck)
DETECTION CONDITION	• Change in ATF temperature cannot be detected for **10 min or more** when driving in D range or R position. **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition in two consecutive drive cycles. • The AT warning light illuminates if the TCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TFT sensor malfunction • TCM connector or terminal malfunction • TCM malfunction

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT RESISTANCE OF TFT SENSOR CIRCUIT** • Inspect for resistance between TCM terminals 1J and 1M (wiring harness-side). • Is resistance as shown below? — ATF temperature **10°C {50°F}**: **approx. 6.445 kilohms** — ATF temperature **25°C {77°F}**: **approx. 3.5 kilohms** — ATF temperature **110°C {230°F}**: **approx. 0.247 kilohms** (See 05-13-22 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	Replace the TFT sensor, then go to Step 5. (See 05-13-24 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION [SJ6A-EL].)
4	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminals 1J and 1M (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to the next step.
5	**VERIFY TROUBLESHOOTING OF DTC P0711 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC from the memory using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine to normal operating temperature. 3. Drive the vehicle in D range for 10 min or more. • Is the PENDING CODE same as the DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
6	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0712 [SJ6A-EL]

id050208801300

DTC P0712	Transmission fluid temperature (TFT) sensor circuit malfunction (short to ground)
DETECTION CONDITION	• If the TCM detects the following condition for **10 s or more**, the TCM determines that the TFT sensor circuit has a malfunction. — ATF temperature **200 °C {392 °F} or more** **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TFT sensor malfunction • TCM connector or terminal malfunction • Short to GND in wiring harness between TFT sensor and TCM terminal 1J • Short to GND in wiring harness between TFT sensor and TCM terminal 1M • Coupler component connector or terminal malfunction • TCM malfunction

TCM
HARNESS-SIDE CONNECTOR

	1AF	1AA		1Y	1R		1P		1H	1D
1AG	1AC	1AB	1Z	1V	1S	1Q	1O	1L	1I	1E	1A
1AH	1AD			1W	1T			1M	1J	1F	1B
1AI	1AE			1X	1U			1N	1K	1G	1C

2AF	2AB		2R	2O	2J	2F				
2AG	2AC	2Y	2V	2S	2P	2M	2K	2G	2C	
2AH	2AD	2Z	2W	2T	2Q	2N	2L	2H	2D	2A
2AI	2AE	2AA	2X	2U				2I	2E	2B

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT RESISTANCE OF TFT SENSOR CIRCUIT** • Inspect for resistance between coupler component terminals 1J and 1M (wiring harness-side). • Is resistance as shown below? — ATF temperature **10°C {50°F}**: **approx. 6.445 kilohms** — ATF temperature **25°C {77°F}**: **approx. 3.5 kilohms** — ATF temperature **110°C {230°F}**: **approx. 0.247 kilohms** (See 05-13-22 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	Replace the TFT sensor, then go to Step 5. (See 05-13-24 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION [SJ6A-EL].)
4	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminals 1J and 1M (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to Step 7.
		No	Repair or replace the connector and/or terminal, then go to Step 7.
5	**INSPECT TFT SENSOR SIGNAL CIRCUIT FOR SHORT TO GND** • Inspect for continuity between coupler component terminals (wiring harness-side) and body GND. — Terminal A and body GND — Terminal B and body GND • Is there continuity?	Yes	Repair or replace the wiring harness for short to GND, go to Step 7.
		No	Go to the next step.
6	**INSPECT COUPLER COMPONENT CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Inspect for poor connection at coupler component terminals A and B (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Replace the TFT sensor, then go to the next step. (See 05-13-24 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Repair or replace the connector and/or terminal, then go to the next step.
7	**VERIFY TROUBLESHOOTING OF DTC P0712 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
8	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

DTC P0713 [SJ6A-EL]

id050208801400

DTC P0713	Transmission fluid temperature (TFT) sensor circuit malfunction (short to power/open circuit)
DETECTION CONDITION	• If the TCM detects the following condition for **1 s or more**, the TCM determines that the TFT sensor circuit has a malfunction. — Engine warmed-up — ATF temperature **less than –43 °C {–45.4 °F}** **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM connector or terminal malfunction • Coupler component connector or terminal malfunction • Open circuit in wiring harness between TFT sensor and TCM terminal 1J • Open circuit in wiring harness between TFT sensor and TCM terminal 1M • TFT sensor malfunction • TCM malfunction

	1AF	1AA		1Y	1R		1P		1H	1D
1AG	1AC	1AB	1Z	1V	1S	1Q	1O	1L	1I	1E	1A
1AH	1AD			1W	1T			1M	1J	1F	1B
1AI	1AE			1X	1U			1N	1K	1G	1C

2AF	2AB		2R	2O		2J	2F		
2AG	2AC	2Y	2V	2S	2P	2M	2K	2G	2C	
2AH	2AD	2Z	2W	2T	2Q	2N	2L	2H	2D	2A
2AI	2AE	2AA	2X	2U				2I	2E	2B

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT RESISTANCE OF TFT SENSOR CIRCUIT** • Inspect for resistance between coupler component terminals 1J and 1M (wiring harness-side). • Is resistance as shown below? — ATF temperature **10°C {50°F}**: **approx. 6.445 kilohms** — ATF temperature **25°C {77°F}**: **approx. 3.5 kilohms** — ATF temperature **110°C {230°F}**: **approx. 0.247 kilohms** (See 05-13-22 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	Go to Step 5.
4	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminals 1J and 1M (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to Step 7.
		No	Repair or replace the connector and/or terminal, then go to Step 7.
5	**INSPECT COUPLER COMPONENT CONNECTOR FOR POOR CONNECTION** • Disconnect the coupler component connector. • Inspect for poor connection at TCM terminals A and B (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 7.
6	**INSPECT TFT SENSOR** • Inspect the TFT sensor. (See 05-13-22 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR INSPECTION [SJ6A-EL].) • Is the TFT sensor normal?	Yes	Repair or replace the wiring harness for open circuit, go to the next step.
		No	Replace the TFT sensor, then go to the next step. (See 05-13-24 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION [SJ6A-EL].)
7	**VERIFY TROUBLESHOOTING OF DTC P0713 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. 800 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
8	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0717 [SJ6A-EL]

id050208801500

DTC P0717	Turbine sensor circuit malfunction (open circuit/short circuit)
DETECTION CONDITION	• When all conditions below are satisfied. — D range of TR switch input — Vehicle speed signal 12 pulse input — Turbine sensor signal not input **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during the first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM connector or terminal malfunction • Short to GND in wiring harness between turbine sensor terminal B and TCM terminal 2A • Short to GND in wiring harness between turbine sensor terminal A and TCM terminal 2B • Short to power supply in wiring harness between turbine sensor terminal B and TCM terminal 2A • Short to power supply in wiring harness between turbine sensor terminal A and TCM terminal 2B • Turbine sensor connector or terminal malfunction • Turbine sensor malfunction • Open circuit between turbine sensor terminal B and TCM terminal 2A • Open circuit between turbine sensor terminal A and TCM terminal 2B • TCM malfunction

TCM
HARNESS-SIDE CONNECTOR

	1AF	1AA		1Y	1R		1P		1H		1D
1AG	1AC	1AB	1Z	1V	1S	1Q	1O	1L	1I	1E	1A
1AH	1AD			1W	1T			1M	1J	1F	1B
1AI	1AE			1X	1U			1N	1K	1G	1C

2AF	2AB		2R		2O		2J		2F	
2AG	2AC	2Y	2V	2S	2P	2M	2K	2G	2C	
2AH	2AD	2Z	2W	2T	2Q	2N	2L	2H	2D	2A
2AI	2AE	2AA	2X	2U				2I	2E	2B

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
3	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminals R18 and R7 (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 13.
4	**INSPECT CONTINUITY OF TURBINE SENSOR CIRCUIT** • Inspect for continuity between the TCM terminals 2A and 2B (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Go to Step 7.
5	**INSPECT TURBINE SENSOR SIGNAL CIRCUIT FOR SHORT TO GND** • Inspect for continuity between the TCM terminals (wiring harness-side) and body GND. — Terminal 2A and body GND — Terminal 2B and body GND • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for short to GND, then go to Step 10.
6	**INSPECT TURBINE SENSOR CIRCUIT FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the ON position (engine off). • Measure the voltage at TCM (wiring harness-side) terminals 2A and 2B. • Is there **0 V** at the TCM wiring harness-side connector terminals?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for short to power supply, then go to Step 10.
7	**INSPECT TERMINAL TURBINE SENSOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the turbine sensor connector. • Inspect for poor connection at turbine sensor terminals A and B (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 10.
8	**INSPECT TURBINE SENSOR** • Inspect the turbine sensor. (See 05-13-26 TURBINE SENSOR INSPECTION [SJ6A-EL].) • Is the turbine sensor normal?	Yes	Go to the next step.
		No	Replace the turbine sensor, then go to Step 10. (See 05-13-26 TURBINE SENSOR REMOVAL/ INSTALLATION [SJ6A-EL].)
9	**INSPECT TURBINE SENSOR CIRCUIT FOR OPEN CIRCUIT** • Inspect for continuity between turbine sensor terminals (wiring harness-side) and TCM terminals (wiring harness-side). — Terminal B and terminal 2A — Terminal A and terminal 2B • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for open circuit, then go to the next step.
10	**VERIFY TROUBLESHOOTING OF DTC P0717 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
11	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0722 [SJ6A-EL]

id050208801600

DTC P0722	Vehicle speed sensor (VSS) circuit malfunction (open circuit/short circuit)
DETECTION CONDITION	• When all conditions below are satisfied. — D range of TR switch input — Turbine speed signal 12 pulse input — VSS signal not input **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during the first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM connector or terminal malfunction • Short to GND in wiring harness between VSS terminal B and TCM terminal 2D • Short to GND in wiring harness between VSS terminal A and TCM terminal 2C • Short to power supply in wiring harness between VSS terminal B and TCM terminal 2D • Short to power supply in wiring harness between VSS terminal A and TCM terminal 2C • VSS connector or terminal malfunction • VSS malfunction • Open circuit between VSS terminal B and TCM terminal 2D • Open circuit between VSS terminal A and TCM terminal 2C • TCM malfunction

TCM
HARNESS-SIDE CONNECTOR

	1AF	1AA		1Y	1R		1P		1H		1D
1AG	1AC	1AB	1Z	1V	1S	1Q	1O	1L	1I	1E	1A
1AH	1AD			1W	1T			1M	1J	1F	1B
1AI	1AE			1X	1U			1N	1K	1G	1C

2AF	2AB		2R	2O		2J		2F	
2AG	2AC	2Y	2V	2S	2P	2M	2K	2G	2C	
2AH	2AD	2Z	2W	2T	2Q	2N	2L	2H	2D	2A
2AI	2AE	2AA	2X	2U				2I	2E	2B

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminals 2D and 2C (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 13.
4	**INSPECT CONTINUITY OF VSS CIRCUIT** • Inspect for continuity between the coupler component terminals 2D and 2C (wiring harness-side). • Is there continuity?	Yes	Go to the next step.
		No	Go to Step 7.
5	**INSPECT VSS SIGNAL CIRCUIT FOR SHORT TO GND** • Inspect for continuity between the TCM terminals (wiring harness-side) and body GND. — Terminal 2D and body GND — Terminal 2C and body GND • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for short to GND, then go to Step 10.
6	**INSPECT VSS CIRCUIT FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the ON position (engine off). • Measure the voltage at TCM (wiring harness-side) terminals 2D and 2C. • Is there **0 V** at the TCM wiring harness-side connector terminals?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for short to power supply, then go to Step 10.
7	**INSPECT TERMINAL VSS FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the VSS connector. • Inspect for poor connection at VSS terminals A and B (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 10.
8	**INSPECT VSS** • Inspect the VSS. (See 05-13-27 VEHICLE SPEED SENSOR (VSS) INSPECTION [SJ6A-EL].) • Is the VSS normal?	Yes	Go to the next step.
		No	Replace the VSS, then go to Step 10. (See 05-13-28 VEHICLE SPEED SENSOR (VSS) REMOVAL/INSTALLATION [SJ6A-EL].)
9	**INSPECT VSS CIRCUIT FOR OPEN CIRCUIT** • Inspect for continuity between VSS terminals (wiring harness-side) and TCM terminals (wiring harness-side). — Terminal B and terminal 2D — Terminal A and terminal 2C • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for open circuit, then go to the next step.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
10	**VERIFY TROUBLESHOOTING OF DTC P0722 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
11	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

DTC P0751 [SJ6A-EL]

id050208808100

DTC P0751	Shift solenoid A malfunction (stuck off)
DETECTION CONDITION	• TCM detects that shift solenoid A does not change from off when engine is running **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction conditions in two consecutive drive cycles. • The AT warning light illuminates if the TCM detects the above malfunction conditions in two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • DTC is stored in TCM memory.
POSSIBLE CAUSE	• Deteriorated ATF • ATF level low • Line pressure low — Oil pump malfunction — Shift solenoid A stuck off — Transmission malfunction • TCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT FOR DTC** • Turn the ignition switch to the ON position (engine off). • Inspect for DTCs. • Are any other DTCs output?	Yes	Follow the applicable DTC inspection procedure, then go to the next step. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	Go to the next step.
4	**INSPECT ATF CONDITION** • Turn the ignition switch to the LOCK position. • Inspect ATF condition. — Transparent red: Normal — Milky: Water mixed in fluid — Reddish brown: Deteriorated ATF • Is it normal? (See 05-13-9 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	If the ATF color milky or reddish brown, repair or replace AT, then go to Step 7.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
5	**INSPECT ATF LEVEL** • Start the engine. • Warm up the AT. • Is the ATF level within the specification? (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)	Yes	Go to the next step.
		No	Add ATF to the specified level, then go to Step 7. (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)
6	**INSPECT LINE PRESSURE** • Start the engine. • Measure the line pressure. (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].) • Are the line pressures within the specifications?	Yes	Go to the next step.
		No	• All ranges: Replace the oil pump or control valve body, then go to the next step. • Any ranges: Replace the AT, then go the next step. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)
7	**VERIFY TROUBLESHOOTING OF DTC P0751 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. 4. Gradually slow down and stop the vehicle. 5. Turn the ignition switch to the LOCK position. 6. Start the engine. 7. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the PENDING CODE same as the DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
8	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

DTC P0752 [SJ6A-EL]

id050208808200

DTC P0752	Shift solenoid A malfunction (stuck on)
DETECTION CONDITION	• TCM detects that shift solenoid A does not change from on when engine is running **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction conditions in two consecutive drive cycles. • The AT warning light illuminates if the TCM detects the above malfunction conditions in two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • DTC is stored in TCM memory.
POSSIBLE CAUSE	• Deteriorated ATF • ATF level low • Line pressure low — Oil pump malfunction — Shift solenoid A stuck on — Transmission malfunction • TCM malfunction

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT FOR DTC** • Turn the ignition switch to the ON position (engine off). • Inspect for DTCs. • Are any other DTCs output?	Yes	Follow the applicable DTC inspection procedure, then go to the next step. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	Go to the next step.
4	**INSPECT ATF CONDITION** • Turn the ignition switch to the LOCK position. • Inspect ATF condition. — Transparent red: Normal — Milky: Water mixed in fluid — Reddish brown: Deteriorated ATF • Is it normal? (See 05-13-9 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	If the ATF color milky or reddish brown, repair or replace AT, then go to Step 7.
5	**INSPECT ATF LEVEL** • Start the engine. • Warm up the AT. • Is the ATF level within the specification? (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)	Yes	Go to the next step.
		No	Add ATF to the specified level, then go to Step 7. (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)
6	**INSPECT LINE PRESSURE** • Start the engine. • Measure the line pressure. (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].) • Are the line pressures within the specifications?	Yes	Go to the next step.
		No	• All ranges: Replace the oil pump or control valve body, then go to the next step. • Any ranges: Replace the AT, then go the next step. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)
7	**VERIFY TROUBLESHOOTING OF DTC P0752 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. 4. Gradually slow down and stop the vehicle. 5. Turn the ignition switch to the LOCK position. 6. Start the engine. 7. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the PENDING CODE same as the DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
8	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0756 [SJ6A-EL]

id050208808400

DTC P0756	Shift solenoid B malfunction (stuck off)
DETECTION CONDITION	• TCM detects that shift solenoid B does not change from off when engine is running **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction conditions in two consecutive drive cycles. • The AT warning light illuminates if the TCM detects the above malfunction conditions in two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • DTC is stored in TCM memory.
POSSIBLE CAUSE	• Deteriorated ATF • ATF level low • Line pressure low — Oil pump malfunction — Shift solenoid B stuck off — Transmission malfunction • TCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT FOR DTC** • Turn the ignition switch to the ON position (engine off). • Inspect for DTCs. • Are any other DTCs output?	Yes	Follow the applicable DTC inspection procedure, then go to the next step. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	Go to the next step.
4	**INSPECT ATF CONDITION** • Turn the ignition switch to the LOCK position. • Inspect ATF condition. — Transparent red: Normal — Milky: Water mixed in fluid — Reddish brown: Deteriorated ATF • Is it normal? (See 05-13-9 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	If the ATF color milky or reddish brown, repair or replace AT, then go to Step 7.
5	**INSPECT ATF LEVEL** • Start the engine. • Warm up the AT. • Is the ATF level within the specification? (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)	Yes	Go to the next step.
		No	Add ATF to the specified level, then go to Step 7. (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)
6	**INSPECT LINE PRESSURE** • Start the engine. • Measure the line pressure. (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].) • Are the line pressures within the specifications?	Yes	Go to the next step.
		No	• All ranges: Replace the oil pump or control valve body, then go to the next step. • Any ranges: Replace the AT, then go the next step. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
7	**VERIFY TROUBLESHOOTING OF DTC P0756 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. 4. Gradually slow down and stop the vehicle. 5. Turn the ignition switch to the LOCK position. 6. Start the engine. 7. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the PENDING CODE same as the DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
8	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

DTC P0757 [SJ6A-EL]

id050208808500

DTC P0757	Shift solenoid B malfunction (stuck on)
DETECTION CONDITION	• TCM detects that shift solenoid B does not change from on when engine is running **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction conditions in two consecutive drive cycles. • The AT warning light illuminates if the TCM detects the above malfunction conditions in two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • DTC is stored in TCM memory.
POSSIBLE CAUSE	• Deteriorated ATF • ATF level low • Line pressure low — Oil pump malfunction — Shift solenoid B stuck on — Transmission malfunction • TCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT FOR DTC** • Turn the ignition switch to the ON position (engine off). • Inspect for DTCs. • Are any other DTCs output?	Yes	Follow the applicable DTC inspection procedure, then go to the next step. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
4	**INSPECT ATF CONDITION** • Turn the ignition switch to the LOCK position. • Inspect ATF condition. — Transparent red: Normal — Milky: Water mixed in fluid — Reddish brown: Deteriorated ATF • Is it normal? (See 05-13-9 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	If the ATF color milky or reddish brown, repair or replace AT, then go to Step 7.
5	**INSPECT ATF LEVEL** • Start the engine. • Warm up the AT. • Is the ATF level within the specification? (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)	Yes	Go to the next step.
		No	Add ATF to the specified level, then go to Step 7. (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)
6	**INSPECT LINE PRESSURE** • Start the engine. • Measure the line pressure. (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].) • Are the line pressures within the specifications?	Yes	Go to the next step.
		No	• All ranges: Replace the oil pump or control valve body, then go to the next step. • Any ranges: Replace the AT, then go the next step. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)
7	**VERIFY TROUBLESHOOTING OF DTC P0757 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. 4. Gradually slow down and stop the vehicle. 5. Turn the ignition switch to the LOCK position. 6. Start the engine. 7. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the PENDING CODE same as the DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
8	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0761 [SJ6A-EL]

id050208808700

DTC P0761	Shift solenoid C malfunction (stuck off)
DETECTION CONDITION	• TCM detects that shift solenoid C does not change from off when engine is running **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction conditions in two consecutive drive cycles. • The AT warning light illuminates if the TCM detects the above malfunction conditions in two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • DTC is stored in TCM memory.
POSSIBLE CAUSE	• Deteriorated ATF • ATF level low • Line pressure low — Oil pump malfunction — Shift solenoid C stuck off — Transmission malfunction • TCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT FOR DTC** • Turn the ignition switch to the ON position (engine off). • Inspect for DTCs. • Are any other DTCs output?	Yes	Follow the applicable DTC inspection procedure, then go to the next step. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	Go to the next step.
4	**INSPECT ATF CONDITION** • Turn the ignition switch to the LOCK position. • Inspect ATF condition. — Transparent red: Normal — Milky: Water mixed in fluid — Reddish brown: Deteriorated ATF • Is it normal? (See 05-13-9 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	If the ATF color milky or reddish brown, repair or replace AT, then go to Step 7.
5	**INSPECT ATF LEVEL** • Start the engine. • Warm up the AT. • Is the ATF level within the specification? (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)	Yes	Go to the next step.
		No	Add ATF to the specified level, then go to Step 7. (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)
6	**INSPECT LINE PRESSURE** • Start the engine. • Measure the line pressure. (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].) • Are the line pressures within the specifications?	Yes	Go to the next step.
		No	• All ranges: Replace the oil pump or control valve body, then go to the next step. • Any ranges: Replace the AT, then go the next step. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
7	**VERIFY TROUBLESHOOTING OF DTC P0761 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. 4. Gradually slow down and stop the vehicle. 5. Turn the ignition switch to the LOCK position. 6. Start the engine. 7. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the PENDING CODE same as the DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
8	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

DTC P0762 [SJ6A-EL]

id050208808800

DTC P0762	Shift solenoid C malfunction (stuck on)
DETECTION CONDITION	• TCM detects that shift solenoid C doe not change from on when engine is running **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction conditions in two consecutive drive cycles. • The AT warning light illuminates if the TCM detects the above malfunction conditions in two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • DTC is stored in TCM memory.
POSSIBLE CAUSE	• Deteriorated ATF • ATF level low • Line pressure low — Oil pump malfunction — Shift solenoid C stuck on — Transmission malfunction • TCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT FOR DTC** • Turn the ignition switch to the ON position (engine off). • Inspect for DTCs. • Are any other DTCs output?	Yes	Follow the applicable DTC inspection procedure, then go to the next step. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
4	**INSPECT ATF CONDITION** • Turn the ignition switch to the LOCK position. • Inspect ATF condition. — Transparent red: Normal — Milky: Water mixed in fluid — Reddish brown: Deteriorated ATF • Is it normal? (See 05-13-9 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	If the ATF color milky or reddish brown, repair or replace AT, then go to Step 7.
5	**INSPECT ATF LEVEL** • Start the engine. • Warm up the AT. • Is the ATF level within the specification? (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)	Yes	Go to the next step.
		No	Add ATF to the specified level, then go to Step 7. (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)
6	**INSPECT LINE PRESSURE** • Start the engine. • Measure the line pressure. (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].) • Are the line pressures within the specifications?	Yes	Go to the next step.
		No	• All ranges: Replace the oil pump or control valve body, then go to the next step. • Any ranges: Replace the AT, then go the next step. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)
7	**VERIFY TROUBLESHOOTING OF DTC P0762 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. 4. Gradually slow down and stop the vehicle. 5. Turn the ignition switch to the LOCK position. 6. Start the engine. 7. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the PENDING CODE same as the DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
8	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0766 [SJ6A-EL]

id050208809000

DTC P0766	**Shift solenoid D malfunction (stuck off)** **Shift solenoid G malfunction (stuck on)**
DETECTION CONDITION	• TCM detects that shift solenoid D does not change from off when engine is running • TCM detects that shift solenoid G does not change from on when engine is running **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction conditions in two consecutive drive cycles. • The AT warning light illuminates if the TCM detects the above malfunction conditions in two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • DTC is stored in TCM memory.
POSSIBLE CAUSE	• Deteriorated ATF • ATF level low • Line pressure low — Oil pump malfunction — Shift solenoid D stuck off — Shift solenoid G stuck on — Transmission malfunction • TCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT FOR DTC** • Turn the ignition switch to the ON position (engine off). • Inspect for DTCs. • Are any other DTCs output?	Yes	Follow the applicable DTC inspection procedure, then go to the next step. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	Go to the next step.
4	**INSPECT ATF CONDITION** • Turn the ignition switch to the LOCK position. • Inspect ATF condition. — Transparent red: Normal — Milky: Water mixed in fluid — Reddish brown: Deteriorated ATF • Is it normal? (See 05-13-9 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	If the ATF color milky or reddish brown, repair or replace AT, then go to Step 7.
5	**INSPECT ATF LEVEL** • Start the engine. • Warm up the AT. • Is the ATF level within the specification? (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)	Yes	Go to the next step.
		No	Add ATF to the specified level, then go to Step 7. (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)
6	**INSPECT LINE PRESSURE** • Start the engine. • Measure the line pressure. (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].) • Are the line pressures within the specifications?	Yes	Go to the next step.
		No	• All ranges: Replace the oil pump or control valve body, then go to the next step. • Any ranges: Replace the AT, then go the next step. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
7	**VERIFY TROUBLESHOOTING OF DTC P0766 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. 4. Gradually slow down and stop the vehicle. 5. Turn the ignition switch to the LOCK position. 6. Start the engine. 7. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the PENDING CODE same as the DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
8	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

DTC P0781 [SJ6A-EL]

id050208811200

DTC P0781	1-2 shift valve malfunction
DETECTION CONDITION	• TCM detects 1–2 shift valve malfunction. **Diagnostic support note:** • The MIL illuminates if the the TCM detects the above malfunction condition in two consecutive drive cycles. • The AT warning light illuminates if the TCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • DTC is stored in TCM memory.
POSSIBLE CAUSE	• Deteriorated ATF • ATF level low • Line pressure low — Oil pump malfunction — 1-2 shift valve stuck — Transmission malfunction • TCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT FOR DTC** • Turn the ignition switch to the ON position (engine off). • Inspect for DTCs. • Are any other DTCs output?	Yes	Follow the applicable DTC inspection procedure, then go to the next step. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
4	**INSPECT ATF CONDITION** • Turn the ignition switch to the LOCK position. • Inspect ATF condition. — Transparent red: Normal — Milky: Water mixed in fluid — Reddish brown: Deteriorated ATF • Is it normal? (See 05-13-9 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	If the ATF color milky or reddish brown, repair or replace AT, then go to Step 7.
5	**INSPECT ATF LEVEL** • Start the engine. • Warm up the AT. • Is the ATF level within the specification? (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)	Yes	Go to the next step.
		No	Add ATF to the specified level, then go to Step 7. (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)
6	**INSPECT LINE PRESSURE** • Start the engine. • Measure the line pressure. (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].) • Are the line pressures within the specifications?	Yes	Go to the next step.
		No	• All ranges: Replace the oil pump or control valve body, then go to the next step. • Any ranges: Replace the AT, then go the next step. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)
7	**VERIFY TROUBLESHOOTING OF DTC P0781 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. 4. Gradually slow down and stop the vehicle. 5. Turn the ignition switch to the LOCK position. 6. Start the engine. 7. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the PENDING CODE same as the DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
8	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0813 [SJ6A-EL]

id050208811300

DTC P0813	Reverse sequence valve malfunction
DETECTION CONDITION	• TCM detects reverse sequence valve malfunction. **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition in two consecutive drive cycles. • The AT warning light illuminates if the TCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • DTC is stored in TCM memory.
POSSIBLE CAUSE	• Deteriorated ATF • ATF level low • Line pressure low — Oil pump malfunction — Reverse sequence valve stuck — Transmission malfunction • TCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT FOR DTC** • Turn the ignition switch to the ON position (engine off). • Inspect for DTCs. • Are any other DTCs output?	Yes	Follow the applicable DTC inspection procedure, then go to the next step. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	Go to the next step.
4	**INSPECT ATF CONDITION** • Turn the ignition switch to the LOCK position. • Inspect ATF condition. — Transparent red: Normal — Milky: Water mixed in fluid — Reddish brown: Deteriorated ATF • Is it normal? (See 05-13-9 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	If the ATF color milky or reddish brown, repair or replace AT, then go to Step 7.
5	**INSPECT ATF LEVEL** • Start the engine. • Warm up the AT. • Is the ATF level within the specification? (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)	Yes	Go to the next step.
		No	Add ATF to the specified level, then go to Step 7. (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)
6	**INSPECT LINE PRESSURE** • Start the engine. • Measure the line pressure. (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].) • Are the line pressures within the specifications?	Yes	Go to the next step.
		No	• All ranges: Replace the oil pump or control valve body, then go to the next step. • Any ranges: Replace the AT, then go the next step. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
7	**VERIFY TROUBLESHOOTING OF DTC P0813 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. 4. Gradually slow down and stop the vehicle. 5. Turn the ignition switch to the LOCK position. 6. Start the engine. 7. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the PENDING CODE same as the DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
8	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0819 [SJ6A-EL]

id050208802700

DTC P0819	Manual switch/up switch/down switch circuit malfunction (open circuit/short circuit)
DETECTION CONDITION	**M range switch circuit malfunction** • M range switch remains on for **2 s or more** except in D range. **Up switch or down switch circuit malfunction** • When all of the following conditions are met: — M range switch off. — Except D range — Up or down switch remains on for **10 s or more**. **Diagnostic support note:** • The MIL does not illuminate. • The AT warning light illuminates if the TCM detects the above malfunction condition during the first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM connector or terminal malfunction • Selector lever component connector or terminal malfunction • Short to GND in wiring harness between selector lever component terminal B and TCM terminal 2G • Short to GND in wiring harness between selector lever component terminal D and TCM terminal 2J • Short to GND in wiring harness between selector lever component terminal F and TCM terminal 2F • M range switch malfunction • Up switch malfunction • Down switch malfunction. • Open circuit in wiring harness between selector lever component terminal A and body GND • Open circuit in wiring harness between selector lever component terminal B and TCM terminal 2G • Open circuit in wiring harness between selector lever component terminal D and TCM terminal 2J • Open circuit in wiring harness between selector lever component terminal F and TCM terminal 2F • TCM malfunction

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Disconnect the TCM connector. • Inspect for poor connection at TCM terminals 2F, 2G and 2J (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 9.
4	**INSPECT SELECTOR LEVER COMPONENT CONNECTOR FOR POOR CONNECTION** • Disconnect the selector lever component connector. • Inspect for poor connection at selector lever component terminals A, B, D and F (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 9.
5	**INSPECT M RANGE SWITCH, UP SWITCH, AND DOWN SWITCH CIRCUIT FOR SHORT TO GND** • Inspect for continuity between selector lever component terminals (wiring harness-side) and body GND. — Terminal B and body GND (M range switch) — Terminal D and body GND (up switch) — Terminal F and body GND (down switch) • Is there continuity?	Yes	Repair or replace the harness, then go to Step 9.
		No	Go to the next step.
6	**INSPECT M RANGE SWITCH, UP SWITCH, AND DOWN SWITCH** • Inspect the M range switch, up switch, and down switch. (See 05-14-3 SELECTOR LEVER INSPECTION) • Are the switches normal?	Yes	Go to the next step.
		No	Replace the selector lever, then go to Step 9. (See 05-14-9 SELECTOR LEVER REMOVAL/ INSTALLATION.)
7	**INSPECT M RANGE SWITCH, UP SWITCH, AND DOWN SWITCH CIRCUIT FOR OPEN CIRCUIT** • Inspect for continuity between selector lever component terminal A (wiring harness-side) and body GND. • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the harness, then go to Step 9.
8	**INSPECT M RANGE SWITCH, UP SWITCH, AND DOWN SWITCH CIRCUIT FOR OPEN CIRCUIT** • Inspect for continuity between TCM terminals (wiring harness-side) and selector lever component terminals (wiring harness-side). — Terminal 2G and terminal B (M range switch) — Terminal 2J and terminal D (up switch) — Terminal 2F and terminal F (down switch) • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the harness, then go to the next step.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
9	**VERIFY TROUBLESHOOTING OF DTC P0819 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm up the engine to normal operating temperature. 3. Drive the vehicle in M range, and shift the selector lever (operate up and down switches) between 1GR to 6GR for 10 s or more. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
10	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0826 [SJ6A-EL]

id050208811400

DTC P0826	Steering shift switch circuit malfunction (open circuit/short to ground)
DETECTION CONDITION	• TCM detects short circuit or short to ground in steering shift switch circuit when engine is running. **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during the first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • DTC is stored in the TCM memory.
POSSIBLE CAUSE	• Audio control switch connector or terminal malfunction • Short to GNDin wiring harness between audio control switch terminal F and TCM terminal 2AF • Steering shift switch malfunction • TCM connector or terminal malfunction • Short to power in wiring harness between audio control switch terminal F and TCM terminal 2AF • Open circuit in wiring harness between audio control switch terminal F and TCM terminal 2AF • Open circuit in wiring harness between audio control switch terminal C and TCM terminal 2AB • TCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
3	**INSPECT AUDIO CONTROL SWITCH CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the audio control switch connector. • Inspect for poor connection at audio control switch terminals F and C (such as damaged/ pulled-out pins, corrosion). • Are the connector and terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 10.
4	**INSPECT SHIFT CONTROL SIGNAL CIRCUIT FOR SHORT TO GROUND** • Inspect for continuity between the audio control switch (wiring harness-side) terminal F and body ground. • Is there continuity?	Yes	Repair or replace the wiring harness, then go to Step 10.
		No	Go to the next step.
5	**INSPECT STEERING SHIFT SWITCH** • Inspect the steering shift switch. (See 05-14-15 STEERING SHIFT SWITCH INSPECTION.) • Is the steering shift switch normal?	Yes	Go to the next step.
		No	Replace the steering shift switch, then go to Step 10. (See 09-20-21 AUDIO CONTROL SWITCH REMOVAL/ INSTALLATION.)
6	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Disconnect the TCM connector. • Inspect for poor connection at TCM terminals 2AB and 2AF (such as damaged/pulled-out pins, corrosion). • Are the connector and terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 10.
7	**INSPECT SHIFT CONTROL SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the ON position (engine off). • Measure the voltage at TCM (wiring harness-side) terminal 2AF. • Is the voltage 5.0 V or more?	Yes	Repair or replace the wiring harness for short to power supply, then go to Step 10.
		No	Go to the next step.
8	**INSPECT SHIFT CONTROL SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Inspect for continuity between the audio control switch (wiring harness-side) terminal F and TCM (wiring harness-side) terminal 2AF. • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness, then go to Step 10.
9	**INSPECT SHIFT CONTROL SIGNAL GROUND CIRCUIT FOR OPEN CIRCUIT** • Inspect for continuity between the audio control switch (wiring harness-side) terminal C and TCM (wiring harness-side) terminal 2AB. • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness, then go to Step 10.
10	**VERIFY TROUBLESHOOTING OF DTC P0826 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine to normal operating temperature. 3. Drive the vehicle in M range, and shift the steering shift switch (operate up and down switches) between 1GR to 6GR for 10 s or more. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
11	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0882 [SJ6A-EL]

id050208802800

DTC P0882	TCM B+ low (less than 9 V)
DETECTION CONDITION	• Voltage of **less than 9 V** detected at TCM terminal 1AD when engine is running. **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during the first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• Melted ROOM 15 A fuse • Poor connection of ROOM 15 A fuse • TCM connector or terminal malfunction • Short to GND in wiring harness between ROOM 15 A fuse and TCM terminal 1AD • Open circuit in wiring harness between ROOM 15 A fuse and TCM terminal 1AD • TCM malfunction

TCM
HARNESS-SIDE CONNECTOR

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT FUSE** • Turn the ignition switch to the LOCK position. • Inspect ROOM 15 A fuse for malfunction. • is it normal?	Yes	Go to the next step.
		No	• If fuse has been melted, go to the next step. • If fuse is not installed correctly, install it correctly, then go to Step 8.
4	**INSPECT VOLTAGE OF POWER SUPPLY CIRCUIT** • Inspect for voltage TCM terminal 1AD (wiring harness-side). • Is the voltage **B+**?	Yes	Go to the next step.
		No	Go to Step 6.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
5	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminals 1AD (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to Step 8.
		No	Repair or replace the connector and/or terminal, then go to Step 8.
6	**INSPECT POWER SUPPLY CIRCUIT FOR SHORT TO GND** • Disconnect the positive battery cable. • Inspect for continuity between the fuse terminals and body GND. — ROOM 15 A fuse terminal and body GND • Is there continuity?	Yes	Repair or replace the wiring harness and install new fuse, then go to Step 8.
		No	Go to the next step.
7	**INSPECT POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT** • Inspect for continuity between TCM terminal and fuse terminals (wiring harness-side). — Terminal 1AD and ROOM 15 A fuse • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the harness, then go to the next step.
8	**VERIFY TROUBLESHOOTING OF DTC P0882 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
9	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

DTC P0961 [SJ6A-EL]

id050208803100

DTC P0961	Line pressure control solenoid range/performance (stuck)
DETECTION CONDITION	• Feedback current corresponding to solenoid current command value is irregular when engine is running. **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during the first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• Deteriorated ATF • ATF level low • Line pressure low — Oil pump malfunction — Line pressure control solenoid stuck — Transmission malfunction • TCM malfunction

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT ATF CONDITION** • Turn the ignition switch to the LOCK position. • Inspect the ATF condition. — Clear red: Normal — Light red (pink): Water mixed in fluid — Reddish brown: Deteriorated ATF • Is it normal? (See 05-13-9 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	If the ATF color is light red or reddish brown, replace ATF, then go to Step 6. (See 05-13-10 AUTOMATIC TRANSMISSION FLUID (ATF) REPLACEMENT [SJ6A-EL].)
4	**INSPECT ATF LEVEL** • Start the engine. • Warm up the AT. • Is the ATF level within the specification? (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)	Yes	Go to the next step.
		No	Add ATF to the specified level, then go to Step 6. (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)
5	**INSPECT LINE PRESSURE** • Start the engine. • Measure the line pressure. (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].) • Are the line pressures within the specifications?	Yes	Go to the next step.
		No	• All ranges: Replace the oil pump or control valve body, then go to the next step. • Any ranges: Replace the AT, then go the next step. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)
6	**VERIFY TROUBLESHOOTING OF DTC P0961 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
7	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0962 [SJ6A-EL]

id050208803200

DTC P0962	Line pressure control solenoid circuit malfunction (short to ground/open circuit)
DETECTION CONDITION	• Open or short circuit in line pressure control solenoid signal system (while TCM monitors solenoid output voltage, the voltage that differs from the signal output by CPU in TCM is detected). **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during the first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM connector or terminal malfunction • Short to GND in wiring harness between line pressure control solenoid terminal B and TCM terminal 1R • Short to GND in wiring harness between line pressure control solenoid terminal A and TCM terminal 1E • Coupler component connector or terminal malfunction • Open circuit between line pressure control solenoid terminal B and TCM terminal 1R • Open circuit between line pressure control solenoid terminal A and TCM terminal 1E • Line pressure control solenoid connector or terminal malfunction • Line pressure control solenoid malfunction • TCM malfunction

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminals 1R and 1E (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 13.
4	**INSPECT RESISTANCE OF LINE PRESSURE CONTROL SOLENOID CIRCUIT** • Inspect for resistance between TCM terminals 1R and 1E (wiring harness-side). • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	Go to go to Step 7.
5	**INSPECT LINE PRESSURE CONTROL SOLENOID CIRCUIT FOR SHORT TO GND** • Disconnect the coupler component connector. • Inspect for continuity between TCM terminals (wiring harness-side) and body GND. — Terminal 1R and body GND — Terminal 1E and body GND • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for short to GND, then go to Step 13.
6	**INSPECT LINE PRESSURE CONTROL SOLENOID CIRCUIT FOR SHORT TO GND** • Inspect for continuity between coupler component terminals (wiring harness-side) and body GND. — Terminal J and body GND — Terminal I and body GND • Is there continuity?	Yes	Go to go to Step 13.
		No	Repair or replace the coupler component, then go to the next step.
7	**INSPECT COUPLER COMPONENT CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Inspect for poor connection at coupler component terminals J and I (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 13.
8	**INSPECT RESISTANCE OF LINE PRESSURE CONTROL SOLENOID CIRCUIT** • Inspect the resistance between coupler component (transmission case side) terminals J and I. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	Go to Step 10.
9	**INSPECT LINE PRESSURE CONTROL SOLENOID CIRCUIT FOR OPEN CIRCUIT** • Inspect for continuity between TCM terminals and coupler component terminals (wiring harness-side). — Terminal 1R and terminal J — Terminal 1E and terminal I • Is there continuity?	Yes	Go to Step 13.
		No	Repair or replace the wiring harness for open circuit, go to Step 13.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
10	**INSPECT LINE PRESSURE CONTROL SOLENOID CONNECTOR FOR POOR CONNECTION** • Disconnect the line pressure control solenoid connector. • Inspect for poor connection at line pressure control solenoid terminals A and B (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 13.
11	**INSPECT LINE PRESSURE CONTROL SOLENOID** • Inspect the line pressure control solenoid. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is the line pressure control solenoid normal?	Yes	Go to the next step.
		No	Replace the control valve body, then go to Step 13. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)
12	**INSPECT LINE PRESSURE CONTROL SOLENOID CIRCUIT FOR OPEN CIRCUIT** • Inspect for continuity between coupler component terminals and line pressure control solenoid terminals (wiring harness-side). — Terminal J and terminal B — Terminal I and terminal A • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the coupler component, then go to the next step.
13	**VERIFY TROUBLESHOOTING OF DTC P0962 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
14	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0963 [SJ6A-EL]

id050208803300

DTC P0963	Line pressure control solenoid circuit malfunction (short to power)
DETECTION CONDITION	• Short circuit in line pressure control solenoid signal system (while TCM monitors solenoid output voltage, the voltage that differs from the signal output by CPU in TCM is detected). **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during the first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM connector or terminal malfunction • Short to power supply in wiring harness between line pressure control solenoid terminal B and TCM terminal 1R • Short to power supply in wiring harness between line pressure control solenoid terminal A and TCM terminal 1E • Line pressure control solenoid malfunction • TCM malfunction

COUPLER COMPONENT CONNECTOR
HARNESS-SIDE CONNECTOR

LINE PRESSURE CONTROL SOLENOID
HARNESS-SIDE CONNECTOR

AUTOMATIC TRANSMISSION
(COUPLE COMPONENT)

TCM

TCM
HARNESS-SIDE CONNECTOR

	1AF	1AA		1Y	1R		1P		1H		1D
1AG	1AC	1AB	1Z	1V	1S	1Q	1O	1L	1I	1E	1A
1AH	1AD			1W	1T			1M	1J	1F	1B
1AI	1AE			1X	1U			1N	1K	1G	1C

2AF	2AB			2R	2O		2J	2F	
2AG	2AC	2Y	2V	2S	2P	2M	2K	2G	2C
2AH	2AD	2Z	2W	2T	2Q	2N	2L	2H	2D	2A
2AI	2AE	2AA	2X	2U				2I	2E	2B

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminals 1R and 1E (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 7.
4	**INSPECT LINE PRESSURE CONTROL SOLENOID CIRCUIT FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the ON position (engine off). • Measure the voltage at TCM (wiring harness-side) terminals 1R and 1E. • Is there **0 V** at the TCM wiring harness-side connector terminals?	Yes	Go to go to Step 7.
		No	Go to the next step.
5	**INSPECT LINE PRESSURE CONTROL SOLENOID CIRCUIT FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Turn the ignition switch to the ON position (engine off). • Measure the voltage at TCM (wiring harness-side) terminals 1R and 1E. • Is there **0 V** at the TCM wiring harness-side connector terminals?	Yes	Go to the next step.
		No	Repair or replace the wiring harness (TCM—coupler component connector) for short to power supply, then go to Step 7.
6	**INSPECT LINE PRESSURE CONTROL SOLENOID** • Inspect the line pressure control solenoid. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is the line pressure control solenoid normal?	Yes	Repair or replace the wiring harness (coupler component connector—line pressure control solenoid) for short to power supply, then go to the next step.
		No	Replace the control valve body, then go to the next step. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)
7	**VERIFY TROUBLESHOOTING OF DTC P0963 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
8	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0969 [SJ6A-EL]

id050208811500

DTC P0969	Shift solenoid F range/performance (stuck)
DETECTION CONDITION	• Feedback current corresponding to solenoid current command value is irregular when engine is running. **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during the first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• Deteriorated ATF • ATF level low • Line pressure low — Oil pump malfunction — Shift solenoid F stuck — Transmission malfunction • TCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT ATF CONDITION** • Turn the ignition switch to the LOCK position. • Inspect the ATF condition. — Clear red: Normal — Light red (pink): Water mixed in fluid — Reddish brown: Deteriorated ATF • Is it normal? (See 05-13-9 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	If the ATF color is light red or reddish brown, replace ATF, then go to Step 6. (See 05-13-10 AUTOMATIC TRANSMISSION FLUID (ATF) REPLACEMENT [SJ6A-EL].)
4	**INSPECT ATF LEVEL** • Start the engine. • Warm up the AT. • Is the ATF level within the specification? (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)	Yes	Go to the next step.
		No	Add ATF to the specified level, then go to Step 6. (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)
5	**INSPECT LINE PRESSURE** • Start the engine. • Measure the line pressure. (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].) • Are the line pressures within the specifications?	Yes	Go to the next step.
		No	• All ranges: Replace the oil pump or control valve body, then go to the next step. • Any ranges: Replace the AT, then go the next step. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)
6	**VERIFY TROUBLESHOOTING OF DTC P0969 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
7	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

DTC P0970 [SJ6A-EL]

id050208811600

DTC P0970	Shift solenoid F circuit malfunction (short to ground/open circuit)
DETECTION CONDITION	• Open or short circuit in shift solenoid F signal system (while TCM monitors solenoid output voltage, the voltage that differs from the signal output by CPU in TCM is detected). **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during the first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM connector or terminal malfunction • Short to GND in wiring harness between shift solenoid F terminal B and TCM terminal 1Z • Short to GND in wiring harness between shift solenoid F terminal A and TCM terminal 1O • Coupler component connector or terminal malfunction • Open circuit between shift solenoid F terminal B and TCM terminal 1Z • Open circuit between shift solenoid F terminal A and TCM terminal 1O • Shift solenoid F connector or terminal malfunction • Shift solenoid F malfunction • TCM malfunction

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminals 1Z and 1O (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 13.
4	**INSPECT RESISTANCE OF SHIFT SOLENOID F CIRCUIT** • Inspect for resistance between TCM terminals 1Z and 1O (wiring harness-side). • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	Go to go to Step 7.
5	**INSPECT SHIFT SOLENOID F CIRCUIT FOR SHORT TO GND** • Disconnect the coupler component connector. • Inspect for continuity between TCM terminals (wiring harness-side) and body GND. — Terminal 1Z and body GND — Terminal 1O and body GND • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for short to GND, then go to Step 13.
6	**INSPECT SHIFT SOLENOID F CIRCUIT FOR SHORT TO GND** • Inspect for continuity between coupler component terminals (wiring harness-side) and body GND. — Terminal F and body GND — Terminal E and body GND • Is there continuity?	Yes	Go to go to Step 13.
		No	Repair or replace the coupler component, then go to the next step.
7	**INSPECT COUPLER COMPONENT CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Inspect for poor connection at coupler component terminals H and G (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 13.
8	**INSPECT RESISTANCE OF SHIFT SOLENOID F CIRCUIT** • Inspect the resistance between coupler component (transmission case side) terminals H and G. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	Go to Step 10.
9	**INSPECT SHIFT SOLENOID F CIRCUIT FOR OPEN CIRCUIT** • Inspect for continuity between TCM terminals and coupler component terminals (wiring harness-side). — Terminal 1Z and terminal F — Terminal 1O and terminal E • Is there continuity?	Yes	Go to Step 13.
		No	Repair or replace the wiring harness for open circuit, go to Step 13.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
10	**INSPECT SHIFT SOLENOID F CONNECTOR FOR POOR CONNECTION** • Disconnect the shift solenoid F connector. • Inspect for poor connection at shift solenoid F terminals A and B (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 13.
11	**INSPECT SHIFT SOLENOID F** • Inspect the shift solenoid F. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is the shift solenoid F normal?	Yes	Go to the next step.
		No	Replace the control valve body, then go to Step 13. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)
12	**INSPECT SHIFT SOLENOID F CIRCUIT FOR OPEN CIRCUIT** • Inspect for continuity between coupler component terminals and shift solenoid F terminals (wiring harness-side). — Terminal F and terminal B — Terminal E and terminal A • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the coupler component, then go to the next step.
13	**VERIFY TROUBLESHOOTING OF DTC P0970 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
14	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0971 [SJ6A-EL]

id050208811700

DTC P0971	Shift solenoid F circuit malfunction (short to power)
DETECTION CONDITION	• Short circuit in shift solenoid F signal system (while TCM monitors solenoid output voltage, the voltage that differs from the signal output by CPU in TCM is detected). **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during the first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM connector or terminal malfunction • Short to power supply in wiring harness between shift solenoid F terminal B and TCM terminal 1Z • Short to power supply in wiring harness between shift solenoid F terminal A and TCM terminal 1O • Shift solenoid F malfunction • TCM malfunction

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminals 1Z and 1O (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 7.
4	**INSPECT SHIFT SOLENOID F CIRCUIT FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the ON position (engine off). • Measure the voltage at TCM (wiring harness-side) terminals 1Z and 1O. • Is there **0 V** at the TCM wiring harness-side connector terminals?	Yes	Go to go to Step 7.
		No	Go to the next step.
5	**INSPECT SHIFT SOLENOID F CIRCUIT FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Turn the ignition switch to the ON position (engine off). • Measure the voltage at TCM (wiring harness-side) terminals 1Z and 1O. • Is there **0 V** at the TCM wiring harness-side connector terminals?	Yes	Go to the next step.
		No	Repair or replace the wiring harness (TCM—coupler component connector) for short to power supply, then go to Step 7.
6	**INSPECT SHIFT SOLENOID F** • Inspect the shift solenoid F. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is the shift solenoid F normal?	Yes	Repair or replace the wiring harness (coupler component connector—shift solenoid F) for short to power supply, then go to the next step.
		No	Replace the control valve body, then go to the next step. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)
7	**VERIFY TROUBLESHOOTING OF DTC P0971 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
8	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0973 [SJ6A-EL]

id050208803400

DTC P0973	Shift solenoid A circuit malfunction (short to ground)
DETECTION CONDITION	• Short to ground in shift solenoid A signal system (while TCM monitors solenoid output voltage, the voltage that differs from the signal output by CPU in TCM is detected). **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM connector or terminal malfunction • Coupler component connector or terminal malfunction • Shift solenoid A connector or terminal malfunction • Short to GND in wiring harness between shift solenoid A terminal A and TCM terminal 1AF • Shift solenoid A malfunction • TCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
3	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminal 1AF (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 9.
4	**INSPECT RESISTANCE OF SHIFT SOLENOID A CIRCUIT** • Inspect for resistance between TCM terminal 1AF (wiring harness-side) and body GND. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to Step 9.
		No	Go to the next step.
5	**INSPECT COUPLER COMPONENT CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Inspect for poor connection at coupler component terminal O (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 9.
6	**INSPECT RESISTANCE OF SHIFT SOLENOID A CIRCUIT** • Inspect the resistance between coupler component (transmission case side) terminal O and body GND. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	Go to Step 9.
7	**INSPECT SHIFT SOLENOID A CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the shift solenoid A connector. • Inspect for poor connection at shift solenoid A terminal A (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 9.
8	**INSPECT SHIFT SOLENOID A** • Inspect the shift solenoid A. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is the shift solenoid A normal?	Yes	Repair or replace the wiring harness (coupler component connector—shift solenoid A) for short to GND, then go to the next step.
		No	Replace the control valve body, then go to the next step. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)
9	**VERIFY TROUBLESHOOTING OF DTC P0973 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
10	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0974 [SJ6A-EL]

id050208803500

DTC P0974	Shift solenoid A circuit malfunction (short to power/open circuit)
DETECTION CONDITION	• Open or short circuit in shift solenoid A signal system (while TCM monitors solenoid output voltage, the voltage that differs from the signal output by CPU in TCM is detected). **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM connector or terminal malfunction • Coupler component connector or terminal malfunction • Shift solenoid A connector or terminal malfunction • Short to GND in wiring harness between shift solenoid A terminal A and TCM terminal 1AF • Shift solenoid A malfunction • Short to power supply in wiring harness between shift solenoid A terminal A and TCM terminal 1AF • TCM malfunction

COUPLER COMPONENT CONNECTOR
HARNESS-SIDE CONNECTOR

AUTOMATIC TRANSMISSION
(COUPLE COMPONENT)

SHIFT SOLENOID A
HARNESS-SIDE CONNECTOR

TCM
HARNESS-SIDE CONNECTOR

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminal 1AF (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 11.
4	**INSPECT RESISTANCE OF SHIFT SOLENOID A CIRCUIT** • Inspect for resistance between TCM terminal 1AF (wiring harness-side) and body GND. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to Step 9.
		No	Go to the next step.
5	**INSPECT COUPLER COMPONENT CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Inspect for poor connection at coupler component terminal O (such as damaged/ pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 11.
6	**INSPECT RESISTANCE OF SHIFT SOLENOID A CIRCUIT** • Inspect the resistance between coupler component (transmission case side) terminal O and body GND. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to Step 11.
		No	Go to the next step.
7	**INSPECT SHIFT SOLENOID A CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the shift solenoid A connector. • Inspect for poor connection at shift solenoid A terminal A (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 11.
8	**INSPECT SHIFT SOLENOID A** • Inspect the shift solenoid A. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is the shift solenoid A normal?	Yes	Repair or replace the wiring harness (coupler component—shift solenoid A) for short to GND, then go to Step 11.
		No	Replace the control valve body, then go to Step 11. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)
9	**INSPECT SHIFT SOLENOID A CIRCUIT FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the ON position (engine off). • Measure the voltage at TCM (wiring harness-side) terminal 1AF. • Is there **0 V** at the TCM wiring harness-side connector terminals?	Yes	Go to Step 11.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
10	**INSPECT SHIFT SOLENOID A CIRCUIT FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Turn the ignition switch to the ON position (engine off). • Measure the voltage at coupler component (wiring harness-side) terminal O. • Is there **0 V** at the TCM wiring harness-side connector terminals?	Yes	Repair or replace the wiring harness (TCM—coupler component) for short to power supply, then go to the next step.
		No	Repair or replace the wiring harness (coupler component—shift solenoid A) for short to power supply, then go to the next step.
11	**VERIFY TROUBLESHOOTING OF DTC P0974 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
12	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0976 [SJ6A-EL]

id050208803600

DTC P0976	Shift solenoid B circuit malfunction (short to ground)
DETECTION CONDITION	• Short to ground in shift solenoid B signal system (while TCM monitors solenoid output voltage, the voltage that differs from the signal output by CPU in TCM is detected). **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM connector or terminal malfunction • Coupler component connector or terminal malfunction • Shift solenoid B connector or terminal malfunction • Short to GND in wiring harness between shift solenoid B terminal A and TCM terminal 1AB • Shift solenoid B malfunction • TCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
3	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminal 1AB (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 9.
4	**INSPECT RESISTANCE OF SHIFT SOLENOID B CIRCUIT** • Inspect for resistance between TCM terminal 1AB (wiring harness-side) and body GND. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to Step 9.
		No	Go to the next step.
5	**INSPECT COUPLER COMPONENT CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Inspect for poor connection at coupler component terminal N (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 9.
6	**INSPECT RESISTANCE OF SHIFT SOLENOID B CIRCUIT** • Inspect the resistance between coupler component (transmission case side) terminal N and body GND. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	Go to Step 9.
7	**INSPECT SHIFT SOLENOID B CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the shift solenoid B connector. • Inspect for poor connection at shift solenoid B terminal A (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 9.
8	**INSPECT SHIFT SOLENOID B** • Inspect the shift solenoid B. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is the shift solenoid B normal?	Yes	Repair or replace the wiring harness (coupler component connector—shift solenoid B) for short to GND, then go to the next step.
		No	Replace the control valve body, then go to the next step. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)
9	**VERIFY TROUBLESHOOTING OF DTC P0976 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
10	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0977 [SJ6A-EL]

id050208803700

DTC P0977	Shift solenoid B circuit malfunction (short to power/open circuit)
DETECTION CONDITION	• Open or short circuit in shift solenoid B signal system (while TCM monitors solenoid output voltage, the voltage that differs from the signal output by CPU in TCM is detected). **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM connector or terminal malfunction • Coupler component connector or terminal malfunction • Shift solenoid B connector or terminal malfunction • Short to GND in wiring harness between shift solenoid B terminal A and TCM terminal 1AB • Shift solenoid B malfunction • Short to power supply in wiring harness between shift solenoid B terminal A and TCM terminal 1AB • TCM malfunction

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminal 1AB (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 11.
4	**INSPECT RESISTANCE OF SHIFT SOLENOID B CIRCUIT** • Inspect for resistance between TCM terminal 1AB (wiring harness-side) and body GND. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to Step 9.
		No	Go to the next step.
5	**INSPECT COUPLER COMPONENT CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Inspect for poor connection at coupler component terminal N (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 11.
6	**INSPECT RESISTANCE OF SHIFT SOLENOID B CIRCUIT** • Inspect the resistance between coupler component (transmission case side) terminal N and body GND. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to Step 11.
		No	Go to the next step.
7	**INSPECT SHIFT SOLENOID B CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the shift solenoid B connector. • Inspect for poor connection at shift solenoid B terminal A (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 11.
8	**INSPECT SHIFT SOLENOID B** • Inspect the shift solenoid B. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is the shift solenoid B normal?	Yes	Repair or replace the wiring harness (coupler component—shift solenoid B) for short to GND, then go to Step 11.
		No	Replace the control valve body, then go to Step 11. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)
9	**INSPECT SHIFT SOLENOID B CIRCUIT FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the ON position (engine off). • Measure the voltage at TCM (wiring harness-side) terminal 1AB. • Is there **0 V** at the TCM wiring harness-side connector terminals?	Yes	Go to Step 11.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
10	**INSPECT SHIFT SOLENOID B CIRCUIT FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Turn the ignition switch to the ON position (engine off). • Measure the voltage at coupler component (wiring harness-side) terminal N. • Is there **0 V** at the TCM wiring harness-side connector terminals?	Yes	Repair or replace the wiring harness (TCM—coupler component) for short to power supply, then go to the next step.
		No	Repair or replace the wiring harness (coupler component—shift solenoid B) for short to power supply, then go to the next step.
11	**VERIFY TROUBLESHOOTING OF DTC P0977 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
12	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0979 [SJ6A-EL]

id050208803900

DTC P0979	Shift solenoid C circuit malfunction (short to ground)
DETECTION CONDITION	• Short to ground in shift solenoid C signal system (while TCM monitors solenoid output voltage, the voltage that differs from the signal output by CPU in TCM is detected). **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM connector or terminal malfunction • Coupler component connector or terminal malfunction • Shift solenoid C connector or terminal malfunction • Short to GND in wiring harness between shift solenoid C terminal A and TCM terminal 1AA • Shift solenoid C malfunction • TCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
3	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminal 1AA(such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 9.
4	**INSPECT RESISTANCE OF SHIFT SOLENOID C CIRCUIT** • Inspect for resistance between TCM terminal 1AA (wiring harness-side) and body GND. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to Step 9.
		No	Go to the next step.
5	**INSPECT COUPLER COMPONENT CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Inspect for poor connection at coupler component terminal M (such as damaged/ pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 9.
6	**INSPECT RESISTANCE OF SHIFT SOLENOID C CIRCUIT** • Inspect the resistance between coupler component (transmission case side) terminal M and body GND. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	Go to Step 9.
7	**INSPECT SHIFT SOLENOID C CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the shift solenoid C connector. • Inspect for poor connection at shift solenoid C terminal A (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 9.
8	**INSPECT SHIFT SOLENOID C** • Inspect the shift solenoid C. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is the shift solenoid C normal?	Yes	Repair or replace the wiring harness (coupler component connector—shift solenoid C) for short to GND, then go to the next step.
		No	Replace the control valve body, then go to the next step. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)
9	**VERIFY TROUBLESHOOTING OF DTC P0979 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
10	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0980 [SJ6A-EL]

id050208804000

DTC P0980	Shift solenoid C circuit malfunction (short to power/open circuit)
DETECTION CONDITION	• Open or short circuit in shift solenoid C signal system (while TCM monitors solenoid output voltage, the voltage that differs from the signal output by CPU in TCM is detected). **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM connector or terminal malfunction • Coupler component connector or terminal malfunction • Shift solenoid C connector or terminal malfunction • Short to GND in wiring harness between shift solenoid C terminal A and TCM terminal 1AA • Shift solenoid C malfunction • Short to power supply in wiring harness between shift solenoid C terminal A and TCM terminal 1AA • TCM malfunction

COUPLER COMPONENT CONNECTOR
HARNESS-SIDE CONNECTOR

AUTOMATIC TRANSMISSION
(COUPLE COMPONENT)

SHIFT SOLENOID C
HARNESS-SIDE CONNECTOR

TCM
HARNESS-SIDE CONNECTOR

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminal 1AA (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 11.
4	**INSPECT RESISTANCE OF SHIFT SOLENOID C CIRCUIT** • Inspect for resistance between TCM terminal 1AA (wiring harness-side) and body GND. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to Step 9.
		No	Go to the next step.
5	**INSPECT COUPLER COMPONENT CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Inspect for poor connection at coupler component terminal M (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 11.
6	**INSPECT RESISTANCE OF SHIFT SOLENOID C CIRCUIT** • Inspect the resistance between coupler component (transmission case side) terminal M and body GND. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to Step 11.
		No	Go to the next step.
7	**INSPECT SHIFT SOLENOID C CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the shift solenoid C connector. • Inspect for poor connection at shift solenoid C terminal A (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 11.
8	**INSPECT SHIFT SOLENOID C** • Inspect the shift solenoid C. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is the shift solenoid C normal?	Yes	Repair or replace the wiring harness (coupler component—shift solenoid C) for short to GND, then go to Step 11.
		No	Replace the control valve body, then go to Step 11. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)
9	**INSPECT SHIFT SOLENOID C CIRCUIT FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the ON position (engine off). • Measure the voltage at TCM (wiring harness-side) terminal 1AA. • Is there **0 V** at the TCM wiring harness-side connector terminals?	Yes	Go to Step 11.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
10	**INSPECT SHIFT SOLENOID C CIRCUIT FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Turn the ignition switch to the ON position (engine off). • Measure the voltage at coupler component (wiring harness-side) terminal M. • Is there **0 V** at the TCM wiring harness-side connector terminals?	Yes	Repair or replace the wiring harness (TCM—coupler component) for short to power supply, then go to the next step.
		No	Repair or replace the wiring harness (coupler component—shift solenoid C) for short to power supply, then go to the next step.
11	**VERIFY TROUBLESHOOTING OF DTC P0980 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
12	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0982 [SJ6A-EL]

id050208804200

DTC P0982	Shift solenoid D circuit malfunction (short to ground)
DETECTION CONDITION	• Short to ground in shift solenoid D signal system (while TCM monitors solenoid output voltage, the voltage that differs from the signal output by CPU in TCM is detected). **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM connector or terminal malfunction • Coupler component connector or terminal malfunction • Shift solenoid D connector or terminal malfunction • Short to GND in wiring harness between shift solenoid D terminal A and TCM terminal 1S • Shift solenoid D malfunction • TCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
3	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminal 1S (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 9.
4	**INSPECT RESISTANCE OF SHIFT SOLENOID D CIRCUIT** • Inspect for resistance between TCM terminal 1S (wiring harness-side) and body GND. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to Step 9.
		No	Go to the next step.
5	**INSPECT COUPLER COMPONENT CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Inspect for poor connection at coupler component terminal L (such as damaged/ pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 9.
6	**INSPECT RESISTANCE OF SHIFT SOLENOID D CIRCUIT** • Inspect the resistance between coupler component (transmission case side) terminal L and body GND. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	Go to Step 9.
7	**INSPECT SHIFT SOLENOID D CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the shift solenoid D connector. • Inspect for poor connection at shift solenoid D terminal A (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 9.
8	**INSPECT SHIFT SOLENOID D** • Inspect the shift solenoid D. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is the shift solenoid D normal?	Yes	Repair or replace the wiring harness (coupler component connector—shift solenoid D) for short to GND, then go to the next step.
		No	Replace the control valve body, then go to the next step. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)
9	**VERIFY TROUBLESHOOTING OF DTC P0982 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
10	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0983 [SJ6A-EL]

id050208804300

DTC P0983	Shift solenoid D circuit malfunction (short to power/open circuit)
DETECTION CONDITION	• Open or short circuit in shift solenoid D signal system (while TCM monitors solenoid output voltage, the voltage that differs from the signal output by CPU in TCM is detected). **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM connector or terminal malfunction • Coupler component connector or terminal malfunction • Shift solenoid D connector or terminal malfunction • Short to GND in wiring harness between shift solenoid D terminal A and TCM terminal 1S • Shift solenoid D malfunction • Short to power supply in wiring harness between shift solenoid D terminal A and TCM terminal 1S • TCM malfunction

COUPLER COMPONENT CONNECTOR
HARNESS-SIDE CONNECTOR

AUTOMATIC TRANSMISSION
(COUPLE COMPONENT)

SHIFT SOLENOID D
HARNESS-SIDE CONNECTOR

TCM
HARNESS-SIDE CONNECTOR

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminal 1S (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 11.
4	**INSPECT RESISTANCE OF SHIFT SOLENOID D CIRCUIT** • Inspect for resistance between TCM terminal 1S (wiring harness-side) and body GND. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to Step 9.
		No	Go to the next step.
5	**INSPECT COUPLER COMPONENT CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Inspect for poor connection at coupler component terminal L (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 11.
6	**INSPECT RESISTANCE OF SHIFT SOLENOID D CIRCUIT** • Inspect the resistance between coupler component (transmission case side) terminal L and body GND. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to Step 11.
		No	Go to the next step.
7	**INSPECT SHIFT SOLENOID D CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the shift solenoid D connector. • Inspect for poor connection at shift solenoid D terminal A (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 11.
8	**INSPECT SHIFT SOLENOID D** • Inspect the shift solenoid D. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is the shift solenoid D normal?	Yes	Repair or replace the wiring harness (coupler component—shift solenoid D) for short to GND, then go to Step 11.
		No	Replace the control valve body, then go to Step 11. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)
9	**INSPECT SHIFT SOLENOID D CIRCUIT FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the ON position (engine off). • Measure the voltage at TCM (wiring harness-side) terminal 1S. • Is there **0 V** at the TCM wiring harness-side connector terminals?	Yes	Go to Step 11.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
10	**INSPECT SHIFT SOLENOID D CIRCUIT FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Turn the ignition switch to the ON position (engine off). • Measure the voltage at coupler component (wiring harness-side) terminal L. • Is there **0 V** at the TCM wiring harness-side connector terminals?	Yes	Repair or replace the wiring harness (TCM—coupler component) for short to power supply, then go to the next step.
		No	Repair or replace the wiring harness (coupler component—shift solenoid D) for short to power supply, then go to the next step.
11	**VERIFY TROUBLESHOOTING OF DTC P0983 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
12	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0985 [SJ6A-EL]

id050208804500

DTC P0985	Shift solenoid E circuit malfunction (short to ground)
DETECTION CONDITION	• Short to ground in shift solenoid E signal system (while TCM monitors solenoid output voltage, the voltage that differs from the signal output by CPU in TCM is detected) **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM connector or terminal malfunction • Coupler component connector or terminal malfunction • Shift solenoid E connector or terminal malfunction • Short to GND in wiring harness between shift solenoid E terminal A and TCM terminal 1V • Shift solenoid E malfunction • TCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
3	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminal 1V (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 9.
4	**INSPECT RESISTANCE OF SHIFT SOLENOID E CIRCUIT** • Inspect for resistance between TCM terminal 1V (wiring harness-side) and body GND. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to Step 9.
		No	Go to the next step.
5	**INSPECT COUPLER COMPONENT CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Inspect for poor connection at coupler component terminal K (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 9.
6	**INSPECT RESISTANCE OF SHIFT SOLENOID E CIRCUIT** • Inspect the resistance between coupler component (transmission case side) terminal K and body GND. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	Go to Step 9.
7	**INSPECT SHIFT SOLENOID E CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the shift solenoid E connector. • Inspect for poor connection at shift solenoid E terminal A (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 9.
8	**INSPECT SHIFT SOLENOID E** • Inspect the shift solenoid E. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is the shift solenoid E normal?	Yes	Repair or replace the wiring harness (coupler component connector—shift solenoid E) for short to GND, then go to the next step.
		No	Replace the control valve body, then go to the next step. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)
9	**VERIFY TROUBLESHOOTING OF DTC P0985 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
10	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P0986 [SJ6A-EL]

id050208804600

DTC P0986	Shift solenoid E circuit malfunction (short to power/open circuit)
DETECTION CONDITION	• Open or short circuit in shift solenoid E signal system (while TCM monitors solenoid output voltage, the voltage that differs from the signal output by CPU in TCM is detected). **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM connector or terminal malfunction • Coupler component connector or terminal malfunction • Shift solenoid E connector or terminal malfunction • Short to GND in wiring harness between shift solenoid E terminal A and TCM terminal 1V • Shift solenoid E malfunction • Short to power supply in wiring harness between shift solenoid E terminal A and TCM terminal 1V • TCM malfunction

COUPLER COMPONENT CONNECTOR
HARNESS-SIDE CONNECTOR

AUTOMATIC TRANSMISSION
(COUPLE COMPONENT)

SHIFT SOLENOID E
HARNESS-SIDE CONNECTOR

TCM
HARNESS-SIDE CONNECTOR

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminal 1V (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 11.
4	**INSPECT RESISTANCE OF SHIFT SOLENOID E CIRCUIT** • Inspect for resistance between TCM terminal 1V (wiring harness-side) and body GND. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to Step 9.
		No	Go to the next step.
5	**INSPECT COUPLER COMPONENT CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Inspect for poor connection at coupler component terminal K (such as damaged/ pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 11.
6	**INSPECT RESISTANCE OF SHIFT SOLENOID E CIRCUIT** • Inspect the resistance between coupler component (transmission case side) terminal K and body GND. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to Step 11.
		No	Go to the next step.
7	**INSPECT SHIFT SOLENOID E CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the shift solenoid E connector. • Inspect for poor connection at shift solenoid E terminal A (such as damaged/pulled-out pins, corrosion). • Is terminal normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 11.
8	**INSPECT SHIFT SOLENOID E** • Inspect the shift solenoid E. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is the shift solenoid E normal?	Yes	Repair or replace the wiring harness (coupler component—shift solenoid E) for short to GND, then go to Step 11.
		No	Replace the control valve body, then go to Step 11. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)
9	**INSPECT SHIFT SOLENOID E CIRCUIT FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the ON position (engine off). • Measure the voltage at TCM (wiring harness-side) terminal 1V. • Is there **0 V** at the TCM wiring harness-side connector terminals?	Yes	Go to Step 11.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
10	**INSPECT SHIFT SOLENOID E CIRCUIT FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Turn the ignition switch to the ON position (engine off). • Measure the voltage at coupler component (wiring harness-side) terminal K. • Is there **0 V** at the TCM wiring harness-side connector terminals?	Yes	Repair or replace the wiring harness (TCM—coupler component) for short to power supply, then go to the next step.
		No	Repair or replace the wiring harness (coupler component—shift solenoid E) for short to power supply, then go to the next step.
11	**VERIFY TROUBLESHOOTING OF DTC P0986 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
12	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

DTC P2719 [SJ6A-EL]

id050208811800

DTC P2719	Shift solenoid G range/performance (stuck)
DETECTION CONDITION	• Feedback current corresponding to solenoid current command value is irregular when engine is running. **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during the first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• Deteriorated ATF • ATF level low • Line pressure low — Oil pump malfunction — Shift solenoid G stuck — Transmission malfunction • TCM malfunction

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT ATF CONDITION** • Turn the ignition switch to the LOCK position. • Inspect the ATF condition. — Clear red: Normal — Light red (pink): Water mixed in fluid — Reddish brown: Deteriorated ATF • Is it normal? (See 05-13-9 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	If the ATF color is light red or reddish brown, replace ATF, then go to Step 6. (See 05-13-10 AUTOMATIC TRANSMISSION FLUID (ATF) REPLACEMENT [SJ6A-EL].)
4	**INSPECT ATF LEVEL** • Start the engine. • Warm up the AT. • Is the ATF level within the specification? (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)	Yes	Go to the next step.
		No	Add ATF to the specified level, then go to Step 6. (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)
5	**INSPECT LINE PRESSURE** • Start the engine. • Measure the line pressure. (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].) • Are the line pressures within the specifications?	Yes	Go to the next step.
		No	• All ranges: Replace the oil pump or control valve body, then go to the next step. • Any ranges: Replace the AT, then go the next step. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)
6	**VERIFY TROUBLESHOOTING OF DTC P2719 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
7	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P2720 [SJ6A-EL]

id050208811900

DTC P2720	Shift solenoid G circuit malfunction (short to ground/open circuit)
DETECTION CONDITION	• Open or short circuit in shift solenoid G signal system (while TCM monitors solenoid output voltage, the voltage that differs from the signal output by CPU in TCM is detected). **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during the first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM connector or terminal malfunction • Short to GND in wiring harness between shift solenoid G terminal B and TCM terminal 1Y • Short to GND in wiring harness between shift solenoid G terminal A and TCM terminal 1L • Coupler component connector or terminal malfunction • Open circuit between shift solenoid G terminal B and TCM terminal 1Y • Open circuit between shift solenoid G terminal A and TCM terminal 1L • Shift solenoid G connector or terminal malfunction • Shift solenoid G malfunction • TCM malfunction

COUPLER COMPONENT CONNECTOR
HARNESS-SIDE CONNECTOR

AUTOMATIC TRANSMISSION
(COUPLE COMPONENT)

TCM

SHIFT SOLENOID G
HARNESS-SIDE CONNECTOR

TCM
HARNESS-SIDE CONNECTOR

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminals 1Y and 1L (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 13.
4	**INSPECT RESISTANCE OF SHIFT SOLENOID G CIRCUIT** • Inspect for resistance between TCM terminals 1Y and 1L (wiring harness-side). • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	Go to go to Step 7.
5	**INSPECT SHIFT SOLENOID G CIRCUIT FOR SHORT TO GND** • Disconnect the coupler component connector. • Inspect for continuity between TCM terminals (wiring harness-side) and body GND. — Terminal 1Y and body GND — Terminal 1L and body GND • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for short to GND, then go to Step 13.
6	**INSPECT SHIFT SOLENOID G CIRCUIT FOR SHORT TO GND** • Inspect for continuity between coupler component terminals (wiring harness-side) and body GND. — Terminal D and body GND — Terminal C and body GND • Is there continuity?	Yes	Go to go to Step 13.
		No	Repair or replace the coupler component, then go to the next step.
7	**INSPECT COUPLER COMPONENT CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Inspect for poor connection at coupler component terminals H and G (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 13.
8	**INSPECT RESISTANCE OF SHIFT SOLENOID G CIRCUIT** • Inspect the resistance between coupler component (transmission case side) terminals H and G. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	Go to Step 10.
9	**INSPECT SHIFT SOLENOID G CIRCUIT FOR OPEN CIRCUIT** • Inspect for continuity between TCM terminals and coupler component terminals (wiring harness-side). — Terminal 1Y and terminal D — Terminal 1L and terminal C • Is there continuity?	Yes	Go to Step 13.
		No	Repair or replace the wiring harness for open circuit, go to Step 13.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
10	**INSPECT SHIFT SOLENOID G CONNECTOR FOR POOR CONNECTION** • Disconnect the shift solenoid G connector. • Inspect for poor connection at shift solenoid G terminals A and B (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 13.
11	**INSPECT SHIFT SOLENOID G** • Inspect the shift solenoid G. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is the shift solenoid G normal?	Yes	Go to the next step.
		No	Replace the control valve body, then go to Step 13. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)
12	**INSPECT SHIFT SOLENOID G CIRCUIT FOR OPEN CIRCUIT** • Inspect for continuity between coupler component terminals and shift solenoid G terminals (wiring harness-side). — Terminal D and terminal B — Terminal C and terminal A • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the coupler component, then go to the next step.
13	**VERIFY TROUBLESHOOTING OF DTC P2720 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
14	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P2721 [SJ6A-EL]

id050208812000

DTC P2721	Shift solenoid G circuit malfunction (short to power)
DETECTION CONDITION	• Short circuit in shift solenoid G signal system (while TCM monitors solenoid output voltage, the voltage that differs from the signal output by CPU in TCM is detected). **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during the first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM connector or terminal malfunction • Short to power supply in wiring harness between shift solenoid G terminal B and TCM terminal 1Y • Short to power supply in wiring harness between shift solenoid G terminal A and TCM terminal 1L • Shift solenoid G malfunction • TCM malfunction

COUPLER COMPONENT CONNECTOR
HARNESS-SIDE CONNECTOR

AUTOMATIC TRANSMISSION
(COUPLE COMPONENT)

SHIFT SOLENOID G
HARNESS-SIDE CONNECTOR

TCM
HARNESS-SIDE CONNECTOR

	1AF	1AA		1Y	1R		1P		1H		1D
1AG	1AC	1AB	1Z	1V	1S	1Q	1O	1L	1I	1E	1A
1AH	1AD			1W	1T			1M	1J	1F	1B
1AI	1AE			1X	1U			1N	1K	1G	1C

2AF	2AB			2R		2O		2J		2F
2AG	2AC	2Y	2V	2S	2P	2M	2K	2G	2C	
2AH	2AD	2Z	2W	2T	2Q	2N	2L	2H	2D	2A
2AI	2AE	2AA	2X	2U				2I	2E	2B

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminals 1Y and 1L (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 7.
4	**INSPECT SHIFT SOLENOID G CIRCUIT FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the ON position (engine off). • Measure the voltage at TCM (wiring harness-side) terminals 1Y and 1L. • Is there **0 V** at the TCM wiring harness-side connector terminals?	Yes	Go to go to Step 7.
		No	Go to the next step.
5	**INSPECT SHIFT SOLENOID G CIRCUIT FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Turn the ignition switch to the ON position (engine off). • Measure the voltage at TCM (wiring harness-side) terminals 1Y and 1L. • Is there **0 V** at the TCM wiring harness-side connector terminals?	Yes	Go to the next step.
		No	Repair or replace the wiring harness (TCM—coupler component connector) for short to power supply, then go to Step 7.
6	**INSPECT SHIFT SOLENOID G** • Inspect the shift solenoid G. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is the shift solenoid G normal?	Yes	Repair or replace the wiring harness (coupler component connector—shift solenoid G) for short to power supply, then go to the next step.
		No	Replace the control valve body, then go to the next step. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)
7	**VERIFY TROUBLESHOOTING OF DTC P2721 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
8	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P2757 [SJ6A-EL]

id050208805100

DTC P2757	Torque converter clutch (TCC) stuck off
DETECTION CONDITION	• TCM detects that TCC control solenoid does not change from on when engine is running **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition in two consecutive drive cycles. • The AT warning light illuminates if the TCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• Deteriorated ATF • ATF level low • Line pressure low — Oil pump malfunction — TCC control solenoid stuck — Line pressure control solenoid stuck • TCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT ATF CONDITION** • Turn the ignition switch to the LOCK position. • Inspect the ATF condition. — Clear red: Normal — Light red (pink): Water mixed in fluid — Reddish brown: Deteriorated ATF • Is it normal? (See 05-13-9 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	If the ATF color is milky or reddish brown, replace ATF, then go to Step 7. (See 05-13-10 AUTOMATIC TRANSMISSION FLUID (ATF) REPLACEMENT [SJ6A-EL].)
4	**INSPECT ATF LEVEL** • Start the engine. • Warm up the AT. • Is the ATF level within the specification? (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)	Yes	Go to the next step.
		No	Add ATF to the specified level, then go to Step 7. (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)
5	**INSPECT LINE PRESSURE** • Start the engine. • Measure the line pressure. (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].) • Are the line pressures within the specifications?	Yes	Go to the next step.
		No	All ranges: Replace the oil pump, then go to Step 7. Any ranges: Replace the control valve body, then go to Step 6. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)
6	**INSPECT SOLENOID VALVE** • Inspect the solenoid valve. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is it normal?	Yes	Go to the next step.
		No	Replace the control valve body, then go to the next step. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
7	**VERIFY TROUBLESHOOTING OF DTC P2757 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine to normal operating temperature. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR and TCC is operated. • Is the PENDING CODE same as the DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
8	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

DTC P2758 [SJ6A-EL]

id050208805200

DTC P2758	Torque converter clutch (TCC) stuck on
DETECTION CONDITION	• TCM detects that TCC control solenoid does not change from off when engine is running **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition in two consecutive drive cycles. • The AT warning light illuminates if the TCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is not available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Deteriorated ATF • ATF level low • Line pressure low — Oil pump malfunction — TCC control solenoid stuck — Line pressure control solenoid stuck • TCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT ATF CONDITION** • Turn the ignition switch to the LOCK position. • Inspect the ATF condition. — Clear red: Normal — Light red (pink): Water mixed in fluid — Reddish brown: Deteriorated ATF • Is it normal? (See 05-13-9 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	If the ATF color is milky or reddish brown, replace ATF, then go to Step 7. (See 05-13-10 AUTOMATIC TRANSMISSION FLUID (ATF) REPLACEMENT [SJ6A-EL].)

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
4	**INSPECT ATF LEVEL** • Start the engine. • Warm up the AT. • Is the ATF level within the specification? (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)	Yes	Go to the next step.
		No	Add ATF to the specified level, then go to Step 7. (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)
5	**INSPECT LINE PRESSURE** • Start the engine. • Measure the line pressure. (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].) • Are the line pressures within the specifications?	Yes	Go to the next step.
		No	All ranges: Replace the oil pump, then go to Step 7. Any ranges: Replace the control valve body, then go to Step 6. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)
6	**INSPECT SOLENOID VALVE** • Inspect the solenoid valve. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is it normal?	Yes	Go to the next step.
		No	Replace the control valve body, then go to the next step. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)
7	**VERIFY TROUBLESHOOTING OF DTC P2758 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine to normal operating temperature. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR and TCC is operated. • Is the PENDING CODE same as the DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
8	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

DTC P2762 [SJ6A-EL]

id050208805300

DTC P2762	TCC control solenoid range/performance (stuck)
DETECTION CONDITION	• Feedback current corresponding to solenoid current command value is irregular when engine is running. **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during the first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• Deteriorated ATF • ATF level low • Line pressure low — Oil pump malfunction — TCC control solenoid stuck — Transmission • TCM malfunction

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT ATF CONDITION** • Turn the ignition switch to the LOCK position. • Inspect the ATF condition. — Clear red: Normal — Light red (pink): Water mixed in fluid — Reddish brown: Deteriorated ATF • Is it normal? (See 05-13-9 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	If the ATF color is light red or reddish brown, replace ATF, then go to Step 6. (See 05-13-10 AUTOMATIC TRANSMISSION FLUID (ATF) REPLACEMENT [SJ6A-EL].)
4	**INSPECT ATF LEVEL** • Start the engine. • Warm up the AT. • Is the ATF level within the specification? (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)	Yes	Go to the next step.
		No	Add ATF to the specified level, then go to Step 6. (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)
5	**INSPECT LINE PRESSURE** • Start the engine. • Measure the line pressure. (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].) • Are the line pressures within the specifications?	Yes	Go to the next step.
		No	• All ranges: Replace the oil pump or control valve body, then go to the next step. • Any ranges: Replace the AT, then go the next step. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)
6	**VERIFY TROUBLESHOOTING OF DTC P2762 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
7	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P2763 [SJ6A-EL]

id050208805400

DTC P2763	TCC control solenoid circuit malfunction (short to power)
DETECTION CONDITION	• Short circuit in TCC control solenoid signal system (while TCM monitors solenoid output voltage, the voltage that differs from the signal output by CPU in TCM is detected). **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during the first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM connector or terminal malfunction • Short to power supply in wiring harness between TCC control solenoid terminal B and TCM terminal 1Q • Short to power supply in wiring harness between TCC control solenoid terminal A and TCM terminal 1D • TCC control solenoid malfunction • TCM malfunction

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminals 1Q and 1D (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 7.
4	**INSPECT TCC CONTROL SOLENOID CIRCUIT FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the ON position (engine off). • Measure the voltage at TCM (wiring harness-side) terminals 1Q and 1D. • Is there **0 V** at the TCM wiring harness-side connector terminals?	Yes	Go to go to Step 7.
		No	Go to the next step.
5	**INSPECT TCC CONTROL SOLENOID CIRCUIT FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Turn the ignition switch to the ON position (engine off). • Measure the voltage at TCM (wiring harness-side) terminals 1Q and 1D. • Is there **0 V** at the TCM wiring harness-side connector terminals?	Yes	Go to the next step.
		No	Repair or replace the wiring harness (TCM—coupler component connector) for short to power supply, then go to Step 7.
6	**INSPECT TCC CONTROL SOLENOID** • Inspect the TCC control solenoid. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is the TCC control solenoid normal?	Yes	Repair or replace the wiring harness (coupler component connector—TCC control solenoid) for short to power supply, then go to the next step.
		No	Replace the control valve body, then go to the next step. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)
7	**VERIFY TROUBLESHOOTING OF DTC P2763 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
8	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

DTC P2764 [SJ6A-EL]

id050208805500

DTC P2764	TCC control solenoid circuit malfunction (short to ground/open circuit)
DETECTION CONDITION	• Open or short circuit in TCC control solenoid signal system (while TCM monitors solenoid output voltage, the voltage that differs from the signal output by CPU in TCM is detected). **Diagnostic support note:** • The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle. • The AT warning light illuminates if the TCM detects the above malfunction condition during the first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • The DTC is stored in the TCM memory.
POSSIBLE CAUSE	• TCM connector or terminal malfunction • Short to GND in wiring harness between TCC control solenoid terminal B and TCM terminal 1Q • Short to GND in wiring harness between TCC control solenoid terminal A and TCM terminal 1D • Coupler component connector or terminal malfunction • Open circuit between TCC control solenoid terminal B and TCM terminal 1Q • Open circuit between TCC control solenoid terminal A and TCM terminal 1D • TCC control solenoid connector or terminal malfunction • TCC control solenoid malfunction • TCM malfunction

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA been recorded on the repair order?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related service repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**INSPECT TCM CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the TCM connector. • Inspect for poor connection at TCM terminals 1Q and 1D (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 13.
4	**INSPECT RESISTANCE OF TCC CONTROL SOLENOID CIRCUIT** • Inspect for resistance between TCM terminals 1Q and 1D (wiring harness-side). • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	Go to Step 7.
5	**INSPECT TCC CONTROL SOLENOID CIRCUIT FOR SHORT TO GND** • Disconnect the coupler component connector. • Inspect for continuity between TCM terminals (wiring harness-side) and body GND. — Terminal 1Q and body GND — Terminal 1D and body GND • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for short to GND, then go to Step 13.
6	**INSPECT TCC CONTROL SOLENOID CIRCUIT FOR SHORT TO GND** • Inspect for continuity between coupler component terminals (wiring harness-side) and body GND. — Terminal H and body GND — Terminal G and body GND • Is there continuity?	Yes	Go to Step 13.
		No	Repair or replace the coupler component, then go to the next step.
7	**INSPECT COUPLER COMPONENT CONNECTOR FOR POOR CONNECTION** • Turn the ignition switch to the LOCK position. • Disconnect the coupler component connector. • Inspect for poor connection at coupler component terminals H and G (such as damaged/pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 13.
8	**INSPECT RESISTANCE OF TCC CONTROL SOLENOID CIRCUIT** • Inspect the resistance between coupler component (transmission case side) terminals H and G. • Is the resistance **within 5.0—5.6 ohms**? (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	Go to Step 10.
9	**INSPECT TCC CONTROL SOLENOID CIRCUIT FOR OPEN CIRCUIT** • Inspect for continuity between TCM terminals and coupler component terminals (wiring harness-side). — Terminal 1Q and terminal H — Terminal 1D and terminal G • Is there continuity?	Yes	Go to Step 13.
		No	Repair or replace the wiring harness for open circuit, go to Step 13.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

STEP	INSPECTION		ACTION
10	**INSPECT TCC CONTROL SOLENOID CONNECTOR FOR POOR CONNECTION** • Disconnect the TCC control solenoid connector. • Inspect for poor connection at TCC control solenoid terminals A and B (such as damaged/ pulled-out pins, corrosion). • Are terminals normal?	Yes	Go to the next step.
		No	Repair or replace the connector and/or terminal, then go to Step 13.
11	**INSPECT TCC CONTROL SOLENOID** • Inspect the TCC control solenoid. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is the TCC control solenoid normal?	Yes	Go to the next step.
		No	Replace the control valve body, then go to Step 13. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)
12	**INSPECT TCC CONTROL SOLENOID CIRCUIT FOR OPEN CIRCUIT** • Inspect for continuity between coupler component terminals and TCC control solenoid terminals (wiring harness-side). — Terminal H and terminal B — Terminal G and terminal A • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the coupler component, then go to the next step.
13	**VERIFY TROUBLESHOOTING OF DTC P2764 COMPLETED** • Make sure to reconnect all the disconnected connectors. • Clear the DTC using the M-MDS. • Perform the following procedure to ensure that the DTC has been resolved: 1. Start the engine. 2. Warm-up the engine and transmission. 3. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR. • Is the same DTC present?	Yes	Replace the TCM, then go to the next step. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
14	**VERIFY NO DTC HAS BEEN PRESENTED** • Perform the “Reading DTCs Procedure”. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	DTC troubleshooting completed.

PID/DATA MONITOR INSPECTION [SJ6A-EL]

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1. Connect the M-MDS to the DLC-2.

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ON-BOARD DIAGNOSTIC [SJ6A-EL]

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2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select the “Toolbox” tab.
     2. Select “DataLogger”.
     3. Select “Modules”.
     4. Select “TCM”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “TCM”.
     3. Select “DataLogger”.
3. Select the PID from the PID table.
4. Verify the PID data according to the directions on the M-MDS screen.

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Note

- Perform part inspection for the output device after TCM inspection.
- The PID/DATA MONITOR function monitors the calculated value of the input/output signals in the TCM. Therefore, if a monitored value of an output device is out of specification, it is necessary to inspect the monitored value of the input device related to the output device control. Since an output device malfunction is not directly indicated as a malfunction of the monitored value for the output device, it is necessary to inspect the output device individually using the simulation function.

PID/DATA MONITOR AND RECORD function table

Monitor item (Definition)	Unit/ Condition	Condition/Specification	Action	TCM terminal
BOO TCM (Brake switch)	On/Off	• Brake pedal depressed: On • Other: Off	Inspect the brake switch. (See 04-11-7 BRAKE SWITCH INSPECTION.)	N/A
DTCCNT	N/A	Indicates number of DTC	Check DTC. (See 05-02-5 DTC TABLE [SJ6A-EL].)	N/A
DWN SW (Down switch)	On/Off	• Down shift at M range: On • Other: Off	Inspect the selector lever component. (See 05-14-3 SELECTOR LEVER COMPONENT INSPECTION.)	2F
ECT TCM (ECT)	°C	Indicates ECT	• Inspect the ECT sensor. (See 01-40-26 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [L8, LF].) • Inspect the PCM. (See 01-40-9 PCM INSPECTION [L8, LF].)	N/A
FDPDTC (FREEZE FRAME DATA)	N/A	Indicates code of FREEZE FRAME DATA	N/A	N/A
GEAR_RA (Gear ratio)	N/A	• 1GR: 3.538 • 2GR: 2.060 • 3GR: 1.404 • 4GR: 1.000 • 5GR: 0.713 • 6GR: 0.582 • R position: 3.168	Inspect following PIDs: OSS, SSA, SSB, SSC, SSD, SSE, SSF, SSG, THOP, TSS, VSS	N/A
GEAR_SEL (Calculated gear range in TCM)	1/2/3/4/5/6	• 1GR: 1 • 2GR: 2 • 3GR: 3 • 4GR: 4 • 5GR: 5 • 6GR: 6	Inspect following PIDs: SSA, SSB, SSC, SSD, SSE, SSF, SSG, THOP, TSS, VSS	N/A
LPS (Line pressure control solenoid)	A	• D range, 1GR (idle): **996 mA** • D range, 3GR: **656 mA** • R position: **719 mA**	Inspect the line pressure control solenoid. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	1E, 1R
MNL SW (M range switch)	On/Off	• M range: On • Other: Off	Inspect the selector lever component. (See 05-14-3 SELECTOR LEVER COMPONENT INSPECTION.)	2G

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Monitor item (Definition)	Unit/ Condition	Condition/Specification	Action	TCM terminal
OSS (Output shaft speed)	RPM	• Vehicle speed 40 km/h {25 mph}: **3,800 RPM** • Indicates output shaft speed	Inspect the VSS. (See 05-13-27 VEHICLE SPEED SENSOR (VSS) INSPECTION [SJ6A-EL].)	2C, 2D
PNP_TCM (Park/Neutral)	Drive/ Neutral	• P, N position: Neutral • D, M range or R position: Drive	Inspect the TR switch. (See 05-13-14 TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL].)	2K, 2M, 2N, 2O
RPM TCM (Engine speed)	RPM	• Ignition switch ON: **0 rpm** • Idle: **700—800 rpm**	• Inspect the CMP sensor. (See 01-40-34 CAMSHAFT POSITION (CMP) SENSOR INSPECTION [L8, LF].) • Inspect the PCM. (See 01-40-9 PCM INSPECTION [L8, LF].)	N/A
SS SW- (Steering shift switch (down switch))	On/Off	M range • Steering shift down switch on: On • Other: Off	Inspect the steering shift switch. (See 05-14-15 STEERING SHIFT SWITCH INSPECTION.)	2AB, 2AF
SS SW+ (Steering shift switch (up switch))	On/Off	M range • Steering shift up switch on: On • Other: Off	Inspect the steering shift switch. (See 05-14-15 STEERING SHIFT SWITCH INSPECTION.)	2AB, 2AF
SSA (Shift solenoid A)	On/Off	• 2GR, 3GR, 4GR, 5GR, 6GR: On • 1GR: Off	Inspect the shift solenoid A. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	1AF
SSB (Shift solenoid B)	On/Off	• 1GR, 2GR, 6GR: On • 3GR, 4GR, 5GR: Off	Inspect the shift solenoid B. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	1AB
SSC (Shift solenoid C)	On/Off	• 1GR, 2GR, 3GR: On • 4GR, 5GR, 6GR: Off	Inspect the shift solenoid C. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	1AA
SSD (Shift solenoid D)	On/Off	• 5GR, 6GR: On • 1GR, 2GR, 3GR, 4GR: Off	Inspect the shift solenoid D. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	1S
SSE (Shift solenoid E)	On/Off	• 1GR, 2GR, 3GR, 4GR: On • 5GR, 6GR: Off	Inspect the shift solenoid E. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	1V
SSF (Shift solenoid F)	A	• 5GR, 6GR: **996 mA** • 1GR, 2GR, 3GR, 4GR: **199 mA**	Inspect the shift solenoid F. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	1O, 1Z
SSG (Shift solenoid G)	A	• 1GR, 2GR, 3GR, 4GR: **996 mA** • 5GR, 6GR: **199 mA**	Inspect the shift solenoid G. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	1L, 1Y
TCCC (TCC solenoid valve)	A	• TCC on: **996 mA** • Other: **199 mA**	Inspect the TCC control solenoid. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)	1D, 1Q
TFT (ATF temperature)	°C	• ATF temperature 20 °C {68 °F}: **20 °C** • ATF temperature 40 °C {104 °F}: **40 °C** • ATF temperature 60 °C {140 °F}: **60 °C**	Inspect the TFT sensor. (See 05-13-22 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR INSPECTION [SJ6A-EL].)	1J, 1M
TFTV (ATF temperature signal voltage)	V	• ATF temperature 20 °C {68 °F}: **3 V** • ATF temperature 40 °C {104 °F}: **2.14 V** • ATF temperature 60 °C {140 °F}: **1.38 V**	Inspect the TFT sensor. (See 05-13-22 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR INSPECTION [SJ6A-EL].)	1J, 1M
THOP (Throttle position)	%	• CTP: **20%** • WOT: **89.8%**	• Inspect the TP sensor. (See 01-40-28 THROTTLE POSITION (TP) SENSOR INSPECTION [L8, LF].) • Inspect the PCM. (See 01-40-9 PCM INSPECTION [L8, LF].)	N/A

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Monitor item (Definition)	Unit/ Condition	Condition/Specification	Action	TCM terminal
TR (TR switch)	R/N/D/P	• R position: R • N position: N • D range: D • P position: P	Inspect the TR switch. (See 05-13-14 TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL].)	2K, 2M, 2N, 2O
TRD (TR switch [D range])	On/Off	• D range: On • Other ranges and all positions: Off	Inspect the TR switch. (See 05-13-14 TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL].)	2K
TRR (TR switch [R position])	On/Off	• R position: On • Other positions and all ranges: Off	Inspect the TR switch. (See 05-13-14 TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL].)	2M
TSS (Turbine shaft speed)	RPM	• Idle: **700—800 rpm** • Vehicle speed 40 km/h {25 mph}: **3,800 RPM**	Inspect the turbine sensor. (See 05-13-26 TURBINE SENSOR INSPECTION [SJ6A-EL].)	2A, 2B
UP SW (Up switch)	On/Off	• Up shift at M range: On • Other: Off	Inspect the selector lever component. (See 05-14-3 SELECTOR LEVER COMPONENT INSPECTION.)	2J
VPWR_TCM (Battery voltage)	V	Ignition switch at ON position: B+	• Inspect the ignition switch. (See 09-21-3 IGNITION SWITCH INSPECTION.) • Inspect the battery. (See 01-17-3 BATTERY INSPECTION [L8, LF].)	1AD
VSS (Vehicle speed)	KPH	• Vehicle speed 40 km/h {25 mph}: **40 KPH** • Indicates vehicle speed	Inspect the VSS. (See 05-13-27 VEHICLE SPEED SENSOR (VSS) INSPECTION [SJ6A-EL].)	2C, 2D

Simulation Function Procedure

1. Connect the M-MDS to the DLC-2.

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2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select the “Toolbox” tab.
     2. Select “DataLogger”.
     3. Select “Modules”.
     4. Select “TCM”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “TCM”.
     3. Select “DataLogger”.
3. Select the simulation items from the PID table.
4. Perform the simulation function, inspect the operations for each parts.
   - If there is no operation sound from the solenoid after the simulation function inspection is performed, it is possible that there is an open or short circuit in the wiring harness, or solenoid, or sticking and operation malfunction.

ON-BOARD DIAGNOSTIC [SJ6A-EL]

Simulation item table

X: Available

Simulation item	Applicable component	Unit/Condition	Operation		TCM terminal
			IG ON	Idle	
LPS	Pressure control solenoid	A	N/A	X	1E, 1R
SSA	Shift solenoid A	On/Off	N/A	X	1AF
SSB	Shift solenoid B	On/Off	N/A	X	1AB
SSC	Shift solenoid C	On/Off	N/A	X	1AA
SSD	Shift solenoid D	On/Off	N/A	X	1S
SSE	Shift solenoid E	On/Off	N/A	X	1V
SSF	Shift solenoid F	A	N/A	X	1O, 1Z
SSG	Shift solenoid G	A	N/A	X	1L, 1Y
TCCC	TCC solenoid valve	A	N/A	X	1D, 1Q

05-03 SYMPTOM TROUBLESHOOTING [SJ6A-EL]

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SYMPTOM TROUBLESHOOTING [SJ6A-EL]

AUTOMATIC TRANSMISSION CONTROL SYSTEM WIRING DIAGRAM [SJ6A-EL]

id050307809500

amxzzw0000016

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

FOREWORD [SJ6A-EL]

id050307800200

- When the customer reports a vehicle malfunction, inspect the malfunction indicator lamp (MIL) indication, AT warning indicator light flash, and diagnostic trouble code (DTC), then diagnose the malfunction according to following flowchart.
  - If a DTC exists, diagnose the applicable DTC inspection. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].)
  - If a DTC does not exist, the MIL does not illuminate and the AT warning indicator light illuminate, diagnose the applicable symptom troubleshooting. (See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE [SJ6A-EL].)

amxzzw0000039

*: Malfunction Indicator Lamp (MIL), AT warning light.

BASIC INSPECTION [SJ6A-EL]

id050307800300

STEP	INSPECTION		ACTION
1	• Measure the battery voltage. • Is the battery voltage **10.0—14.0 V**?	Yes	Go to the next step.
		No	Recharge or replace the battery. (See 01-17-4 BATTERY RECHARGING [L8, LF].) (See 01-17-4 BATTERY RECHARGING [L8, LF].)
2	• Inspect the TCM related harnesses, connectors and fuses. • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
3	• Warm up the engine to normal operating temperature. • Retrieve the DTC using the M-MDS. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) • Are any DTCs present?	Yes	Record the Freeze Frame Data and perform the appropriate DTC troubleshooting. (See 05-02-5 DTC TABLE [SJ6A-EL].)
		No	Go to the next step.
4	• Inspect the ATF color and condition. (See 05-13-9 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results. Flush the AT and cooler line, if necessary.
		No	Go to the next step.
5	• Perform the road test. (See 05-13-5 ROAD TEST [SJ6A-EL].) • Is the AT operating normally?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
6	• Perform the time lag test. (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].) • Is the AT operating normally?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

STEP	INSPECTION		ACTION
7	• Perform the stall test. (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].) • Is the stall speed within the specified?	Yes	Go to the next step.
		No	Repair or replace malfunctioning part according to the inspection results.
8	• Perform the line pressure test. (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].) • Is the line pressure within the specified?	Yes	Perform the symptom troubleshooting and follow the procedures.
		No	Repair or replace malfunctioning part according to the inspection results.
9	• Inspect following part or signal related PIDs using the M-MDS. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) **PCM PIDs:** — APP — BOO — ECT — RPM — TP_REL — VSS **TCM PIDs:** — THOP — TSS — OSS — TFT — TR — MNL SW — UP SW — DWN SW — BOO TCM • Are the PIDs normal? (See 01-40-9 PCM INSPECTION [L8, LF].) (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].)	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Perform the symptom troubleshooting and follow the procedures.

SYMPTOM TROUBLESHOOTING ITEM TABLE [SJ6A-EL]

id050307800400

- Use the chart below to verify the symptoms of the trouble in order to diagnose the appropriate area.

NO.	TROUBLESHOOTING ITEM	DESCRIPTION	PAGE
1	Vehicle does not move in D, M ranges, or in R position	• Vehicle does not move when accelerator pedal is depressed.	(See 05-03-11 NO.1 VEHICLE DOES NOT MOVE IN D, M RANGES, OR IN R POSITION [SJ6A-EL].)
2	Vehicle moves in N position	• Vehicle creeps in N position. • Vehicle creeps if brake pedal is not depressed in N position.	(See 05-03-12 NO.2 VEHICLE MOVES IN N POSITION [SJ6A-EL].)
3	Vehicle moves in P position, or parking gear does not disengage when P is disengaged	• Vehicle rolls when on a downward slope and tires do not lock in P position. • Tires are locked when P position is disengaged, vehicle does not move in D range, and R position when accelerator pedal is depressed, and engine remains in stalled condition.	(See 05-03-13 NO.3 VEHICLE MOVES IN P POSITION, OR PARKING GEAR DOES NOT DISENGAGE WHEN P IS DISENGAGED [SJ6A-EL].)
4	Excessive creep	• Vehicle accelerates in D range, and R position when accelerator pedal is not depressed.	(See 05-03-13 NO.4 EXCESSIVE CREEP [SJ6A-EL].)
5	No creep at all	• Vehicle does not move in D range, or R position when idling on flat paved road.	(See 05-03-13 NO.5 NO CREEP AT ALL [SJ6A-EL].)
6	Low maximum speed and poor acceleration	• Vehicle acceleration is poor at start. • Delayed acceleration when accelerator pedal is depressed while driving.	(See 05-03-14 NO.6 LOW MAXIMUM SPEED AND POOR ACCELERATION [SJ6A-EL].)

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

NO.	TROUBLESHOOTING ITEM	DESCRIPTION	PAGE
7	No shifting	• Single shift range only. • Sometimes shifts correctly.	(See 05-03-16 NO.7 NO SHIFTING [SJ6A-EL].)
8	Does not shift to 6GR	• Vehicle does not upshift from 5GR to 6GR even though vehicle speed increased. • Vehicle does not shift to 6GR even though accelerator pedal is released in D range at **80 km/h {50 mph}**.	(See 05-03-17 NO.8 DOES NOT SHIFT TO 6GR [SJ6A-EL].)
9	Abnormal shifting	• Shifts incorrectly (incorrect shift pattern).	(See 05-03-19 NO.9 ABNORMAL SHIFTING [SJ6A-EL].)
10	Frequent shifting	• Downshifting occurs suddenly even when accelerator pedal is depressed slightly in D range.	(See 05-03-20 NO.10 FREQUENT SHIFTING [SJ6A-EL].)
11	Shift point is high or low	• Shift point considerably different from automatic shift diagram. • Shift delays when accelerating. • Shift occurs suddenly when accelerating and engine speed does not increase.	(See 05-03-20 NO.11 SHIFT POINT IS HIGH OR LOW [SJ6A-EL].)
12	Torque converter clutch (TCC) non-operation	• TCC does not operate when vehicle reaches TCC operation range.	(See 05-03-21 NO.12 TORQUE CONVERTER CLUTCH (TCC) NON-OPERATION [SJ6A-EL].)
13	No kickdown	• Does not downshift when accelerator pedal is fully depressed within kickdown range.	(See 05-03-22 NO.13 NO KICKDOWN [SJ6A-EL].)
14	Engine flares up or slips when upshifting or downshifting	• When accelerator pedal is depressed, engine speed increases normally but vehicle speed increases slowly. • When accelerator pedal is depressed while driving, engine speed increases but vehicle speed does not increase.	(See 05-03-22 NO.14 ENGINE FLARES UP OR SLIPS WHEN UPSHIFTING OR DOWNSHIFTING [SJ6A-EL].)
15	Engine flares up or slips when accelerating vehicle	• Engine flares up when accelerator pedal is depressed for upshifting. • Engine flares up suddenly when accelerator pedal is depressed for downshifting.	(See 05-03-23 NO.15 ENGINE FLARES UP OR SLIPS WHEN ACCELERATING VEHICLE [SJ6A-EL].)
16	Judder upon torque converter clutch (TCC) operation	• Vehicle jolts when TCC is engaged.	(See 05-03-24 NO.16 JUDDER UPON TORQUE CONVERTER CLUTCH (TCC) OPERATION [SJ6A-EL].)
17	Excessive shift shock from N to D or N to R position/range	• Strong shock is felt when shifting from N to D or N to R position/range at idle.	(See 05-03-24 NO.17 EXCESSIVE SHIFT SHOCK FROM N TO D OR N TO R POSITION/RANGE [SJ6A-EL]?.)
18	Excessive shift shock is given when upshifting and downshifting	• Excessive shift shock is felt when depressing accelerator pedal to accelerate at upshifting. • During cruising, excessive shift shock is felt when depressing accelerator pedal at downshifting.	(See 05-03-26 NO.18 EXCESSIVE SHIFT SHOCK IS GIVEN WHEN UPSHIFTING AND DOWNSHIFTING [SJ6A-EL].)
19	Excessive shift shock on torque converter clutch (TCC)	• Strong shock is felt when TCC is engaged.	(See 05-03-27 NO.19 EXCESSIVE SHIFT SHOCK ON TORQUE CONVERTER CLUTCH (TCC) [SJ6A-EL].)
20	Noise occurs at idle when vehicle is stopped in all positions/ranges	• Transmission is noisy in all positions and ranges when vehicle is idling.	(See 05-03-28 NO.20 NOISE OCCURS AT IDLE WHEN VEHICLE IS STOPPED IN ALL POSITIONS/RANGES [SJ6A-EL].)
21	Noise occurs at idle when vehicle is stopped in D range, or in R position	• Transmission is noisy in driving ranges when vehicle is idling.	(See 05-03-28 NO.21 NOISE OCCURS AT IDLE WHEN VEHICLE IS STOPPED IN D RANGE, OR IN R POSITION [SJ6A-EL].)

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

NO.	TROUBLESHOOTING ITEM	DESCRIPTION	PAGE
22	No engine braking	• Engine speed drops to idle but vehicle coasts when accelerator pedal is released during cruising at medium to high speeds. • Engine speed drops to idle but vehicle coasts when accelerator pedal is released when in M range (1GR) at low vehicle speed.	(See 05-03-29 NO.22 NO ENGINE BRAKING [SJ6A-EL].)
23	Transmission overheats	• Burnt smell is emitted from transmission. • Smoke is emitted from transmission.	(See 05-03-30 NO.23 TRANSMISSION OVERHEATS [SJ6A-EL].)
24	Engine stalls when shifted to D range, or in R position	• Engine stalls when shifting from N or P position to D range or R position at idle.	(See 05-03-31 NO.24 ENGINE STALLS WHEN SHIFTED TO D RANGE, OR IN R POSITION [SJ6A-EL].)
25	Engine stalls when driving at slow speeds or stopping	• Engine stalls when brake pedal is depressed while driving at low speed or stopping.	(See 05-03-32 NO.25 ENGINE STALLS WHEN DRIVING AT SLOW SPEED OR STOPPING [SJ6A-EL].)
26	Starter does not work	• Starter does not work even when P or N position is selected.	(See 05-03-32 NO.26 STARTER DOES NOT WORK [SJ6A-EL].)
27	Gear position indicator light does not illuminate in M range	• Gear position indicator light in instrument cluster does not illuminate in M range with ignition switch at ON position.	(See 05-03-33 NO.27 GEAR POSITION INDICATOR LIGHT DOES NOT ILLUMINATE IN M RANGE [SJ6A-EL].)
28	Gear position indicator light illuminates in D range or P, N, R positions	• Gear position indicator light in instrument cluster illuminates in D range or P, N, R positions with ignition switch at ON position.	(See 05-03-34 NO.28 GEAR POSITION INDICATOR LIGHT ILLUMINATES IN D RANGE OR P, N, R POSITIONS [SJ6A-EL].)
29	Does not upshift in M range	• Gear position indicator light in instrument cluster illuminates, but vehicle does not upshift when selector lever is pushed to “+” side or steering shift switch “UP” is pulled.	(See 05-03-35 NO.29 DOES NOT UPSHIFT IN M RANGE [SJ6A-EL].)
30	Does not downshift in M range	• Gear position indicator light in instrument cluster illuminates, but vehicle does not downshift when selector lever is pushed to “–” side or steering shift switch “DOWN” is pushed.	(See 05-03-36 NO.30 DOES NOT DOWNSHIFT IN M RANGE [SJ6A-EL].)
31	M range position indicator light does not illuminate in M range and/or in D range with direct mode/M range position indicator light illuminates in D range while not in direct mode	• M range position indicator light in instrument cluster does not illuminate in M range and/or in D range in direct mode when ignition switch is in ON position. • M range position indicator light illuminates in D range while not in direct mode when ignition switch is in ON position.	(See 05-03-37 NO.31 M RANGE POSITION INDICATOR LIGHT DOES NOT ILLUMINATE IN M RANGE AND/OR IN D RANGE WITH DIRECT MODE/M RANGE POSITION INDICATOR LIGHT ILLUMINATES IN D RANGE WHILE NOT IN DIRECT MODE [SJ6A-EL].)

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

QUICK DIAGNOSIS CHART [SJ6A-EL]

id050307800500

X : Applicable

	Symptom item / Cause of trouble	Selector lever is mis-adjisted	Not within line pressure specification	TR switch is mis-adjisted	Parking mechanism not operating properly	Not within ATF amount	Electrical system components											
							AT outer parts											
							CAN signal						TR switch		M range switch		Up switch/Steering shift switch "UP" side	
							Engine speed (from PCM)	Accelertor pedal position (from PCM)	Throttle opening (from PCM)	Engine coolant temperature (from PCM)	Engine torque (from PCM)	TCM power supply/GND						
							Abnormal signal	Abnormal signal	Abnormal signal	Abnormal signal	Abnormal signal	Open/short	No signal input	Abnormal signal input	No signal input	Abnormal signal input	No signal input	Abnormal signal input
1	Vehicle does not move in D, M ranges, or in R position	X			X	X						X						
2	Vehicle moves in N position	X	X	X	X													
3	Vehicle moves in P position, or parking gear does not disengage when P is disengaged	X			X													
4	Excessive creep																	
5	No creep at all		X			X												
6	Low maximum speed and poor acceleration		X															
7	No shifting		X				X	X	X	X	X	X	X	X				
8	Does not shift to 6GR	X	X				X	X	X	X	X	X	X	X	X	X		
9	Abnormal shifting		X				X	X	X	X	X	X						
10	Frequent shifting		X				X	X	X	X	X							
11	Shift point is high or low						X	X	X	X	X							
12	Torque converter clutch (TCC) non-operation		X				X	X	X	X	X	X						
13	No kickdown						X	X	X	X	X	X						
14	Engine flares up or slips when upshifting or downshifting		X				X	X	X	X	X	X						
15	Engine flares up or slips when accelerating vehicle		X				X	X	X	X	X	X						
16	Judder upon torque converter clutch (TCC) operation		X				X	X	X	X	X	X						
17	Excessive shift shock from N to D or N to R position/range		X				X	X	X	X	X	X						
18	Excessive shift shock is given when upshifting and downshifting		X					X	X			X	X	X				
19	Excessive shift shock on torque converter clutch (TCC)		X				X	X	X	X	X	X						
20	Noise occurs at idle when vehicle is stopped in all positions/ranges																	
21	Noise occurs at idle when vehicle is stopped in D range, or in R position													X				
22	No engine braking		X				X	X	X	X	X							
23	Transmission overheats		X			X												
24	Engine stalls when shifted to D range, or in R position																	
25	Engine stalls when driving at slow speeds or stopping																	
26	Starter does not work	X		X									X	X				
27	Gear position indicator light does not illuminate in D or M range														X	X		
28	Gear position indicator light illuminate in P, R and N position														X	X		
29	Does not upshift in M range																X	X
30	Does not downshift in M range																	
31	M range position indicator light does not illuminate in M range and/or in D range with direct mode/M range position indicator light illuminates in D range while not in direct mode														X	X	X	X

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SYMPTOM TROUBLESHOOTING [SJ6A-EL]

X : Applicable

	Symptom item / Cause of trouble	Down switch/Steering shift switch "DOWN" side: No signal input	Down switch/Steering shift switch "DOWN" side: Abnormal signal input	VSS: No signal input	VSS: Abnormal signal input	Turbine sensor: No signal input	Turbine sensor: Abnormal signal input	TFT sensor: Open/short	TFT sensor: Malfunction signal input	Starter lock relay: Open/short	Shift solenoid A: Open/short	Shift solenoid B: Open/short	Shift solenoid C: Open/short	Shift solenoid D: Open/short	Shift solenoid E: Open/short	Line pressure control solenoid: Open/short	TCC control solenoid: Open/short	Shift solenoid F: Open/short	Shift solenoid G: Open/short
		Electrical system components																	
		AT outer parts									AT inner parts								
1	Vehicle does not move in D, M ranges, or in R position										X	X	X		X	X			X
2	Vehicle moves in N position											X	X		X				X
3	Vehicle moves in P position, or parking gear does not disengage when P is disengaged																		
4	Excessive creep																		
5	No creep at all											X	X		X	X			X
6	Low maximum speed and poor acceleration															X			
7	No shifting			X	X	X	X	X	X		X	X	X	X	X	X		X	X
8	Does not shift to 6GR					X	X	X	X		X	X	X	X		X			X
9	Abnormal shifting					X	X	X	X							X			
10	Frequent shifting					X	X	X	X							X			
11	Shift point is high or low			X	X	X	X												
12	Torque converter clutch (TCC) non-operation			X	X	X	X										X		
13	No kickdown																		
14	Engine flares up or slips when upshifting or downshifting			X	X	X	X				X	X	X	X	X	X	X	X	X
15	Engine flares up or slips when accelerating vehicle			X	X	X	X				X	X	X	X	X	X	X	X	X
16	Judder upon torque converter clutch (TCC) operation			X	X	X	X										X		
17	Excessive shift shock from N to D or N to R position/range										X					X	X	X	
18	Excessive shift shock is given when upshifting and downshifting					X	X				X	X	X	X	X	X	X	X	X
19	Excessive shift shock on torque converter clutch (TCC)			X	X	X	X										X		
20	Noise occurs at idle when vehicle is stopped in all positions/ranges																		
21	Noise occurs at idle when vehicle is stopped in D range, or in R position																		
22	No engine braking			X	X											X			
23	Transmission overheats							X	X										
24	Engine stalls when shifted to D range, or in R position					X	X										X		
25	Engine stalls when driving at slow speeds or stopping																		
26	Starter does not work									X									
27	Gear position indicator light does not illuminate in D or M range																		
28	Gear position indicator light illuminate in P, R and N position																		
29	Does not upshift in M range																		
30	Does not downshift in M range	X	X																
31	M range position indicator light does not illuminate in M range and/or in D range with direct mode/M range position indicator light illuminates in D range while not in direct mode	X	X																

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SYMPTOM TROUBLESHOOTING [SJ6A-EL]

X : Applicable

	Symptom item / Cause of trouble	Valve body spool is not operating properly	C1 accumulator is not operating properly	C2 accumulator is not operating properly	C3 accumulator is not operating properly	B3 accumulator is not operating properly	Clogging Shift solenoid A hydraulic circuit	Clogging Shift solenoid B hydraulic circuit	Clogging Shift solenoid C hydraulic circuit	Clogging Shift solenoid D hydraulic circuit	Clogging Shift solenoid E hydraulic circuit	Clogging Line pressure control solenoid hydraulic circuit	Clogging TCC control solenoid hydraulic circuit	Clogging Shift solenoid F hydraulic circuit	Clogging Shift solenoid G hydraulic circuit	ATF cooler is not operating properly
		Hydraulic system components														
		Control valve body														
1	Vehicle does not move in D, M ranges, or in R position	X	X		X		X	X	X		X	X			X	
2	Vehicle moves in N position	X	X					X	X		X				X	
3	Vehicle moves in P position, or parking gear does not disengage when P is disengaged															
4	Excessive creep															
5	No creep at all		X		X			X	X		X	X			X	
6	Low maximum speed and poor acceleration	X	X	X	X	X						X				
7	No shifting	X	X	X	X	X	X	X	X	X	X	X		X	X	
8	Does not shift to 6GR	X		X	X							X				
9	Abnormal shifting	X	X	X	X	X						X				
10	Frequent shifting	X	X	X	X	X						X				
11	Shift point is high or low															
12	Torque converter clutch (TCC) non-operation												X			
13	No kickdown															
14	Engine flares up or slips when upshifting or downshifting	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
15	Engine flares up or slips when accelerating vehicle	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
16	Judder upon torque converter clutch (TCC) operation	X											X			
17	Excessive shift shock from N to D or N to R position/range	X	X		X											
18	Excessive shift shock is given when upshifting and downshifting	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
19	Excessive shift shock on torque converter clutch (TCC)	X											X			
20	Noise occurs at idle when vehicle is stopped in all positions/ranges	X	X	X	X	X										
21	Noise occurs at idle when vehicle is stopped in D range, or in R position	X	X	X	X	X										
22	No engine braking	X										X				
23	Transmission overheats															X
24	Engine stalls when shifted to D range, or in R position												X			
25	Engine stalls when driving at slow speeds or stopping															
26	Starter does not work															
27	Gear position indicator light does not illuminate in D or M range															
28	Gear position indicator light illuminate in P, R and N position															
29	Does not upshift in M range															
30	Does not downshift in M range															
31	M range position indicator light does not illuminate in M range and/or in D range with direct mode/M range position indicator light illuminates in D range while not in direct mode															

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SYMPTOM TROUBLESHOOTING [SJ6A-EL]

X : Applicable

	Symptom item / Cause of trouble	Powertrain: Slipping (clutch, brake)	Powertrain: Burnt (clutch, brake)	Powertrain: One-way clutch is not operated properly	Powertrain: Torque converter is not operating properly	Powertrain: TCC is cracking or peeling	Powertrain: TCC is not operating properly	TCM malfunction	Loose parts installation (engine or transmission mounts, propeller shaft or suspension)	Insufficient battery voltage	Engine speed high	Engine output low
1	Vehicle does not move in D, M ranges, or in R position	X		X	X			X				
2	Vehicle moves in N position		X	X								
3	Vehicle moves in P position, or parking gear does not disengage when P is disengaged											
4	Excessive creep									X		
5	No creep at all		X		X			X				
6	Low maximum speed and poor acceleration	X	X		X						X	
7	No shifting		X					X				
8	Does not shift to 6GR	X	X		X							
9	Abnormal shifting	X	X					X				
10	Frequent shifting	X	X					X				
11	Shift point is high or low											
12	Torque converter clutch (TCC) non-operation					X	X					
13	No kickdown							X				
14	Engine flares up or slips when upshifting or downshifting	X	X									
15	Engine flares up or slips when accelerating vehicle	X	X									
16	Judder upon torque converter clutch (TCC) operation				X	X						
17	Excessive shift shock from N to D or N to R position/range		X						X		X	
18	Excessive shift shock is given when upshifting and downshifting	X	X					X	X	X		
19	Excessive shift shock on torque converter clutch (TCC)	X	X		X	X						
20	Noise occurs at idle when vehicle is stopped in all positions/ranges											
21	Noise occurs at idle when vehicle is stopped in D range, or in R position											
22	No engine braking	X	X									
23	Transmission overheats											
24	Engine stalls when shifted to D range, or in R position				X		X					X
25	Engine stalls when driving at slow speeds or stopping											X
26	Starter does not work											
27	Gear position indicator light does not illuminate in D or M range											
28	Gear position indicator light illuminate in P, R and N position											
29	Does not upshift in M range											
30	Does not downshift in M range											
31	M range position indicator light does not illuminate in M range and/or in D range with direct mode/M range position indicator light illuminates in D range while not in direct mode											

amxzzw0000039

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

NO.1 VEHICLE DOES NOT MOVE IN D, M RANGES, OR IN R POSITION [SJ6A-EL]

id050307808500

1	Vehicle does not move in D, M ranges, or in R position
DESCRIPTION	• Vehicle does not move when accelerator pedal is depressed.
POSSIBLE CAUSE	• If the vehicle does not move in D, M ranges or R position, basically, the malfunction is in the AT. (Vehicle will move even with a malfunction in the TCM.) Since a malfunction is in the sensor circuit or output circuit is the cause of the malfunction in the AT, inspect the sensors, output circuit, and the related wiring harnesses. —Parking mechanism not operating properly —Selector lever malfunction —Clutch slippage, worn (D range—C1 clutch, One-way clutch, R position—C3 clutch, B4 brake, One-way clutch) • Line pressure low • Shift solenoid A malfunction • Shift solenoid B malfunction • Shift solenoid C malfunction • Shift solenoid E malfunction • Shift solenoid G malfunction • Line pressure control solenoid malfunction • Sensor GND malfunction • Body GND malfunction • Control valve body malfunction —Torque converter malfunction —Foreign materials or water mixed in ATF —Improper ATF amount —TCM malfunction **Note** • Before following the troubleshooting steps, make sure that the Automatic Transmission On-Board Diagnostic and Automatic Transmission Basic Inspection are conducted. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) (See 05-03-3 BASIC INSPECTION [SJ6A-EL].)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• When the vehicle is stopped on a flat, level road and the engine off, does the vehicle move when pushed (in D range or N, R positions with the brake pedal released)?	Yes	Go to the next step.
		No	Inspect for parking mechanism. Repair or replace the malfunctioning part according to the inspection results.
2	• Start the engine. • Does the vehicle move when selector lever in between N position and D range?	Yes	Inspect and adjust the selector lever. (See 05-14-3 SELECTOR LEVER INSPECTION.)
		No	Go to the next step.
3	• Stop the engine. • Inspect the following solenoid: (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) — Shift solenoid A — Shift solenoid B — Shift solenoid C — Shift solenoid D — Shift solenoid E — Shift solenoid G — Line pressure control solenoid • Is there any malfunction?	Yes	Inspect the coupler component. Repair or replace the malfunctioning part according to the inspection results. If normal: • Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)
		No	Overhaul the transmission. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) Repair or replace the malfunctioning part according to the inspection results (clutch slippage, worn).
4	• Verify test results. — If normal, return to the diagnostic index to service any additional symptoms. — If malfunction remains, inspect the related Service Information and perform repair or diagnosis. • If the vehicle is repaired, troubleshooting completed. • If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)		

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

NO.2 VEHICLE MOVES IN N POSITION [SJ6A-EL]

id050307800700

2	Vehicle moves in N position
DESCRIPTION	• Vehicle creeps in N position. • Vehicle creeps if brake pedal is not depressed in N position.
POSSIBLE CAUSE	• If the vehicle moves in N position, basically, the malfunction is in the AT. Since a malfunction in the sensor circuit or output circuit is the cause of the malfunction in the AT, inspect the sensors, output circuit, and the related wiring harnesses. — Selector lever position disparity (Although the selector indicator shows N position, the hydraulic circuit shows D range or R position) • TR switch mis-adjustment — Clutch burnt (C1 clutch, C4 clutch, One-way clutch) • Line pressure low • Shift solenoid B malfunction • Shift solenoid C malfunction • Shift solenoid E malfunction • Shift solenoid G malfunction • Control valve body malfunction **Note** • Before following the troubleshooting steps, make sure that the Automatic Transmission On-Board Diagnostic and Automatic Transmission Basic Inspection are conducted. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) (See 05-03-3 BASIC INSPECTION [SJ6A-EL].)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Does the vehicle creep when selector lever is moved slightly in N position?	Yes	Go to the next step.
		No	Inspect and adjust the selector lever and TR switch. (See 05-14-3 SELECTOR LEVER INSPECTION.) (See 05-13-14 TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL].) (See 05-13-16 TRANSMISSION RANGE (TR) SWITCH ADJUSTMENT [SJ6A-EL].)
2	• Inspect the following solenoid: (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) — Shift solenoid B — Shift solenoid C — Shift solenoid E — Shift solenoid G • Is there any malfunction?	Yes	Inspect the coupler component. Repair or replace the malfunctioning part according to the inspection results. If normal: • Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)
		No	Overhaul the transmission. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) Repair or replace the any malfunctioning parts (clutch slippage, worn). (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)
3	• Verify test results. — If normal, return to the diagnostic index to service any additional symptoms. — If malfunction remains, inspect the related Service Information and perform repair or diagnosis. • If the vehicle is repaired, troubleshooting completed. • If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)		

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

NO.3 VEHICLE MOVES IN P POSITION, OR PARKING GEAR DOES NOT DISENGAGE WHEN P IS DISENGAGED [SJ6A-EL]

id050307800800

3	Vehicle moves in P position, or parking gear does not disengage when P is disengaged
DESCRIPTION	• Vehicle rolls when on a downward slope and tires do not lock in P position. • Tires are locked when P position is disengaged, vehicle does not move in D range, and R position when accelerator pedal is depressed, and the engine remains in stalled condition.
POSSIBLE CAUSE	• Parking mechanism malfunction (May have effect on noise or shock from transmission) • Improper adjustment of selector lever • If the vehicle moves in N position, perform the symptom troubleshooting “NO.2 VEHICLE MOVES IN N POSITION” (See 05-03-12 NO.2 VEHICLE MOVES IN N POSITION [SJ6A-EL].)

NO.4 EXCESSIVE CREEP [SJ6A-EL]

id050307800900

4	Excessive creep
DESCRIPTION	• Vehicle accelerates in D range, and R position when accelerator pedal is not depressed.
POSSIBLE CAUSE	• Engine idle speed is high (transmission system is not cause of problem) • Perform the symptom troubleshooting “NO.9 FAST IDLE/RUNS ON [L8, LF]” (See 01-03-34 NO.9 FAST IDLE/RUNS ON [L8, LF].)

NO.5 NO CREEP AT ALL [SJ6A-EL]

id050307801000

5	No creep at all
DESCRIPTION	• Vehicle does not move in D range, or R position when idling on a flat paved road.
POSSIBLE CAUSE	• Either engine output low or there is clutch slippage. — Transmission fixed in 4GR (Operation of fail-safe function) • Short or open circuit in wiring harness • Poor connection of connector • Malfunction of electronic parts of output and input system — Clutch burnt (C1 clutch, C4 clutch) • Line pressure low • Shift solenoid B malfunction • Shift solenoid C malfunction • Shift solenoid E malfunction • Shift solenoid G malfunction • Line pressure control solenoid malfunction • Body GND malfunction • Control valve body malfunction — There is no engine torque • Torque converter malfunction — Foreign material or water mixed in ATF — Excessive or low amount of ATF — TCM malfunction **Note** • Before following the troubleshooting steps, make sure that the Automatic Transmission On-Board Diagnostic and Automatic Transmission Basic Inspection are conducted. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) (See 05-03-3 BASIC INSPECTION [SJ6A-EL].)

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Does the vehicle creep when the selector lever in P and/or N position?	Yes	Inspect and adjust the selector lever. (See 05-14-3 SELECTOR LEVER INSPECTION.)
		No	Go to the next step.
2	• Stop the engine. • Inspect the following solenoid: (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) — Shift solenoid B — Shift solenoid C — Shift solenoid E — Shift solenoid G — Line pressure control solenoid • Is there any malfunction?	Yes	Inspect the coupler component. If normal: • Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)
		No	Go to the next step.
3	• Remove the torque converter. (See 05-13-45 TORQUE CONVERTER REMOVAL/INSTALLATION [SJ6A-EL].) • Inspect the torque converter. • Is there any malfunction?	Yes	Replace the torque converter. (See 05-13-45 TORQUE CONVERTER REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Inspect the ATF condition. If a large amount of metal specks are found: • Overhaul the transmission. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) • Repair or replace the any malfunctioning parts. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) If a large amount of metal specks are not found: • Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)
4	• Verify test results. — If normal, return to the diagnostic index to service any additional symptoms. — If malfunction remains, inspect the related Service Information and perform repair or diagnosis. • If the vehicle is repaired, troubleshooting completed. • If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)		

NO.6 LOW MAXIMUM SPEED AND POOR ACCELERATION [SJ6A-EL]

id050307801100

6	Low maximum speed and poor acceleration
DESCRIPTION	• Vehicle acceleration is poor at start. • Delayed acceleration when accelerator pedal is depressed while driving.
POSSIBLE CAUSE	• If the clutch is stuck or does not stay in 4GR, malfunction is in engine circuit. — Transmission fixed in 4GR (Operation of fail-safe function) • Short or open circuit in wiring harness • Poor connection of connector • Malfunction of electronic parts of output and input system — Engine output low — Clutch slippage, burnt (C1 clutch, C2 clutch, C3 clutch, B1 brake, B2 brake, B3 brake, B4 brake) • Line pressure low • Line pressure control solenoid malfunction • Control valve body malfunction — Insufficient starting torque (Suspected when in-gear, shift control and engine circuit are normal) • Torque converter malfunction (Poor operation, stuck) **Note** • Before following the troubleshooting steps, make sure that the Automatic Transmission On-Board Diagnostic and Automatic Transmission Basic Inspection are conducted. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) (See 05-03-3 BASIC INSPECTION [SJ6A-EL].)

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• With the ignition switch at the ON position, does the gear position indicator light indication correspond to the selector lever position?	Yes	Go to the next step.
		No	Perform the symptom troubleshooting “NO.27 GEAR POSITION INDICATOR LIGHT DOES NOT ILLUMINATE IN M RANGE” or “NO.28 GEAR POSITION INDICATOR LIGHT ILLUMINATES IN D RANGE OR P, N, R POSITIONS”. (See 05-03-33 NO.27 GEAR POSITION INDICATOR LIGHT DOES NOT ILLUMINATE IN M RANGE [SJ6A-EL].) (See 05-03-34 NO.28 GEAR POSITION INDICATOR LIGHT ILLUMINATES IN D RANGE OR P, N, R POSITIONS [SJ6A-EL].)
2	• Perform the symptom troubleshooting “NO.12 LACK/LOSS OF POWER-ACCELERATION/CRUISE [L8, LF]”. (See 01-03-42 NO.12 LACK/LOSS OF POWER-ACCELERATION/CRUISE [L8, LF].) • Does the engine control system normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
3	• Stop the engine. • Inspect the line pressure control solenoid. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is there any malfunction?	Yes	Inspect the coupler component. If normal: • Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)
		No	Go to the next step.
4	• Remove the torque converter. (See 05-13-45 TORQUE CONVERTER REMOVAL/INSTALLATION [SJ6A-EL].) • Inspect the torque converter. • Is there any malfunction?	Yes	Replace the torque converter. (See 05-13-45 TORQUE CONVERTER REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Inspect the ATF condition. If a large amount of metal specks are found: • Overhaul the transmission. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) • Repair or replace the any malfunctioning parts. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) If a large amount of metal specks are not found: • Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)
5	• Verify test results. — If normal, return to the diagnostic index to service any additional symptoms. — If malfunction remains, inspect the related Service Information and perform repair or diagnosis. • If the vehicle is repaired, troubleshooting completed. • If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)		

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

NO.7 NO SHIFTING [SJ6A-EL]

id050307801200

7	No shifting
DESCRIPTION	• Single shift range only. • Sometimes it shifts correctly.

POSSIBLE CAUSE	• When the gear position is fixed in 4GR due to the fail-safe operation, malfunction is in the AT.
	— TR switch malfunction
	— 4GR is fixed (Operation in fail-safe function)
	  • Short or open circuit in wiring harness
	  • Poor connection of connector
	  • Poor ground of shift solenoid
	  • Malfunction of electronic parts of output and input system
	— Clutch burnt (C1 clutch, C2 clutch, C3 clutch, B1 brake, B2 brake, B3 brake, B4 brake)
	  • Line pressure low
	  • Incorrect throttle position signal
	  • Incorrect accelerator pedal position signal
	  • Incorrect engine speed signal
	  • Incorrect engine coolant temperature signal
	  • Incorrect engine torque signal
	  • VSS malfunction
	  • Turbine sensor malfunction
	  • Sensor GND malfunction
	  • Shift solenoid A malfunction
	  • Shift solenoid B malfunction
	  • Shift solenoid C malfunction
	  • Shift solenoid D malfunction
	  • Shift solenoid E malfunction
	  • Shift solenoid F malfunction
	  • Shift solenoid G malfunction
	  • Line pressure control solenoid malfunction
	  • Control valve body malfunction
	— TFT sensor malfunction
	— TCM malfunction
	
	Note
	• Before following the troubleshooting steps, make sure that the Automatic Transmission On-Board Diagnostic and Automatic Transmission Basic Inspection are conducted. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) (See 05-03-3 BASIC INSPECTION [SJ6A-EL].)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• With the ignition switch at the ON position, does the gear position indicator light indication corresponded to the selector lever position?	Yes	Go to the next step.
		No	Perform the symptom troubleshooting “NO.27 GEAR POSITION INDICATOR LIGHT DOES NOT ILLUMINATE IN M RANGE” or “NO.28 GEAR POSITION INDICATOR LIGHT ILLUMINATES IN D RANGE OR P, N, R POSITIONS”. (See 05-03-33 NO.27 GEAR POSITION INDICATOR LIGHT DOES NOT ILLUMINATE IN M RANGE [SJ6A-EL].) (See 05-03-34 NO.28 GEAR POSITION INDICATOR LIGHT ILLUMINATES IN D RANGE OR P, N, R POSITIONS [SJ6A-EL].)
2	• Perform the PID/DATA Monitor and Record Procedure and access the following PCM PIDs. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) — APP — ECT — ENG_TRQ — RPM — TP • Are the PIDs value normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
3	• Inspect the TFT sensor. (See 05-13-22 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR INSPECTION [SJ6A-EL].) • Is there any malfunction?	Yes	Replace the TFT sensor. (See 05-13-24 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

STEP	INSPECTION		ACTION
4	• Stop the engine. • Inspect the following solenoid: (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) — Shift solenoid A — Shift solenoid B — Shift solenoid C — Shift solenoid D — Shift solenoid E — Shift solenoid F — Shift solenoid G — Line pressure control solenoid • Is there any malfunction?	Yes	Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)
		No	Inspect the ATF condition. If a large amount of metal specks are found: • Overhaul the transmission. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) • Repair or replace the any malfunctioning parts. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) If a large amount of metal specks are not found: • Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)
5	• Verify test results. — If normal, return to the diagnostic index to service any additional symptoms. — If malfunction remains, inspect the related Service Information and perform repair or diagnosis. • If the vehicle is repaired, troubleshooting completed. • If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)		

NO.8 DOES NOT SHIFT TO 6GR [SJ6A-EL]

id050307801300

8	Does not shift to 6GR
DESCRIPTION	• Vehicle does not upshift from 5GR to 6GR even though vehicle speed is increased. • Vehicle does not shift to 6GR even though accelerator pedal is released in D range at **80 km/h {50 mph}**.
POSSIBLE CAUSE	• Basically, TCC does not operate when the fail-safe is operating. Verify the DTC at first. If the TCC operates when driving at high speeds only, the malfunction (improper adjustment) is in the M range switch circuit or TR switch circuit. **Caution** • **If the TCC is stuck, inspect it. In addition, inspect the oil cooler for foreign particles which may have mixed in with the ATF.** — TR switch malfunction • Selector lever adjustment incorrect • TR switch adjustment incorrect — C2 clutch, C3 clutch, B2 brake slippage, burnt • Line pressure low • Incorrect throttle position signal • Incorrect accelerator pedal position signal • Incorrect engine speed signal • Incorrect engine coolant temperature signal • Incorrect engine torque signal • VSS malfunction • Turbine sensor malfunction • Sensor GND malfunction — TFT sensor malfunction • Short or open circuit in wiring harness • Poor connection of connector • Sensor malfunction — M range switch malfunction • Selector lever adjustment incorrect • Short or open circuit in wiring harness — Shift solenoid A, shift solenoid B, shift solenoid C, shift solenoid D, shift solenoid G, line pressure control solenoid malfunction • Short or open circuit in wiring harness • Poor connection of connector • Solenoid valve stuck — Torque converter malfunction — Control valve body malfunction **Note** • Before following the troubleshooting steps, make sure that the Automatic Transmission On-Board Diagnostic and Automatic Transmission Basic Inspection are conducted. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) (See 05-03-3 BASIC INSPECTION [SJ6A-EL].)

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• With the ignition switch at the ON position. • Does the gear position indicator light indication correspond to selector lever position?	Yes	Go to the next step.
		No	Perform the symptom troubleshooting “NO.27 GEAR POSITION INDICATOR LIGHT DOES NOT ILLUMINATE IN M RANGE” or “NO.28 GEAR POSITION INDICATOR LIGHT ILLUMINATES IN D RANGE OR P, N, R POSITIONS”. (See 05-03-33 NO.27 GEAR POSITION INDICATOR LIGHT DOES NOT ILLUMINATE IN M RANGE [SJ6A-EL].) (See 05-03-34 NO.28 GEAR POSITION INDICATOR LIGHT ILLUMINATES IN D RANGE OR P, N, R POSITIONS [SJ6A-EL].)
2	• Perform the PID/DATA Monitor and Record Procedure and access the following PCM PIDs. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) — APP — ECT — ENG_TRQ — RPM — TP • Are the PIDs value normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
3	• Inspect the TFT sensor. (See 05-13-22 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR INSPECTION [SJ6A-EL].) • Is there any malfunction?	Yes	Replace the TFT sensor. (See 05-13-24 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
4	• Drive the vehicle in D range and inspect following: — 1—2 shift up and down — 2—3 shift up and down — 3—4 shift up and down — 4—5 shift up and down — 5—6 shift up and down • Are all shift-up and shift-down possible?	Yes	Go to the next step.
		No	No shift at all: • Perform the symptom troubleshooting “NO.7 NO SHIFTING”. (See 05-03-16 NO.7 NO SHIFTING [SJ6A-EL].) Abnormal shift: • Perform the symptom troubleshooting “NO.9 ABNORMAL SHIFTING”. (See 05-03-19 NO.9 ABNORMAL SHIFTING [SJ6A-EL].)
5	• Stop the engine. • Inspect the following solenoid: (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) — Shift solenoid A — Shift solenoid B — Shift solenoid C — Shift solenoid D — Shift solenoid F — Line pressure control solenoid • Is there any malfunction?	Yes	Inspect for shift solenoid stuck. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
6	• Inspect the ATF condition. (See 05-13-9 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL].) • Are there any metal specks found?	Yes	If a large amount of metal specks are found: • Overhaul the transmission. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) • Repair or replace the any malfunctioning parts. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) If a large amount of metal specks are not found: • Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)
		No	Replace the torque converter. (See 05-13-45 TORQUE CONVERTER REMOVAL/INSTALLATION [SJ6A-EL].)

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

STEP	INSPECTION	ACTION
7	• Verify test results. — If normal, return to the diagnostic index to service any additional symptoms. — If malfunction remains, inspect the related Service Information and perform repair or diagnosis. • If the vehicle is repaired, troubleshooting completed. • If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)	

NO.9 ABNORMAL SHIFTING [SJ6A-EL]

id050307801400

9	Abnormal shifting
DESCRIPTION	• Shift incorrectly (incorrect shift pattern).
POSSIBLE CAUSE	• There is a malfunction in the signal circuit which controls shifting (throttle position signal, turbine sensor, VSS), the control valve is stuck, or the clutch circuit is stuck. — Clutch slippage, burnt (C1 clutch, C2 clutch, C3 clutch, B1 brake, B2 brake, B3 brake) • Body GND malfunction • Sensor GND malfunction • Incorrect accelerator pedal position signal • Incorrect engine coolant temperature signal • Incorrect engine torque signal • Incorrect engine speed signal • Incorrect throttle position signal • VSS malfunction • Turbine sensor malfunction • TFT sensor malfunction • Line pressure control solenoid malfunction • Line pressure low • Control valve body malfunction • TCM malfunction **Note** • Before following the troubleshooting steps, make sure that the Automatic Transmission On-Board Diagnostic and Automatic Transmission Basic Inspection are conducted. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) (See 05-03-3 BASIC INSPECTION [SJ6A-EL].)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Inspect for continuity between TCM terminal 1P, 1X and battery negative terminal. • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the suspected wiring harness.
2	• Is the line pressure normal? (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].)	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
3	• Perform the PID/DATA Monitor and Record Procedure and access the following PCM and TCM PIDs. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].) **PCM PIDs:** — APP — ECT — ENG_TRQ — RPM — TP **TCM PIDs:** — VSS — TSS • Are the PIDs value normal? (See 01-40-9 PCM INSPECTION [L8, LF].) (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

STEP	INSPECTION		ACTION
4	• Inspect the TFT sensor. (See 05-13-22 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR INSPECTION [SJ6A-EL].) • Is there any malfunction?	Yes	Replace the TFT sensor. (See 05-13-24 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.
5	• Inspect the line pressure control solenoid. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is there any malfunction?	Yes	Inspect the TCM terminal for bend, damage, corrosion or poor contact. Repair or replace the malfunctioning part according to the inspection results.
		No	Inspect the coupler component. If normal: • Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)
6	• Verify test results. — If normal, return to the diagnostic index to service any additional symptoms. — If malfunction remains, inspect the related Service Information and perform repair or diagnosis. • If the vehicle is repaired, troubleshooting completed. • If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)		

NO.10 FREQUENT SHIFTING [SJ6A-EL]

id050307801500

10	Frequent shifting
DESCRIPTION	• Downshifting occurs suddenly even when accelerator pedal is depressed slightly in D range.
POSSIBLE CAUSE	• The malfunctioning circuit is basically the same as symptom troubleshooting “NO.9 ABNORMAL SHIFTING”. (See 05-03-19 NO.9 ABNORMAL SHIFTING [SJ6A-EL].) However, a malfunction of the input signal to the APP sensor, TP sensor, turbine sensor, VSS (including the sensor GND, sensor wiring harness and connector), or clutch slippage (clutch stuck, low pressure in line) may also be the cause.

NO.11 SHIFT POINT IS HIGH OR LOW [SJ6A-EL]

id050307801600

11	Shift point is high or low
DESCRIPTION	• Shift point considerably different from automatic shift diagram. • Shift delays when accelerating. • Shift occurs suddenly when accelerating and engine speed does not increase.
POSSIBLE CAUSE	• If the transmission does not shift abnormally, there is a malfunction of the input signal to the TP sensor, turbine sensor, or VSS. • If the engine speed is high or low, regardless of normal shifting, inspect the tachometer. • Verify that the output signals of the APP sensor and TP sensor change linearly.

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

NO.12 TORQUE CONVERTER CLUTCH (TCC) NON-OPERATION [SJ6A-EL]

id050307801700

12	Torque converter clutch (TCC) non-operation
DESCRIPTION	• TCC does not operate when vehicle reaches TCC operation range.
POSSIBLE CAUSE	• Basically, TCC does not operate when the fail-safe is operating. Verify the DTC at first. If the TCC operates when driving at high speeds only, the malfunction (improper adjustment) is in the M range switch circuit or TR switch circuit. **Caution** • **If the TCC is stuck, inspect it. In addition, inspect the oil cooler for foreign particles which may have mixed in with the ATF.** • TCC slippage, burnt — Line pressure low • Incorrect accelerator pedal position signal • Incorrect engine coolant temperature signal • Incorrect engine torque signal • Incorrect engine speed signal • Incorrect throttle position signal • Turbine sensor malfunction • VSS malfunction • Output solenoid valve system malfunction (Sticking) • TCC control solenoid malfunction • TCC hydraulic pressure system malfunction • Control valve body system malfunction (Poor operation, sticking) • APP sensor malfunction (Not operating linearly) • Turbine sensor or VSS malfunction • Operation of fail-safe function — Short to power or GND at TCC control solenoid related circuit **Note** • Before following the troubleshooting steps, make sure that the Automatic Transmission On-Board Diagnostic and Automatic Transmission Basic Inspection are conducted. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) (See 05-03-3 BASIC INSPECTION [SJ6A-EL].)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• With the ignition switch at the ON position. • Does the gear position indicator light indication correspond to the selector lever position?	Yes	Go to the next step.
		No	Perform the symptom troubleshooting “NO.27 GEAR POSITION INDICATOR LIGHT DOES NOT ILLUMINATE IN M RANGE” or “NO.28 GEAR POSITION INDICATOR LIGHT ILLUMINATES IN D RANGE OR P, N, R POSITIONS”. (See 05-03-33 NO.27 GEAR POSITION INDICATOR LIGHT DOES NOT ILLUMINATE IN M RANGE [SJ6A-EL].) (See 05-03-34 NO.28 GEAR POSITION INDICATOR LIGHT ILLUMINATES IN D RANGE OR P, N, R POSITIONS [SJ6A-EL].)
2	• Disconnect the TCM. • Is the resistance between the TCM ground terminal 1P, 1X and the body GND **less than 5.0 ohms**?	Yes	Go to the next step.
		No	Repair or replace the suspected wiring harness.
3	• Perform the PID/DATA Monitor and Record Procedure and access the following PCM PIDs. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) — APP — ECT — ENG_TRQ — RPM — TP • Are the PIDs value normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
4	• Inspect the TFT sensor. (See 05-13-22 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR INSPECTION [SJ6A-EL].) • Is there any malfunction?	Yes	Replace the TFT sensor. (See 05-13-24 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

STEP	INSPECTION		ACTION
5	• Inspect the TCC control solenoid. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is the line pressure control solenoid normal?	Yes	Go to the next step.
		No	Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)
6	• Remove the torque converter. (See 05-13-45 TORQUE CONVERTER REMOVAL/INSTALLATION [SJ6A-EL].) • Inspect the torque converter. • Is there any malfunction?	Yes	Replace the torque converter. (See 05-13-45 TORQUE CONVERTER REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Inspect the ATF condition. If a large amount of metal specks are found: • Overhaul the transmission. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) • Repair or replace the any malfunctioning parts. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) If a large amount of metal specks are not found: • Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)
7	• Verify test results. — If normal, return to the diagnostic index to service any additional symptoms. — If malfunction remains, inspect the related Service Information and perform repair or diagnosis. • If the vehicle is repaired, troubleshooting completed. • If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)		

NO.13 NO KICKDOWN [SJ6A-EL]

id050307801800

13	No kickdown
DESCRIPTION	• Does not downshift when accelerator pedal is fully depressed within kickdown range.
POSSIBLE CAUSE	• If the transmission does not downshift though shifting is normal, the malfunction is in the accelerator pedal position, engine speed, throttle position, ECT sensor, engine torque signals or TCM (including sensor GND, sensor wiring harness and connector CAN communication).

NO.14 ENGINE FLARES UP OR SLIPS WHEN UPSHIFTING OR DOWNSHIFTING [SJ6A-EL]

id050307801900

14	Engine flares up or slips when upshifting or downshifting
DESCRIPTION	• When accelerator pedal is depressed, engine speed increases normally but vehicle speed increases slowly. • When accelerator pedal is depressed while driving, engine speed increases but vehicle speed does not increase.
POSSIBLE CAUSE	• There is clutch slippage because the clutch is stuck or the line pressure is low. — Clutch stuck, slippage (C1 clutch, C2 clutch, C3 clutch, B1 brake, B2 brake, B3 brake) • Line pressure control solenoid malfunction • Line pressure low • Incorrect accelerator pedal position signal • Incorrect engine coolant temperature signal • Incorrect engine speed signal • Incorrect engine torque signal • Incorrect throttle position signal • Shift solenoid A malfunction • Shift solenoid B malfunction • Shift solenoid C malfunction • Shift solenoid D malfunction • Shift solenoid E malfunction • Shift solenoid F malfunction • Shift solenoid G malfunction • VSS malfunction • TCC control solenoid malfunction • Turbine sensor malfunction • Body GND malfunction • Sensor GND malfunction • Control valve body malfunction **Note** • Before following the troubleshooting steps, make sure that the Automatic Transmission On-Board Diagnostic and Automatic Transmission Basic Inspection are conducted. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) (See 05-03-3 BASIC INSPECTION [SJ6A-EL].)

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is the line pressure normal? (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].)	Yes	Go to the next step.
		No	Repair or replace malfunctioning part according to the inspection results.
2	• Is the shift point normal? (See 05-13-5 ROAD TEST [SJ6A-EL].)	Yes	Go to the next step.
		No	Perform the symptom troubleshooting “NO.9 ABNORMAL SHIFTING”. (See 05-03-19 NO.9 ABNORMAL SHIFTING [SJ6A-EL].)
3	• Perform the PID/DATA Monitor and Record Procedure and access the following PCM PIDs. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) — APP — ECT — ENG_TRQ — RPM — TP • Are the PIDs value normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
4	• Stop the engine. • Inspect the following solenoids: (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) — Shift solenoid A — Shift solenoid B — Shift solenoid C — Shift solenoid D — Shift solenoid E — Line pressure control solenoid — TCC control solenoid • Is there any malfunction?	Yes	Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)
		No	Inspect the ATF condition. If a large amount of metal specks are found: • Overhaul the transmission. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) • Repair or replace the any malfunctioning parts. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) If a large amount of metal specks are not found: • Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)
5	• Inspect the coupler component for open or short. • Is there any malfunction?	Yes	Replace the coupler component. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)
		No	Go to the next step.
6	• Inspect the ATF condition. • Are large amount of specks found?	Yes	Overhaul the transmission. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) Repair or replace the any malfunctioning parts. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)
7	• Verify test results. — If normal, return to the diagnostic index to service any additional symptoms. — If malfunction remains, inspect the related Service Information and perform repair or diagnosis. • If the vehicle is repaired, troubleshooting completed. • If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)		

NO.15 ENGINE FLARES UP OR SLIPS WHEN ACCELERATING VEHICLE [SJ6A-EL]

id050307802000

15	Engine flares up or slips when accelerating vehicle
DESCRIPTION	• Engine flares up when accelerator pedal is depressed for upshifting. • Engine flares up suddenly when accelerator pedal is depressed for downshifting.
POSSIBLE CAUSE	• The malfunction is basically the same as for symptom troubleshooting “NO.14 ENGINE FLARES UP OR SLIPS WHEN UPSHIFTING OR DOWNSHIFTING”. — If conditions for No.14 worsen, the malfunction will develop to No.15.

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

NO.16 JUDDER UPON TORQUE CONVERTER CLUTCH (TCC) OPERATION [SJ6A-EL]

id050307802100

16	Judder upon torque converter clutch (TCC) operation
DESCRIPTION	• Vehicle jolts when TCC is engaged.
POSSIBLE CAUSE	• Poor TCC engagement due to either slippage because the TCC piston is stuck or the line pressure is low. **Caution** • **If the TCC is stuck, inspect it. In addition, inspect the oil cooler for foreign particles which may have mixed in with the ATF.** — TCC slippage, burnt • Line pressure low • Incorrect accelerator pedal position signal • Incorrect engine coolant temperature signal • Incorrect engine torque signal • Incorrect engine speed signal • Incorrect throttle position signal • VSS malfunction • Turbine sensor malfunction • Sensor GND malfunction • TCC control solenoid malfunction • Control valve body malfunction — Torque converter malfunction

NO.17 EXCESSIVE SHIFT SHOCK FROM N TO D OR N TO R POSITION/RANGE [SJ6A-EL]

id050307802200

17	Excessive shift shock from N to D or N to R position/range
DESCRIPTION	• Strong shock is felt when shifting from N to D or N to R position/range at idle.
POSSIBLE CAUSE	• Shift shock may worsen when the fail-safe is operating. If no DTC is output, the shift shock may worsen due to poor operation of the control valve body or sticking of the clutch. — Harness or connector malfunction — Line pressure high — Idle speed high — Clutch burnt (N→D: C1 clutch, N→R: C3 clutch or B4 brake) • TFT sensor malfunction • Line pressure low • Incorrect accelerator pedal position signal • Incorrect engine coolant temperature signal • Incorrect engine torque signal • Incorrect engine speed signal • Incorrect throttle position signal • Incorrect turbine sensor signal (N→D) • Sensor GND malfunction • Line pressure control solenoid malfunction • Shift solenoid A malfunction • Shift solenoid F malfunction • TCC control solenoid malfunction (N→R) • ATF level low • Control valve body malfunction — Poor hydraulic operation (Malfunction in range change) — Poor tightening torque of engine mount, exhaust mount, suspension, propeller shaft — Insufficient battery voltage — AT malfunction **Note** • Before following the troubleshooting steps, make sure that the Automatic Transmission On-Board Diagnostic and Automatic Transmission Basic Inspection are conducted. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) (See 05-03-3 BASIC INSPECTION [SJ6A-EL].)

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Does the shift shock occur only when the engine is cold?	Yes	Go to the next step.
		No	Go to Step 3.
2	• Inspect the TFT sensor and related wiring harness (vibration, intermittent open/short circuit). (See 05-13-22 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR INSPECTION [SJ6A-EL].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
3	• Perform the Initial Learning. (See 05-03-26 Initial Learning.) • Does the symptom eliminate?	Yes	Symptom troubleshooting is completed.
		No	Go to the next step.
4	• Is the line pressure normal? (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].)	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
5	• Is the stall speed normal? (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].)	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
6	• Perform the PID/DATA Monitor and Record Procedure and access the following PCM PIDs. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) — APP — ECT — ENG_TRQ — RPM — TP • Are the PIDs value normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
7	• Stop the engine. • Inspect the following solenoids: (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) — Line pressure control solenoid — Shift solenoid A — Shift solenoid F — TCC control solenoid • Is there any malfunction?	Yes	Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)
		No	Inspect the ATF condition. If a large amount of metal specks are found: • Overhaul the transmission. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) • Repair or replace the any malfunctioning parts. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) If a large amount of metal specks are not found: • Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)
8	• Verify test results. — If normal, return to the diagnostic index to service any additional symptoms. — If malfunction remains, inspect the related Service Information and perform repair or diagnosis. • If the vehicle is repaired, troubleshooting completed. • If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)		

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

Initial Learning

Warning
- **When performing a initial learning, be aware of other vehicles, people, and other impediments to order to avoid an accident.**

Note
- While self-learning control gradually reduces shock during normal driving, initial learning is performed to initially learn a certain amount of driving conditions.

1. Warm-up
   - Increase the ATF temperature by leaving the vehicle idling or performing city driving. Verify that the ATF temperature is **between 50—120 °C {122—248 °F}**. If the ATF temperature is outside this range, work to bring it inside the range.

   Caution
   - **Do not raise the ATF temperature by stalling the engine.**

   Note
   - If the ATF temperature is not **between 50—120 °C {122—248 °F}**, initial learning cannot be performed. Before learning, inspect for variable shift shock.

2. Gear shift control learning
   - In D range, with the throttle opening between **25—30%**, drive until you reach 6th gear and a vehicle speed of **80 km/h {50 mph}** or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in at least **60 s**. Repeat this procedure **10 times**.
3. Inspect learning results
   - Verify that variable speed shock and shift shock have decreased compared to the conditions before learning.

NO.18 EXCESSIVE SHIFT SHOCK IS GIVEN WHEN UPSHIFTING AND DOWNSHIFTING [SJ6A-EL]

id050307802300

18	Excessive shift shock is given when upshifting and downshifting
DESCRIPTION	• Excessive shift shock is felt when depressing accelerator pedal to accelerate at upshifting. • During cruising, excessive shift shock is felt when depressing accelerator pedal at downshifting.
POSSIBLE CAUSE	• Shift shock may worsen when the fail-safe is operating. The shift shock may worsen if the APP sensor, TP sensor, or turbine sensor malfunctions. — Clutch slippage, burnt (C1 clutch, C2 clutch, C3 clutch, B1 brake, B2 brake, B3 brake, B4 brake) • ATF level low • Line pressure low, high • Incorrect throttle position signal • Turbine sensor malfunction • Shift solenoid A malfunction • Shift solenoid B malfunction • Shift solenoid C malfunction • Shift solenoid D malfunction • Shift solenoid E malfunction • Shift solenoid F malfunction • Shift solenoid G malfunction • Line pressure control solenoid malfunction • TCC control solenoid malfunction • Body GND and sensor GND malfunction • Control valve body malfunction • AT internal malfunction • TR switch malfunction • Harness and/or connector malfunction • Insufficient battery voltage • Loose parts installation (engine or transmission mounts, suspension, propeller shaft) • TCM malfunction — Poor hydraulic operation (Malfunction in range change)

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Inspect for continuity between TCM terminal 1P, 1X and battery negative terminal. • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the suspected wiring harness.
2	• Perform the PID/DATA Monitor and Record Procedure and access the following PCM and TCM PIDs while excessive shift shock condition. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].) **PCM PIDs:** — APP — TP **TCM PIDs:** — SSF — SSG — LPS — TCC — TSS — OSS • Are the PIDs value normal? (See 01-40-9 PCM INSPECTION [L8, LF].) (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
3	• Stop the engine. • Inspect the following solenoid: (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) — Shift solenoid A — Shift solenoid B — Shift solenoid C — Shift solenoid D — Shift solenoid E • Is there any malfunction?	Yes	Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)
		No	Inspect the ATF condition. (See 05-13-9 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL].) • If a large amount of metal specks are found: — Overhaul the transmission. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) — Repair or replace the any malfunctioning parts. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) • If a large amount of metal specks are not found: — Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)
4	• Verify test results. — If normal, return to the diagnostic index to service any additional symptoms. — If malfunction remains, inspect the related Service Information and perform repair or diagnosis. • If the vehicle is repaired, troubleshooting completed. • If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)		

NO.19 EXCESSIVE SHIFT SHOCK ON TORQUE CONVERTER CLUTCH (TCC) [SJ6A-EL]

id050307802400

19	Excessive shift shock on torque converter clutch (TCC)
DESCRIPTION	• Strong shock is felt when TCC is engaged.
POSSIBLE CAUSE	• The symptom troubleshooting flow is the same as “NO.16 JUDDER UPON TORQUE CONVERTER CLUTCH (TCC) OPERATION”. (See 05-03-24 NO.16 JUDDER UPON TORQUE CONVERTER CLUTCH (TCC) OPERATION [SJ6A-EL].)

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

NO.20 NOISE OCCURS AT IDLE WHEN VEHICLE IS STOPPED IN ALL POSITIONS/RANGES [SJ6A-EL]

id050307802500

20	Noise occurs at idle when vehicle is stopped in all positions/ranges
DESCRIPTION	• Transmission is noisy in all positions and ranges when vehicle is idling.
POSSIBLE CAUSE	• The malfunction is in the pressure solenoid or oil pump which causes a high-pitched noise to be emitted from the transmission at idle. **Note** • If a noise is emitted during shifting only, the malfunction is in the C1 clutch, C2 clutch, C3 clutch, B1 brake, B2 brake, B3 brake, or B4 brake. • If a noise is emitted during shifting at certain gears only or during deceleration only, it is gear noise. • Before following the troubleshooting steps, make sure that the Automatic Transmission On-Board Diagnostic and Automatic Transmission Basic Inspection are conducted. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) (See 05-03-3 BASIC INSPECTION [SJ6A-EL].)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Inspect the engine condition. • Is there any engine concern (e.g. Rough idle, vibration)?	Yes	Perform the appropriate symptom troubleshooting. (See 01-03-4 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].)
		No	Repair or replace the malfunctioning part according to the inspection results.
2	• Verify test results. — If normal, return to the diagnostic index to service any additional symptoms. — If malfunction remains, inspect the related Service Information and perform repair or diagnosis. • If the vehicle is repaired, troubleshooting completed. • If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)		

NO.21 NOISE OCCURS AT IDLE WHEN VEHICLE IS STOPPED IN D RANGE, OR IN R POSITION [SJ6A-EL]

id050307802600

21	Noise occurs at idle when vehicle is stopped in D range, or in R position
DESCRIPTION	• Transmission is noisy in driving ranges when vehicle is idling.
POSSIBLE CAUSE	• Although the malfunction is basically the same as symptom troubleshooting “NO.20 NOISE OCCURS AT IDLE WHEN VEHICLE IS STOPPED IN ALL POSITIONS/RANGES”, other causes may include selector lever position disparity or TR switch position disparity. (See 05-03-28 NO.20 NOISE OCCURS AT IDLE WHEN VEHICLE IS STOPPED IN ALL POSITIONS/RANGES [SJ6A-EL].)

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

NO.22 NO ENGINE BRAKING [SJ6A-EL]

id050307809600

22	No engine braking
DESCRIPTION	• Engine speed drops to idle but vehicle coasts when accelerator pedal is released during cruising at medium to high speeds. • Engine speed drops to idle but vehicle coasts when accelerator pedal is released when in M range (1GR) at low vehicle speed.

POSSIBLE CAUSE	• Clutch slippage, burnt (C4 clutch/B1 brake/B2 brake/B4 brake)
	— Line pressure low
	  • VSS malfunction
	  • Improper signal from PCM (engine speed, accelerator pedal position, throttle position, engine coolant temperature, engine torque signals)
	  • Line pressure control solenoid malfunction
	  • Control valve body malfunction
	
	Note
	• Before following the troubleshooting steps, make sure that the Automatic Transmission On-Board Diagnostic and Automatic Transmission Basic Inspection are conducted. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) (See 05-03-3 BASIC INSPECTION [SJ6A-EL].)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Do the following symptoms occur concurrently? — Engine flares up or slips during acceleration — Engine flares up or slips when shifting	Yes	Perform the symptom troubleshooting “NO.14 ENGINE FLARES UP OR SLIPS WHEN UPSHIFTING OR DOWNSHIFTING” or “NO.15 ENGINE FLARES UP OR SLIPS WHEN ACCELERATING VEHICLE”. (See 05-03-22 NO.14 ENGINE FLARES UP OR SLIPS WHEN UPSHIFTING OR DOWNSHIFTING [SJ6A-EL].) (See 05-03-23 NO.15 ENGINE FLARES UP OR SLIPS WHEN ACCELERATING VEHICLE [SJ6A-EL].)
		No	Go to the next step.
2	• Perform the PID/DATA Monitor and Record Procedure and access the following PCM PIDs. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) — APP — ECT — ENG_TRQ — RPM — TP • Are the PIDs value normal? (See 01-40-9 PCM INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
3	• Stop the engine. • Inspect the line pressure control solenoid. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is there any malfunction?	Yes	Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)
		No	Inspect the ATF condition. If a large amount of metal specks are found: • Overhaul the transmission. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) • Repair or replace the any malfunctioning parts. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) If a large amount of metal specks are not found: • Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)

4	• Verify test results.
	— If normal, return to the diagnostic index to service any additional symptoms.
	— If malfunction remains, inspect the related Service Information and perform repair or diagnosis.
	  • If the vehicle is repaired, troubleshooting completed.
	  • If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)		

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

NO.23 TRANSMISSION OVERHEATS [SJ6A-EL]

id050307809700

23	Transmission overheats
DESCRIPTION	• Burnt smell is emitted from transmission. • Smoke is emitted from transmission.

POSSIBLE CAUSE	• The malfunction is restricted to the hindrance of coolant at the oil cooler. In addition, overheating of the transmission may be caused by a malfunction of the TFT sensor.
	— Line pressure low
	  • ATF level low
	  • Incorrect throttle position signal
	— TFT sensor malfunction
	— Oil cooler malfunction (Foreign material mixed in with ATF)
	— Excessive amount of ATF
	
	Note
	• Before following the troubleshooting steps, make sure that the Automatic Transmission On-Board Diagnostic and Automatic Transmission Basic Inspection are conducted. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) (See 05-03-3 BASIC INSPECTION [SJ6A-EL].)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is the line pressure normal? (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].)	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
2	• Is the stall speed normal? (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].)	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
3	• Inspect the TFT sensor and related wiring harness (vibration, intermittent open/short circuit). (See 05-13-22 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR INSPECTION [SJ6A-EL].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
4	• Inspect the line pressure control solenoid. (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].) • Is there any malfunction?	Yes	Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].)
		No	Go to the next step.
5	• Inspect for bending, damage, corrosion or kinks of the oil cooler pipes. • Are oil cooler pipes normal?	Yes	Overhaul the transmission. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) Repair or replace the any malfunctioning parts. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Repair or replace the malfunctioning part according to the inspection results.

6	• Verify test results.
	— If normal, return to the diagnostic index to service any additional symptoms.
	— If malfunction remains, inspect the related Service Information and perform repair or diagnosis.
	  • If the vehicle is repaired, troubleshooting completed.
	  • If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)		

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

NO.24 ENGINE STALLS WHEN SHIFTED TO D RANGE, OR IN R POSITION [SJ6A-EL]

id050307802900

24	Engine stalls when shifted to D range, or in R position
DESCRIPTION	• Engine stalls when shifting from N or P position to D range or R position at idle.
POSSIBLE CAUSE	• The malfunction is on the engine control side (e.g. electronic controlled throttle system). Otherwise, the malfunction is in the turbine sensor (engine sometimes starts) or the TCC circuit (engine always stalls). **Note** • Before following the troubleshooting steps, make sure that the Automatic Transmission On-Board Diagnostic and Automatic Transmission Basic Inspection are conducted. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) (See 05-03-3 BASIC INSPECTION [SJ6A-EL].)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Perform the symptom troubleshooting “NO.5 ENGINE STALLS-AFTER START/AT IDLE [L8, LF]”. (See 01-03-19 NO.5 ENGINE STALLS-AFTER START/AT IDLE [L8, LF].) • Is the engine control system normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
2	• Remove the torque converter. (See 05-13-45 TORQUE CONVERTER REMOVAL/INSTALLATION [SJ6A-EL].) • Inspect the torque converter. • Is there any malfunction?	Yes	Inspect for bending, damage, corrosion or kinks of the oil cooler pipes. If normal: • Replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) If problem remains: • Overhaul the transmission. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].) • Repair or replace the any malfunctioning parts. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Replace the torque converter. (See 05-13-45 TORQUE CONVERTER REMOVAL/INSTALLATION [SJ6A-EL].)
3	• Verify test results. — If normal, return to the diagnostic index to service any additional symptoms. — If malfunction remains, inspect the related Service Information and perform repair or diagnosis. • If the vehicle is repaired, troubleshooting completed. • If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)		

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

NO.25 ENGINE STALLS WHEN DRIVING AT SLOW SPEED OR STOPPING [SJ6A-EL]

id050307803000

25	Engine stalls when driving at slow speed or stopping
DESCRIPTION	• Engine stalls when brake pedal is depressed while driving at low speed or stopping.
POSSIBLE CAUSE	• The malfunction is in the engine control system (e.g. Fuel injection control, electronic controlled throttle system). **Note** • Before following the troubleshooting steps, make sure that the Automatic Transmission On-Board Diagnostic and Automatic Transmission Basic Inspection are conducted. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) (See 05-03-3 BASIC INSPECTION [SJ6A-EL].)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Perform the symptom troubleshooting “NO.10 LOW IDLE/STALLS DURING DECELERATION [L8, LF]”. (See 01-03-35 NO.10 LOW IDLE/STALLS DURING DECELERATION [L8, LF].) • Is the engine control system normal?	Yes	Perform the symptom troubleshooting “NO.24 ENGINE STALLS WHEN SHIFTED TO D RANGE, OR IN R POSITION”. (See 05-03-31 NO.24 ENGINE STALLS WHEN SHIFTED TO D RANGE, OR IN R POSITION [SJ6A-EL].)
		No	Repair or replace the malfunctioning part according to the inspection results.
2	• Verify test results. — If normal, return to the diagnostic index to service any additional symptoms. — If malfunction remains, inspect the related Service Information and perform repair or diagnosis. • If the vehicle is repaired, troubleshooting completed. • If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)		

NO.26 STARTER DOES NOT WORK [SJ6A-EL]

id050307803100

26	Starter does not work
DESCRIPTION	• Starter does not work even when in P or N position is selected.
POSSIBLE CAUSE	• Selector lever mis-adjustment • TR switch mis-adjustment • Manual shaft malfunction • TR switch malfunction • Transmission operates in fail-safe function (Starter lock system related circuit open or short) • Immobilizer system operating or system malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Inspect the selector lever, TR switch and manual shaft positions. • Are these position normal?	Yes	Go to the next step.
		No	Adjust the suspect part position.
2	• Inspect the TR switch. (See 05-13-14 TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL].) • Is there any malfunction?	Yes	Replace the TR switch. (See 05-13-19 TRANSMISSION RANGE (TR) SWITCH REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Perform the symptom troubleshooting “NO.3 WILL NOT CRANK [L8, LF]”. (See 01-03-14 NO.3 WILL NOT CRANK [L8, LF].)
3	• Verify test results. — If normal, return to the diagnostic index to service any additional symptoms. — If malfunction remains, inspect the related Service Information and perform repair or diagnosis. • If the vehicle is repaired, troubleshooting completed. • If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)		

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

NO.27 GEAR POSITION INDICATOR LIGHT DOES NOT ILLUMINATE IN M RANGE [SJ6A-EL]

id050307803200

27	Gear position indicator light does not illuminate in M range
DESCRIPTION	• Gear position indicator light in instrument cluster does not illuminate in M range with the ignition switch at ON position.
POSSIBLE CAUSE	• M range switch (built-in selector lever), gear position indicator light or related wiring harness malfunction **Note** • Before following the troubleshooting steps, make sure that the Automatic Transmission On-Board Diagnostic and Automatic Transmission Basic Inspection are conducted. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) (See 05-03-3 BASIC INSPECTION [SJ6A-EL].)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• With the ignition at ON position. • When the selector lever is moved, does the selector illumination indicate synchronized position to lever location?	Yes	Go to Step 5.
		No	Go to the next step.
2	• Perform the “PID/DATA MONITOR INSPECTION” and access the TR PID. (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].) • Is the PID value normal? (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].)	Yes	Go to Step 7.
		No	Go to the next step.
3	• Adjust the TR switch. (See 05-13-16 TRANSMISSION RANGE (TR) SWITCH ADJUSTMENT [SJ6A-EL].) • Perform the “PID/DATA MONITOR INSPECTION” and access the TR PID again. (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].) • Is the PID value normal? (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].)	Yes	Symptom troubleshooting is completed. (TR switch is mis-adjustment.)
		No	Go to the next step.
4	• Inspect the TR switch. (See 05-13-14 TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL].) • Is there any malfunction?	Yes	Replace the TR switch. (See 05-13-19 TRANSMISSION RANGE (TR) SWITCH REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Inspect the wiring harness between the following terminals: • TCM terminal 2K and TR switch • TCM terminal 2M and TR switch • TCM terminal 2N and TR switch • TCM terminal 2O and TR switch Repair or replace the suspected wiring harness.
5	• Perform the “PID/DATA MONITOR INSPECTION” and access the MNL SW PID. (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].) • Is the PID value normal? (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].)	Yes	Go to Step 7.
		No	Go to the next step.
6	• Inspect the M range switch. (See 05-14-3 SELECTOR LEVER INSPECTION.) • Is there any malfunction?	Yes	Replace the selector lever component. (See 05-14-9 SELECTOR LEVER REMOVAL/ INSTALLATION.)
		No	Inspect the wiring harness between TCM terminal 2G and selector lever component terminal B. Repair or replace the suspected wiring harness.
7	• Inspect the instrument cluster. (See 09-22-4 INSTRUMENT CLUSTER INSPECTION.) • Is there any malfunction?	Yes	Replace the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

STEP	INSPECTION	ACTION
8	• Verify test results. — If normal, return to the diagnostic index to service any additional symptoms. — If malfunction remains, inspect the related Service Information and perform repair or diagnosis. • If the vehicle is repaired, troubleshooting completed. • If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)	

NO.28 GEAR POSITION INDICATOR LIGHT ILLUMINATES IN D RANGE OR P, N, R POSITIONS [SJ6A-EL]

id050307803300

28	Gear position indicator light illuminates when in D range or P, N, R positions
DESCRIPTION	• Gear position indicator light in instrument cluster illuminates in D range or P, N, R position with the ignition switch at ON position.
POSSIBLE CAUSE	• M range switch (built-in selector lever) or related wiring harness malfunction **Note** • Before following the troubleshooting steps, make sure that the Automatic Transmission On-Board Diagnostic and Automatic Transmission Basic Inspection are conducted. (See 05-02-3 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC FUNCTION [SJ6A-EL].) (See 05-03-3 BASIC INSPECTION [SJ6A-EL].)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• With the ignition at ON position. • When the selector lever is moved, does the selector illumination indicate synchronized position to lever location?	Yes	Go to Step 5.
		No	Go to the next step.
2	• Perform the “PID/DATA MONITOR INSPECTION” and access the TR PID. (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].) • Is the PID value normal? (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].)	Yes	Go to Step 7.
		No	Go to the next step.
3	• Adjust the TR switch. (See 05-13-16 TRANSMISSION RANGE (TR) SWITCH ADJUSTMENT [SJ6A-EL].) • Perform the “PID/DATA MONITOR INSPECTION” and access the TR PID again. (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].) • Is the PID value normal? (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].)	Yes	Symptom troubleshooting is completed. (TR switch is mis-adjustment.)
		No	Go to the next step.
4	• Inspect the TR switch. (See 05-13-14 TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL].) • Is there any malfunction?	Yes	Replace the TR switch. (See 05-13-19 TRANSMISSION RANGE (TR) SWITCH REMOVAL/INSTALLATION [SJ6A-EL].)
		No	Inspect the wiring harness between the following terminals: • TCM terminal 2K and TR switch • TCM terminal 2M and TR switch • TCM terminal 2N and TR switch • TCM terminal 2O and TR switch Repair or replace the suspected wiring harness.
5	• Perform the “PID/DATA MONITOR INSPECTION” and access the MNL SW PID. (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].) • Is the PID value normal? (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].)	Yes	Go to Step 7.
		No	Go to the next step.
6	• Inspect the M range switch. (See 05-14-3 SELECTOR LEVER INSPECTION.) • Is there any malfunction?	Yes	Replace the selector lever component. (See 05-14-9 SELECTOR LEVER REMOVAL/INSTALLATION.)
		No	Inspect the wiring harness between TCM terminal 2G and selector lever component terminal B. Repair or replace the suspected wiring harness.

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

STEP	INSPECTION		ACTION
7	• Inspect the instrument cluster. (See 09-22-4 INSTRUMENT CLUSTER INSPECTION.) • Is there any malfunction?	Yes	Replace the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)
		No	Go to the next step.
8	• Verify test results. — If normal, return to the diagnostic index to service any additional symptoms. — If malfunction remains, inspect the related Service Information and perform repair or diagnosis. • If the vehicle is repaired, troubleshooting completed. • If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)		

NO.29 DOES NOT UPSHIFT IN M RANGE [SJ6A-EL]

id050307803400

29	Does not upshift in M range
DESCRIPTION	• Gear position indicator light in instrument cluster illuminates, but vehicle does not upshift when selector lever is pushed to “+” side or steering shift switch “UP” is pulled.
POSSIBLE CAUSE	• Up switch or related wiring harness malfunction • Steering shift switch or related wiring harness malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Perform the “PID/DATA MONITOR INSPECTION” and access the UP SW PID. (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].) • Monitor the UP SW PID when the selector lever is pushed to “+” side. • Is the PID value normal? (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	Inspect the up switch. (See 05-14-3 SELECTOR LEVER INSPECTION.) If the up switch has a malfunction: • Replace the selector lever component. (See 05-14-9 SELECTOR LEVER REMOVAL/ INSTALLATION.) If the up switch is normal: • Inspect for continuity between selector lever component terminal D and TCM terminal 2J. • Repair or replace the suspected wiring harness.
2	• Perform the “PID/DATA MONITOR INSPECTION” and access the UP SW PID. (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].) • Monitor the UP SW PID when the steering shift switch “UP” is pulled. • Is the PID value normal? (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].)	Yes	Inspect the instrument cluster. (See 09-22-4 INSTRUMENT CLUSTER INSPECTION.) Replace the instrument cluster, if necessary. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)
		No	Inspect the steering shift switch. (See 05-14-15 STEERING SHIFT SWITCH INSPECTION.) If the steering shift switch has a malfunction: • Replace the steering shift switch. (See 05-14-15 STEERING SHIFT SWITCH REMOVAL/ INSTALLATION.) If the steering shift switch is normal: • Inspect for continuity between steering shift switch and TCM terminal 2AF. • Repair or replace the suspected wiring harness.
3	• Verify test results. — If normal, return to the diagnostic index to service any additional symptoms. — If malfunction remains, inspect the related Service Information and perform repair or diagnosis. • If the vehicle is repaired, troubleshooting completed. • If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)		

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

NO.30 DOES NOT DOWNSHIFT IN M RANGE [SJ6A-EL]

id050307803500

30	Does not downshift in M range
DESCRIPTION	• Gear position indicator light in instrument cluster illuminates, but vehicle does not downshift when selector lever is pushed to "–" side or steering shift switch "DOWN" is pushed.
POSSIBLE CAUSE	• Down switch or related wiring harness malfunction • Steering shift switch or related wiring harness malfunction.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Perform the "PID/DATA MONITOR INSPECTION" and access the DWN SW PID. (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].) • Monitor the DWN SW PID when the selector lever is pushed to "–" side. • Is the PID value normal? (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	Inspect the down switch. (See 05-14-3 SELECTOR LEVER INSPECTION.) If the down switch has a malfunction: • Replace the selector lever component. (See 05-14-9 SELECTOR LEVER REMOVAL/INSTALLATION.) If the down switch is normal: • Inspect for continuity between selector lever component terminal F and TCM terminal 2F. • Repair or replace the suspected wiring harness.
2	• Perform the "PID/DATA MONITOR INSPECTION" and access the DWN SW PID. (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].) • Monitor the DWN SW PID when the steering shift switch "DOWN" is pulled. • Is the PID value normal? (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].)	Yes	Inspect the instrument cluster. (See 09-22-4 INSTRUMENT CLUSTER INSPECTION.) Replace the instrument cluster, if necessary. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
		No	Inspect the steering shift switch. (See 05-14-15 STEERING SHIFT SWITCH INSPECTION.) If the steering shift switch has a malfunction: • Replace the steering shift switch. (See 05-14-15 STEERING SHIFT SWITCH REMOVAL/INSTALLATION.) If the steering shift switch is normal: • Inspect for continuity between steering shift switch and TCM terminal 2AF. • Repair or replace the suspected wiring harness.
3	• Verify test results. — If normal, return to the diagnostic index to service any additional symptoms. — If malfunction remains, inspect the related Service Information and perform repair or diagnosis. • If the vehicle is repaired, troubleshooting completed. • If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)		

SYMPTOM TROUBLESHOOTING [SJ6A-EL]

NO.31 M RANGE POSITION INDICATOR LIGHT DOES NOT ILLUMINATE IN M RANGE AND/OR IN D RANGE WITH DIRECT MODE/M RANGE POSITION INDICATOR LIGHT ILLUMINATES IN D RANGE WHILE NOT IN DIRECT MODE [SJ6A-EL]

id050307813500

31	**M range position indicator light does not illuminate in M range and/or in D range with direct mode/ M range position indicator light illuminates in D range while not in direct mode**
DESCRIPTION	• M range position indicator light in instrument cluster does not illuminate in M range and/or in D range in direct mode when ignition switch is in ON position. • M range position indicator light illuminates in D range while not in direct mode when ignition switch is in ON position.
POSSIBLE CAUSE	• M range switch (built-in selector lever) malfunction • Open or short circuit in wiring harness between M range switch (built-in selector lever) and TCM • Steering shift switch malfunction • Open or short circuit in wiring harness between steering shift switch and TCM

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Perform the “PID/DATA MONITOR INSPECTION” and access the MNL SW PID. (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].) • Monitor the MLN SW PID with move the selector lever to all position and range. • Does the MNL SW PID indicate properly? (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].)	Yes	Go to the next step.
		No	Inspect the M range switch. (See 05-14-3 SELECTOR LEVER INSPECTION.) If the M range switch has a malfunction: • Replace the selector lever component. (See 05-14-9 SELECTOR LEVER REMOVAL/ INSTALLATION.) If the M range switch is normal: • Inspect for continuity between selector lever component terminal B and TCM terminal 2G. • Repair or replace the suspected wiring harness.
2	• Perform the “PID/DATA MONITOR INSPECTION” and access the UP SW and DWN SW PIDs. (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].) • Monitor the UP SW and DWN SW PIDs by pressing the steering shift switch while the selector lever is in the D range. • Are the UP SW and DWN SW PIDs indicated properly? (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].)	Yes	Inspect the instrument cluster. (See 09-22-4 INSTRUMENT CLUSTER INSPECTION.) Replace the instrument cluster, if necessary. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)
		No	Inspect the steering shift switch. (See 05-14-15 STEERING SHIFT SWITCH INSPECTION.) If the steering shift switch has a malfunction: • Replace the steering shift switch. (See 05-14-15 STEERING SHIFT SWITCH REMOVAL/ INSTALLATION.) If the steering shift switch is normal: • Inspect for continuity between the following terminals: — Steering shift switch terminal C and TCM terminal 2AB — Steering shift switch terminal F and TCM terminal 2AF • Repair or replace the suspected wiring harness.
3	• Verify test results. — If normal, return to the diagnostic index to service any additional symptoms. — If malfunction remains, inspect the related Service Information and perform repair or diagnosis. • If the vehicle is repaired, troubleshooting completed. • If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)		

05-10 CLUTCH

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CLUTCH

CLUTCH LOCATION INDEX

id051000800400

amxzzw0000046

1	Clutch pipe (See 05-10-3 GENERAL PROCEDURES (CLUTCH).)
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3	Clutch pedal (See 05-10-4 CLUTCH PEDAL ADJUSTMENT.) (See 05-10-5 CLUTCH PEDAL REMOVAL/ INSTALLATION.)
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10	Pilot bearing (See 05-10-13 PILOT BEARING INSPECTION.)
11	Flywheel (See 05-10-14 FLYWHEEL INSPECTION.)

CLUTCH

GENERAL PROCEDURES (CLUTCH)

id051000800500

Caution
- **Fluid will damage painted surfaces. Be careful not to spill any fluid on painted surfaces. If fluid does get on painted surfaces, wipe it off immediately.**

Note
- If any hydraulic related parts of the clutch sytem are removed during the procedure, add brake fluid, bleed the system and inspect for leakage after the procedure has been completed.

1. Remove the clutch pipe.
2. Install the clutch pipe using a torque wrench.

CLUTCH FLUID INSPECTION

id051000800600

1. Inspect whether the fluid level in the brake fluid reservoir tank is between MIN and MAX.

amxzzw0000046

CLUTCH FLUID REPLACEMENT

id051000802400

Caution
- **Fluid will damage painted surfaces. Be careful not to spill any fluid on painted surfaces. If fluid does get on painted surfaces, wipe it off immediately.**
- **Keep the fluid level in the reserve tank at 3/4 full or more during air bleeding.**

Note
- When replacing the fluid, drain the old fluid, fill the reserve tank with new fluid and then perform Steps 2—7 below.

Clutch fluid
SAE J1703, FMVSS 116 DOT-3 or DOT-4

1. Remove the under guard. (LF engine MT models) (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].) (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)
2. Remove the bleeder cap from the clutch release cylinder, and connect a vinyl hose to the bleeder plug.
3. Place the other end of the vinyl tube in a clear container, and fill fluid in the container during air bleeding.
4. Working with two people, one should depress the clutch pedal a few times and then depress and hold the pedal down.
5. While the clutch pedal is being held down, the other person should loosen the bleeder screw, and bleed any fluid containing air bubbles. Once completed, tighten the bleeder screw.
6. Continue to perform Steps 3 and 4 until no air comes from the vinyl hose.
7. Tighten the bleeder screw.

   Tightening torque
   5.9—8.8 N·m {61—89 kgf·cm, 53—77 in·lbf}

8. Install the under guard. (LF engine MT models) (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].) (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)
9. Fill the reserve tank to MAX with the recommended fluid.
10. Perform the following inspections:
    - Brake operation
    - Fluid leakage
    - Fluid level

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CLUTCH

CLUTCH PEDAL ADJUSTMENT

id051000802600

Clutch Pedal Stroke Inspection/Adjustment

1. Measure the clutch pedal stroke.
   - If there is any malfunction, loosen locknut A and adjust the pedal stroke by adjusting bolt B. Tighten locknut A after adjustment.

   Clutch pedal stroke
   130 mm {5.12 in}

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Clutch Pedal Play Inspection/Adjustment

1. Lightly depress the clutch pedal by hand until clutch resistance is felt and then measure the pedal play.

   Clutch pedal play
   5—15 mm {0.20—0.59 in}

   Clutch pedal push rod play
   At push rod setting line: 0.1—0.5 mm {0.004—0.020 in} (Reference value)
   At pedal pad: 0.5—2.7 mm {0.020—0.106 in}

2. If it is not within the specification, loosen locknut C and turn push rod D to adjust the pedal play.
3. Remeasure the pedal play and, if it is within the specification, tighten locknut C.

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Clutch Disengagement Point Inspection

1. Start the engine.
2. Without depressing the clutch pedal, move the shift lever slowly to the reverse position until gear noise is heard and hold the lever in that position.
3. Slowly depress the clutch pedal and hold at the point where the gear noise stops (clutch disengagement point).

CLUTCH

4. Measure distance A (from pedal not depressed to clutch disengagement point) and verify that it is within the specification.

   Clutch disengagement stroke (Reference value)
   A: 80—110 mm {3.15—4.33 in}

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CLUTCH PEDAL REMOVAL/INSTALLATION

id051000801200

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. Inspect and adjust the clutch pedal. (See 05-10-4 CLUTCH PEDAL ADJUSTMENT.)

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1	Clutch switch connector
2	Clutch switch
3	Nut A (See 05-10-6 Nut Cap, Nut A and Nut B Installation Note.)
4	Nut cap (See 05-10-6 Nut Cap, Nut A and Nut B Installation Note.)
5	Nut B (See 05-10-6 Nut Cap, Nut A and Nut B Installation Note.)

6	Retaining ring
7	Joint pin
8	Bush
9	Nut C
10	Push rod
11	Fork
12	Pedal pad
13	Clutch pedal component

CLUTCH

Nut Cap, Nut A and Nut B Installation Note

1. Temporarily tighten nut A.
2. Install the nut cap.
3. Tighten the bolts B.
4. Tighten the bolt A completely.

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CLUTCH MASTER CYLINDER REMOVAL/INSTALLATION

id051000801400

Caution

- **Fluid will damage painted surfaces. Be careful not to spill any fluid on painted surfaces. If it is spilled, wipe it off immediately.**

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. Bleed the air from the system. (See 05-10-3 CLUTCH FLUID REPLACEMENT.)
4. Inspect and adjust the clutch pedal. (See 05-10-4 CLUTCH PEDAL ADJUSTMENT.)

amxzzw0000047

1	Hose clip
2	Clutch pipe
3	Nut

4	Clutch master cylinder
5	Packing

CLUTCH

CLUTCH MASTER CYLINDER DISASSEMBLY/ASSEMBLY

id051000802300

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

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1	Hose clip
2	Reserve tank hose
3	Joint
4	Bushing
5	Snap ring (See 05-10-7 Snap Ring Disassembly/Assembly Note.)

6	Piston, secondary cup component
7	Spacer
8	Primary cup
9	Return spring
10	Clutch master cylinder body

Snap Ring Disassembly/Assembly Note

1. While pressing the piston in with a cloth-wrapped pin punch to protect the push rod contacting surface, remove/install the snap ring.

amxzzw0000047

CLUTCH

CLUTCH RELEASE CYLINDER REMOVAL/INSTALLATION

id051000801300

Caution

- **Fluid will damage painted surfaces. Be careful not to spill any fluid on painted surfaces. If fluid does get on painted surfaces, wipe it off immediately.**

1. Remove the under guard. (LF engine MT models) (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].) (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.
4. Bleed the air from the system. (See 05-10-3 CLUTCH FLUID REPLACEMENT.)
5. Inspect and adjust the clutch pedal. (See 05-10-4 CLUTCH PEDAL ADJUSTMENT.)

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1	Clutch pipe
2	Clutch release cylinder

CLUTCH RELEASE CYLINDER DISASSEMBLY/ASSEMBLY

id051000802200

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

amxzzw0000047

CLUTCH

1	Boot
2	Push rod
3	Piston, piston cup component
4	Return spring

5	Bleeder cap
6	Bleeder screw
7	Clutch release cylinder body

CLUTCH UNIT REMOVAL/INSTALLATION

id051000800300

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.

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1	Clutch release cylinder (See 05-10-8 CLUTCH RELEASE CYLINDER REMOVAL/INSTALLATION.)
2	Manual transaxle (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].) (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)
3	Boot
4	Clutch release collar (See 05-10-13 CLUTCH RELEASE COLLAR INSPECTION.)
5	Clutch release fork

6	Clutch cover (See 05-10-10 Clutch Cover and Disc Removal Note.) (See 05-10-11 Clutch Cover Installation Note.)
7	Clutch disc (See 05-10-10 Clutch Cover and Disc Removal Note.) (See 05-10-11 Clutch Disc Installation Note.)
8	Pilot bearing (See 05-10-10 Pilot Bearing Removal Note.) (See 05-10-10 Pilot Bearing Installation Note.)
9	Flywheel (See 05-10-11 Flywheel Removal Note.) (See 05-10-11 Flywheel Installation Note.)

CLUTCH

Clutch Cover and Disc Removal Note

1. Install the **SSTs**.
2. Loosen each bolt one turn at a time in a crisscross pattern until spring tension is released.
3. Remove the clutch cover and disc.

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Pilot Bearing Removal Note

Note

- The pilot bearing does not need to be removed unless you are replacing it.

1. Use the **SST** to remove the pilot bearing.

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Pilot Bearing Installation Note

1. Install the pilot bearing using the corresponding 20 mm {0.79 in} side of a Snap-on brand millimeter size bushing driver set A160M adapter A160M7 (20—22 mm {0.79—0.86 in}).

   Substitution

   - **A160M7 (20 mm {0.79 in})**
     Outer diameter: 21 mm {0.83 in}
     Inner diameter: 19 mm {0.75 in}

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amxzzw0000045

CLUTCH

Flywheel Removal Note

1. Hold the flywheel using the **SST**.
2. Remove the bolts evenly and gradually in a crisscross pattern.
3. Remove the flywheel.
4. Inspect for oil leakage from the crankshaft rear oil seal.
   - If there is any malfunction, replace the crankshaft rear oil seal.
     (See 01-10-33 REAR OIL SEAL REPLACEMENT [L8, LF].)

amxzzw0000045

Flywheel Installation Note

1. Clean the crankshaft thread holes.
2. Install the flywheel to the crankshaft.
3. Hand-tighten the flywheel lock bolts.
4. Install the **SST** to the flywheel.
5. Gradually tighten the flywheel lock bolts in a crisscross pattern.

   Tightening torque
   108—116 N·m
   {11.1—11.8 kgf·m, 79.7—85.5 ft·lbf}

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Clutch Disc Installation Note

1. Hold the clutch disc position using the **SST**.

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Clutch Cover Installation Note

1. Install the **SSTs**.
2. Tighten the bolts evenly and gradually in a crisscross pattern.

   Tightening torque
   25.0—33.0 N·m
   {2.6—3.4 kgf·m, 18.5—24.4 ft·lbf}

amxzzw0000045

CLUTCH

CLUTCH COVER INSPECTION

id051000800800

1. Measure the wear of the diaphragm spring fingers.
   - If it exceeds the maximum specification, replace the clutch cover.

   Clutch disc maximum depth
   0.6 mm {0.024 in}

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2. Measure the flatness of the pressure plate with a straight edge and a feeler gauge.
   - If it exceeds the maximum specification, replace the clutch cover.

   Clutch cover maximum clearance
   0.5 mm {0.020 in}

3. When checking the diaphragm spring fingers, mount a dial indicator on the cylinder block.

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4. Rotate the flywheel and check for misaligned diaphragm spring fingers.
   - If it exceeds the maximum specification, replace the clutch cover.

   Clutch cover maximum height difference
   1.0 mm {0.039 in}

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CLUTCH DISC INSPECTION

id051000800900

1. Remove the clutch disc.
2. Inspect the lining surface for discoloration and grease/oil contamination.
3. Inspect the torsion spring for weakness and the rivet for looseness.
4. Using a vernier caliper, measure the depth between the lining surface and the rivet head.

   Clutch disc minimum depth
   0.3 mm {0.012 in}

   - If it is less than the minimum specification, replace the clutch disc.

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CLUTCH

5. Measure the clutch disc runout using a dial gauge.

   Clutch disc maximum runout
   0.7 mm {0.028 in}

   - If it exceeds the maximum specification, replace the clutch disc.
6. Install the clutch disc.

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CLUTCH RELEASE COLLAR INSPECTION

id051000801000

Caution
- **Do not clean the clutch release collar with cleaning fluids or a steam cleaner because it is filled with grease.**

1. Remove the clutch release collar.
2. Turn the collar while applying force in the axial direction, and inspect for sticking, excessive resistance, and an abnormal noise.
   - If there is any malfunction, replace the clutch release collar.
3. Install the clutch release collar.

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PILOT BEARING INSPECTION

id051000800200

1. Without removing the pilot bearing, turn the bearing while applying force in the axial direction.
   - If there is any malfunction, replace the pilot bearing.

amxzzw0000045

CLUTCH

FLYWHEEL INSPECTION

id051000800100

1. Remove the flywheel.

Note
- Correct slight scratches and discoloration using sandpaper.
- Inspect the runout of the surface that contacts the clutch disc with the flywheel installed to the crankshaft.

2. Inspect the surface that contacts the clutch disc for scratches, nicks, and discoloration.
3. Inspect the ring gear teeth for damage and wear.
4. Install the flywheel.

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5. Measure the runout of the surface that contacts the clutch disc using a dial gauge.

Flywheel maximum runout
0.1 mm {0.004 in}

- If it exceeds the maximum specification, replace the flywheel.

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05-11A MANUAL TRANSMISSION [M15M-D]

MANUAL TRANSMISSION LOCATION INDEX [M15M-D] 05-11A–1
NEUTRAL SWITCH REMOVAL/INSTALLATION [M15M-D] 05-11A–2
BACK-UP LIGHT SWITCH REMOVAL/INSTALLATION [M15M-D] 05-11A–2
TRANSMISSION OIL INSPECTION [M15M-D] 05-11A–2
TRANSMISSION OIL REPLACEMENT [M15M-D] 05-11A–3
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MANUAL TRANSMISSION [M15M-D]

MANUAL TRANSMISSION LOCATION INDEX [M15M-D]

id051110247200

amxzzw0000214

1	Transmission oil (See 05-11A-2 TRANSMISSION OIL INSPECTION [M15M-D].) (See 05-11A-3 TRANSMISSION OIL REPLACEMENT [M15M-D].)
2	Oil seal (extension housing) (See 05-11A-4 OIL SEAL (EXTENSION HOUSING) REPLACEMENT [M15M-D].)
3	Neutral switch (See 05-11A-2 NEUTRAL SWITCH REMOVAL/ INSTALLATION [M15M-D].)
4	Back-up light switch (See 05-11A-2 BACK-UP LIGHT SWITCH REMOVAL/INSTALLATION [M15M-D].)
5	Transmission (See 05-11A-4 TRANSMISSION REMOVAL/ INSTALLATION [M15M-D].) (See 05-11A-9 INSPECTION AFTER TRANSMISSION INSTALLATION [M15M-D].)

MANUAL TRANSMISSION [M15M-D]

NEUTRAL SWITCH REMOVAL/INSTALLATION [M15M-D]

id051110247100

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the transmission. (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].)
4. Remove the neutral switch.
5. Install the neutral switch and a new packing to the transmission case.

   Tightening torque
   25—34 N·m
   {2.6—3.4 kgf·m, 19—25 ft·lbf}

6. Install the transmission. (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].)

amxzzw0000049

BACK-UP LIGHT SWITCH REMOVAL/INSTALLATION [M15M-D]

id051110248000

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the back-up light switch connector and remove the back-up light switch.
4. Install the back-up light switch (with a new gasket) to the transaxle case.

   Tightening torque
   25—34 N·m {2.5—3.5 kgf·m, 18—25 ft·lbf}

5. Install in the reverse order of removal.

amxzzw0000187

TRANSMISSION OIL INSPECTION [M15M-D]

id051110247800

1. Position the vehicle on level ground.
2. Remove the Insulator (except L8). (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].)
3. Remove the check plug A.
4. Verify that the oil is at the brim of the check plug hole as shown.
   - If it is low, add the specified oil from the check plug hole.

   Specified oil grade
   API Service GL-4 or GL-5

   Specified oil viscosity
   All season: SAE 75W-90
   Above 10°C {50°F}: SAE 80W-90

amxzzw0000049

5. Install the new check plug A.

   Tightening torque
   A: 25—39 N·m {2.6—3.9 kgf·m, 19—28 ft·lbf}

6. Install the Insulator (except L8). (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].)

MANUAL TRANSMISSION [M15M-D]

TRANSMISSION OIL REPLACEMENT [M15M-D]

id051110247900

1. Position the vehicle on level ground.
2. Remove the Insulator (except L8). (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].)
3. Remove the drain plug B with washer.
4. Drain the oil into a container.
5. Wipe the drain plug B clean and apply sealant to the drain plug B threads before installing.
6. Install the drain plug B with new washer.

   Tightening torque
   B: 39—59 N·m {4.0—5.9 kgf·m, 29—42 ft·lbf}

amxzzw0000049

7. Remove the check plug A.
8. Add the specified oil from check plug A port until the level reaches the brim of check plug hole.

   Specified oil grade
   API Service GL-4 or GL-5

   Specified oil viscosity
   All season: SAE 75W-90
   Above 10°C {50°F}: SAE 80W-90

   Capacity (approx. quantity)
   2.0 L {2.1 US qt, 1.8 Imp qt}

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9. Install the new check plug A.

   Tightening torque
   A: 25—39 N·m {2.6—3.9 kgf·m, 19—28 ft·lbf}

10. Install the Insulator (except L8). (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].)

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MANUAL TRANSMISSION [M15M-D]

OIL SEAL (EXTENSION HOUSING) REPLACEMENT [M15M-D]

id051110247300

1. Position the vehicle on level ground.
2. Drain the transmission oil. (See 05-11A-3 TRANSMISSION OIL REPLACEMENT [M15M-D].)
3. Remove the following parts:
   (1) Under guard (except L8) (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].)
   (2) Insulator (except L8) (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].)
   (3) Member bracket (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].)
   (4) Tunnel member (See 05-11A-4 TRANSMISSION REMOVAL/INSTALLATION [M15M-D].)
   (5) Catalytic converter, middle pipe (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
   (6) Propeller shaft (See 03-15-2 PROPELLER SHAFT REMOVAL/INSTALLATION.)
4. Remove the oil seal using a flathead screwdriver.

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5. Tap a new oil seal into the case using the **SST**.
6. Apply the specified oil to the oil seal lip.
7. Install in the reverse order of removal.
8. Add transmission oil. (See 05-11A-3 TRANSMISSION OIL REPLACEMENT [M15M-D].)

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TRANSMISSION REMOVAL/INSTALLATION [M15M-D]

id051110246700

1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Loosen the starter installation bolts only enough that the starter is loose, but not removed. (See 01-19-1 STARTER REMOVAL/INSTALLATION [L8, LF].)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. Perform the "INSPECTION AFTER TRANSMISSION INSTALLATION", and verify that there is no malfunction. (See 05-11A-9 INSPECTION AFTER TRANSMISSION INSTALLATION [M15M-D].)

MANUAL TRANSMISSION [M15M-D]

amxzzw0000048

1	Shift lever knob
2	Console
3	Shift insulator component (outer)
4	Shift insulator component (inner)
5	Shift lever component (See 05-11A-9 Shift Lever Component Installation Note.)

6	Under guard
7	Insulator
8	Member bracket
9	Tunnel member
10	Catalytic converter, middle pipe (See 01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION [L8, LF].)

MANUAL TRANSMISSION [M15M-D]

11	Clutch release cylinder (See 05-10-8 CLUTCH RELEASE CYLINDER REMOVAL/INSTALLATION.)
12	Power plant frame (See 05-11A-6 Power Plant Frame Removal Note.) (See 05-11A-8 Power Plant Frame Installation Note.)
13	Hanger bracket
14	Propeller shaft (See 05-11A-6 Propeller Shaft Removal Note.) (See 03-15-2 PROPELLER SHAFT REMOVAL/ INSTALLATION.)
15	Back-up light switch connector
16	Neutral switch connector
17	Wire
18	Transmission installation bolt
19	Transmission (See 05-11A-6 Power Plant Frame Removal Note.) (See 05-11A-8 Power Plant Frame Installation Note.)
20	Stopper
21	Bolt

Caution

- **When removing/installing the transmission, be sure not to move the engine up and down more than necessary to prevent part interference with the engine.**

Power Plant Frame Removal Note

1. Support the transmission using a transmission jack.
2. Remove the power plant frame.

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Propeller Shaft Removal Note

1. Install the **SST** to the main shaft.

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2. Insert a slab of wood behind the rear differential, and remove the propeller shaft.

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MANUAL TRANSMISSION [M15M-D]

Transmission Removal Note

Warning
- **Remove the transmission carefully, holding it steady. If the transmission falls it could be damaged or cause injury.**

1. Support the transmission securely using a transmission jack.
2. Remove the transmission installation bolts.
3. Remove the transmission.

amxzzw0000048

Transmission Installation Note

1. Shift to any gear position.
2. Install the **SST** to the main shaft.

Warning
- **Install the transmission carefully, holding it steady. If the transmission falls it could be damaged or cause injury.**

3. Place the transmission on the transmission jack and raise it.

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Note
- Slowly rotate the **SST** to engage the clutch with the main drive gear spline, and install the transmission.

4. Install the transmission.

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5. Tighten the transmission installation bolts and nuts.

Tightening torque
37—52 N·m {3.8—5.3 kgf·m, 28—38 ft·lbf}

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MANUAL TRANSMISSION [M15M-D]

Power Plant Frame Installation Note

1. Support the transmission using a transmission jack.
2. Install the power plant frame.

amxzzw0000048

3. Temporarily tighten the nuts 1, 2, 3 in order shown in the figure.
4. Tighten nut 2 until the power plant frame is seated in the rear differential.
5. Temporarily tighten the nuts 4, 5 in order shown in the figure.
6. Install the catalytic converter, middle pipe and tunnel member.
7. Raise the front end of the power plant frame (transmission side) or the transmission with the transmission jack, and adjust dimension A to **26.7—34.7 mm {1.06—1.36 in}** (lower surface of power plant frame-upper surface of the tunnel member) as shown in the figure.

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Note

- If there is the possibility of age-related bending/deterioration of the mount, adjust dimension A to approx. 15 mm {0.59 in} higher than the adjustment value to facilitate obtaining the specification.

amxzzw0000048

8. Tighten the power plant frame installation nuts.

   Tightening torque
   126.0—154.0 N·m {12.9—15.7 kgf·m, 93.0—113 ft·lbf}

9. Verify that dimension A is within the specification with the transmission jack removed.
   - If it is not within the specification, adjust dimension A again.

amxzzw0000192

MANUAL TRANSMISSION [M15M-D]

Shift Lever Component Installation Note

Note
- If the extension housing has been removed or the transmission has been disassembled and inspected, always add the specified type and amount of transmission oil.

1. Add the specified type and amount of oil to the shift control case.

   Shift control case specified oil grade
   API Service GL-4 or GL-5

   Shift control case specified oil viscosity
   SAE 75W-90

   Shift control case capacity (approx. quantity)
   290—330 ml {290—330 cc, 17.69—20.13 cu in}

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2. Apply grease to the areas of the shift lever component as shown in the figure.
3. Align the shift lever component notch with the shift control case pin and install the shift lever component.

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INSPECTION AFTER TRANSMISSION INSTALLATION [M15M-D]

id051110246800

Note
- Perform the following inspection only when the transmission has been overhauled.

1. Perform a road test and inspect the following items:
   (1) No abnormal noise in each shift position.
   (2) Smooth shift operation when shifting gears.
   (3) No gear slipout after shifting gears.
   (4) Back-up light switch operates correctly.

05-11B MANUAL TRANSMISSION [P66M-D]

MANUAL TRANSMISSION LOCATION INDEX [P66M-D] 05-11B–1
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TRANSMISSION OIL REPLACEMENT [P66M-D] 05-11B–3
OIL SEAL (EXTENSION HOUSING) REPLACEMENT [P66M-D] 05-11B–4
TRANSMISSION REMOVAL/INSTALLATION [P66M-D] 05-11B–4
Power Plant Frame Removal Note 05-11B–6
Propeller Shaft Removal Note 05-11B–6
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Transmission Installation Note 05-11B–7
Power Plant Frame Installation Note 05-11B–8
Shift Lever Component Installation Note 05-11B–9
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MANUAL TRANSMISSION [P66M-D]

MANUAL TRANSMISSION LOCATION INDEX [P66M-D]

id051111247200

amxzzw0000051

1	Transmission oil (See 05-11B-2 TRANSMISSION OIL INSPECTION [P66M-D].) (See 05-11B-3 TRANSMISSION OIL REPLACEMENT [P66M-D].)
2	Oil seal (extension housing) (See 05-11B-4 OIL SEAL (EXTENSION HOUSING) REPLACEMENT [P66M-D].)
3	Neutral switch (See 05-11B-2 NEUTRAL SWITCH REMOVAL/ INSTALLATION [P66M-D].)

4	Back-up light switch (See 05-11B-2 BACK-UP LIGHT SWITCH REMOVAL/INSTALLATION [P66M-D].)
5	Transmission (See 05-11B-4 TRANSMISSION REMOVAL/ INSTALLATION [P66M-D].) (See 05-11B-9 INSPECTION AFTER TRANSMISSION INSTALLATION [P66M-D].)

MANUAL TRANSMISSION [P66M-D]

NEUTRAL SWITCH REMOVAL/INSTALLATION [P66M-D]

id051111247100

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the transmission. (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)
4. Remove the neutral switch.
5. Install the neutral switch and a new packing to the transmission case.

   Tightening torque
   23.6—35.3 N·m
   {2.5—3.5 kgf·m, 18—26 ft·lbf}

6. Install the transmission. (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)

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BACK-UP LIGHT SWITCH REMOVAL/INSTALLATION [P66M-D]

id051111248000

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Loosen the starter installation bolts only enough that the starter is loose, but not removed. (See 01-19-1 STARTER REMOVAL/INSTALLATION [L8, LF].)
4. Remove the transmission. (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)
5. Disconnect the back-up light switch connector and remove the back-up light switch.
6. Install the back-up light switch (with a new gasket) to the transaxle case.

   Tightening torque
   25—34 N·m {2.5—3.5 kgf·m, 18—25 ft·lbf}

7. Install in the reverse order of removal.

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TRANSMISSION OIL INSPECTION [P66M-D]

id051111247800

1. Position the vehicle on level ground.
2. Remove the Insulator. (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)
3. Remove oil filler plug.
4. Verify that the oil is near the brim of the plug port.
   - If the oil is not near the brim of the plug port, add the specified amount and type of oil.

   Transmission case specified oil grade
   API service GL-4 or GL-5

   Transmission case specified oil viscosity
   SAE 75W-90

5. Install oil filler plug and a new washer.

   Tightening torque
   40—59 N·m {4.1—6.0 kgf·m, 30—43 ft·lbf}

6. Install the Insulator. (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)

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MANUAL TRANSMISSION [P66M-D]

TRANSMISSION OIL REPLACEMENT [P66M-D]

id051111247900

1. Position the vehicle on level ground.
2. Remove the Insulator. (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)
3. Remove oil filler plug and drain plug, and then drain the oil.
4. Clean drain plug.
5. Install drain plug and a new washer.

   Tightening torque
   40—59 N·m {4.1—6.0 kgf·m, 30—43 ft·lbf}

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6. Add the specified amount and type of oil through the plug port for oil filler plug to near the brim of the port.

   Transmission case specified oil grade
   API service GL-4 or GL-5

   Transmission case specified oil viscosity
   SAE 75W-90

   Transmission case capacity (approx. quantity)
   2.1 L {2.2 US qt, 1.8 Imp qt}

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7. Install oil filler plug and a new washer.

   Tightening torque
   40—59 N·m {4.1—6.0 kgf·m, 30—43 ft·lbf}

8. Install the Insulator. (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)

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MANUAL TRANSMISSION [P66M-D]

OIL SEAL (EXTENSION HOUSING) REPLACEMENT [P66M-D]

id051111247300

1. Position the vehicle on level ground.
2. Drain the transmission oil. (See 05-11B-3 TRANSMISSION OIL REPLACEMENT [P66M-D].)
3. Remove the following parts:
   (1) Under guard (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)
   (2) Insulator (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)
   (3) Member bracket (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)
   (4) Tunnel member (See 05-11B-4 TRANSMISSION REMOVAL/INSTALLATION [P66M-D].)
   (5) Catalytic converter, middle pipe (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
   (6) Propeller shaft (See 03-15-2 PROPELLER SHAFT REMOVAL/INSTALLATION.)
4. Remove the oil seal using a flathead screwdriver.

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5. Tap a new oil seal into the case using the **SSTs**.
6. Apply the specified oil to the oil seal lip.
7. Install in the reverse order of removal.
8. Add transmission oil. (See 05-11B-3 TRANSMISSION OIL REPLACEMENT [P66M-D].)

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TRANSMISSION REMOVAL/INSTALLATION [P66M-D]

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1. Remove the battery cover. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Loosen the starter installation bolts only enough that the starter is loose, but not removed. (See 01-19-1 STARTER REMOVAL/INSTALLATION [L8, LF].)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. Perform the "INSPECTION AFTER TRANSMISSION INSTALLATION", and verify that there is no malfunction. (See 05-11B-9 INSPECTION AFTER TRANSMISSION INSTALLATION [P66M-D].)

MANUAL TRANSMISSION [P66M-D]

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1	Shift lever knob
2	Console
3	Shift insulator component (outer)
4	Shift insulator component (inner)
5	Shift lever component (See 05-11B-9 Shift Lever Component Installation Note.)
6	Under guard
7	Insulator

8	Member bracket
9	Tunnel member
10	Catalytic converter, middle pipe (See 01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION [L8, LF].)
11	Clutch release cylinder (See 05-10-8 CLUTCH RELEASE CYLINDER REMOVAL/INSTALLATION.)

MANUAL TRANSMISSION [P66M-D]

12	Power plant frame (See 05-11B-6 Power Plant Frame Removal Note.) (See 05-11B-8 Power Plant Frame Installation Note.)
13	Hanger bracket
14	Propeller shaft (See 05-11B-6 Propeller Shaft Removal Note.) (See 03-15-2 PROPELLER SHAFT REMOVAL/ INSTALLATION.)
15	Back-up light switch connector
16	Neutral switch connector
17	Wire
18	Transmission installation bolt
19	Transmission (See 05-11B-6 Power Plant Frame Removal Note.) (See 05-11B-8 Power Plant Frame Installation Note.)
20	Stopper
21	Bolt

Caution

- **When removing/installing the transmission, be sure not to move the engine up and down more than necessary to prevent part interference with the engine.**

Power Plant Frame Removal Note

1. Support the transmission using a transmission jack.
2. Remove the power plant frame.

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Propeller Shaft Removal Note

1. Install the **SST** to the main shaft.

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2. Insert a slab of wood behind the rear differential, and remove the propeller shaft.

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MANUAL TRANSMISSION [P66M-D]

Transmission Removal Note

Warning
- **Remove the transmission carefully, holding it steady. If the transmission falls it could be damaged or cause injury.**

1. Support the transmission securely using a transmission jack.
2. Remove the transmission installation bolts.
3. Remove the transmission.

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Transmission Installation Note

1. Shift to any gear position.
2. Install the **SST** to the main shaft.

Warning
- **Install the transmission carefully, holding it steady. If the transmission falls it could be damaged or cause injury.**

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3. Place the transmission on the transmission jack and raise it.

Note
- Slowly rotate the **SST** to engage the clutch with the main drive gear spline, and install the transmission.

4. Install the transmission.

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5. Tighten the transmission installation bolts and nuts.

Tightening torque
37—52 N·m {3.8—5.3 kgf·m, 28—38 ft·lbf}

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MANUAL TRANSMISSION [P66M-D]

Power Plant Frame Installation Note

1. Support the transmission using a transmission jack.
2. Install the power plant frame.

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3. Temporarily tighten the nuts 1, 2, 3 in order shown in the figure.
4. Tighten nut 2 until the power plant frame is seated in the rear differential.
5. Temporarily tighten the nuts 4, 5 in order shown in the figure.
6. Install the catalytic converter, middle pipe, and tunnel member.
7. Raise the front end of the power plant frame (transmission side) or the transmission with the transmission jack, and adjust dimension A to **26.7—34.7 mm {1.06—1.36 in}** (lower surface of power plant frame-upper surface of the tunnel member) as shown in the figure.

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Note

- If there is the possibility of age-related bending/deterioration of the mount, adjust dimension A to approx. 15 mm {0.59 in} higher than the adjustment value to facilitate obtaining the specification.

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8. Tighten the power plant frame installation nuts.

   Tightening torque
   126.0—154.0 N·m {12.9—15.7 kgf·m, 93.0—113 ft·lbf}

9. Verify that dimension A is within the specification with the transmission jack removed.
   - If it is not within the specification, adjust dimension A again.

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MANUAL TRANSMISSION [P66M-D]

Shift Lever Component Installation Note

Note
- If the extension housing has been removed or the transmission has been disassembled and inspected, always add the specified type and amount of transmission oil.

1. Add the specified type and amount of oil to the shift control case.

   Shift control case specified oil grade
   API Service GL-4

   Shift control case specified oil viscosity
   SAE 75W-90

   Shift control case capacity (approx. quantity)
   80—230 ml {80—230 cc, 4.88—14.03 cu in}

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2. Apply grease to the areas of the shift lever component as shown in the figure.
3. Align the shift lever component notch with the shift control case pin and install the shift lever component.

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INSPECTION AFTER TRANSMISSION INSTALLATION [P66M-D]

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Note
- Perform the following inspection only when the transmission has been overhauled.

1. Perform a road test and inspect the following items:
   (1) No abnormal noise in each shift position.
   (2) Smooth shift operation when shifting gears.
   (3) No gear slipout after shifting gears.
   (4) Back-up light switch operates correctly.

05-13 AUTOMATIC TRANSMISSION [SJ6A-EL]

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AUTOMATIC TRANSMISSION [SJ6A-EL]

AUTOMATIC TRANSMISSION LOCATION INDEX [SJ6A-EL]

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1	Automatic transmission fluid (See 05-13-9 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL].) (See 05-13-10 AUTOMATIC TRANSMISSION FLUID (ATF) REPLACEMENT [SJ6A-EL].) (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)
2	Transmission range (TR) switch (See 05-13-14 TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL].) (See 05-13-19 TRANSMISSION RANGE (TR) SWITCH REMOVAL/INSTALLATION [SJ6A-EL].) (See 05-13-16 TRANSMISSION RANGE (TR) SWITCH ADJUSTMENT [SJ6A-EL].)
3	Transmission fluid temperature (TFT) sensor (See 05-13-22 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR INSPECTION [SJ6A-EL].) (See 05-13-24 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR REMOVAL/ INSTALLATION [SJ6A-EL].)
4	Turbine sensor (See 05-13-26 TURBINE SENSOR INSPECTION [SJ6A-EL].) (See 05-13-26 TURBINE SENSOR REMOVAL/ INSTALLATION [SJ6A-EL].)
5	Vehicle speed sensor (VSS) (See 05-13-27 VEHICLE SPEED SENSOR (VSS) INSPECTION [SJ6A-EL].) (See 05-13-28 VEHICLE SPEED SENSOR (VSS) REMOVAL/INSTALLATION [SJ6A-EL].)

6	Solenoid valve (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL].)
7	TCM (See 05-13-31 TCM INSPECTION [SJ6A-EL].) (See 05-13-38 TCM REMOVAL/INSTALLATION [SJ6A-EL].)
8	Automatic transmission (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)
9	Torque converter (See 05-13-45 TORQUE CONVERTER REMOVAL/ INSTALLATION [SJ6A-EL].)
10	Oil seal (oil pump) (See 05-13-47 OIL SEAL (OIL PUMP) REPLACEMENT [SJ6A-EL].)
11	Oil seal (extension housing) (See 05-13-48 OIL SEAL (EXTENSION HOUSING) REPLACEMENT [SJ6A-EL].)
12	Control valve body (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)

AUTOMATIC TRANSMISSION [SJ6A-EL]

13	Oil cooler (See 05-13-53 OIL COOLER FLUSHING [SJ6A-EL].) (See 05-13-49 OIL COOLER REMOVAL/ INSTALLATION [SJ6A-EL].) (See 05-13-55 OIL COOLER DISASSEMBLY/ ASSEMBLY [SJ6A-EL].)

14	Drive plate (See 05-13-46 DRIVE PLATE REMOVAL/ INSTALLATION [SJ6A-EL].)

MECHANICAL SYSTEM TEST [SJ6A-EL]

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Mechanical System Test Preparation

1. Engage the parking brake and use wheel chocks at the front and rear of the wheels.
2. Inspect the engine coolant level. (See 01-12-2 ENGINE COOLANT LEVEL INSPECTION [L8, LF].)
3. Inspect the engine oil level. (See 01-11-2 ENGINE OIL LEVEL INSPECTION [L8, LF].)
4. Inspect the ATF level. (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)
5. Inspect the idle speed. (See 01-10-3 ENGINE TUNE-UP [L8, LF].)
6. Inspect the ignition timing. (See 01-10-3 ENGINE TUNE-UP [L8, LF].)
7. Verify that no DTCs are stored.

Line Pressure Test

1. Perform mechanical system test preparation. (See 05-13-3 Mechanical System Test Preparation.)

   Warning
   - **Removing the square head plug when the ATF is hot can be dangerous. Hot ATF can come out of the opening and badly burn you. Before removing the square head plug, allow the ATF to cool.**

2. Remove the test plug and O-ring, then connect the SSTs to the line pressure inspection port as shown in the figure.

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3. Start the engine and warm it up until the ATF reaches **60—70 °C {140—158 °F}**.
4. Shift the selector lever to the D range.
5. Read the line pressure while the engine is idling for the D range.

AUTOMATIC TRANSMISSION [SJ6A-EL]

6. Read the line pressure while the engine is idling for the P, R, N positions range in the same manner.
7. Stop the engine, then replace the oil pressure gauge.
8. Start the engine.
9. Firmly depress the brake pedal with the left foot.
10. Shift the selector lever to the D range.

Caution
- **If the accelerator pedal is pressed for more than 5 s while the brake pedal is pressed, the transmission could be damaged. Therefore, perform Steps 11 and 12 within 5 s.**

11. Gradually depress the accelerator pedal with the right foot.
12. When the engine speed no longer increases, quickly read the line pressure and release the accelerator pedal.
13. Shift the selector lever to the N position and idle the engine for **1 min or more** to cool the ATF.
14. Read the line pressure at the engine stall speed for the D and R position in the same manner as in Steps 9—13.

Line pressure

Position/Range		Specification (kPa {kgf/cm^2, psi})
D, M	Idle	355—425 {3.7—4.3, 52—61}
	Stall	863—959 {8.8—9.7, 126—139}
R	Idle	804—942 {8.2—9.6, 117—136}
	Stall	1,424—1,608 {14.6—16.3, 207—233}

Warning
- **Removing the square head plug when the ATF is hot can be dangerous. Hot ATF can come out of the opening and badly burn you. Before removing the square head plug, allow the ATF to cool.**

15. Remove the **SSTs**.
16. Install the test plug and O-ring in the inspection port.

Tightening torque
5.9—8.8 N·m {61—89 kgf·cm, 53—77 in·lbf}

Evaluation of line pressure test

Condition	Possible cause
High pressure in all ranges	• Line pressure control solenoid malfunction • Primary regulator valve malfunction
Low pressure in all ranges	• Line pressure control solenoid malfunction • Primary regulator valve malfunction • Oil pump malfunction
Low pressure in D range only	• Hydraulic circuit of D malfunction • C1 clutch malfunction
Low pressure in R position only	• Hydraulic circuit of R malfunction • C3 clutch malfunction • B4 brake malfunction

Stall Speed Test
1. Perform mechanical system test preparation. (See 05-13-3 Mechanical System Test Preparation.)
2. Start the engine.
3. Firmly depress the brake pedal with the left foot.
4. Shift the selector lever to the D range.

Caution
- **If the accelerator pedal is pressed for more than 5 s while the brake pedal is pressed, the transmission could be damaged. Therefore, perform Steps 5 and 6 within 5 s.**

5. Gently depress the accelerator pedal with the right foot.
6. When the engine speed no longer increases, quickly read the engine speed and release the accelerator pedal.
7. Shift the selector lever to the N position and idle the engine for **1 min or more** to cool the ATF.
8. Perform a stall test of the D and R position in the same manner as in Steps 3—7.
9. Turn off the engine.

AUTOMATIC TRANSMISSION [SJ6A-EL]

Engine stall speed

Position/Range	Specification (rpm)
D, R, M	2,307—2,607

Evaluation of stall test

Condition	Possible cause
Low pressure in all ranges	• Engine lack of power • Torque converter one-way clutch malfunction
High pressure in D range only	• Insufficient line pressure • C1 clutch malfunction (slippage) • F3 one-way clutch malfunction
High pressure in R range only	• Insufficient line pressure • B4 brake malfunction (slippage) • C3 clutch malfunction (slippage) • F1 one-way clutch malfunction
High pressure in all ranges	• Insufficient line pressure • Oil leakage from each range circuit

Time Lag Test

1. Perform mechanical system test preparation. (See 05-13-3 Mechanical System Test Preparation.)
2. Start the engine.
3. Warm up the engine until the ATF temperature reaches **60—70°C {140—158°F}**.
4. Shift the selector lever from the N position to D range.
5. Use a stopwatch to measure the time it takes from shifting until shock is felt. Take three measurements for each test and average from the results using the following formula.

   Formula
   Average time lag = (Time 1 + Time 2 + Time 3) / 3

6. Perform the test for the following shifts in the same manner Step 5.
   - N position → R position

   Time lag
   N position → D range: 0.7 s or less
   N position → R position: 1.2 s or less

Evaluation of time lag test

Condition	Possible Cause
N → D shift	• Insufficient line pressure • C1 clutch malfunction (slippage) • F3 one-way clutch malfunction
N → R shift	• Insufficient line pressure • C1 clutch malfunction (slippage) • C3 clutch malfunction (slippage) • F1 one-way clutch malfunction

ROAD TEST [SJ6A-EL]

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Warning
- **When performing a road test, be aware of other vehicles, people, impediments to avoid an accident.**

Note
- When the legal speed limit must be exceeded, use a chassis dynamometer instead of performing a road test.

Road Test Preparation

1. Inspect the engine coolant level. (See 01-12-2 ENGINE COOLANT LEVEL INSPECTION [L8, LF].)
2. Inspect the engine oil level. (See 01-11-2 ENGINE OIL LEVEL INSPECTION [L8, LF].)
3. Inspect the ATF level. (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)
4. Inspect the idle speed. (See 01-10-3 ENGINE TUNE-UP [L8, LF].)
5. Inspect the ignition timing. (See 01-10-3 ENGINE TUNE-UP [L8, LF].)
6. Verify that no DTCs are stored.

AUTOMATIC TRANSMISSION [SJ6A-EL]

Shift Diagram
D range (normal mode)

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D Range Test

1. Perform road test preparation. (See 05-13-5 Road Test Preparation.)
2. Shift the selector lever to the D range.
3. Accelerate with the throttle half and then wide open.
4. Verify that 1→2, 2→3, 3→4, 4→5, and 5→6 upshifts can be obtained. The shift points must be as shown in the table below.
   - If there is any malfunction, inspect the TCM and AT. (See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE [SJ6A-EL].)
5. Drive the vehicle in 6GR, 5GR, 4GR, 3GR, 2GR and verify that kickdown occurs for 6→5, 5→4, 4→3, 3→2, and 2→1 downshifts, and that the shift points are as shown in the table below.
   - If there is any malfunction, inspect the TCM and AT. (See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE [SJ6A-EL].)
6. Decelerate the vehicle and verify that engine braking effect is felt in 4GR, 5GR, and 6GR.
   - If there is any malfunction, inspect the TCM and AT. (See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE [SJ6A-EL].)
7. Drive the vehicle and verify that TCC operation is obtained. The operation points must be as shown in the table below.
   - If there is any malfunction, inspect the TCM and AT. (See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE [SJ6A-EL].)

AUTOMATIC TRANSMISSION [SJ6A-EL]

Shift point table

Range	Mode	Throttle condition	Shift	Vehicle speed (km/h {mph})	Turbine speed (rpm)
D	NORMAL	Wide open throttle	$D_1 \rightarrow D_2$	40—46 {25—28}	5,150—5,900
			$D_2 \rightarrow D_3$	76—84 {48—52}	5,700—6,250
			$D_3 \rightarrow D_4$	112—122 {70—75}	5,750—6,200
			$D_4 \rightarrow D_5$	160—170 {100—105}	5,850—6,150
			TCC ON (D_5)	160—170 {100—105}	4,150—4,400
			$D_5 \rightarrow D_6$	222—232 {138—143}	5,800—6,000
			TCC ON (D_6)	222—232 {138—143}	4,700—4,900
		Half throttle	$D_1 \rightarrow D_2$	26—34 {17—21}	3,350—4,400
			$D_2 \rightarrow D_3$	41—60 {26—37}	3,050—4,500
			$D_3 \rightarrow D_4$	70—95 {44—58}	3,600—4,850
			$D_4 \rightarrow D_5$	104—131 {65—81}	3,800—4,750
			TCC ON (D_5)	130—150 {81—93}	3,350—3,900
			$D_5 \rightarrow D_6$	155—186 {97—115}	4,050—4,800
			TCC ON (D_6)	155—186 {97—115}	3,300—3,950
		Closed throttle position	$D_6 \rightarrow D_5$	52—58 {33—35}	1,150—1,200
			$D_5 \rightarrow D_4$	35—41 {22—25}	950—1,050
			$D_4 \rightarrow D_3$	23—29 {15—17}	850—1,050
			$D_3 \rightarrow D_2$	12—18 {8—11}	650—900
			$D_2 \rightarrow D_1$	4—10 {3—6}	300—700
		Kickdown	$D_6 \rightarrow D_5$	215—225 {134—139}	4,600—4,750
			$D_5 \rightarrow D_4$	152—162 {95—100}	3,950—4,200
			$D_4 \rightarrow D_3$	100—110 {62—68}	3,650—4,000
			$D_3 \rightarrow D_2$	63—71 {40—44}	3,250—3,600
			$D_2 \rightarrow D_1$	27—33 {17—20}	2,050—2,450
	AAS	Wide open throttle	$D_1 \rightarrow D_2$	40—46 {25—28}	5,150—5,900
			$D_2 \rightarrow D_3$	76—84 {48—52}	5,700—6,250
			$D_3 \rightarrow D_4$	112—122 {70—75}	5,750—6,200
			$D_4 \rightarrow D_5$	160—170 {100—105}	5,850—6,150
			TCC ON (D_5)	160—170 {100—105}	4,150—4,400
			$D_5 \rightarrow D_6$	222—232 {138—143}	5,800—6,000
			TCC ON (D_6)	222—232 {138—143}	4,700—4,900
		Half throttle	$D_1 \rightarrow D_2$	26—34{17—21}	3,350—4,400
			$D_2 \rightarrow D_3$	48—64 {30—39}	3,600—4,800
			$D_3 \rightarrow D_4$	71—94 {45—58}	3,600—4,800
			$D_4 \rightarrow D_5$	104—131 {65—81}	3,800—4,750
			TCC ON (D_5)	130—150 {81—93}	3,350—3,900
			$D_5 \rightarrow D_6$	216—234 {134—145}	5,650—6,050
			TCC ON (D_6)	216—234 {134—145}	4,600—4,950
		Closed throttle position	$D_6 \rightarrow D_5$	52—58 {33—35}	1,150—1,200
			$D_5 \rightarrow D_4$	35—41 {22—25}	950—1,050
			$D_4 \rightarrow D_3$	22—28 {14—17}	850—1,000
			$D_3 \rightarrow D_2$	12—18 {8—11}	650—900
			$D_2 \rightarrow D_1$	4—10 {3—6}	300—700
		Kickdown	$D_6 \rightarrow D_5$	215—225 {134—139}	4,600—4,750
			$D_5 \rightarrow D_4$	152—162 {95—100}	3,950—4,200
			$D_4 \rightarrow D_3$	100—110 {62—68}	3,650—4,000
			$D_3 \rightarrow D_2$	63—71 {40—44}	3,250—3,600
			$D_2 \rightarrow D_1$	27—33 {17—20}	2,050—2,450

AUTOMATIC TRANSMISSION [SJ6A-EL]

Direct Mode Test

Note
- Direct mode inspection is performed representatively between 3rd and 4th gears.

1. Perform road test preparation. (See 05-13-5 Road Test Preparation.)
2. Shift the selector lever to D range.
3. Perform the following tests.
   - If there is any malfunction, inspect the steering shift switch. (See 05-14-15 STEERING SHIFT SWITCH INSPECTION.)

   (1) When the vehicle is driven according to the following table, inspect the point at which the system switches from automatic shift mode to direct mode.

Driving conditions					Inspection item
Range	Mode	Gear position	Accelerator opening angle (%)	Vehicle speed (km/h {mph})	
D	Automatic shift mode	3GR	10—15	35—45 {22—27}	• While driving under condition indicated on left with up-switch of steering shift switch operated, verify shift-up to 4GR with system switched to direct mode.
D	Automatic shift mode	4GR	10—15	35—45 {22—27}	• While driving under condition indicated on left with down-switch of steering shift switch operated, verify shift-down to 3GR with system switched to direct mode.

   (2) When the vehicle is driven according to the following table, inspect the point at which the system switches from direct mode to automatic shift mode.

Driving conditions					Inspection item
Range	Mode	Gear position	Accelerator opening angle (%)	Vehicle speed (km/h {mph})	
D	Direct mode	4GR	10—15	35—45 {22—27}	• While driving under condition indicated on left and at constant speed for several seconds *, verify that system switches to automatic shift mode automatically.

* : Depending on the driving conditions, the time required to switch to automatic shift mode may vary.

M Range Test

1. Perform road test preparation. (See 05-13-5 Road Test Preparation.)
2. Shift the selector lever to M range.
3. Verify that 1→2, 2→3, 3→4, 4→5, and 5→6 upshifts and 6→5, 5→4, 4→3, 3→2, and 2→1 downshifts are obtained by manual shifting.
   - If there is any malfunction, inspect the TCM and AT. (See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE [SJ6A-EL].)
4. Decelerate the vehicle and verify that 6→5, 5→4, 4→3, 3→2, and 2→1 downshifts are obtained. The shift points must be as shown in the table below.
   - If there is any malfunction, inspect the TCM and AT. (See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE [SJ6A-EL].)
5. Decelerate the vehicle and verify that engine braking effect is felt in all gears.
   - If there is any malfunction, inspect the TCM and AT. (See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE [SJ6A-EL].)
6. Drive the vehicle and verify that TCC operation is obtained in 5GR and 6GR. The operation points must be as shown in the table below.
   - If there is any malfunction, inspect the TCM and AT. (See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE [SJ6A-EL].)

AUTOMATIC TRANSMISSION [SJ6A-EL]

Vehicle speed at shift point table

Range	Mode	Throttle condition	Shift	Vehicle speed km/h {mph}	Turbine speed (rpm)
M	Normal	Half throttle	TCC ON (D_5)	130—150 {81—93}	3,350—3,900
			TCC ON (D_6)	130—150 {81—93}	2,750—3,200
		All round	$D_6 \rightarrow D_5$	44—50 {28—31}	950—1,050
			$D_5 \rightarrow D_4$	35—41 {22—25}	950—1,050
			$D_4 \rightarrow D_3$	17—23 {11—14}	650—800
			$D_3 \rightarrow D_2$	12—18 {8—11}	650—900
			$D_2 \rightarrow D_1$	9—15 {6—9}	700—1,100

P Position Test

1. Shift into the P position on a gentle slope. Release the brake, and verify that the vehicle does not roll.
   - If there is any malfunction, inspect the AT. (See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE [SJ6A-EL].)

AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL]

id051311251100

Automatic Transmission Fluid (ATF) Condition Inspection

1. Inspect the ATF for the following to determine whether the transmission should be disassembled.

- The ATF is muddy.
- The ATF smells strange or unusual.

ATF Condition

Condition			Possible cause
Clear dark red		Normal	—
Light red (pink)		Contaminated with water	• Damaged oil cooler inside of the radiator Problem could occur to parts inside the transmission by water contamination. It is necessary to overhaul the transmission and detect defected parts. If necessary, replace the transmission.
Reddish brown	Has burnt smell and metal particles are found	Deteriorated ATF	Defective the powertrain components inside the transmission: Particles cause wide range of problems by plugging up in oil pipe, control valve body and oil cooler in radiator. • When large amount of metal particles are found, overhaul the transmission and inspect for defective parts. If necessary, replace the transmission. • Implement flushing operation as there is a possibility to have particles plugging up the oil pipe or oil cooler inside the radiator.
	Has no burnt smell	Normal	• Discoloration by oxidation

AUTOMATIC TRANSMISSION [SJ6A-EL]

AUTOMATIC TRANSMISSION FLUID (ATF) REPLACEMENT [SJ6A-EL]

id051311251200

Warning
- **A hot transmission and ATF can cause severe burns. Turn off the engine and wait until they are cool before replacing ATF.**

Note
- Do not mistake the overflow plug for the drain plug.

1. Remove the drain plug and the drain plug gasket from the oil pan.
2. Drain the ATF into a container.
3. Clean the drain plug.

Caution
- **Be sure to install the drain plug gasket in the correct direction as shown in the figure.**

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4. Install a new drain plug gasket and the drain plug to the oil pan.

Tightening torque
17.5—22.5 N·m {1.8—2.2 kgf·m, 13.0—16.5 ft·lbf}

Note
- Do not mistake the overflow plug for the drain plug.

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5. Remove the overflow plug and the overflow plug gasket.

amxzzw0000017

6. Remove the filler plug and the O-ring.
7. Add the specified type of ATF through the filler plug hole.

ATF
Type: JWS3309
Capacity (approx. quantity): 7.4 L {7.8 US qt, 6.5 Imp qt}

8. Verify the ATF is dripping from the overflow orifice.

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Caution
- **Be sure to install the overflow plug gasket in the correct direction as shown in the figure.**

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9. Install a new overflow plug gasket and the overflow plug.

Tightening torque
17.5—22.5 N·m {1.8—2.2 kgf·m, 13.0—16.5 ft·lbf}

Note
- Replace the O-ring if it has malfunction.

10. Coat a new O-ring with ATF, and install it to the filler plug.

Tightening torque
23.5—54.9 N·m {2.4—5.5 kgf·m, 17.4—40.4 ft·lbf}

Caution
- **Always adjust the ATF level when replacing the ATF so that the appropriate level is maintained.**

11. Adjust the ATF level. (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)

AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL]

id051311260000

Automatic Transmission Fluid (ATF) Level Inspection

Caution
- **The ATF level cannot be adjusted correctly if the ATF temperature is not within a normal range (50-60 degrees C). Always perform the servicing according to the adjustment procedure.**
- **Remaining ATF may drip from the overflow tube even when the ATF level is less than the specified value, therefore careful determination is required.**

Note
- An overflow-type SJ6A-EL automatic transmission has been adopted with an overflow tube installed to the oil pan for inspection of the ATF level. Therefore, no dipstick has been equipped.

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1. Lift up the vehicle.
2. Remove the filler plug and O-ring.

Note
- Do not mistake the overflow plug for the drain plug.

3. Remove the overflow plug and the overflow plug gasket.
4. Fill with ATF from the filler plug hole until it starts dripping from the overflow orifice.

ATF type
ATF JWS3309

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AUTOMATIC TRANSMISSION [SJ6A-EL]

Supplemental ATF amount (approx. quantity)

Service	Supplemental ATF amount
Procedure including ATF draining • Transmission replacement • Torque converter replacement • Oil cooler replacement • Control valve body replacement • TFT sensor replacement	Fill ATF to the specified amount (approx. quantity: 7.4 L {7.8 US qt, 6.5 Imp qt})
Procedure without ATF draining • Oil seal (extension housing) replacement • Fixing oil leakage or stains	Add small amount of ATF

Note
- Replace the O-ring if it has malfunction.

5. Coat a new O-ring with ATF, and install it to the filler plug.

Tightening torque
23.5—54.9 N·m {2.4—5.5 kgf·m, 17.4—40.4 ft·lbf}

6. Temporarily tighten the overflow plug.
7. Start the engine and warm it up by idling to increase the ATF temperature.

Note
- Perform the following precedure quickly, otherwise, the ATF temperature will exceed the proper range.

8. Shift to all ranges, from the P position to the D range, taking **2 s or more** for each position or range, then after repeating the procedure two times, shift to the P position again.

Caution
- **Do not shift from the N position when the AT warning light is illuminated.**

9. Verify that the ATF temperature is in the proper range **(39—54 °C {103—129 °F})**. (See 05-13-13 Using the M-MDS.)(See 05-13-13 Using the AT warning light.)
10. Remove the overflow plug and inspect whether the ATF is dripping from the overflow orifice.
    - If there is no ATF dripping, install the overflow plug after the engine is stopped, refill with ATF from the filler plug hole, and repeat the procedure from Step 7.
11. Wait until the ATF starts dripping from the overflow plug.

Caution
- **Be sure to install the overflow plug gasket in the correct direction as shown in the figure**

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12. If ATF dripping is verified, install a new overflow plug gasket and overflow plug.

Tightening torque
17.5—22.5 N·m {1.8—2.2 kgf·m, 13.0—16.5 ft·lbf}

13. Wipe off any ATF drips after tightening the overflow plug.
14. Lower the vehicle.

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AUTOMATIC TRANSMISSION [SJ6A-EL]

ATF Temperature Verification
Using the M-MDS

1. Connect the M-MDS to the DLC-2.

L.H.D.

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R.H.D.

2. Verify the ATF temperature using the PID/data monitor “TFT”.
3. Warm up the automatic transmission until the ATF temperature is **39—54 °C {103—129 °F}**.

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Using the AT warning light

1. Short the TFT check connector terminal A and B of the TCM.

L.H.D.

amxzzw0000054

R.H.D.

amxzzw0000018

AUTOMATIC TRANSMISSION [SJ6A-EL]

2. Perform the following operations to activate the control for the oil level adjustment.
   - Continue the shifting operation from N to D, D to N **within 1.5 s** until the AT warning light illuminates.

   Note
   - When adjusting the ATF level, refer to the following chart and verify the specified ATF temperature **(39—54 °C {103—129 °F})**.

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AT warning light illumination chart for ATF level adjustment

ATF condition	Time chart
ATF Temperature **below 39 °C {103 °F}** • ATF temperature is lower than a ATF level adjustable temperature.	
ATF Temperature **39—54 °C {103—129 °F}** • ATF temperature is same a ATF level adjustable temperature.	
ATF Temperature **above 54 °C {129 °F}** • ATF temperature is higher than a ATF level adjustable temperature.	

TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL]

id051311251300

Operating inspection

1. Verify that the starter operates only when the ignition switch is turned to the START position with the selector lever in the P or N position.
   - If there is any malfunction, adjust the TR switch. (See 05-13-16 TRANSMISSION RANGE (TR) SWITCH ADJUSTMENT [SJ6A-EL].)
2. Verify that the back-up lights illuminate when shifted to the R position with the ignition switch at the ON position.
   - If there is any malfunction, adjust the TR switch. (See 05-13-16 TRANSMISSION RANGE (TR) SWITCH ADJUSTMENT [SJ6A-EL].)
3. Verify that the positions of the selector lever and the indicator are aligned.

AUTOMATIC TRANSMISSION [SJ6A-EL]

L.H.D.

amxzzw0000110

R.H.D.

- If there is any malfunction, adjust the TR switch. (See 05-13-16 TRANSMISSION RANGE (TR) SWITCH ADJUSTMENT [SJ6A-EL].)

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Continuity Inspection

Caution

- **Water or foreign material entering the connector can cause poor connections or corrosion. Be sure that water or foreign material do not enter the connector when disconnecting it.**

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the tunnel member component.
4. Remove the middle pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
5. Remove the insulator.

e5u513zw5005

AUTOMATIC TRANSMISSION [SJ6A-EL]

6. Disconnect the TR switch connector.

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7. Verify that the continuity is as indicated in the table.
   - If there is any malfunction, adjust the TR switch. (See 05-13-16 TRANSMISSION RANGE (TR) SWITCH ADJUSTMENT [SJ6A-EL].)

amxzzw0000019

8. Reinspect for continuity at TR switch.
   - If there is any malfunction, replace the TR switch. (See 05-13-19 TRANSMISSION RANGE (TR) SWITCH REMOVAL/INSTALLATION [SJ6A-EL].)
9. Connect the TR switch connector.
10. Install the insulator.

    Tightening torque
    8—11 N·m {82—112 kgf·cm, 72—97 in·lbf}

11. Install the middle pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
12. Install the tunnel member component.
13. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
14. Install the battery cover.

○—○ : Continuity

Selector position \ Terminal	Starter circuit		Position-circuit				
	A	I	E	B	C	H	D
P	○	○	○	○			
R			○		○		
N	○	○	○			○	
D			○				○

amxzzw0000018

TRANSMISSION RANGE (TR) SWITCH ADJUSTMENT [SJ6A-EL]

id051311251600

Caution
- **Water or foreign material entering the connector can cause poor connections or corrosion. Be sure that water or foreign material do not enter the connector when disconnecting it.**

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the tunnel member component.
4. Remove the middle pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)

AUTOMATIC TRANSMISSION [SJ6A-EL]

5. Remove the insulator.

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6. Mark the manual shaft lever component as shown in the figure.
7. Separate the manual shaft lever component from selector lever.

e5u513zw5007

8. Disconnect the TR switch connector.
9. Rotate the manual shaft to the N position.

Caution
- **Do not use an impact wrench. Hold the manual shaft lever when removing the manual shaft nut, otherwise the transmission may be damaged.**

e5u513zw5006

10. Set the adjustable wrench as shown in the figure to hold the manual shaft lever.
11. Remove the manual shaft nut.

amxzzw0000019

12. Remove the washer and manual shaft lever component.
13. Loosen the TR switch mounting bolts.
14. Temporarily install the TR switch mounting bolt.

Caution
- **Improper adjustment of the TR switch will cause abnormal operation of the automatic transmission. Be sure to adjust the TR switch correctly.**

e5u513zw5009

AUTOMATIC TRANSMISSION [SJ6A-EL]

15. Verify the TR switch reference line and the notch of the manual shaft are aligned.
16. Tighten the TR switch mounting bolts.

    Tightening torque
    9.8—15.7 N·m {100—160 kgf·cm, 87—138 in·lbf}

e5u513zw5081

17. Inspect for continuity between TR switch terminals E and H.
18. Install the manual shaft lever component and washer.

    Caution
    - **Do not use an impact wrench. Hold the manual shaft lever when tightening the manual shaft nut, otherwise the transmission may be damaged.**

amxzzw0000019

19. Set the adjustable wrench as shown in the figure to hold the manual shaft lever.
20. Tighten the manual shaft nut using a torque wrench.

    Tightening torque
    14—18 N·m {1.5—1.8 kgf·m, 11—13 ft·lbf}

amxzzw0000019

21. Shift the selector lever to P position.
22. Turn the manual shaft lever to P position.
23. Inspect TR switch continuity. (See 05-13-14 TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL].)
24. Connect the TR switch connector.
25. Align the mark of the manual shaft lever component as shown in the figure.
26. Install the manual shaft lever component installation nut.

    Tightening torque
    10.8—14.7 N·m {111—149 kgf·cm, 96.4—129.3 in·lbf}

e5u513zw5007

27. Install the insulator.

    Tightening torque
    8—11 N·m {82—112 kgf·cm, 72—97 in·lbf}

28. Install the middle pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
29. Install the tunnel member component.
30. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
31. Install the battery cover.
32. Inspect TR switch operation. (See 05-13-14 TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL].)

AUTOMATIC TRANSMISSION [SJ6A-EL]

TRANSMISSION RANGE (TR) SWITCH REMOVAL/INSTALLATION [SJ6A-EL]

id0513117102001

Caution

- **Water or foreign material entering the connector can cause poor connections or corrosion. Be sure that water or foreign material do not enter the connector when disconnecting it.**

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the tunnel member component.
4. Remove the middle pipe.(See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
5. Remove the insulator.

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6. Mark the manual shaft lever component as shown in the figure.
7. Separate the manual shaft lever component from selector lever.

e5u513zw5007

8. Disconnect the TR switch connector.
9. Rotate the manual shaft to the N position.

Caution

- **Do not use an impact wrench. Hold the manual shaft lever when removing the manual shaft nut, otherwise the transmission may be damaged.**

e5u513zw5006

10. Set the adjustable wrench as shown in the figure to hold the manual shaft lever.
11. Remove the manual shaft nut.

amxzzw0000020

AUTOMATIC TRANSMISSION [SJ6A-EL]

12. Remove the washer and manual shaft lever component.

e5u513zw5009

13. Pry off the lock washer using a flathead screwdriver.

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14. Remove the nut, lock washer and the washer.

amxzzw0000020

15. Remove the TR switch.

amxzzw0000020

16. Rotate the manual shaft to the extension housing side fully and return two notches to set the N position.
17. Install the TR switch and hand-tighten the new mounting bolts.

Caution

- **Improper adjustment of the TR switch will cause abnormal operation of the automatic transmission. Be sure to adjust the TR switch correctly.**

amxzzw0000020

AUTOMATIC TRANSMISSION [SJ6A-EL]

18. Verify the TR switch reference line and the notch of the manual shaft are aligned.

e5u513zw5081

19. Install the washer and the lock washer with the nut.

Tightening torque
5.9—7.8 N·m {61—79 kgf·cm, 53—68 in·lbf}

amxzzw0000020

20. Stake the lock washer using a flathead screwdriver.
21. Tighten the TR switch mounting bolts.

Tightening torque
9.8—15.7 N·m {100—160 kgf·cm, 87—138 in·lbf}

amxzzw0000020

22. Inspect for continuity between TR switch terminals E and H.
23. Install the manual shaft lever component and washer.

Caution
- **Do not use an impact wrench. Hold the manual shaft lever when tightening the manual shaft nut, otherwise the transmission may be damaged.**

amxzzw0000020

24. Set the adjustable wrench as shown in the figure to hold the manual shaft lever.
25. Tighten the manual shaft nut using a torque wrench.

Tightening torque
14—18 N·m {1.5—1.8 kgf·m, 11—13 ft·lbf}

26. Shift the selector lever to the P position.
27. Turn the manual shaft lever to the P position.
28. Inspect TR switch continuity. (See 05-13-14 TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL].)

amxzzw0000020

AUTOMATIC TRANSMISSION [SJ6A-EL]

29. Connect the TR switch connector.
30. Align the mark of the manual shaft lever component as shown in the figure.
31. Install the manual shaft lever component installation nut.

    Tightening torque
    10.8—14.7 N·m {111—149 kgf·cm, 96.4—129.3 in·lbf}

32. Install the insulator.

    Tightening torque
    8—11 N·m {82—112 kgf·cm, 72—97 in·lbf}

e5u513zw5007

33. Install the middle pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
34. Install the tunnel member component.
35. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
36. Install the battery cover.
37. Inspect TR switch operation. (See 05-13-14 TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL].)

TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR INSPECTION [SJ6A-EL]

id051311710300

Caution
- **Water or foreign material entering the connector can cause poor connections or corrosion. Be sure that water or foreign material do not enter the connector when disconnecting it.**

On-Vehicle Inspection

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the coupler component connector.

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4. Measure resistance between the terminals A and B.
   - If there is any malfunction, perform the off-vehicle inspection for TFT sensor. (See 05-13-23 Off-Vehicle Inspection.)

amxzzw0000020

AUTOMATIC TRANSMISSION [SJ6A-EL]

Transmission fluid temperature (TFT) sensor

ATF temperature (°C {°F})	Resistance (kilohm)
10 {50}	6.445
25 {77}	3.5
110 {230}	0.247

5. Connect the coupler component connector.
6. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
7. Install the battery cover.

Off-Vehicle Inspection

Warning
- **A hot the transmission and ATF can cause severe burns. Turn off the engine and wait until they are cool before replacing ATF.**

1. Remove the TFT sensor. (See 05-13-24 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION [SJ6A-EL].)
2. Place the TFT sensor and a thermometer in ATF as shown in the figure, and heat the ATF gradually.

amxzzw000002

3. Measure the resistance between the TFT sensor terminals.
   - If there is any malfunction, replace the TFT sensor. (See 05-13-24 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION [SJ6A-EL].)

amxzzw0000020

Transmission fluid temperature (TFT) sensor

ATF temperature (°C {°F})	Resistance (kilohm)
10 {50}	6.445
25 {77}	3.5
110 {230}	0.247

4. Install the TFT sensor. (See 05-13-24 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION [SJ6A-EL].)

AUTOMATIC TRANSMISSION [SJ6A-EL]

TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION [SJ6A-EL]

id051311710400

Warning
- **A hot transmission and ATF can cause severe burns. Turn off the engine and wait until they are cool before replacing ATF.**

Caution
- **Water or foreign material entering the connector can cause poor connections or corrosion. Be sure that water or foreign material do not enter the connector when disconnecting it.**

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Drain the ATF. (See 05-13-10 AUTOMATIC TRANSMISSION FLUID (ATF) REPLACEMENT [SJ6A-EL].)

Caution
- **Do not damage the fitting surface of the transmission case and the oil pan.**
- **Do not deform the oil pan.**

4. Remove the oil pan and gasket.
5. Remove the oil strainer from the control valve body component.
6. Remove the O-ring from the oil strainer.

e5u513zw5048

7. Disconnect the connectors from the solenoids.
8. Disconnect the coupler component from the clamps.

amxzzw0000086

9. Remove the lock plate from the control valve body component.
10. Pull the TFT sensor from the control valve body component.
11. Remove the coupler component mounting bolt from the transmission case.
12. Remove the coupler component from the transmission case.
13. Remove the O-ring from the coupler component.
14. Install a new O-ring to the coupler component.
15. Tighten the coupler component mounting bolt to the transmission case.

e5u513zw5067

Tightening torque
3.9—6.9 N·m {40—49 kgf·cm, 35—42 in·lbf}

AUTOMATIC TRANSMISSION [SJ6A-EL]

16. Install the TFT sensor and the lock plate with the bolt to the control valve body component.

    Tightening torque
    8.0—12.0 N·m {82—122 kgf·cm, 26—42 in·lbf}

e5u513zw5067

17. Connect the coupler component to the clamps.

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18. Connect the connectors to the solenoids.
19. Coat a new O-ring with ATF and install it to the oil strainer.
20. Install the oil strainer with the bolts to the control valve body component.

    Caution
    - **Pay attention to the fabric so that foreign materials from it cannot comes out in the transmission.**

amxzzw0000014

21. Clean the contact surface of oil pan and transmission case.

    Caution
    - **Do not damage the fitting surface of the transmission case and the oil pan.**
    - **Do not deform the oil pan.**

22. Install a new oil pan gasket and the oil pan to the transmission case.

    Caution
    - **Be reminded that bolts might be damaged if tightened too much since the gasket is cork-made and there is little tightening sense.**

e5u513zw5069

23. Tighten the oil pan installation bolt.

    Tightening torque
    6.0—7.9 N·m {62—80 kgf·cm, 54—69 in·lbf}

24. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
25. Install the battery cover.
26. Add ATF and, with the engine idling, inspect the ATF level and inspect for leakage. (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)

AUTOMATIC TRANSMISSION [SJ6A-EL]

TURBINE SENSOR INSPECTION [SJ6A-EL]

id051311251900

Caution
- **Water or foreign material entering the connector can cause poor connections or corrosion. Be sure that water or foreign material do not enter the connector when disconnecting it.**

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the turbine sensor connector.

Caution
- **Do not apply a shock in the turbine sensor.**
- **Do not damage the terminals.**

amxzzw0000014

4. Measure the resistance between the turbine sensor terminals.
   - If there is any malfunction, replace the turbine sensor. (See 05-13-26 TURBINE SENSOR REMOVAL/INSTALLATION [SJ6A-EL].)

Turbine sensor resistance
560—680 ohm

amxzzw0000019

5. Connect the turbine sensor connector.
6. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
7. Install the battery cover.

TURBINE SENSOR REMOVAL/INSTALLATION [SJ6A-EL]

id051311252000

Caution
- **Water or foreign material entering the connector can cause poor connections or corrosion. Be sure that water or foreign material do not enter the connector when disconnecting it.**
- **Do not damage the turbine sensor.**

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the turbine sensor connector.
4. Remove the turbine sensor.
5. Install the turbine sensor.

Tightening torque
3.9—6.9 N·m {40—70 kgf·cm, 35—60 in·lbf}

6. Connect the turbine sensor connector.
7. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
8. Install the battery cover.

e5u513zw5070

AUTOMATIC TRANSMISSION [SJ6A-EL]

VEHICLE SPEED SENSOR (VSS) INSPECTION [SJ6A-EL]

id0513112526001

Caution
- **Water or foreign material entering the connector can cause poor connections or corrosion. Be sure that water or foreign material do not enter the connector when disconnecting it.**

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the tunnel member component.
4. Remove the middle pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
5. Remove the insulator.

amxzzw0000019

6. Mark the manual shaft lever component as shown in the figure.
7. Separate the manual shaft lever component from selector lever.

e5u513zw5007

8. Disconnect the VSS connector.

Caution
- **Do not apply a shock in the VSS.**
- **Do not damage the terminals.**

amxzzw0000019

9. Measure the resistance between the VSS terminals.
   - If there is any malfunction, replace the VSS. (See 05-13-28 VEHICLE SPEED SENSOR (VSS) REMOVAL/INSTALLATION [SJ6A-EL].)

VSS resistance
560—680 ohm

10. Connect the VSS connector.

amxzzw0000019

AUTOMATIC TRANSMISSION [SJ6A-EL]

11. Align the mark of the manual shaft lever component as shown in the figure.
12. Install the manual shaft lever component installation nut.

    Tightening torque
    10.8—14.7 N·m {111—149 kgf·cm, 96.4—129.3 in·lbf}

13. Install the insulator.

    Tightening torque
    8—11 N·m {82—112 kgf·cm, 72—97 in·lbf}

e5u513zw5007

14. Install the middle pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
15. Install the tunnel member component.
16. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
17. Install the battery cover.

VEHICLE SPEED SENSOR (VSS) REMOVAL/INSTALLATION [SJ6A-EL]

id051311252700

Caution
- **Water or foreign material entering the connector can cause poor connections or corrosion. Be sure that water or foreign material do not enter the connector when disconnecting it.**
- **Do not damage the VSS.**

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the tunnel member component.
4. Remove the middle pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
5. Remove the insulator.

e5u513zw5005

6. Mark the manual shaft lever component as shown in the figure.
7. Separate the manual shaft lever component from the selector lever.
8. Disconnect the VSS connector.

e5u513zw5007

AUTOMATIC TRANSMISSION [SJ6A-EL]

9. Remove the VSS.
10. Install the VSS.

    Tightening torque
    3.9—6.9 N·m {40—70 kgf·cm, 35—60 in·lbf}

11. Connect the VSS connector.

e5u513zw5033

12. Align the mark of the manual shaft lever component as shown in the figure.
13. Install the manual shaft lever component installation nut.
14. Install the insulator.

    Tightening torque
    8—11 N·m {82—112 kgf·cm, 72—97 in·lbf}

15. Install the middle pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
16. Install the tunnel member component.
17. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
18. Install the battery cover.

e5u513zw5007

SOLENOID VALVE INSPECTION [SJ6A-EL]

id051311253200

Caution
- **Water or foreign material entering the connector can cause poor connections or corrosion. Be sure that water or foreign material do not enter the connector when disconnecting it.**
- **Do not damage the terminals.**

Resistance inspection (On-vehicle)

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the coupler component connector.

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AUTOMATIC TRANSMISSION [SJ6A-EL]

4. Measure the resistance between the following terminals.
   - If there is any malfunction, inspect the coupler component.
   - If the coupler component is normal, replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)

amxzzw0000014

Solenoid valve resistance (ATF temperature: 20 °C {68 °F})

Terminals	Solenoid valve	Resistance (ohm)
O—GND	Shift solenoid A	11—15
N—GND	Shift solenoid B	11—15
M—GND	Shift solenoid C	11—15
L—GND	Shift solenoid D	11—15
K—GND	Shift solenoid E	11—15
E—F	Shift solenoid F	5.0—5.6
C—D	Shift solenoid G	5.0—5.6
I—J	Line pressure control solenoid	5.0—5.6
G—H	TCC control solenoid	5.0—5.6

5. Connect the coupler component connector.
6. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
7. Install the battery cover.

Continuity Inspection (On-Vehicle Inspection)

Caution
- **Water or foreign material entering the connector can cause a poor connection or corrosion. Be sure not to allow water or foreign material on the connector when disconnecting.**
- **Do not damage the terminals.**

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the coupler component connector.
4. Verify that there is no continuity between coupler component terminals C, D, E, F, G, H, I, J and GND.
   - If there is any malfunction, inspect the coupler component.
   - If the coupler component is normal, replace the control valve body. (See 05-13-57 CONTROL VALVE BODY REMOVAL [SJ6A-EL].) (See 05-13-61 CONTROL VALVE BODY INSTALLATION [SJ6A-EL].)
5. Connect the coupler component connector.
6. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
7. Install the battery cover.

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AUTOMATIC TRANSMISSION [SJ6A-EL]

TCM INSPECTION [SJ6A-EL]

id0513111250700

Terminal Voltage Table (Reference)

Note

- Use the ground of terminal 1P and 1X of the TCM when measuring terminal voltage, as an error may occur when connecting the negative circuit tester to ground.

TCM
HARNESS-SIDE CONNECTOR

amxzzw0000013

Terminal	Signal	Connected to	Test Condition	Voltage (V)	Action
1A	—	—	—	—	—
1B	—	—	—	—	—
1C	CAN_L	Other module	Because this terminal is for serial communication, good/no good judgment by terminal voltage is not possible. Carry out inspection according to DTCs.		• Inspect the related wiring harness
1D	TCC control solenoid GND	TCC control solenoid	• Inspect using the wave profile. (See 05-13-35 Inspection Using An Oscilloscope (Reference).)		• Inspect the TCC control solenoid (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL]) • Inspect the related wiring harness
1E	Line pressure control solenoid GND	Line pressure control solenoid	• Inspect using the wave profile. (See 05-13-35 Inspection Using An Oscilloscope (Reference).)		• Inspect the line pressure control solenoid (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL]) • Inspect the related wiring harness
1F	—	—	—	—	—
1G	CAN_H	Other module	Because this terminal is for serial communication, good/no good judgment by terminal voltage is not possible. Carry out inspection according to DTCs.		• Inspect the related wiring harness
1H	—	—	—	—	—
1I	—	—	—	—	—
1J	ATF temperature (+)	TFT sensor	ATF temperature 20°C {68°F}	Approx. 3.0	• Inspect the TFT sensor (See 05-13-22 TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR INSPECTION [SJ6A-EL]) • Inspect the related wiring harness
			ATF temperature 40°C {104°F}	Approx. 2.14	
			ATF temperature 60°C {140°F}	Approx. 1.38	
1K	—	—	—	—	—

AUTOMATIC TRANSMISSION [SJ6A-EL]

Terminal	Signal	Connected to	Test Condition	Voltage (V)	Action
1L	Shift solenoid G GND	Shift solenoid G	• Inspect using the wave profile. (See 05-13-35 Inspection Using An Oscilloscope (Reference).)		• Inspect the shift solenoid G (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL]) • Inspect the related wiring harness
1M	TFT sensor GND	TFT sensor	Under any condition	Continuity	• Inspect the related wiring harness
1N	—	—	—	—	—
1O	Shift solenoid F GND	Shift solenoid F	• Inspect using the wave profile. (See 05-13-35 Inspection Using An Oscilloscope (Reference).)		• Inspect the shift solenoid F (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL]) • Inspect the related wiring harness
1P	System GND	GND	Under any condition	Continuity	• Inspect the related wiring harness
1Q	TCC control solenoid control	TCC control solenoid	• Inspect using the wave profile. (See 05-13-35 Inspection Using An Oscilloscope (Reference).)		• Inspect the TCC control solenoid (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL]) • Inspect the related wiring harness
1R	Line pressure control solenoid control	Line pressure control solenoid	• Inspect using the wave profile. (See 05-13-35 Inspection Using An Oscilloscope (Reference).)		• Inspect the line pressure control solenoid (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL]) • Inspect the related wiring harness
1S	Shift solenoid D control	Shift solenoid D	5GR, 6GR	B+	• Inspect the shift solenoid D (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL]) • Inspect the related wiring harness
			1GR, 2GR, 3GR, 4GR	Below 1.0	
1T	—	—	—	—	—
1U	—	—	—	—	—
1V	Shift solenoid E control	Shift solenoid E	1GR, 2GR, 3GR, 4GR	B+	• Inspect the shift solenoid E (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL]) • Inspect the related wiring harness
			5GR, 6GR	Below 1.0	
1W	—	—	—	—	—
1X	System GND	GND	Under any condition	Continuity	• Inspect the related wiring harness
1Y	Shift solenoid G control	Shift solenoid G	• Inspect using the wave profile. (See 05-13-35 Inspection Using An Oscilloscope (Reference).)		• Inspect the shift solenoid G (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL]) • Inspect the related wiring harness

AUTOMATIC TRANSMISSION [SJ6A-EL]

Terminal	Signal	Connected to	Test Condition	Voltage (V)	Action
1Z	Shift solenoid F control	Shift solenoid F	• Inspect using the wave profile. (See 05-13-35 Inspection Using An Oscilloscope (Reference).)		• Inspect the shift solenoid F (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL]) • Inspect the related wiring harness
1AA	Shift solenoid C control	Shift solenoid C	1GR, 2GR, 3GR	B+	• Inspect the shift solenoid C (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL]) • Inspect the related wiring harness
			4GR, 5GR, 6GR	Below 1.0	
1AB	Shift solenoid B control	Shift solenoid B	1GR, 2GR, 6GR	B+	• Inspect the shift solenoid B (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL]) • Inspect the related wiring harness
			3GR, 4GR, 5GR	Below 1.0	
1AC	—	—	—	—	—
1AD	Power supply	Battery	Under any condition	B+	• Inspect the related wiring harness
1AE	IG	Ignition switch	Ignition switch ON	B+	• Inspect the Ignition switch (See 09-21-3 IGNITION SWITCH INSPECTION) • Inspect the related wiring harness
			Ignition switch OFF (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL])	Below 1.0	
1AF	Shift solenoid A control	Shift solenoid A	2GR, 3GR, 4GR, 5GR, 6GR	B+	• Inspect the shift solenoid A (See 05-13-29 SOLENOID VALVE INSPECTION [SJ6A-EL]) • Inspect the related wiring harness
			1GR	Below 1.0	
1AG	—	—	—	—	—
1AH	—	—	—	—	—
1AI	IG	Ignition switch	Ignition switch ON	B+	• Inspect the Ignition switch (See 09-21-3 IGNITION SWITCH INSPECTION) • Inspect the related wiring harness
			Ignition switch OFF	Below 1.0	
2A	Turbine speed (+)	Turbine sensor	• Inspect using the wave profile. (See 05-13-35 Inspection Using An Oscilloscope (Reference).)		• Inspect the turbine sensor (See 05-13-26 TURBINE SENSOR INSPECTION [SJ6A-EL]) • Inspect the related wiring harness
2B	Turbine speed (-)	Turbine sensor	Ignition switch ON	Approx. 2.54	• Inspect the turbine sensor (See 05-13-26 TURBINE SENSOR INSPECTION [SJ6A-EL]) • Inspect the related wiring harness

AUTOMATIC TRANSMISSION [SJ6A-EL]

Terminal	Signal	Connected to	Test Condition	Voltage (V)	Action
2C	Vehicle speed (-)	VSS	Ignition switch ON	Approx. 4.0	• Inspect the VSS (See 05-13-27 VEHICLE SPEED SENSOR (VSS) INSPECTION [SJ6A-EL]) • Inspect the related wiring harness
2D	Vehicle speed (+)	VSS	• Inspect using the wave profile. (See 05-13-35 Inspection Using An Oscilloscope (Reference).)		• Inspect the VSS (See 05-13-27 VEHICLE SPEED SENSOR (VSS) INSPECTION [SJ6A-EL]) • Inspect the related wiring harness
2E	Turbine sensor wiring harness shield GND	GND	Under any condition	Continuity	• Inspect the related wiring harness
2F	Down switch (Selector lever component)	Down switch (Selector lever component)	Shift down (M range)	Below 1.0	• Inspect the selector lever component (See 05-14-3 SELECTOR LEVER COMPONENT INSPECTION) • Inspect the related wiring harness
			Other ranges, all positions	B+	
2G	M range switch	M range switch	M range	Below 1.0	• Inspect the selector lever component (See 05-14-3 SELECTOR LEVER COMPONENT INSPECTION) • Inspect the related wiring harness
			Other positions, all ranges	B+	
2H	VSS wiring harness shield GND	GND	Under any condition	Continuity	• Inspect the related wiring harness
2I	—	—	—	—	—
2J	Up switch (Selector lever component)	Up switch (Selector lever component)	Shift up (M range)	Below 1.0	• Inspect the selector lever component (See 05-14-3 SELECTOR LEVER COMPONENT INSPECTION) • Inspect the related wiring harness
			Other ranges, all positions	B+	
2K	TR switch (D range)	TR switch	D range	B+	• Inspect the TR switch (See 05-13-14 TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL]) • Inspect the related wiring harness
			Other ranges, all positions	Below 1.0	
2L	—	—	—	—	—
2M	TR switch (R position)	TR switch	R position	B+	• Inspect the TR switch (See 05-13-14 TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL]) • Inspect the related wiring harness
			Other ranges, all positions	Below 1.0	

AUTOMATIC TRANSMISSION [SJ6A-EL]

Terminal	Signal	Connected to	Test Condition	Voltage (V)	Action
2N	TR switch (N position)	TR switch	N position	B+	• Inspect the TR switch (See 05-13-14 TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL]) • Inspect the related wiring harness
			Other positions, all ranges	Below 1.0	
2O	TR switch (P position)	TR switch	P position	B+	• Inspect the TR switch (See 05-13-14 TRANSMISSION RANGE (TR) SWITCH INSPECTION [SJ6A-EL]) • Inspect the related wiring harness
			Other positions, all ranges	Below 1.0	
2P	—	—	—	—	—
2Q	ATF temperature monitor mode control	TFT check connector	Under any condition	B+	• Inspect the related wiring harness
2R	—	—	—	—	—
2S	—	—	—	—	—
2T	—	—	—	—	—
2U	—	—	—	—	—
2V	—	—	—	—	—
2W	—	—	—	—	—
2X	—	—	—	—	—
2Y	—	—	—	—	—
2Z	—	—	—	—	—
2AA	—	—	—	—	—
2AB	Steering shift switch GND	Steering shift switch	Under any condition	Below 1.0	• Inspect the related wiring harness
2AC	—	—	—	—	—
2AD	—	—	—	—	—
2AE	—	—	—	—	—
2AF	Shift up/Shift down signal (Steering shift switch)	Steering shift switch	Up switch operated (Steering shift switch)	Approx. 2.0	• Inspect the steering shift switch (See 05-14-15 STEERING SHIFT SWITCH INSPECTION) • Inspect the related wiring harness
			Down switch operated (Steering shift switch)	Approx. 2.53	
			Others	Approx. 4.0	
2AG	—	—	—	—	—
2AH	—	—	—	—	—
2AI	—	—	—	—	—

Inspection Using An Oscilloscope (Reference)
Turbine sensor

- TCM terminal: 2A
- Oscilloscope setting: 5 V/DIV (Y) 1 ms/DIV (X)
- Measuring condition: Vehicle speed at **30 km/h {19 mph}** (D range 1GR)

amxzzw0000013

AUTOMATIC TRANSMISSION [SJ6A-EL]

Vehicle speed
- TCM terminal: 2D
- Oscilloscope setting: 5 V/DIV (Y) 1 ms/DIV (X)
- Measuring condition: Vehicle speed at **30 km/h {19 mph}** (D range 1GR)

amxzzw0000013

Shift solenoid F control (+)
- TCM terminal: 1Z
- Oscilloscope setting: 5 V/DIV (Y) 1 ms/DIV (X)
- Measuring condition: D range 5GR

amxzzw0000013

Shift solenoid F control (-)
- TCM terminal: 1O
- Oscilloscope setting: 200 mV/DIV (Y) 1 ms/DIV (X)
- Measuring condition: D range 5GR

amxzzw0000013

Shift solenoid G control (+)
- TCM terminal: 1Y
- Oscilloscope setting: 5 V/DIV (Y) 1 ms/DIV (X)
- Measuring condition: D range 1GR

amxzzw0000013

AUTOMATIC TRANSMISSION [SJ6A-EL]

Shift solenoid G control (-)
- TCM terminal: 1L
- Oscilloscope setting: 100 mV/DIV (Y) 1ms/DIV (X)
- Measuring condition: D range 3GR→ 4GR

amxzzw0000013

TCC control solenoid control (+)
- TCM terminal: 1Q
- Oscilloscope setting: 50 mV/DIV (Y) 1 ms/DIV (X)
- Measuring condition: P, N position, Idle

amxzzw0000014

TCC control solenoid control (-)
- TCM terminal: 1D
- Oscilloscope setting: 50 mV/DIV (Y) 1 ms/DIV (X)
- Measuring condition: P, N position, Idle

amxzzw0000014

Line pressure control solenoid control (+)
- TCM terminal: 1R
- Oscilloscope setting: 5 V/DIV (Y) 1 ms/DIV (X)
- Measuring condition: P, N position, Idle

amxzzw0000014

AUTOMATIC TRANSMISSION [SJ6A-EL]

Line pressure control solenoid control (-)

- TCM terminal: 1E
- Oscilloscope setting: 100 mV/DIV (Y) 1 ms/DIV (X)
- Measuring condition: P, N position, Idle

amxzzw0000014

TCM REMOVAL/INSTALLATION [SJ6A-EL]

id051311250800

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

L.H.D.

amxzzw0000022

1	TCM connector
2	Nut
3	Nut

4	Bracket
5	TCM

AUTOMATIC TRANSMISSION [SJ6A-EL]

R.H.D.

amxzzw0000022

1	TCM connector
2	Nut
3	Nut

4	Bracket
5	TCM

AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL]

id0513112492001

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Drain the ATF. (See 05-13-10 AUTOMATIC TRANSMISSION FLUID (ATF) REPLACEMENT [SJ6A-EL].)
4. Loosen the starter installation bolts only enough that the starter is loose, but not removed. (See 01-19-1 STARTER REMOVAL/INSTALLATION [L8, LF].)
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.
7. Add ATF and, with the engine idling, inspect the ATF level and inspect for leakage. (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)
8. Inspect selector lever operation. (See 05-14-3 SELECTOR LEVER INSPECTION.)
9. Inspect for leakage of ATF from all connecting points.
10. Perform the mechanical system test. (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].)

Service item	Test item		
	Line pressure test	Stall speed test	Time lag test
Automatic transmission replacement	×		
Control valve body replacement	×	×	×
Torque converter replacement	×	×	

AUTOMATIC TRANSMISSION [SJ6A-EL]

11. Perform the road test. (See 05-13-5 ROAD TEST [SJ6A-EL].)

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1	Tunnel member component
2	Middle pipe (See 01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION [L8, LF].)

3	Manual shaft lever component (See 05-13-41 Manual Shaft Lever Component Removal Note.) (See 05-13-45 Manual Shaft Lever Component Installation Note.)
4	Transverse member

AUTOMATIC TRANSMISSION [SJ6A-EL]

5	Under cover
6	Torque converter installation nuts (See 05-13-41 Torque Converter Installation Nuts Removal Note.) (See 05-13-45 Torque Converter Installation Nuts Installation Note.)
7	Oil pipe, oil hose (See 05-13-49 OIL COOLER REMOVAL/ INSTALLATION [SJ6A-EL].)
8	Insulator
9	TR switch connector
10	Coupler component connector
11	VSS connector
12	Turbine sensor connector
13	Oil pressure switch connector (for oil filter)
14	Wiring harness
15	Power plant frame (See 05-13-42 Power Plant Frame Removal Note.) (See 05-13-44 Power Plant Frame Installation Note.)
16	Hanger bracket
17	Propeller shaft (See 05-13-42 Propeller Shaft Removal Note.) (See 03-15-2 PROPELLER SHAFT REMOVAL/ INSTALLATION.)
18	Transmission installation bolt and nut
19	Transmission (See 05-13-42 Transmission Removal Note.) (See 05-13-43 Transmission Installation Note.)
20	Stopper
21	Bolt
22	Hose clamp
23	Breather hose
24	Breather tube
25	Stiffener
26	Side cover

Manual Shaft Lever Component Removal Note

1. Mark the manual shaft lever component as shown in the figure.
2. Remove the manual shaft lever component installation nut.

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Torque Converter Installation Nuts Removal Note

1. Lock the drive plate using a flathead screwdriver as shown in the figure.
2. Remove the torque converter installation nuts using a **SST**.

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AUTOMATIC TRANSMISSION [SJ6A-EL]

Power Plant Frame Removal Note

1. Support the transmission using a transmission jack.
2. Remove the power plant frame.

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Propeller Shaft Removal Note

1. Install the **SST** to the output shaft.

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2. Insert a slab of wood behind the differential and remove the propeller shaft.

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Transmission Removal Note

Warning

- **Verify that the transmission is securely supported by the jack. If the transmission falls, serious injury or death and damage to the vehicle could result. Before removing the transmission make sure that the jack is securely supporting the transmission.**

Caution

- **To prevent the torque converter and transmission from separating, remove the transmission without tilting it toward the torque converter.**

AUTOMATIC TRANSMISSION [SJ6A-EL]

1. Support the transmission securely using a transmission jack.
2. Remove the transmission installation bolt.

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Transmission Installation Note

Warning

- **Verify that the transmission is securely supported by the jack. If the transmission falls, serious injury or death and damage to the vehicle could result. Before removing the transmission make sure that the jack is securely supporting the transmission.**

Caution

- **To prevent the torque converter and transmission from separating, remove the transmission without tilting it toward the torque converter**

1. Support the transmission securely using a transmission jack.

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2. Tighten the transmission installation bolts and nuts.

   Tightening torque
   37—52 N·m {3.8—5.3 kgf·m, 28—38 ft·lbf}

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AUTOMATIC TRANSMISSION [SJ6A-EL]

Power Plant Frame Installation Note

1. Support the transmission and differential so that they are level using a transmission jack.
2. Install the power plant frame.

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3. Temporarily tighten the nuts 1, 2, 3 in order shown in the figure.
4. Tighten nut 2 until the power plant frame is seated in the rear differential.
5. Temporarily tighten the nuts 4, 5 in order shown in the figure.
6. Install the middle pipe and tunnel member.
7. Raise the front end of the power plant frame (transmission side) or the transmission with the transmission jack, and adjust dimension A to **26.7—34.7 mm {1.06—1.36 in}** (lower surface of power plant frame-upper surface of the tunnel member) as shown in the figure.

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Note

- If there is the possibility of age-related bending/deterioration of the mount, adjust dimension A to approx. 15 mm {0.59 in}higher than the adjustment value to facilitate obtaining the specification.

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8. Tighten the power plant frame installation nuts.

   Tightening torque
   126—154 N·m {12.9—15.7 kgf·m, 93.0—113.5 ft·lbf}

9. Verify that dimension A is within the specification with the transmission jack and the adjustment bolt removed.
   - If not within the specification, adjust dimension A again.

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AUTOMATIC TRANSMISSION [SJ6A-EL]

Torque Converter Installation Nuts Installation Note

1. Align the holes by turning the torque converter.
2. Lock the drive plate using a flathead screwdriver.

Caution

- **Loosely and equally tighten the torque converter nuts, then further tighten them to the specified tightening torque.**

3. Tighten the torque converter installation nuts.

Tightening torque
34—49 N·m {3.5—4.9 kgf·m, 26—36 ft·lbf}

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Manual Shaft Lever Component Installation Note

1. Align the mark of the manual shaft lever component as shown in the figure.
2. Install the manual shaft lever component installation nut.

Tightening torque
10.8—14.7 N·m {111—149 kgf·cm, 96.4—129.3 in·lbf}

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TORQUE CONVERTER REMOVAL/INSTALLATION [SJ6A-EL]

id0513117101001

1. Remove the transmission. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)

Caution

- **The oil seal is easily damaged by the sharp edges of the torque converter splines. Do not let the splines contact the oil seal.**
- **Do not drop the torque converter.**
- **Do not pinch fingers.**

2. Remove the torque converter, and immediately turn it so that the hole faces upward. This will help to keep any remaining ATF from spilling.
3. Drain any ATF remaining in the torque converter.
4. Using a flathead screwdriver, position the drive gear on the oil pump component in the center.

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AUTOMATIC TRANSMISSION [SJ6A-EL]

5. Install the torque converter to the transmission.

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6. To ensure that the torque converter is installed accurately, measure distance A between the end of the torque converter and the end of the converter housing.

   Distance A between end of torque converter and face of converter housing
   26.2 mm {1.03 in}

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7. Install the automatic transmission. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/ INSTALLATION [SJ6A-EL].)
8. Perform the mechanical system test. (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].)

DRIVE PLATE REMOVAL/INSTALLATION [SJ6A-EL]

id051311250200

1. Remove the transmission. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

1	Bolt
2	Backing plate
3	Drive plate (See 05-13-47 Drive Plate Removal Note.) (See 05-13-47 Drive Plate Installation Note.)

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AUTOMATIC TRANSMISSION [SJ6A-EL]

Drive Plate Removal Note

1. Set the **SST** or equivalent against the drive plate.
2. Remove the bolts and the drive plate.

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Drive Plate Installation Note

1. Remove the sealant from the bolt holes in the crankshaft.
2. Install the drive plate.
3. Install the backing plate.
4. Set the **SST** or equivalent against the drive plate.
5. Tighten the drive plate mounting bolts in two or three steps in the order as shown in the figure.

   Tightening torque
   108—116 N·m
   {11.0—11.8 kgf·m, 79.7—85.5 ft·lbf}

6. Install the transmission. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)

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OIL SEAL (OIL PUMP) REPLACEMENT [SJ6A-EL]

id0513117105001

1. Remove the automatic transmission. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)

   Caution
   - **The oil seal is easily damaged by the sharp edges of the torque converter splines. Do not let the splines contact the oil seal.**
   - **Do not drop the torque converter.**
   - **Do not pinch fingers.**

2. Remove the torque converter. (See 05-13-45 TORQUE CONVERTER REMOVAL/INSTALLATION [SJ6A-EL].)

   Caution
   - **Do not to damage the bushing on the oil pump body.**

3. Remove the oil seal from the oil pump body using the SST.

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AUTOMATIC TRANSMISSION [SJ6A-EL]

4. Using the **SST** and a hammer, install the new oil seal to the oil pump body.
5. Coat the lip of the oil seal with grease.
6. Install the torque converter. (See 05-13-45 TORQUE CONVERTER REMOVAL/ INSTALLATION [SJ6A-EL].)
7. Install the automatic transmission. (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/ INSTALLATION [SJ6A-EL].)
8. Perform the mechanical system test. (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].)

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OIL SEAL (EXTENSION HOUSING) REPLACEMENT [SJ6A-EL]

id051311710000

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Clean the transmission exterior thoroughly using a steam cleaner or cleaning solvent.
4. Drain the ATF. (See 05-13-10 AUTOMATIC TRANSMISSION FLUID (ATF) REPLACEMENT [SJ6A-EL].)
5. Remove the following parts.
   (1) Tunnel member component
   (2) Middle pipe (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
   (3) Power plant frame (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)
   (4) Propeller shaft (See 03-15-2 PROPELLER SHAFT REMOVAL/INSTALLATION.)

Caution
- **Do not to damage the extension dust deflector.**
- **Do not to damage the extension housing.**

6. Using a plastic hammer and slab of wood, tap the extension dust deflector to remove it.

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7. Using a tape-wrapped flathead screwdriver, remove the extension housing shroud.

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AUTOMATIC TRANSMISSION [SJ6A-EL]

8. Using a tape-wrapped flathead screwdriver, remove the oil seal.

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9. Using the **SST** and a hammer, install the new oil seal to the extension housing.
10. Coat the oil seal lip with grease.

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11. Using the **SST** and a hammer, install the new extension housing shroud to the extension housing.
12. Using a hammer and slab of wood, install the extension dust deflector to the extension housing.
13. Install the following parts.
    (1) Propeller shaft (See 03-15-2 PROPELLER SHAFT REMOVAL/INSTALLATION.)
    (2) Power plant frame (See 05-13-39 AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL].)
    (3) Middle pipe (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
    (4) Tunnel member component

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14. Add ATF and, with the engine idling, inspect the ATF level and for leakage. (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)
15. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
16. Install the battery cover.

OIL COOLER REMOVAL/INSTALLATION [SJ6A-EL]

id0513112487000

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Drain the ATF. (See 05-13-10 AUTOMATIC TRANSMISSION FLUID (ATF) REPLACEMENT [SJ6A-EL].)
4. Drain the engine coolant. (See 01-12-4 ENGINE COOLANT REPLACEMENT [L8, LF].)
5. Remove the following parts.
    (1) Splash shield
    (2) Under cover
    (3) Mudguard
    (4) Battery, battery tray, battery duct (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
    (5) Air cleaner (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
    (6) PCM and air cleaner insulator (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
    (7) Coolant reserve tank (See 01-12-6 COOLANT RESERVE TANK REMOVAL/INSTALLATION [L8, LF].)
    (8) Tunnel member component
    (9) Transverse member
    (10) Exhaust manifold bracket
    (11) Middle pipe (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
6. Remove in the order indicated in the table.
7. Install in the reverse order of removal.

AUTOMATIC TRANSMISSION [SJ6A-EL]

8. Add the engine coolant. (See 01-12-4 ENGINE COOLANT REPLACEMENT [L8, LF].)
9. Add ATF to the specified level. (See 05-13-10 AUTOMATIC TRANSMISSION FLUID (ATF) REPLACEMENT [SJ6A-EL].)
10. Inspect for oil leakage from the oil pipes and oil hoses.
11. Inspect for coolant from the hoses.
12. Inspect for engine coolant leakage.(See 01-12-5 ENGINE COOLANT LEAKAGE INSPECTION [L8, LF].)
13. Inspect the ATF level and condition. (See 05-13-9 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION [SJ6A-EL].)

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1	Oil hose (See 05-13-51 Oil Pipe, Hose clamp, Oil hose Installation Note.)
2	Hose clamp (See 05-13-51 Oil Pipe, Hose clamp, Oil hose Installation Note.)
3	Engine mount (RH) (See 05-13-51 Engine Mount Removal Note.)

4	Oil pipe, oil hose (See 05-13-51 Oil Pipe, Hose clamp, Oil hose Installation Note.)
5	Radiator (in tank oil cooler) (See 01-12-7 RADIATOR REMOVAL/ INSTALLATION [L8, LF].) (See 05-13-51 Radiator (In Tank Oil Cooler) Installation Note.)
6	Oil pipe (See 05-13-51 Oil Pipe, Hose clamp, Oil hose Installation Note.)

AUTOMATIC TRANSMISSION [SJ6A-EL]

Engine Mount Removal Note

1. Support the engine using the SST.
2. Remove the engine mount.

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Radiator (In Tank Oil Cooler) Installation Note

1. The automatic transmission oil cooler flushing must be performed whenever a transmission is removed for service because the existing fluid may be contaminated, and to prevent contamination of new fluid.

   Note
   - Flushing must be performed after installation of the overhauled or replaced transmission.

2. Follow the instructions in the manufacturer's publication for flushing operation.

Oil Pipe, Hose clamp, Oil hose Installation Note

1. Apply compressed air to cooler-side opening, and blow any remaining grime and foreign material from the cooler pipes. Compressed air should be applied for **more than 1 min**.

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2. Be sure to install the oil hose between the power steering pipe and the radiator cowl as shown in the figure.

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AUTOMATIC TRANSMISSION [SJ6A-EL]

3. Align the marks, and slide the oil hose onto the oil pipe until it is fully seated as shown.
4. Install the hose clamp onto the hose.

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Note

- If reusing the hose, install the new hose clamp exactly on the mark left by the previous hose clamp. Then apply force to the hose clamp in the direction of the arrow in order to fit the clamp in place.

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5. Verify that the hose clamp does not interfere with any other components.

AUTOMATIC TRANSMISSION [SJ6A-EL]

OIL COOLER FLUSHING [SJ6A-EL]

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Note
- The contaminated cooler line (oil pipes and hoses) and auxiliary cooler must be flushed completely when AT is overhauled or replaced.

1. Remove the two oil cooler line hoses and apply air pressure of **196 kPa {2.0 kgf/cm^2, 28 psi}** from the return hose (pipe) side.

Caution
- **Power flushing should be performed very carefully when removing the accumulated debris from the fluid baffle, otherwise the debris cannot be removed or the problem becomes even worse.**

Note
- Performing back and reverse power flushing two times each does not work because debris or particles flow out from the feed pipe side of AT.

2. If there is no air blown out the feed side, flush the oil cooler lines using the power-flushing tool. (See 05-13-53 Power Flushing.)

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Recommended power-flushing manufacturer

Manufacturer	Part number	Description
Kent Moore	J35944-AMAZ	Flushing kit or equivalent
OTC	60081	Portable torque converter, oil cooler cleaner or equivalent

Power Flushing
Repair procedure
1. Before power flushing, inspect the hoses/lines and clamps. Power flushing must begin with back flushing followed by forward flushing to quickly dislodge the restriction. If back flushing is not performed before forward flushing, the restriction could further reduce the ATF flow through the internal mesh type baffle of the cooler and flushing will not be effective or possible.

Inspecting oil lines and clamps
1. Be sure to inspect the lines (hoses/pipes) for cuts, crimps (pinched), cracks or any other damage before reusing them.
   - If there is any malfunction, replace lines and clamps.

Caution
- **Always use new clamps when replacing hoses.**

AUTOMATIC TRANSMISSION [SJ6A-EL]

Back flushing

1. Following the power flushing equipment manufacturer"s instructions, connect equipment so the flushing fluid flows in the opposite direction of normal fluid flow.
2. Flush oil cooler/lines until discharge fluid is clean.

Caution

- **If the cooler can not be properly flushed using recommended equipment, send the radiator out for sublet cleaning or replace.**

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Forward flushing

1. Connect power flushing equipment so the flushing fluid flows in the direction of normal fluid flow.
2. Flush oil cooler/lines until discharged fluid is clean.

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AUTOMATIC TRANSMISSION [SJ6A-EL]

OIL COOLER DISASSEMBLY/ASSEMBLY [SJ6A-EL]

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1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

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1	Radiator outer tank (in-tank oil cooler) (See 05-13-55 Radiator Outer Tank (In-Tank Oil Cooler) Disassembly Note.) (See 05-13-56 Radiator Outer Tank (In Tank Oil Cooler) Assembly Note.)

2	O-ring
3	ATF cooler
4	Radiator

Radiator Outer Tank (In-Tank Oil Cooler) Disassembly Note

1. Inspect the height of the header tabs.
2. Insert the end of a medium tip screwdriver between the end of the header tab and the outer tank.

Note

- Do not open more tabs than necessary for tank removal.

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AUTOMATIC TRANSMISSION [SJ6A-EL]

3. Pivot the screwdriver to pry the tab away from the tank and repeat the procedure for each tab.

   Note
   - If any header tabs are missing from the core, replace the radiator.

4. Remove the radiator outer tank and O-ring (gasket) from the core header when all of the tabs are opened.
5. Inspect the gasket surface of the radiator core header to ensure it is clean and free of foreign material or damage.
6. Inspect the radiator outer tank for warping. If it is warped, replace the radiator tank.

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Radiator Outer Tank (In Tank Oil Cooler) Assembly Note

1. Install a new O-ring and ensure it is not twisted.

   Note
   - The old O-ring must be replaced.

2. Position the radiator tank in the original direction to the core using care not to scratch the tank sealing surface with the header tabs.

   Note
   - Step 3 will set jaw opening to the correct specification.

3. With the jaws of locking-type pliers (vise grips) closed and locked, turn the adjusting screw to position the jaws against the drill bit with the diameter measured (height) in removal procedure 1. Tighten the lock nut on the adjusting screw against the handle to lock the adjustment in place.

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aea5714w082

AUTOMATIC TRANSMISSION [SJ6A-EL]

4. Squeeze the header tabs down in the order as shown in the figure against the lip of the radiator outer tank base with the locking-type pliers while rotating the pliers toward the tank.

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5. Verify that the height of the header tabs is same as the height before removal.
6. Inspect for leakage from radiator. (See 01-12-5 ENGINE COOLANT LEAKAGE INSPECTION [L8, LF].)

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CONTROL VALVE BODY REMOVAL [SJ6A-EL]

id051311710600

On-Vehicle Removal

Warning
- **A hot transmission and ATF can cause severe burns. Turn off the engine and wait until they are cool before replacing ATF.**
- **Using compressed air can cause dirt and other particles to fly out, causing injury to the eyes. Wear protective eye wear whenever using compressed air.**

Caution
- **Clean the transmission exterior thoroughly with a stream cleaner or cleaning solvents before removal.**
- **If any old sealant gets into the transmission during installation of the oil pan, trouble may occur in the transmission case and oil pan. Clean with cleaning fluids.**

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Drain the ATF. (See 05-13-10 AUTOMATIC TRANSMISSION FLUID (ATF) REPLACEMENT [SJ6A-EL].)

Caution
- **Do not damage the fitting surface of the transmission case and the oil pan.**
- **Do not to deform the oil pan.**

4. Remove the oil pan and the oil pan gasket.

AUTOMATIC TRANSMISSION [SJ6A-EL]

5. Remove the magnets from the oil pan.

Note
- Examine the chips and particles in the oil pan to determine what type of wear has occurred in the transmission. Steel (magnetic)= bearing, gear and plate wear. Brass (non-magnetic)= busing wear.

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6. Remove the oil strainer from the control valve body component.
7. Remove the O-ring from the oil strainer.

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8. Disconnect the connectors from the solenoids.
9. Disconnect the coupler component from the clamps.

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10. Remove the lock plate from the control valve body component.
11. Pull the TFT sensor from the control valve body component.

Note
- Be sure that the coupler component does not interface with the control valve body component when installing.

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12. Fix the coupler component with tape to the transmission case as shown in the figure.

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AUTOMATIC TRANSMISSION [SJ6A-EL]

13. Remove the detent spring cover and detent spring from the control valve body component.

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14. Remove the bolts from the transmission case as shown in the figure.

Caution
- **Do not to drop the control valve body component.**

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15. Disconnect the manual valve link and remove the control valve body component.

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16. Remove the check valve sub-component and the compression spring from the transmission case.

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AUTOMATIC TRANSMISSION [SJ6A-EL]

17. Remove the transmission case gaskets and the brake drum gaskets from the transmission case.

    Caution
    - **Take care as the C-2 and B-3 accumulator piston may eject.**

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18. Apply compressed air into the oil passage as shown in the figure and remove the accumulator pistons (C-2, B-3) and the compression springs from the transmission case.

    Caution
    - **Do not to damage the accumulator pistons.**

19. Remove the snap rings from the accumulator pistons (C-2, B-3) using a flathead screwdriver.
20. Remove the compression springs from the accumulator pistons (C-2, B-3).
21. Remove the O-rings from the accumulator pistons (C-2, B-3) using a flathead screwdriver.

    Caution
    - **Take care as the C-3 accumulator piston may eject.**

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AUTOMATIC TRANSMISSION [SJ6A-EL]

22. Apply compressed air into the oil passage as shown in the figure and remove the accumulator piston (C-3) and compression springs from the transmission case.
23. Remove the O-rings from the accumulator piston (C-3) using a flathead screwdriver.

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24. Remove the accumulator valve and compression springs from the transmission case.

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CONTROL VALVE BODY INSTALLATION [SJ6A-EL]

id051311710700

On-Vehicle Installation

Caution

- **When installing the control valve body component, do not put the coupler component in the open space of the separate plate in the control valve body component.**
- **Do not pinch the coupler component between the separate plate and the control valve body component.**

AUTOMATIC TRANSMISSION [SJ6A-EL]

1. Install the accumulator valve and compression springs to the transmission case.

   Caution
   - **Do not to damage the O-ring and accumulator piston.**

2. Coat the new O-rings with ATF, and install it to the accumulator piston (C-3).

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3. Install the accumulator piston (C-3) and the compression spring to the transmission case.
4. Coat the new O-rings with ATF, and install it to the accumulator pistons (C-2, B-3).
5. Install the compression springs and the snap rings to the accumulator pistons (C-2, B-3) using a flathead screwdriver.

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6. Install the accumulator pistons (C-2, B-3) and the compression springs to the transmission case.

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AUTOMATIC TRANSMISSION [SJ6A-EL]

7. Coat the new transmission gaskets and the new brake drum gaskets with ATF, and install it to the transmission case.

   Caution
   - **Do not to damage the gasket.**

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8. Install the check valve sub-component and the compression spring to the transmission case.

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9. Connect the manual valve link and install the control valve body component.

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   Caution
   - **When installing, be sure to put the wiring harness in the concave portion of the separator plate in the control valve body component as shown in the figure.**

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AUTOMATIC TRANSMISSION [SJ6A-EL]

10. Temporarily install the control valve body component with the bolts.

    Bolt length (measured from below the head)
    A: 25 mm {0.984 in}
    B: 36mm {1.42 in}
    C: 45mm {1.77 in}
    D: 50mm {1.97 in}

    Note
    - Aligning the bolt holes, temporarily tighten the bolts by hand.
    - Tighten the bolts starting from the inner ones and moving in a criss-cross pattern.

amxzzw0000016

11. Tighten the bolts.

    Tightening torque
    10.0—12.0 N·m {102—122 kgf·cm, 89—105 in·lbf}

12. Install the detent spring cover and detent spring with the bolt to the control valve body component.

    Tightening torque
    8.0—12.0 N·m {82—122 kgf·cm, 72—105 in·lbf}

13. Install the TFT sensor and the lock plate with the bolt to the control valve body component.

    Tightening torque
    8.0—12.0 N·m {82—122 kgf·cm, 72—105 in·lbf}

14. Connect the coupler component to the clamps.
15. Connect the connectors to the solenoids.
16. Coat a new O-ring with ATF and install it to the oil strainer.

amxzzw0000077

17. Install the oil strainer with the bolts to the control valve body component.

    Tightening torque
    8.0—12.0 N·m {82—122 kgf·cm, 72—105 in·lbf}

    Caution
    - **Pay attention to the fabric so that foreign materials from it cannot comes out in the transmission.**

e5u513zw5048

18. Clean the contact surface of oil pan and transmission case.

    Note
    - Clean the oil cleaner magnets before install it.

AUTOMATIC TRANSMISSION [SJ6A-EL]

19. Install the magnets to the oil pan.

    Caution
    - **Do not to damage the contact surface of the transmission case and the oil pan.**
    - **Do not to deform the oil pan.**

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20. Install a new oil pan gasket and the oil pan to the transmission case.

    Caution
    - **Be careful that bolts might be damaged if tightened too much since the gasket is cork-made.**

21. Install the bolts to the transmission case.

    Tightening torque
    6.0—7.9 N·m {62—80 kgf·cm, 54—69 in·lbf}

22. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
23. Install the battery cover.
24. Add ATF and, with the engine idling, inspect the ATF level and for leakage. (See 05-13-11 AUTOMATIC TRANSMISSION FLUID (ATF) LEVEL ADJUSTMENT [SJ6A-EL].)
25. Perform the mechanical system test. (See 05-13-3 MECHANICAL SYSTEM TEST [SJ6A-EL].)
26. Perform the road test. (See 05-13-5 ROAD TEST [SJ6A-EL].)

05-14 AUTOMATIC TRANSMISSION SHIFT MECHANISM

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AUTOMATIC TRANSMISSION SHIFT MECHANISM

AUTOMATIC TRANSMISSION SHIFT MECHANISM LOCATION INDEX

id051400254000

L.H.D.

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AUTOMATIC TRANSMISSION SHIFT MECHANISM

R.H.D.

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1	Shift lock (See 05-14-4 SHIFT LOCK INSPECTION.)
2	Key interlock (See 05-14-4 KEY INTERLOCK INSPECTION.)
3	Interlock cable (See 05-14-4 INTERLOCK CABLE INSPECTION.) (See 05-14-5 INTERLOCK CABLE ADJUSTMENT.)
4	Selector lever (See 05-14-3 SELECTOR LEVER INSPECTION.) (See 05-14-3 SELECTOR LEVER COMPONENT INSPECTION.) (See 05-14-9 SELECTOR LEVER REMOVAL/INSTALLATION.)

5	Steering shift switch (up switch) (See 05-14-15 STEERING SHIFT SWITCH REMOVAL/INSTALLATION.) (See 05-14-15 STEERING SHIFT SWITCH INSPECTION.)
6	Steering shift switch (down switch) (See 05-14-15 STEERING SHIFT SWITCH REMOVAL/INSTALLATION.) (See 05-14-15 STEERING SHIFT SWITCH INSPECTION.)

AUTOMATIC TRANSMISSION SHIFT MECHANISM

SELECTOR LEVER INSPECTION

id051400255500

1. Turn the ignition switch to the ON position (engine off).
2. With the brake pedal depressed, verify that there is a “click” at each range when shifted.

L.H.D.

amxzzw0000021

R.H.D.

3. Verify that the selector lever can be shifted.
4. Verify that there is a “click” at each position when shifted from the P position to the M range.

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5. Verify that the positions of the selector lever and the indicator are aligned.
   - If there is any malfunction, adjust the TR switch. (See 05-13-16 TRANSMISSION RANGE (TR) SWITCH ADJUSTMENT [SJ6A-EL].)
6. Verify that the vehicle operates in each selected range.

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SELECTOR LEVER COMPONENT INSPECTION

id051400255600

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the shift knob. (See 05-14-9 SELECTOR LEVER REMOVAL/INSTALLATION.)
4. Remove the console panel and indicator assembly. (See 05-14-9 SELECTOR LEVER REMOVAL/INSTALLATION.)
5. Disconnect the selector lever component connector.
6. Verify continuity as indicated in the table.
   - If there is any malfunction, replace the selector lever. (See 05-14-9 SELECTOR LEVER REMOVAL/INSTALLATION.)

○——○ : Continuity

Selector lever position/range		Connector terminal					
		A	B	C	D	E	F
M range	Up switch	○	○		○		
	Down switch	○	○				○
	Other	○	○				
Other							

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amxzzw0000021

AUTOMATIC TRANSMISSION SHIFT MECHANISM

SHIFT LOCK INSPECTION

id051400254700

1. Turn the ignition switch to the ON position (engine off).
2. Verify that the selector lever is in the P position.
3. Without the brake pedal depressed, verify that the selector lever cannot be shifted the P position.
4. Depress the brake pedal and verify that the selector lever can be shifted from the P position.
   - If there is any malfunction, adjust the interlock cable. (See 05-14-5 INTERLOCK CABLE ADJUSTMENT.)

KEY INTERLOCK INSPECTION

id051400254200

1. Verify that the key cannot be pulled out except in the P position.
   - If there is any malfunction, inspect the interlock cable. (See 05-14-4 INTERLOCK CABLE INSPECTION.)

INTERLOCK CABLE INSPECTION

id051400254300

1. Turn the ignition switch to the ON position. (engine off)
2. Remove the clip of the selector lever base plate, then remove the interlock cable from the U-groove.

L.H.D.

amxzzw0000023

R.H.D.

amxzzw0000023

3. Remove the interlock cable from the selector lever.

L.H.D.

amxzzw0000023

AUTOMATIC TRANSMISSION SHIFT MECHANISM

R.H.D.

amxzzw0000023

4. Verify that the interlock cable moves freely with the brake pedal depressed.
   - If there is any malfunction, replace the interlock cable.

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INTERLOCK CABLE ADJUSTMENT

id051400254400

1. Turn the ignition switch to the ON position. (engine off)
2. Pull up the lock piece of the interlock cable to release the lock.

L.H.D.

amxzzw0000023

R.H.D.

amxzzw0000023

AUTOMATIC TRANSMISSION SHIFT MECHANISM

3. Remove the clip of the selector lever base plate, then remove the interlock cable from the U-groove.

L.H.D.

amxzzw0000023

R.H.D.

4. Remove the interlock cable from the selector lever.

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5. Fully pull the end of the interlock cable to the selector lever.
6. Remove the lock unit from the bracket.

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7. Verify that the markings on the slider pin and the lock unit are aligned.

L.H.D.

amxzzw0000103

AUTOMATIC TRANSMISSION SHIFT MECHANISM

R.H.D.

amxzzw0000059

8. Push a **1.5 mm {0.06 in}** round bar or similar into hole A by fully pushing the slider pin in.
9. Push a **1.5 mm {0.06 in}** round bar or similar into hole B and hole C of the lock unit until it passes through.
10. Disconnect the brake switch connector.
11. Remove the brake switch. (See 04-11-5 BRAKE PEDAL REMOVAL/INSTALLATION.)
12. Install the new brake switch. (See 04-11-5 BRAKE PEDAL REMOVAL/INSTALLATION.)

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Caution
- **Do not connect the brake switch connector until the interlock cable adjustment is completed.**

13. Install the lock unit to the bracket. (See 05-14-9 SELECTOR LEVER REMOVAL/INSTALLATION.)
14. Rotate the slider pin to release the lock, and verify that it slides freely.
15. Verify that the slider pin contacts the brake pedal stopper rubber and rotate the slider pin to lock.

L.H.D.

amxzzw0000103

R.H.D.

amxzzw0000059

AUTOMATIC TRANSMISSION SHIFT MECHANISM

16. Install the interlock cable end to the interlock link on the selector lever.
L.H.D.

amxzzw0000023

R.H.D.

amxzzw0000023

17. Fit the interlock cable in the U-groove in the selector lever base plate and install the clip.
L.H.D.

amxzzw0000023

R.H.D.

amxzzw0000023

AUTOMATIC TRANSMISSION SHIFT MECHANISM

18. Press the interlock cable lock piece in until it is locked.

    Caution
    - **Applying a load to the interlock cable while pressing the lock piece in can affect the lock unit operation.**

19. Remove a **1.5 mm {0.06 in} round bar or similar** from the lock unit hole A, B and C.

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20. Connect the brake switch connector with the brake pedal released.

    Caution
    - **The clearance between the brake switch and the brake pedal is automatically adjusted to the correct amount when the brake switch connector is connected after the brake switch has been properly installed. If the brake switch is not properly installed or the connector is connected before installation, the clearance may be incorrect, causing a brake light malfunction. Therefore, always verify that the brake switch is properly installed before connecting the connector.**
    - **Once the brake switch clearance has automatically been adjusted, it cannot be adjusted again. Therefore, replace the switch with a new one when replacing the power brake unit or the pedal, or performing any procedure that changes the pedal stroke.**

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21. Inspect shift lock operation. (See 05-14-4 SHIFT LOCK INSPECTION.)

SELECTOR LEVER REMOVAL/INSTALLATION

id051400255700

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the following parts.
   (1) Side wall (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
   (2) Column cover (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.)
   (3) Driver-side air bag module (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
   (4) Steering shaft (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (5) Audio unit (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.)
   (6) SAS control module (See 08-10-9 SAS CONTROL MODULE REMOVAL/INSTALLATION.)
   (7) Tunnel member component
   (8) Middle pipe (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [L8, LF].)
   (9) Insulator (See 05-13-19 TRANSMISSION RANGE (TR) SWITCH REMOVAL/INSTALLATION [SJ6A-EL].)
4. Shift the selector lever to the P position.
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.
7. After installation, perform the shift lock inspection and key interlock inspection. (See 05-14-4 SHIFT LOCK INSPECTION.) (See 05-14-4 KEY INTERLOCK INSPECTION.)

AUTOMATIC TRANSMISSION SHIFT MECHANISM

L.H.D.

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AUTOMATIC TRANSMISSION SHIFT MECHANISM

R.H.D.

amxzzw0000028

1	Manual shaft lever component (See 05-14-12 Manual Shaft Lever Component Removal Note.) (See 05-14-14 Manual Shaft Lever Component Installation Note.)
2	Clip
3	Boot panel (See 09-17-12 CONSOLE REMOVAL/ INSTALLATION.)
4	Shift knob

5	Console panel (See 09-17-12 CONSOLE REMOVAL/ INSTALLATION.)
6	Indicator component
7	Clip
8	Brake switch (See 04-11-5 BRAKE PEDAL REMOVAL/ INSTALLATION.)
9	Interlock cable (See 05-14-12 Interlock Cable Installation Note.)
10	Selector lever component

AUTOMATIC TRANSMISSION SHIFT MECHANISM

Manual Shaft Lever Component Removal Note

1. Mark the manual shaft lever component as shown in the figure.
2. Remove the manual shaft lever component installation nut.

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Interlock Cable Installation Note

1. Push a **1.5 mm {0.06 in}** round bar or similar into hole A by fully pushing the slider pin in.
2. Push a **1.5 mm {0.06 in} round bar or similar** into hole B and hole C of the lock unit until it passes through.
3. Install the new brake switch. (See 04-11-5 BRAKE PEDAL REMOVAL/INSTALLATION.)

   Caution
   - **Do not connect the brake switch connector until the interlock cable is installed.**

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4. With the slider pin pressed, slide the lock unit to fix the lock unit hook into the bracket hole securely as shown in the figure.

   Caution
   - **Allowing the interlock cable to be bent or twisted during installation can affect the lock unit operation.**

5. Rotate the slider pin to release the lock, and verify that it slides freely.

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6. Pull the slider pin outward until it contacts the brake pedal stopper rubber and rotate the slider pin to lock.

L.H.D.

amxzzw0000103

R.H.D.

amxzzw0000059

AUTOMATIC TRANSMISSION SHIFT MECHANISM

7. Verify that the shift the selector lever in P position.
8. Install the interlock cable end to the cam pin on the selector lever.

L.H.D.

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R.H.D.

amxzzw0000023

9. Fit the interlock cable in the U–groove in the selector lever base plate, and install the clip.

L.H.D.

amxzzw0000023

R.H.D.

amxzzw0000023

AUTOMATIC TRANSMISSION SHIFT MECHANISM

10. Press the interlock cable lock piece in until it is locked.

Caution
- **Applying a load to the interlock cable while pressing the lock piece in can affect the lock unit operation.**

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11. Remove a **1.5 mm {0.06 in} round bar or similar** from the lock unit hole A, B and C.
12. Connect the brake switch connector with the brake pedal released.

Caution
- **The clearance between the brake switch and the brake pedal is automatically adjusted to the correct amount when the brake switch connector is connected after the brake switch has been properly installed. If the brake switch is not properly installed or the connector is connected before installation, the clearance may be incorrect, causing a brake light malfunction. Therefore, always verify that the brake switch is properly installed before connecting the connector.**
- **Once the brake switch clearance has automatically been adjusted, it cannot be adjusted again. Therefore, replace the switch with a new one when replacing the power brake unit or the pedal, or performing any procedure that changes the pedal stroke.**

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13. Turn the ignition switch to ON position.
14. Install the interlock cable to the key cylinder.
15. Slide the outer casing to the key cylinder, and insert the clip over the convex part of the outer casing.

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Manual Shaft Lever Component Installation Note
1. Align the mark of the manual shaft lever component as shown in the figure.
2. Install the manual shaft lever component installation nut.

Tightening torque
10.8—14.7 N·m {111—149 kgf·cm, 96.4—129.3 in·lbf}

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AUTOMATIC TRANSMISSION SHIFT MECHANISM

STEERING SHIFT SWITCH INSPECTION

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1. Remove the driver-side air bag module. (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
2. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the audio control switch connector. (See 09-20-21 AUDIO CONTROL SWITCH REMOVAL/INSTALLATION.)
4. Measure resistance between the terminals F and C.

amxzzw0000044

Test condition	Resistance (ohm)	Action
Steering shift switch off	1,764—1,836	• Replace the audio control switch. (See 09-20-21 AUDIO CONTROL SWITCH INSPECTION.)
LH up-switch on	352.8—367.2	• If not within the specification, replace the audio control switch. (See 09-20-21 AUDIO CONTROL SWITCH INSPECTION.) • If there is no continuity, replace the up switch. (See 09-20-21 AUDIO CONTROL SWITCH INSPECTION.)
RH up-switch on	352.8—367.2	
LH down-switch on	607.6—632.4	• Replace the audio control switch. (See 09-20-21 AUDIO CONTROL SWITCH INSPECTION.)
RH down-switch on	607.6—632.4	

STEERING SHIFT SWITCH REMOVAL/INSTALLATION

id051400255800

Note
- The down switch is built into the audio control switch.

1. Remove the steering shift switch. (See 09-20-21 AUDIO CONTROL SWITCH REMOVAL/INSTALLATION.)
2. Install in the reverse order of removal.

05-50 TECHNICAL DATA

TRANSMISSION/TRANSAXLE
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Manual Transmission [M15M-D] **05-50–1**
Manual Transmission [P66M-D] **05-50–1**
Automatic Transmission [SJ6A-EL] **05-50–1**

TECHNICAL DATA

TRANSMISSION/TRANSAXLE TECHNICAL DATA

id055000800100

Clutch

Item	Specification
Clutch fluid	SAE J1703, FMVSS 116 DOT-3 or DOT-4
Clutch pedal stroke	130 mm {5.12 in}
Clutch pedal play	5—15 mm {0.20—0.59 in}
Clutch pedal push rod play	At push rod setting line: 0.1—0.5 mm {0.004—0.020 in} (Reference value) At pedal pad: 0.5—2.7 mm {0.020—0.106 in}
Clutch disengagement stroke (Reference value)	A: 80—110 mm {3.15—4.33 in}
Clutch disc maximum depth	0.6 mm {0.024 in}
Clutch cover maximum clearance	0.5 mm {0.020 in}
Clutch cover maximum height difference	1.0 mm {0.039 in}
Clutch disc minimum depth	0.3 mm {0.012 in}
Clutch disc maximum runout	0.7 mm {0.028 in}
Flywheel maximum runout	0.1 mm {0.004 in}

Manual Transmission [M15M-D]

Item	Specification
Specified oil grade	API Service GL-4 or GL-5
Specified oil viscosity	All season: SAE 75W-90 Above 10°C {50°F}: SAE 80W-90
Capacity (approx. quantity)	2.0 L {2.1 US qt, 1.8 Imp qt}
Shift control case specified oil grade	API Service GL-4 or GL-5
Shift control case specified oil viscosity	SAE 75W-90
Shift control case capacity (approx. quantity)	290—330 ml {290—330 cc, 17.69—20.13 cu in}

Manual Transmission [P66M-D]

Item	Specification
Transmission case specified oil grade	API Service GL-4
Transmission case specified oil viscosity	SAE 75W-90
Transmission case capacity (approx. quantity)	2.1 L {2.2 US qt, 1.8 Imp qt}
Shift control case specified oil grade	API Service GL-4
Shift control case specified oil viscosity	SAE 75W-90
Shift control case capacity (approx. quantity)	80—230 ml {80—230 cc, 4.88—14.03 cu in}

Automatic Transmission [SJ6A-EL]

Item	Specification
Time lag	N position → D range: 0.7 s or less N position → R position: 1.2 s or less
ATF	Type: JWS3309 Capacity (approx. quantity): 7.4 L {7.8 US qt, 6.5 Imp qt}
Turbine sensor resistance	560—680 ohm
VSS resistance	560—680 ohm
Distance A between end of torque converter and face of converter housing	26.2 mm {1.03 in}

TECHNICAL DATA

Line pressure

Position/Range		Specification (kPa {kgf/cm^2, psi})
D, M	Idle	355—425 {3.7—4.3, 52—61}
	Stall	863—959 {8.8—9.7, 126—139}
R	Idle	804—942 {8.2—9.6, 117—136}
	Stall	1,424—1,608 {14.6—16.3, 207—233}

Engine stall speed

Position/Range	Specification (rpm)
D, R, M	2,307—2,607

Transmission fluid temperature (TFT) sensor

ATF temperature (°C {°F})	Resistance (kilohm)
10 {50}	6.445
25 {77}	3.5
110 {230}	0.247

Solenoid valve resistance (ATF temperature: 20 °C {68 °F})

Terminals	Solenoid valve	Resistance (ohm)
O—GND	Shift solenoid A	5.0—5.6
N—GND	Shift solenoid B	5.0—5.6
M—GND	Shift solenoid C	5.0—5.6
L—GND	Shift solenoid D	5.0—5.6
K—GND	Shift solenoid E	5.0—5.6
E—F	Shift solenoid F	5.0—5.6
C—D	Shift solenoid G	5.0—5.6
I—J	Line pressure control solenoid	5.0—5.6
G—H	TCC control solenoid	5.0—5.6

05-60 SERVICE TOOLS

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Manual Transmission [P66M-D] **05-60–1**
Automatic Transmission [SJ6A-EL] **05-60–1**

SERVICE TOOLS

TRANSMISSION/TRANSAXLE SST

id056000804200

1: Mazda SST number
2: Global SST number

Example

1:49 UN30 3009 2:303-009 Crankshaft damper remover	

Clutch

1:49 E011 1A0 2: – Ring gear brake set	1:49 SE01 310A 2: – Clutch disc centering tool	1:49 1285 071 2: – Bearing puller

Manual Transmission [M15M-D]

1:49 0259 440 2: – Mainshaft holder	1:49 B025 0A0 2: – Dust seal installer set	–

Manual Transmission [P66M-D]

1:49 S120 440 2: – Mainshaft holder	1:49 B025 004 2: – Installer, dust seal	1:49 G030 797 2: – Handle

Automatic Transmission [SJ6A-EL]

1:49 0378 400C 2: – Oil pressure gauge set	1:49 B019 901B 2: – Oil pressure gauge	1:49 HD64 406A 2: – Adapter
49 D019 907 Oil pressure gauge (Part of 49 D019 9A2)	49 D019 908 Oil pressure gauge (Part of 49 D019 9A2)	49 D019 909 Hose (Part of 49 D019 9A2)

SERVICE TOOLS

49 D019 910 Adapter (Part of 49 D019 9A2)	49 D019 911 Adapter (Part of 49 D019 9A2)	49 D019 912 Adapter (Part of 49 D019 9A2)
1:49 0877 435 2: – Wrench	1:49 S120 440 2: – Mainshaft holder	1:49 0813 215A 2: – Dowel puller and oil pump puller
1:49 S019 005 2: – Oil seal puller	1:49 W027 003 2: – Bearing installer	1:49 S019 006 2: – Oil seal installer
1:49 G030 797 2: – Handle	1:49 E017 5A0 2: – Engine support	1:49 E011 1A0 2: – Ring gear brake set

STEERING

06
SECTION

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Power Steering Components Removal/Installation **06-10–1**

GENERAL PROCEDURES

GENERAL PRECAUTION (STEERING)

id061000800300

Wheels and Tire Installation

1. When installing the wheels and tires, tighten the wheel nuts in a criss-cross pattern to the following tightening torque.

   Tightening torque
   88—118 N·m {9.00—12.0 kgf·m, 65.0—87.0 ft·lbf}

Connector Disconnection

1. Disconnect the negative battery cable before performing any work that requires handling of connectors. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)

Power Steering Components Removal/Installation

1. If any power steering fluid line has been disconnected anytime during the procedure, add ATF M-III or equivalent (e.g. Dexron®II), bleed the fluid lines, and inspect for leakage after the procedure has been completed.

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POWER STEERING

STEERING LOCATION INDEX

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2	Steering wheel and column (See 06-14-5 STEERING WHEEL AND COLUMN INSPECTION.) (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
3	Steering shaft (See 06-14-8 STEERING SHAFT INSPECTION.)

4	Steering gear and linkage (See 06-14-8 STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION.) (See 06-14-12 STEERING GEAR AND LINKAGE DISASSEMBLY.) (See 06-14-15 STEERING GEAR AND LINKAGE INSPECTION.) (See 06-14-16 STEERING GEAR AND LINKAGE ASSEMBLY.)
5	Power steering oil pump (See 06-14-20 POWER STEERING OIL PUMP REMOVAL/INSTALLATION.) (See 06-14-21 POWER STEERING OIL PUMP DISASSEMBLY/ASSEMBLY.)

POWER STEERING

AIR BLEEDING

id061400800200

Caution
- **Do not turn the steering wheel during the fluid level inspection, otherwise the fluid level changes and cannot be inspected correctly.**

1. Inspect the fluid level. (See 06-14-3 POWER STEERING FLUID INSPECTION.)
2. Jack up the front of the vehicle and support it on safety stands.
3. Turn the steering wheel fully to the left and right several times with the engine not running.
4. Reinspect the fluid level.
   - If it has dropped, add fluid.
5. Repeat Steps 3 and 4 until the fluid level stabilizes.
6. Lower the vehicle.
7. Start the engine and let it idle.
8. Turn the steering wheel fully to the left and right several times.
9. Verify that the fluid is not foamy and that the fluid level has not dropped.
   - If the fluid level has dropped, add fluid as necessary and repeat Steps 8 and 9.

POWER STEERING FLUID INSPECTION

id061400800500

Fluid Level Inspection

1. Inspect the power steering fluid level.
   - Add fluid to the specified level as necessary.

Power steering fluid type
ATF M-III or equivalent (e.g. Dexron®II)

Power steering fluid capacity (approximate quantity)
L.H.D.: 1.19 L {1.25 US qt, 1.04 Imp qt}
R.H.D.: 1.17 L {1.24 US qt, 1.03 Imp qt}

Fluid Leakage Inspection

1. Start the engine and let it idle.
2. Turn the steering wheel fully to the left and right to apply fluid pressure.

Caution
- **If the steering wheel is kept in the fully turned position for more than 5 seconds, the fluid temperature will rise excessively and adversely affect the oil pump.**

3. Inspect for fluid leakage.

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- If fluid leakage is found, replace related pipe or hose.

Note
- The points where fluid leakage may occur are indicated in the figure.

POWER STEERING

Fluid Pressure Inspection

1. Assemble the **SSTs** as shown in the figure.

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2. Disconnect the pressure pipe from the oil pump, and connect the **SSTs**.

   Tightening torque
   29.4—44.1 N·m {3.00—4.49 kgf·m, 21.7—32.5 ft·lbf}

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3. Bleed the air from the system. (See 06-14-3 AIR BLEEDING.)
4. Open the gauge valve fully.
5. Start the engine and turn the steering wheel fully left and right to raise the fluid temperature to **50—60 °C {122—140 °F}**.
6. Close the gauge valve completely.
7. Increase the engine speed to **1,000—1,500 rpm** and measure the fluid pressure generated by the oil pump.
   - If the pressure is not within the specification, repair or replace the oil pump component.

   Caution
   - **If the valve is left closed for more than 5 seconds, the fluid temperature will rise excessively and adversely affect the oil pump.**

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   Oil pump fluid pressure
   7.55—8.05 MPa {77.0—82.0 kgf/cm^2, 1095—1167 psi}

8. Open the gauge valve fully and increase the engine speed to **1,000—1,500 rpm**.
9. Turn the steering wheel fully to the left and right, then measure the fluid pressure generated at the gear housing.
   - If the pressure is not within the specification, repair or replace the steering gear component.

   Caution
   - **If the steering wheel is kept in the fully turned position for more than 5 seconds, the fluid temperature will rise excessively and adversely affect the oil pump.**

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   Gear housing fluid pressure
   7.55—8.05 MPa {77.0—82.0 kgf/cm^2, 1095—1167 psi}

10. Remove the **SSTs**. Install and tighten the pressure pipe to the specified torque.

    Tightening torque
    29.4—44.1 N·m {3.00—4.49 kgf·m, 21.7—32.5 ft·lbf}

11. Bleed the air from the system.

POWER STEERING

STEERING WHEEL AND COLUMN INSPECTION

id061400800400

Steering Wheel Play Inspection

1. With the wheels in the straight-ahead position, gently turn the steering wheel to the left and right and verify that the play is within the specification.
   - If the play exceeds the specification, either the steering joints are worn or the backlash of the steering gear is excessive. Correct as necessary.

Steering wheel play
0—30 mm {0—1.18 in}

Steering Wheel Looseness Inspection

1. Move the steering wheel as shown in the figure to inspect for column bearing wear, steering shaft joint play, steering wheel looseness, and column looseness.
   - Repair or replace as necessary.

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Steering Wheel Effort Inspection

1. Inspect the following points:
   - Tire size and tire pressure
   - Fluid level
   - Drive belt deflection
2. With the vehicle on a hard, level surface, put the wheels in the straight-ahead position.
3. Remove the air bag module.

Warning
- **Handling the air bag module improperly can accidentally deploy the air bag module, which may seriously injure you. Read AIR BAG SYSTEM WARNINGS before handling the air bag module. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**

4. Start the engine and warm the power steering fluid to **50—60 °C {122—140 °F}**.
5. Measure the steering wheel effort using a torque wrench.
   - If not within the specification, verify the following:
     — No air in steering system
     — No fluid leakage at hose or connectors
     — Function of oil pump and steering gear

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Steering wheel effort
7.8 N·m {80 kgf·cm, 58 in·lbf} max.

Note
- To determine whether the steering effort is satisfactory or not, perform the inspection on another vehicle of the same model and under the same conditions, and compare the results.
- The steering wheel effort varies with conditions as shown below.
  — Road conditions, such as dry or wet, and asphalt or concrete.
  — Tire conditions, such as brand, wear, and tire pressure.

POWER STEERING

STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION

id061400803600

Warning

- **Handling the air bag module improperly can accidentally deploy the air bag module, which may seriously injure you. Read AIR BAG SYSTEM WARNINGS before handling the air bag module. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.

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1	Air bag module (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
2	Locknut
3	Steering wheel (See 06-14-7 Steering Wheel Removal Note.) (See 06-14-8 Steering Wheel Installation Note.)
4	Column cover
5	Clock spring (See 08-10-10 CLOCK SPRING REMOVAL/INSTALLATION.)

6	Combination switch
7	Lower panel
8	Steering shaft (See 06-14-7 Steering Shaft Installation Note.)
9	Dust cover
10	Steering lock mounting bolts (See 06-14-7 Steering Lock Mounting Bolts Removal Note.) (See 06-14-7 Steering Lock Mounting Bolts Installation Note.)
11	Steering lock component

POWER STEERING

Steering Wheel Removal Note

Caution
- **Do not try to remove the steering wheel by hitting the shaft with a hammer. The column will collapse.**

1. Set the vehicle in the straight-ahead position.
2. Remove the steering wheel using a suitable puller.

Steering Lock Mounting Bolts Removal Note

1. Make a groove in the heads of the steering lock mounting bolts using a chisel and a hammer.
2. Remove the bolts using a screwdriver.
3. Disassemble the steering lock component.

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Steering Lock Mounting Bolts Installation Note

1. Assemble the steering lock component to the steering shaft.
2. Verify that the lock operates correctly.
3. Install new steering lock mounting bolts.
4. Tighten the bolts until the heads break off.

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Steering Shaft Installation Note

Caution
- **Do not apply a shock in the axial direction of the shaft.**

1. Lock the tilt lever.
2. Tighten nut A.
3. Tighten nut B.
4. Tighten bolt C.

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POWER STEERING

Steering Wheel Installation Note

1. Make sure the wheels in the straight-ahead position, and install the steering wheel.

STEERING SHAFT INSPECTION

id061400800600

1. Inspect the following.
   (1) Column bearing for damage
   (2) Steering shaft length
      - Replace the steering shaft component as necessary.

   Steering shaft length
   247.3 mm {9.736 in}

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2. Inspect the tilt operation.
   (1) Verify that the adjusting lever moves smoothly from unlock position to lock position.
   (2) Verify that the steering shaft is fixed firmly when the adjusting lever is locked.
      - Replace the steering shaft component as necessary.

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STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION

id061400800900

Caution

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.**

1. Remove the ABS wheel-speed sensor. (See 04-13-8 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)
2. Remove the splash shield A. (See 09-16-20 SPLASH SHIELD REMOVAL/INSTALLATION.)
3. Remove the front under cover. (See 09-16-20 FRONT UNDER COVER REMOVAL/INSTALLATION.)
4. Remove the front stabilizer. (See 02-13-14 FRONT STABILIZER REMOVAL/INSTALLATION.)
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.

POWER STEERING

7. After installation, adjust front wheel alignment. (See 02-11-2 FRONT WHEEL ALIGNMENT.)

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POWER STEERING

1	Bolt (intermediate shaft) (See 06-14-10 Bolt (Intermediate Shaft) Removal Note.) (See 06-14-11 Bolt (Intermediate Shaft) Installation Note.)
2	Cotter pin
3	Nuts (tie-rod end ball joint)
4	Tie-rod end ball joint (See 06-14-10 Tie-rod End Ball Joint Removal Note.)
5	Lower mounting rubber bracket
6	Pressure pipe
7	Return hose
8	Steering gear and linkage (See 06-14-11 Steering Gear and Linkage Removal Note.) (See 06-14-11 Steering Gear and Linkage Installation Note.)
9	Return pipe

Bolt (Intermediate Shaft) Removal Note

1. Mark the pinion shaft and gear housing for proper installation.

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Tie-rod End Ball Joint Removal Note

1. Remove the tie-rod nut.
2. Separate the tie-rod end from the steering knuckle using the **SSTs**.

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POWER STEERING

Steering Gear and Linkage Removal Note

1. Remove the steering gear and linkage by pulling it from the right side.

Steering Gear and Linkage Installation Note

1. Tighten bolts loosely.
2. Assemble the mounting bracket with the mark on the bracket facing the vehicle rear.

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3. Tighten the mounting bracket bolts to the specified torque in the order shown.

   Tightening torque
   74.4—104.8 N·m {7.587—10.68 kgf·m, 54.88—77.29 ft·lbf}

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Bolt (Intermediate Shaft) Installation Note

1. Align the marks and install the intermediate shaft and bolt.

POWER STEERING

STEERING GEAR AND LINKAGE DISASSEMBLY

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Caution

- **Place copper plates, rag, or similar material in a vise, when securing the mounting bracket portion of the steering gear.**

1. Disassemble in the order indicated in the table.

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1	Oil pipe
2	Tie-rod end
3	Locknut
4	Boot clamp
5	Boot band
6	Boot
7	Tie rod (See 06-14-13 Tie Rod Disassembly Note.)
8	Lock washer and o-ring
9	Locknut (adjusting cover)
10	Adjusting cover
11	Yoke spring
12	Washer
13	Support yoke
14	Clip
15	Dust cover
16	Pinion plug (See 06-14-13 Pinion Plug, Pinion Shaft Component Disassembly Note.)
17	O-ring

18	Pinion shaft component (See 06-14-13 Pinion Plug, Pinion Shaft Component Disassembly Note.)
19	Mounting bracket
20	Mounting rubber
21	Holder (See 06-14-13 Holder Disassembly Note.)
22	Steering rack (See 06-14-14 Steering Rack, Oil Seal (Holder Side) Disassembly Note.)
23	Oil seal (holder side) (See 06-14-14 Steering Rack, Oil Seal (Holder Side) Disassembly Note.)
24	Inner guide (See 06-14-14 Oil Seal (Gear Housing Side), Inner Guide Disassembly Note.)
25	Oil seal (gear housing side) (See 06-14-14 Oil Seal (Gear Housing Side), Inner Guide Disassembly Note.)
26	Gear housing
27	Mounting rubber (See 06-14-14 Mounting Rubber Disassembly Note.)

POWER STEERING

Tie Rod Disassembly Note

1. Unclamp the washer.
2. Remove the tie rod.

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Pinion Plug, Pinion Shaft Component Disassembly Note

1. Remove the clip and the dust cover, then remove the pinion plug using the **SST**.

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2. Remove the pinion shaft component from the gear housing.

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Holder Disassembly Note

1. Remove the crimp from the holder and cylinder ends using a hacksaw.

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POWER STEERING

2. Remove the holder using the **SST**.

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Steering Rack, Oil Seal (Holder Side) Disassembly Note

1. Install the **SST** to the gear housing.
2. Remove the steering rack and oil seal (holder side) using a press.
3. Remove the oil seal (holder side) from the steering rack.

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Oil Seal (Gear Housing Side), Inner Guide Disassembly Note

1. Set the **SSTs** as shown.
2. Install the **SST** to the gear housing.
3. Remove the oil seal (gear housing side) and inner guide using a press.

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Mounting Rubber Disassembly Note

- Press the mounting rubber out from the gear housing using the **SSTs** and a press.

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POWER STEERING

STEERING GEAR AND LINKAGE INSPECTION

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Rack Inspection

1. Inspect the rack for cracking, damage, and tooth wear. Replace it if necessary.
2. Measure the runout of the rack.

   Steering rack runout
   Near point A: 0.08 mm {0.003 in} max.
   Near point B: 0.15 mm {0.006 in} max.

3. If not within the specification, replace the rack.

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Tie-rod End Inspection

1. Inspect the tie-rod end for damage and boot cracks. Replace it if necessary.
2. Inspect the ball joint for looseness. Replace the tie-rod end if necessary.
3. Rotate the ball joint five times.
4. Measure the rotation torque of the ball joint using the **SST** and a pull scale.

   Tie-rod end rotational torque
   0.4—3.0 N·m {3.5—30.5 kgf·cm, 3.1—26.5 in·lbf}
   [Pull scale reading: 3.5—29.9 N {0.35—3.05 kgf, 0.8—6.7 lbf}]

5. If not within the specification, replace the tie-rod end.

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Tie rod Inspection

1. Inspect the tie rod for bending and damage. Replace it if necessary.
2. Inspect the ball joint for looseness. Replace the tie rod if necessary.
3. Swing the tie rod five times.
4. Measure the swinging torque using a pull scale.

   Tie-rod swing torque
   0.1—4.1 N·m {1.1—41.8 kgf·cm, 1.0—36.2 in·lbf}
   [Pull scale reading: 0.6—24.4 N {0.06—2.49 kgf, 0.2—5.4 lbf}]

5. If not within the specification, replace the tie rod.

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POWER STEERING

STEERING GEAR AND LINKAGE ASSEMBLY

id061400801200

Caution

- **Place copper plates, rag, or similar material in a vise, when securing the mounting bracket portion of the steering gear.**

1. Assemble in the order indicated in the table.

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1	Gear housing
2	Mounting rubber (See 06-14-17 Mounting Rubber Assembly Note.)
3	Oil seal (gear housing side) (See 06-14-18 Steeling Rack, Oil Seal (Gear Housing Side), Inner Guide Assembly Note.)
4	Inner guide (See 06-14-18 Steeling Rack, Oil Seal (Gear Housing Side), Inner Guide Assembly Note.)
5	Steering rack (See 06-14-18 Steeling Rack, Oil Seal (Gear Housing Side), Inner Guide Assembly Note.)
6	Oil seal (holder side) (See 06-14-18 Oil Seal (Holder Side), Holder Assembly Note.)
7	Holder (See 06-14-18 Oil Seal (Holder Side), Holder Assembly Note.)
8	Pinion shaft component
9	O-ring
10	Pinion plug (See 06-14-19 Pinion Plug Assembly Note.)

11	Support yoke
12	Washer
13	Yoke spring
14	Adjusting cover (See 06-14-19 Adjusting Cover Assembly Note.)
15	Locknut (adjusting cover) (See 06-14-19 Adjusting Cover Assembly Note.)
16	Washer and O-ring
17	Tie rod
18	Boot
19	Boot band
20	Boot clamp
21	Locknut
22	Tie-rod end
23	Oil pipe
24	Mounting rubber
25	Mounting bracket
26	Dust cover
27	Clip

POWER STEERING

Mounting Rubber Assembly Note

1. Install the mounting rubber so that two notches of mounting rubber are aligned to the steering rack.
2. Apply soapy water to the rubber part of the mounting rubber.

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3. Press the mounting rubber until the mounting rubber end comes out completely from the gear housing using the **SSTs** and a press.

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4. Reverse the gear housing, then press the mounting rubber until the mounting rubber end comes out completely from the other side. At this time, the mounting rubber end and steel pipe are aligned.

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POWER STEERING

Steeling Rack, Oil Seal (Gear Housing Side), Inner Guide Assembly Note

1. Apply multi-purpose grease to the oil seal (gear housing side) and Inner guide.
2. Install the plastic bag to the steering rack teeth so as not to damage the oil seal (gear housing side) and the inner guide, and install the oil seal (gear housing side) and the inner guide to the seal. Move the oil seal (gear housing side) and the inner guide together with the plastic bag so that they pass the steering rack teeth, then remove the plastic bag.
3. Put the steering rack into the gear housing.

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4. Using a press, press-in the oil seal (gear housing side) and inner guide until the press-in force increases rapidly.

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Oil Seal (Holder Side), Holder Assembly Note

1. Apply multi-purpose grease to the oil seal holder side).
2. Install the plastic bag to the steering rack end so as not to damage the oil seal (holder side) and install the oil seal (holder side) to the seal. Move the oil seal (holder side) together with the plastic bag so that they pass the steering rack end, then remove the plastic bag.
3. Install the holder and move the steering rack until it contacts the housing.

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4. Tighten the holder to the specified torque using the **SST**.

   Tightening torque
   58.9—73.5 N·m {6.00—7.49 kgf·m, 43.4—54.2 ft·lbf}

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5. After tightening the holder, crimp the cylinder end as shown in the figure using a flathead screwdriver so that the holder does not loosen.

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POWER STEERING

Pinion Plug Assembly Note

1. Tighten the pinion plug using the **SST**.

   Tightening torque
   39.2—44.1 N·m {4.00—4.49 kgf·m, 29.0—32.5 ft·lbf}

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Adjusting Cover Assembly Note

1. Set the rack to the center position.
2. Tighten the adjusting cover to **20 N·m {2.0 kgf·m, 15 ft·lbf}**.
3. Rotate the pinion shaft thoroughly three times to make sure that the pinion shaft and the rack engage smoothly, then loosen the adjusting cover.
4. Retighten the adjusting cover to **4.9 N·m {0.5 kgf·m, 3.6 ft·lbf}**, then loosen it about 0 to 15° using the SST.

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5. Measure the rotation torque in the range ±**90**° from the pinion gear neutral point using a SST and a pull-scale.
   - If not within the specification, repeat **Steps 2—4**.

   Pinion shaft rotation torque
   Center of rack ±90°: 0.98—1.38 N·m {10.0—14.0 kgf·cm, 8.7—12.2 in·lbf}
   [Pull scale reading: 9.8—13.8 N {1.00—1.40 kgf, 2.21—3.10 lbf}]
   Except center of rack ±90°: Less than 1.87 N·m {19.1 kgf·cm, 16.6 in·lbf}
   [Pull scale reading: Less than 19.5 N {1.99 kgf, 4.38 lbf}]

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6. Apply sealant to the thread of the locknut.
7. Hold the adjusting cover so as not to rotate and tighten the locknut.

   Tightening torque
   40.0—58.0 N·m {4.08—5.91 kgf·m, 29.5—42.7 ft·lbf}

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POWER STEERING

Hermetic sealing inspection

1. Connect the **SSTs** to the power cylinder section of the gear housing.
2. Apply **53.3 kPa {400 mmHg, 15.7 inHg}** vacuum with a vacuum pump and verify that it is held for at least **30 seconds**.
3. If the vacuum is not held, replace the oil seal.

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POWER STEERING OIL PUMP REMOVAL/INSTALLATION

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1. Remove the drive belt. (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

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1	Pressure switch connector
2	Pressure pipe
3	Hose band

4	Return hose
5	Power steering oil pump

POWER STEERING

POWER STEERING OIL PUMP DISASSEMBLY/ASSEMBLY

id061400800800

Note

- The following procedure is for replacement of the O-ring and oil seal only. Replace the pump component if other repairs are necessary.

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

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1	Power steering oil pump component (See 06-14-22 Power Steering Oil Pump Component Disassembly Note.)
2	Pressure switch component
3	Pressure pipe fitting
4	O-ring
5	Control valve
6	Spring
7	Suction pipe
8	O-ring
9	Rear pump body (See 06-14-22 Rear Pump Body Assembly Note.)
10	Gasket

11	Clip
12	Cam ring (See 06-14-22 Cam Ring Assembly Note.)
13	Rotor
14	Vane (See 06-14-22 Vane Assembly Note.)
15	Side plate
16	O-ring
17	Shaft component
18	Oil seal (See 06-14-22 Oil Seal Assembly Note.)
19	Front pump body

POWER STEERING

Power Steering Oil Pump Component Disassembly Note

1. Secure the power pressure oil pump using the **SST**.

   Caution
   - **Use the SST to prevent damage to the pump when securing it in a vise.**

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Oil Seal Assembly Note

1. Install the oil seal in the front pump body using the **SST** and plastic hammer.

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Vane Assembly Note

1. Place the vanes in the rotor with the rounded edges contacting the cam.

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Cam Ring Assembly Note

1. Install the cam ring in the front pump body with the mark facing upward.

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Rear Pump Body Assembly Note

1. After installing the rear body, manually turn the shaft to verify that it rotates smoothly.

TECHNICAL DATA

06-50 TECHNICAL DATA

STEERING TECHNICAL DATA. 06-50–1

TECHNICAL DATA

STEERING TECHNICAL DATA

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Item	Specification
Power steering fluid type	ATF M-III or equivalent (e.g. Dexron®II)
Power steering fluid capacity (approximate quantity)	L.H.D.: 1.19 L {1.25 US qt, 1.04 Imp qt} R.H.D.: 1.17 L {1.24 US qt, 1.03 Imp qt}
Oil pump fluid pressure	7.55—8.05 MPa {77.0—82.0 kgf/cm^2, 1095—1167 psi}
Gear housing fluid pressure	7.55—8.05 MPa {77.0—82.0 kgf/cm^2, 1095—1167 psi}
Steering wheel play	0—30 mm {0—1.18 in}
Steering wheel effort	7.8 N·m {80 kgf·cm, 58 in·lbf} max.
Steering shaft length	247.3 mm {9.736 in}
Steering rack runout	Near point A: 0.08 mm {0.003 in} max. Near point B: 0.15 mm {0.006 in} max.
Tie-rod end rotational torque	0.4—3.0 N·m {3.5—30.5 kgf·cm, 3.1—26.5 in·lbf} [Pull scale reading: 3.5—29.9 N {0.35—3.05 kgf, 0.8—6.7 lbf}]
Tie-rod swing torque	0.1—4.1 N·m {1.1—41.8 kgf·cm, 1.0—36.2 in·lbf} [Pull scale reading: 0.6—24.4 N {0.06—2.49 kgf, 0.2—5.4 lbf}]
Pinion shaft rotation torque	Center of rack ±90°: 0.98—1.38 N·m {10.0—14.0 kgf·cm, 8.7—12.2 in·lbf} [Pull scale reading: 9.8—13.8 N {1.00—1.40 kgf, 2.21—3.10 lbf}] Except center of rack ±90°: Less than 1.87 N·m {19.1 kgf·cm, 16.6 in·lbf} [Pull scale reading: Less than 19.5 N {1.99 kgf, 4.38 lbf}]

06-60 SERVICE TOOLS

STEERING SST. 06-60–1

SERVICE TOOLS

STEERING SST

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49 1232 670B Power steering gauge set 	49 H002 671 Adapter 	49 G032 3A4A Power steering gauge adapter set
49 T028 3A0 Ball joint puller set 	49 B032 317 Bearing and oil seal remover 	49 F032 303 Handle
49 N032 303 Remover body 	49 T028 301 Dust boot installer 	49 D032 316 Protractor
49 0180 510B Preload measuring attachment 	49 G032 317 Hose 	49 G032 319 Adopter
49 G033 106 Attachment 	49 KKV4 810540 Wrench 	49 F017 1A0 Unversal Wrench
49 H032 338 Joint shaft 	49 F032 301 Power steering pump hanger 	49 G033 102 Handle

HEATER, VENTILATION & AIR CONDITIONING (HVAC)

07 SECTION

ON-BOARD DIAGNOSTIC. . . . 07-02
SYMPTOM TROUBLESHOOTING [FULL-AUTO AIR CONDITIONER]. 07-03A
SYMPTOM TROUBLESHOOTING [MANUAL AIR CONDITIONER]. 07-03B
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BASIC SYSTEM 07-11
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07-02 ON-BOARD DIAGNOSTIC

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NO.2 CABIN TEMPERATURE SENSOR MALFUNCTION. 07-02–4
NO.3 SOLAR RADIATION SENSOR MALFUNCTION. 07-02–5
NO.4 EVAPORATOR TEMPERATURE RADIATION SENSOR MALFUNCTION 07-02–6
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NO.7 AIRFLOW MODE ACTUATOR MALFUNCTION 07-02–7

ON-BOARD DIAGNOSTIC

HVAC SYSTEM WIRING DIAGRAM

id070200800100

amxzzw0000112

DTC INSPECTION

id070200800200

1. Switch the ignition to ON, then press and hold the A/C switch for **5 s** or more within **10 s**.
2. Turn the fan switch to the OFF position.
3. Verify that all the indicator lights of the climate control unit illuminate.

amxzzw0000112

4. Press the recirculate switch or switch the ignition to off to finish.

ON-BOARD DIAGNOSTIC

Malfunction detection function

1. Expose the solar radiation sensor to natural sunlight.

   Note
   - If incandescent light is not shone on the solar radiation sensor, the climate control unit determines that there is a malfunction

2. Switch the ignition to ON, then press and hold the A/C switch for **5 s** or more within **10 s**.
3. Turn the fan switch to the AUTO position.
4. Turn and adjust the mode dial to the inspection item.
   - If the system is normal, the A/C switch indicator light illuminates.

INSPECTION ITEM	MODE DIAL POSITION	A/C SWITCH INDICATOR	
		OK	NG
ALL SENSOR	AUTO	ON	OFF
AMBIENT TEMPERATURE SENSOR	OPEN/VENT	ON	OFF
CABIN TEMPERATURE SENSOR	BI-LEVEL	ON	OFF
SOLAR RADIATION SENSOR	OPEN/HEAT	ON	OFF
EVAPORATOR TEMPERATURE SENSOR	VENT	ON	OFF
AIR MIX ACTUATOR	HEAT	ON	OFF

5. Press the recirculate switch or switch the ignition to off to finish.

Door position check function

1. Switch the ignition to ON, then press and hold the A/C switch for **5 s** or more within **10 s**.
2. Turn the fan switch to the LO position.
3. Verify that the indicator light of the climate control unit illuminates.

MALFUNCTION	INDICATOR PARTS
ALL OK	A/C SWITCH
AIRFLOW MODE ACTUATOR	REC SWITCH
AIR INTAKE ACTUATOR	REAR WINDOW DEFROSTER SWITCH

4. Press the recirculate switch or switch the ignition to off to finish.

Operation check function

1. Switch the ignition to ON, then press and hold the A/C switch for **5 s** or more within **10 s**.
2. Turn the fan switch to a position other than OFF, AUTO, or LO positions.
3. Verify the operation of each output related part by switching the mode dial positions while referring to the operation check table.
   - If there is any malfunction, inspect the malfunctioning system.

	MODE DIAL POSITION							
	AUTO	OPEN VENT	BI-LEVEL	OPEN/ HEAT	VENT	HEAT	DEF/HEAT	DEFROSTER
MODE DOOR	OPEN VENT	OPEN VENT	BI-LEVEL	OPEN VENT	VENT	HEAT	DEF/HEAT	DEFROSTER
AIR INTAKE DOOR	REC	REC	FRESH	REC	REC	FRESH	FRESH	FRESH
AIR MIX DOOR	MAX COLD	MAX COLD	MAX HOT	MAX COLD	MAX COLD	MAX HOT	MAX HOT	MAX HOT
BLOWER MORTER	4.5±2 V	4.5±2 V	10.5± 2 V	4.5± 2 V	10.5± 2 V	8.5± 2 V	8.5±2 V	V_B
A/C COMPRESSOR	OFF	ON	OFF	ON	OFF	ON	ON	ON

4. Press the recirculate switch or switch the ignition to off to finish.

ON-BOARD DIAGNOSTIC

NO.1 AMBIENT TEMPERATURE SENSOR MALFUNCTION

id070200809700

Ambient temperature sensor malfunction	
POSSIBLE CAUSE	• Ambient temperature sensor malfunction • Open or short circuit in wiring harness between climate control unit and ambient temperature sensor

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	• Inspect the ambient temperature sensor. (See 07-40A-13 AMBIENT TEMPERATURE SENSOR INSPECTION [FULL-AUTO AIR CONDITIONER].) • Is it normal?	Yes	Go to the next step.
		No	Replace the ambient temperature sensor. (See 07-40A-13 AMBIENT TEMPERATURE SENSOR REMOVAL/ INSTALLATION [FULL-AUTO AIR CONDITIONER].)
2	• Disconnect the climate control unit connector and the ambient temperature sensor connector. • Is there an open circuit in the wiring harness between the following terminals of the climate control unit and the ambient temperature sensor? — T—B — S—A	Yes	Repair the wiring harness.
		No	Go to the next step.
3	• Is there a short circuit to ground in the wiring harness between climate control unit terminal T and ambient temperature sensor terminal B?	Yes	Repair the wiring harness.
		No	Connect the climate control unit connector, then go to the next step.
4	• Switch the ignition to ON. • Inspect the voltage at the following climate control unit terminal (wiring harness-side). — Terminal T (ambient temperature sensor input signal) • Is the voltage normal?	Yes	The system is normal at present. (Clear the malfunction from the memory.)
		No	Inspect the connection of the climate control unit connector. (See 07-40A-17 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].) (See 07-40B-15 CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER].)

CLIMATE CONTROL UNIT CONNECTOR

AMBIENT TEMPERATURE SENSOR CONNECTOR

NO.2 CABIN TEMPERATURE SENSOR MALFUNCTION

id070200809800

Cabin temperature sensor malfunction	
POSSIBLE CAUSE	• Cabin temperature sensor malfunction • Open or short circuit in wiring harness between climate control unit and cabin temperature sensor

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	• Inspect the cabin temperature sensor. (See 07-40A-14 CABIN TEMPERATURE SENSOR INSPECTION [FULL-AUTO AIR CONDITIONER].) • Is it normal?	Yes	Go to the next step.
		No	Replace the cabin temperature sensor. (See 07-40A-13 CABIN TEMPERATURE SENSOR REMOVAL/ INSTALLATION [FULL-AUTO AIR CONDITIONER].)
2	• Disconnect the climate control unit connector and the cabin temperature sensor connector. • Is there an open circuit in the wiring harness between the following terminals of the climate control unit and the cabin temperature sensor? — O—B — S—A	Yes	Repair the wiring harness.
		No	Go to the next step.
3	• Is there a short circuit to ground in the wiring harness between climate control unit terminal O and cabin temperature sensor terminal B?	Yes	Repair the wiring harness.
		No	Connect the climate control unit connector, then go to the next step.

ON-BOARD DIAGNOSTIC

STEP	INSPECTION		ACTION
4	• Switch the ignition to ON. • Inspect the voltage at the following climate control unit terminal (wiring harness-side). — Terminal O (cabin temperature sensor input signal) • Is the voltage normal? (**approx. 5 V**)	Yes	The system is normal at present. (Clear the malfunction from the memory.)
		No	Inspect the connection of the climate control unit connector. (See 07-40A-17 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].) (See 07-40B-15 CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER].)

CLIMATE CONTRL UNIT CONNECTOR

CABIN TEMPERATURE SENSOR CONNECTOR

NO.3 SOLAR RADIATION SENSOR MALFUNCTION

id070200809900

Solar radiation sensor malfunction	
POSSIBLE CAUSE	• Solar radiation sensor malfunction • Open or short circuit in wiring harness between climate control unit and solar radiation sensor

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	• Inspect the solar radiation sensor. (See 07-40A-12 SOLAR RADIATION SENSOR INSPECTION [FULL-AUTO AIR CONDITIONER].) • Is it normal?	Yes	Go to the next step.
		No	Replace the solar radiation sensor. (See 07-40A-12 SOLAR RADIATION SENSOR REMOVAL/ INSTALLATION [FULL-AUTO AIR CONDITIONER].)
2	• Disconnect the climate control unit connector and the solar radiation sensor connector. • Is there an open circuit in the wiring harness between the following terminals of the climate control unit and the solar radiation sensor? — Q—B — S—A	Yes	Repair the wiring harness.
		No	Go to the next step.
3	• Is there a short circuit to ground in the wiring harness between climate control unit terminal Q and solar radiation sensor terminal B?	Yes	Repair the wiring harness.
		No	Connect the climate control unit connector, then go to the next step.
4	• Switch the ignition to ON. • Inspect the voltage at the following climate control unit terminal (wiring harness-side). — Terminal Q (solar radiation sensor input signal) • Is the voltage normal? (**approx. 5 V**)	Yes	The system is normal at present. (Clear the malfunction from the memory.)
		No	Inspect the connection of the climate control unit connector. (See 07-40A-17 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].) (See 07-40B-15 CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER].)

CLIMATE CONTROL UNIT CONNECTOR

SOLAR RADIATION SENSOR CONNECTOR

ON-BOARD DIAGNOSTIC

NO.4 EVAPORATOR TEMPERATURE RADIATION SENSOR MALFUNCTION

id070200810000

Evaporator temperature sensor malfunction	
POSSIBLE CAUSE	• Evaporator temperature sensor malfunction • Open or short circuit in wiring harness between climate control unit and evaporator temperature sensor

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	• Inspect the evaporator temperature sensor. (See 07-40A-15 EVAPORATOR TEMPERATURE SENSOR INSPECTION [FULL-AUTO AIR CONDITIONER].)(See 07-40B-13 EVAPORATOR TEMPERATURE SENSOR INSPECTION [MANUAL AIR CONDITIONER].) • Is it normal?	Yes	Go to the next step.
		No	Replace the evaporator temperature sensor. (See 07-40A-15 EVAPORATOR TEMPERATURE SENSOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].) (See 07-40B-13 EVAPORATOR TEMPERATURE SENSOR REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER].)
2	• Disconnect the climate control unit connector and the evaporator temperature sensor connector. • Is there an open circuit in the wiring harness between the following terminals of the climate control unit and the evaporator temperature sensor? — M—B — S—A	Yes	Repair the wiring harness.
		No	Go to the next step.
3	• Is there a short circuit to ground in the wiring harness between climate control unit terminal M and evaporator temperature sensor terminal B?	Yes	Repair the wiring harness.
		No	Connect the climate control unit connector, then go to the next step.
4	• Switch the ignition to ON. • Inspect the voltage at the following climate control unit terminal (wiring harness-side). — Terminal M (evaporator temperature sensor input signal) • Is the voltage normal? (**approx. 5 V**)	Yes	The system is normal at present. (Clear the malfunction from the memory.)
		No	Inspect the connection of the climate control unit connector. (See 07-40A-17 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].) (See 07-40B-15 CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER].)

CLIMATE CONTROL UNIT CONNECTOR

EVAPORATOR TEMPERATURE SENSOR CONNECTOR

NO.5 AIR MIX ACTUATOR MALFUNCTION

id070200810100

Diagnostic procedure

Replace the air mix actuator.(See 07-40A-4 AIR MIX ACTUATOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].)(See 07-40B-4 AIR MIX ACTUATOR REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER].)

NO.6 AIR INTAKE ACTUATOR MALFUNCTION

id070200810200

Diagnostic procedure

Replace the air intake actuator.(See 07-40A-3 AIR INTAKE ACTUATOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].)(See 07-40B-3 AIR INTAKE ACTUATOR REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER].)

ON-BOARD DIAGNOSTIC

NO.7 AIRFLOW MODE ACTUATOR MALFUNCTION

id070200810300

Diagnostic procedure

Replace the airflow mode actuator.(See 07-40A-5 AIRFLOW MODE ACTUATOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].)(See 07-40B-5 AIRFLOW MODE ACTUATOR REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER].)

07-03A SYMPTOM TROUBLESHOOTING [FULL-AUTO AIR CONDITIONER]

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SYMPTOM TROUBLESHOOTING [FULL-AUTO AIR CONDITIONER]

HVAC SYSTEM WIRING DIAGRAM [FULL-AUTO AIR CONDITIONER]

id0703c1800100

amxzzw0000110

SYMPTOM TROUBLESHOOTING [FULL-AUTO AIR CONDITIONER]

FOREWORD [FULL-AUTO AIR CONDITIONER]

id0703c1800200

- The areas for inspection (steps) are given according to various circuit malfunctions. Use the following chart to verify the symptoms of the trouble in order to diagnose the appropriate area.

TROUBLESHOOTING INDEX [FULL-AUTO AIR CONDITIONER]

id0703c1800300

No.	TROUBLESHOOTING ITEM	DESCRIPTION
1	Insufficient air (or no air) blown from vents.	• Problem with each vent and/or duct. • Airflow mode does not change.
2	Amount of air blown from vents does not change.	• Malfunction in blower system.
3	Air intake mode does not change.	• Air intake mode does not change when switching REC/FRESH mode.
4	No temperature control with climate control unit.	• Malfunction in A/C unit and/or climate control unit air mix system or both.
5	Windshield fogged.	• A/C compressor does not operate while airflow mode is in DEFROSTER or HEAT/DEF modes. • Air intake mode does not change to FRESH while airflow mode is in DEFROSTER or HEAT/DEF modes.
6	Air from vents not cold enough.	• Magnetic clutch operates but A/C system malfunctions.
7	No cool air.	• Magnetic clutch does not operate.
8	Noise while operating A/C system.	• Noise from magnetic clutch, A/C compressor, hose or refrigerant line.

NO.1 INSUFFICIENT AIR (OR NO AIR) BLOWN FROM VENTS [FULL-AUTO AIR CONDITIONER]

id0703c1800400

1	**Insufficient air (or no air) blown from vents.**
DESCRIPTION	• Problem with each vent and/or duct. • Airflow mode does not change.
POSSIBLE CAUSE	• Malfunction in airflow mode actuator • Malfunction in VENT mode system • Malfunction in HEAT mode system • Malfunction in DEFROSTER mode system

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT AIRFLOW MODE ACTUATOR** • Inspect airflow mode actuator. • Is it okay?	Yes	Go to the next step.
		No	Repair or replace malfunctioning part in accordance with further inspection result.
2	**INSPECT TO SEE WHETHER MALFUNCTION IS IN VENT MODE OR OTHER MODES** • Does air blow out when in VENT mode?	Yes	Go to Step 5.
		No	Go to the next step.
3	**INSPECT VENT** • Is vent clogged?	Yes	Remove obstruction, then go to Step 9.
		No	Go to the next step.
4	**VERIFY THAT DUCT IN DASHBOARD IS INSTALLED** • Is duct in dashboard properly installed?	Yes	Inspect duct for clogging, deformity and air leakage, then go to Step 9.
		No	Install duct securely in the proper position, then go to Step 9.
5	**INSPECT TO SEE WHETHER MALFUNCTION IS IN HEAT MODE OR DEFROSTER MODE** • Does air blow out when in HEAT mode?	Yes	Go to the next step.
		No	Inspect vent for clogging, then go to Step 9.
6	**INSPECT DEFROSTER MODE** • Does air blow out when in DEFROSTER mode?	Yes	Operation is okay. Recheck malfunction symptoms.
		No	Go to the next step.
7	**INSPECT VENT** • Is vent clogged?	Yes	Remove obstruction, then go to Step 9.
		No	Go to the next step.
8	**VERIFY THAT DEFROSTER DUCT IS INSTALLED** • Is defroster duct properly installed?	Yes	Inspect duct for clogging, deformity, and air leakage, then go to the next step.
		No	Install duct securely in proper position, then go to the next step.

SYMPTOM TROUBLESHOOTING [FULL-AUTO AIR CONDITIONER]

STEP	INSPECTION		ACTION
9	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT RECUR AFTER REPAIR** • Does air blow out?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

NO.2 AMOUNT OF AIR BLOWN FROM VENTS DOES NOT CHANGE [FULL-AUTO AIR CONDITIONER]

id0703c1800500

2	**Amount of air blown from vents does not change.**
DESCRIPTION	• Malfunction in blower system
POSSIBLE CAUSE	• A/C unit malfunction • Blower motor malfunction • Malfunction in power MOS FET system • Climate control unit malfunction

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, inspect make sure connectors, terminals and wiring harnesses are connected correctly and undamaged.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT HEATER 40 A FUSE** • Inspect the HEATER 40 A fuse. • Is it normal?	Yes	Go to the next step.
		No	Replace the fuse, then go to Step 15. If the fuse burns out immediately, go to the next step.
2	**INSPECT TO SEE WHETHER MALFUNCTION IS IN A/C UNIT OR ELSEWHERE** • Switch the ignition to ON. • Recirculate air inside the vehicle. • Does the blower motor rotate smoothly?	Yes	Go to Step 4.
		No	Go to the next step.
3	**INSPECT A/C UNIT INTAKE VENT** • Is A/C unit intake vent clogged?	Yes	Remove obstruction, then go to Step 15.
		No	Inspect if there are any obstruction in the A/C unit passage, then go to Step 15.
4*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN BLOWER RELAY SYSTEM OR POWER MOS FET SYSTEM** • Switch the ignition to ON. • Measure the voltage at the following blower motor terminal. — Terminal B (blower motor operation signal) • Is voltage **approx. 12 V**?	Yes	Go to Step 8.
		No	Go to the next step.
5*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN FUSE BLOCK AND BLOWER RELAY) OR ELSEWHERE** • Measure the voltage at the following blower relay terminals. — Terminal E (IG2 signal) — Terminal C (B+ signal) • Is the voltage **approx. 12 V**?	Yes	Go to the next step.
		No	Repair the wiring harness between the blower relay and HEATER 40 A fuse, then go to Step 15.
6*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN BLOWER RELAY AND GROUND) OR ELSEWHERE** • Measure the voltage at the following blower relay terminal. — Terminal A (GND signal) • Is the voltage **approx. 0 V**?	Yes	Go to the next step.
		No	Repair the wiring harness between the blower relay and ground, then go to Step 15.

SYMPTOM TROUBLESHOOTING [FULL-AUTO AIR CONDITIONER]

STEP	INSPECTION		ACTION
7*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN BLOWER RELAY AND BLOWER MOTOR) OR BLOWER RELAY** • Measure the voltage at the following blower relay terminal. — Terminal D (blower motor operation signal) • Is the voltage **approx. 12 V**?	Yes	Repair the wiring harness between the blower relay and blower motor, then go to Step 15.
		No	Replace the blower relay, then go to Step 15.
8*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN BLOWER MOTOR OR ELSEWHERE** • Measure the voltage at the following blower motor terminal. — Terminal B (blower motor operation signal) • Is the voltage **approx. 12 V**?	Yes	Go to the next step.
		No	Inspect the blower motor, then go to Step 15.
9*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN BLOWER MOTOR AND POWER MOS FET) OR ELSEWHERE** • Measure the voltage at the following terminal of power MOS FET. — Terminal C (blower motor operation signal) • Is voltage **approx. 12 V**?	Yes	Go to the next step.
		No	Repair the wiring harness between the blower motor and power MOS FET, then go to Step 15.
10*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN POWER MOS FET AND GROUND) OR ELSEWHERE** • Measure the voltage at the following power MOS FET terminal. — Terminal D (power MOS FET ground) • Is the voltage **approx. 0 V**?	Yes	Go to the next step.
		No	Repair the wiring harness between the power MOS FET and ground, then go to Step 15.
11	**INSPECT A/C UNIT** • Inspect the fan in A/C unit. — Is the fan free of interference with the A/C unit case? — Is the fan free of foreign material and obstruction? • Is the fan normal?	Yes	Go to the next step.
		No	Remove obstruction, repair or replace the fan and A/C unit case, then go to Step 15.
12*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN POWER MOS FET OR ELSEWHERE** • Disconnect power MOS FET connector. • Measure the voltage at the following power MOS FET terminal. — Terminal B (blower motor control signal) • Is voltage **approx. 10 V**?	Yes	Replace the power MOS FET, then go to Step 15.
		No	Go to the next step.
13*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN POWER MOS FET AND CLIMATE CONTROL UNIT) OR ELSEWHERE** • Switch the ignition to off. • Disconnect climate control unit connector. • Inspect for continuity at the following terminals between the power MOS FET and climate control unit. — Terminal A—C (20 pin, blower motor control signal) — Terminal B—E (20 pin, blower motor feedback signal) • Is there continuity?	Yes	Go to the next step.
		No	Repair the wiring harness between the power MOS FET and climate control unit, then go to Step 15.

SYMPTOM TROUBLESHOOTING [FULL-AUTO AIR CONDITIONER]

STEP	INSPECTION		ACTION
14*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN CLIMATE CONTROL UNIT OR WIRING HARNESS (SHORT TO GROUND IN WIRING HARNESS BETWEEN POWER MOS FET AND CLIMATE CONTROL UNIT)** • Inspect for continuity at the following terminal between the power MOS FET and ground. — Terminal A (blower motor control signal)— ground • Is there continuity?	Yes	Repair the wiring harness between the power MOS FET and ground, then go to the next step.
		No	Replace the climate control unit, then go to the next step.
15	**CONFIRM THAT MALFUNCTION SYMPTOM DOES NOT RECUR AFTER REPAIR** • Is air discharged from vent?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if the malfunction recurs.

NO.3 AIR INTAKE MODE DOES NOT CHANGE [FULL-AUTO AIR CONDITIONER]

id0703c1802900

3	**Air intake mode does not change.**
DESCRIPTION	• Air intake mode does not change when switching REC/FRESH mode.
POSSIBLE CAUSE	• Malfunction in air intake actuator • Malfunction in air intake door

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harnesses are connected correctly and undamaged.

Diagnostic procedure

STEP	INSPECTION		ACTION
1*	**INSPECT TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN AIR INTAKE ACTUATOR, WIRING HARNESS (BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR) OR ELSEWHERE** • Switch the ignition to ON. • Test voltages at the following terminals of climate control unit. — Terminal G (20-pin, ACTR POWER) — Terminal I (20-pin, ACTR SIGNAL) — Terminal H (20-pin, GND) (See 07-40A-17 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].) • Are voltages okay?	Yes	Go to the next step.
		No	Go to Step 3.
2*	**INSPECT TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN AIR INTAKE ACTUATOR OR WIRING HARNESS (BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR)** • Test voltages at the following terminals of air intake actuator. — Terminal A — Terminal C • Are voltages as shown below? — Terminal A: **approx. 0.5 V** during RECIRCULATE and **approx. 10 V** during FRESH — Terminal C: **approx. 10 V** during RECIRCULATE and **approx. 0.5 V** during FRESH	Yes	Replace air intake actuator, then go to Step 8. (See 07-40A-3 AIR INTAKE ACTUATOR REMOVAL/ INSTALLATION [FULL-AUTO AIR CONDITIONER].)
		No	Repair wiring harness between climate control unit and air intake actuator, then go to Step 8.

SYMPTOM TROUBLESHOOTING [FULL-AUTO AIR CONDITIONER]

STEP	INSPECTION		ACTION
3	**INSPECT TO SEE WHETHER MALFUNCTION IS IN AIR INTAKE ACTUATOR OR ELSEWHERE** • Disconnect air intake actuator connector. • Test voltages at the following terminals of climate control unit. — Terminal G (20-pin, ACTR POWER) — Terminal I (20-pin, ACTR SIGNAL) (See 07-40A-17 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].) • Are voltages okay?	Yes	Inspect air intake actuator, then go to Step 8.
		No	Go to the next step.
4	**INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (SHORT TO B+ BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR) OR ELSEWHERE** • Disconnect climate control unit connector. • Test voltages at the following terminals of climate control unit. — Terminal G (20-pin, ACTR POWER) — Terminal I (20-pin, ACTR SIGNAL) • Are voltages **approx. 0 V**?	Yes	Go to the next step.
		No	Repair wiring harness between climate control unit and air intake actuator, then go to Step 8.
5	**INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (SHORT TO GROUND BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR) OR ELSEWHERE** • Switch the ignition to off. • Inspect for continuity at the following terminals between climate control unit and ground. — Terminal G (20-pin, ACTR POWER) — Terminal I (20-pin, ACTR SIGNAL) • Is there continuity?	Yes	Repair wiring harness between climate control unit and air intake actuator, then go to Step 8.
		No	Go to the next step.
6	**INSPECT AIR INTAKE LINK** • Inspect air intake links. — Is there grease on link? — Are links securely and properly installed? — Are links free of obstructions and hindrances? • Are above items okay?	Yes	Go to the next step.
		No	Apply grease to links. If any links are damaged, replace air intake actuator, then go to Step 8.
7	**INSPECT TO SEE WHETHER MALFUNCTION IS IN CLIMATE CONTROL UNIT OR AIR INTAKE DOOR** • Inspect blower unit air intake door. — Is door free of obstructions, cracks, and damage? — Are doors securely and properly installed? • Are above items okay?	Yes	Replace climate control unit, then go to the next step. (See 07-40A-17 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].)
		No	Remove obstruction, or install doors in proper position. If any doors are cracked or damaged, replace them, then go to the next step.
8	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT RECUR AFTER REPAIR** • Does air intake mode change smoothly?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

SYMPTOM TROUBLESHOOTING [FULL-AUTO AIR CONDITIONER]

NO.4 NO TEMPERATURE CONTROL WITH CLIMATE CONTROL UNIT [FULL-AUTO AIR CONDITIONER]

id0702c1812400

4	**No temperature control with climate control unit.**
DESCRIPTION	• Malfunction in A/C unit and/or climate control unit air intake system.
POSSIBLE CAUSE	• A/C unit air intake link, air intake crank, air intake rod malfunction • Climate control unit rack-and-pinion, air intake wire malfunction • A/C unit air intake door malfunction • Heater piping malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT COOLANT TEMPERATURE** • Is coolant sufficiently warmed up?	Yes	Go to the next step.
		No	Warm engine up, then go to Step 8.
2	**INSPECT A/C UNIT AIR INTAKE SYSTEM** • Inspect A/C unit air intake links, air intake cranks, air intake rods, air intake actuator. — Is there grease on links and cranks? — Are links, cranks, and rods securely installed in their proper positions? • Are above items okay?	Yes	Go to the next step.
		No	Apply grease or install links, cranks, and rods securely in their proper positions, repair or replace air intake actuator, then go to Step 8.
3	**VERIFY THAT AIR INTAKE WIRE FROM A/C UNIT IS POSITIONED SECURELY AND CORRECTLY (IF AVAILABLE)** • Is air intake wire securely installed in the correct position in relation to A/C unit air intake links?	Yes	Go to the next step.
		No	Adjust air intake wire or install securely in correct position, then go to Step 8.
4	**INSPECT CLIMATE CONTROL UNIT** • Inspect climate control unit. (See 07-40A-17 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].) • Is climate control unit okay?	Yes	Go to the next step.
		No	Repair or replace climate control unit, then go to Step 8. (See 07-40A-17 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].)
5	**INSPECT A/C UNIT** • Is there any foreign material or obstruction in A/C unit air intake doors?	Yes	Remove obstruction, then go to Step 8.
		No	Go to the next step.
6	**INSPECT A/C UNIT AIR INTAKE DOORS** • Is A/C unit air intake door securely and properly installed?	Yes	Inspect air intake door for cracks or damage, then go to the next step.
		No	Install air intake door securely in proper position, then go to the next step.
7	**INSPECT HEATER LINES** • Inspect heater lines. — Is heater piping free of damage and cracks? — Are heater piping connections free of engine coolant leakage? — Are heater piping connections securely tightened? — Are heater piping installation points on A/C unit free of engine coolant leakage? • Are above items okay?	Yes	Operation is okay. Recheck malfunction symptoms.
		No	If heater piping connections is loosed, tighten connections with specified torque. Repair or replace heater piping, then go to the next step.
8	**VERIFY THAT MALFUNCTION SYMPTOM OCCURS AFTER REPAIR** • Does unit operate in every temperature setting?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

SYMPTOM TROUBLESHOOTING [FULL-AUTO AIR CONDITIONER]

NO.5 WINDSHIELD FOGGED [FULL-AUTO AIR CONDITIONER]

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- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

5	**Windshield fogged.**
DESCRIPTION	• A/C compressor does not operate while airflow mode is in DEFROSTER or HEAT/DEF modes. • Air intake mode does not change to FRESH while airflow mode is in DEFROSTER or HEAT/DEF modes.
POSSIBLE CAUSE	• Climate control unit (B+ signal) system malfunction • Air intake actuator malfunction • Climate control unit (RECIRCULATE, FRESH signal) system malfunction • Malfunction in A/C unit air intake doors

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**COOL AIR BLOW OUT INSPECTION** • When both A/C and fan switch in climate control unit are on, does cool air blow out from front vent?	Yes	Go to the next step.
		No	Go to Step 1 of troubleshooting index No.8.
2	**INSPECT CLIMATE CONTROL UNIT POWER SUPPLY FUSE FOR B+ SIGNAL** • Is climate control unit power supply fuse for B+ signal okay?	Yes	Go to the next step.
		No	Inspect for a short to ground on blown fuse circuit. Repair or replace as necessary. Install appropriate amperage fuse.
3	**INSPECT AIR INTAKE ACTUATOR** • Inspect air intake actuator. — Is there grease on link? — Is link securely and properly positioned? — Is link free of obstructions? • Are above items okay?	Yes	Go to the next step.
		No	Apply grease or install link properly and securely, remove obstruction, then go to Step 14.
*4	**INSPECT WIRING HARNESS BETWEEN FUSE BLOCK AND CLIMATE CONTROL UNIT FOR CONTINUITY** • Disconnect climate control unit connector (20-pin). • Switch the ignition to ON. • Test voltage at climate control unit connector terminal B (B+ signal). • Is voltage **approx. 12 V**?	Yes	Go to the next step.
		No	Repair wiring harness between fuse block and climate control unit, then go to Step 14.
*5	**INSPECT WIRING HARNESS BETWEEN CLIMATE CONTROL UNIT AND GROUND FOR VOLTAGE** • Test voltage at climate control unit connector terminal H (Ground). • Is voltage **approx. 0V**?	Yes	Go to the next step.
		No	Repair wiring harness between climate control unit and ground, then go to Step 14.
6	**VERIFY WHETHER MALFUNCTION IS IN A/C UNIT AIR INTAKE DOOR OR ELSEWHERE** • Switch the ignition to off. • Connect climate control unit connector (20-pin). • Remove air intake actuator. • Switch the ignition to ON. • Set fan switch to 4th position. • Does air intake mode (RECIRCULATE, FRESH) change smoothly when air intake link is operated by hand?	Yes	Go to the next step.
		No	Go to Step 12.
7	**INSPECT AIR INTAKE ACTUATOR** • Inspect air intake actuator. (See 07-02-2 DTC INSPECTION.) • Is it okay?	Yes	Go to the next step.
		No	Replace air intake actuator, go to Step 14. (See 07-40A-3 AIR INTAKE ACTUATOR REMOVAL/ INSTALLATION [FULL-AUTO AIR CONDITIONER].)
8	**INSPECT AIR INTAKE SELECTOR SWITCH AND DEFROSTER SWITCH IN CLIMATE CONTROL UNIT** • Test voltage at climate control unit connector (20-pin) terminals G and I. • Is it okay?	Yes	Go to the next step.
		No	Replace climate control unit, then go to Step 14. (See 07-40A-17 CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [FULL-AUTO AIR CONDITIONER].)

SYMPTOM TROUBLESHOOTING [FULL-AUTO AIR CONDITIONER]

STEP	INSPECTION		ACTION
*9	**INSPECT WIRING HARNESS BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR FOR CONTINUITY** • Switch the ignition to off. • Is there continuity between following climate control unit connector (20-pin) terminal and air intake actuator connector terminal? — Terminal A —Terminal G (ACTR POWER) — Terminal C —Terminal I (ACTR SIGNAL)	Yes	Go to the next step.
		No	Repair wiring harness between climate control unit and air intake actuator, then go to Step 14.
*10	**INSPECT WIRING HARNESS BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR FOR SHORT TO GROUND** • Is there continuity between following climate control unit connector (20-pin) terminal and ground? — Terminal G (ACTR POWER) — Terminal I (ACTR SIGNAL)	Yes	Repair wiring harness between climate control unit and air intake actuator, then go to Step 14.
		No	Go to the next step.
*11	**INSPECT WIRING HARNESS BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR FOR SHORT TO B+** • Switch the ignition to ON. • Test voltage at following climate control unit connector (20-pin) terminal. — Terminal G (ACTR POWER) — Terminal I (ACTR SIGNAL) • Is voltage **approx. 12 V**?	Yes	Repair wiring harness between climate control unit and air intake actuator, then go to Step 14.
		No	Replace climate control unit, then go to Step 14. (See 07-40A-17 CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [FULL-AUTO AIR CONDITIONER].)
12	**INSPECT A/C UNIT AIR INTAKE DOOR** • Is there any foreign material or obstruction in A/C unit air intake door?	Yes	Remove obstruction, then go to Step 14.
		No	Go to the next step.
13	**VERIFY THAT A/C UNIT AIR INTAKE DOOR IS POSITIONED SECURELY AND PROPERLY** • Is A/C unit air intake door securely and properly positioned?	Yes	Inspect air intake door for cracks or damage, then go to the next step.
		No	Install air intake door securely in proper position, then go to the next step.
14	**VERIFY THAT MALFUNCTION SYMPTOM OCCURS AFTER REPAIR** • Does malfunction disappear?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

NO.6 AIR FROM VENTS NOT COLD ENOUGH [FULL-AUTO AIR CONDITIONER]

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6	**Air from vents not cold enough.**
DESCRIPTION	• Magnetic clutch operates but A/C system malfunctions.
POSSIBLE CAUSE	• Drive belt malfunction • Refrigerant pressure switch malfunction • Malfunction in blower unit or condenser • Cooling fan system malfunction • Condenser or related part malfunction • A/C unit or condenser malfunction • Receiver/drier or expansion valve malfunction (valve closes too mach) • Malfunction in refrigerant lines • A/C compressor system malfunction, insufficient compressor oil • Over filling of compressor oil, malfunction in expansion valve or A/C unit air mix link system • Evaporative temperature sensor malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT REFRIGERANT SYSTEM PERFORMANCE** • Perform refrigerant system performance test. (See 07-10-6 REFRIGERANT SYSTEM PERFORMANCE TEST.) • Is the operation normal?	Yes	Operation is normal. (Recheck malfunction symptoms.)
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [FULL-AUTO AIR CONDITIONER]

STEP	INSPECTION		ACTION
2	**INSPECT DRIVE BELT** • Inspect the drive belt. (See 01-10-5 DRIVE BELT INSPECTION [L8, LF].) • Is it normal?	Yes	Go to the next step.
		No	Adjust or replace the drive belt, then the next step. (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].)
3	**INSPECT REFRIGERANT PRESSURE SWITCH** • Inspect the refrigerant pressure switch. (See 07-40A-16 REFRIGERANT PRESSURE SWITCH INSPECTION [FULL-AUTO AIR CONDITIONER].) • Is it normal?	Yes	Go to the next step.
		No	Replace the refrigerant pressure switch, then go to Step 23. (See 07-40A-17 CLIMATE CONTROL UNIT REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].)
4	**CHECK TO SEE WHETHER MALFUNCTION IS IN BLOWER UNIT INTAKE AND CONDENSER OR ELSEWHERE** • Perform refrigerant pressure check. (See 07-10-5 REFRIGERANT PRESSURE CHECK.) • Are the refrigerant high-pressure and low-pressure values both high?	Yes	Go to the next step.
		No	After recording the inspection results, go to Step 9.
5	**INSPECT COOLING FAN OPERATION** • Verify the cooling fan operation. (See 01-12-12 COOLING FAN MOTOR INSPECTION [L8, LF].) • Is the cooling fan operation normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning location according to the inspection results. Then go to Step 23.
6	**VISUALLY INSPECT CONDENSER** • Is the condenser fin clogged or obstructed by foreign material?	Yes	Remove the foreign material. Repair the condenser fin. Then go to Step 23.
		No	Go to the next step.
7	**CHECK TO SEE WHETHER MALFUNCTION IS IN EXPANSION VALVE OR ELSEWHERE** • Verify the condition of the low pressure hose while the A/C is operating. • Is there frost or condensation adhering?	Yes	Replace the expansion valve. After performing the following servicing, go to Step 23. • Adjust the compressor oil to the specified level. • After discharging, charge with new refrigerant to the specified level.
		No	Go to the next step.
8	**INSPECT AIR MIX DOOR RELATED PART INSTALLATION** • Remove the A/C unit. (See 07-11-2 A/C UNIT REMOVAL/INSTALLATION.) • Are the air mix link, air mix crank, and air mix rod of the A/C unit correctly and securely installed to their positions?	Yes	Adjust the compressor oil to the specified amount, then go to Step 23. (See 07-11-10 A/C COMPRESSOR REMOVAL/INSTALLATION.)
		No	Repair or install the links, cranks and rods securely in the proper position, then go to Step 23.
9	**CHECK TO SEE WHETHER MALFUNCTION IS IN BLOWER UNIT AND REFRIGERANT PRESSURE LINE OR ELSEWHERE** • Are the refrigerant high-pressure and low-pressure values low?	Yes	Go to the next step.
		No	Go to Step 16.
10	**INSPECT BLOWER UNIT FOR BLOCKAGE** • Is the blower unit intake and air filter clogged?	Yes	Remove the cause of the clogging. Replace the air filter if it is clogged. Then go to Step 23.
		No	Go to the next step.
11	**CHECK TO SEE WHETHER MALFUNCTION IS REFRIGERANT LINE LEAKAGE OR ELSEWHERE** • Verify if there is gas leakage from the system hoses using the gas leak tester. • Is there gas leakage?	Yes	If there is leakage from a system hose connection area, go to Step 13.If there is leakage other than from a system hose connection area, go to Step 15.
		No	Go to the next step.
12	**VISUALLY INSPECT REFRIGERANT LINE** • Is a system hose crushed?	Yes	Replace the crushed system hose. (See 07-11-13 REFRIGERANT LINE REMOVAL/INSTALLATION.) After performing the following servicing, go to Step 23. • Adjust the compressor oil to the specified level. • After discharging, charge with new refrigerant to the specified level.
		No	Go to Step 22.

SYMPTOM TROUBLESHOOTING [FULL-AUTO AIR CONDITIONER]

STEP	INSPECTION		ACTION
13	**CHECK TO SEE WHETHER MALFUNCTION IS IN REFRIGERANT LINE JOINT LOOSE OR O-RING** • Tighten the system hose connection area to the specified torque. (See 07-11-13 REFRIGERANT LINE REMOVAL/INSTALLATION.) • Has the leakage stopped?	Yes	Go to the next step.
		No	Go to Step 15.
14	**VISUALLY INSPECT REFRIGERANT LINE** • Is a system hose crushed?	Yes	Replace the crushed system hose. (See 07-11-13 REFRIGERANT LINE REMOVAL/INSTALLATION.) After performing the following servicing, go to Step 23. • Adjust the compressor oil to the specified level. • After discharging, charge with new refrigerant to the specified level.
		No	Adjust the compressor oil to the specified amount, then go to Step 23. (See 07-11-10 A/C COMPRESSOR REMOVAL/INSTALLATION.)
15	**VISUALLY INSPECT REFRIGERANT LINE** • Is a system hose crushed?	Yes	Replace the O-ring of the leaking area. Replace the crushed system hose. (See 07-11-13 REFRIGERANT LINE REMOVAL/INSTALLATION.) After performing the following servicing, go to Step 23. • Adjust the compressor oil to the specified level. • After discharging, charge with new refrigerant to the specified level.
		No	Replace the O-ring of the leaking area. After performing the following servicing, go to Step 23. • Adjust the compressor oil to the specified level. • After discharging, charge with new refrigerant to the specified level.
16	**CHECK TO SEE WHETHER MALFUNCTION IS IN CONDENSER AND EXPANSION VALVE OR ELSEWHERE** • Do the results of the refrigerant pressure inspection in Step 4 indicate vacuum on the low pressure side and extremely low pressure on the high pressure side?	Yes	Go to the next step.
		No	Go to Step 20.
17	**CHECK TO SEE WHETHER MALFUNCTION IS IN EXPANSION VALVE AND RECEIVER/DRIER OR ELSEWHERE** • Is there is no refrigerant pressure on the low pressure side, or is it normal?	Yes	Replace the condenser. (See 07-11-12 CONDENSER REMOVAL/INSTALLATION.) After performing the following servicing, go to Step 23. • Adjust the compressor oil to the specified level. • After discharging, charge with new refrigerant to the specified level.
		No	Go to the next step.
18	**CHECK TO SEE WHETHER MALFUNCTION IS IN CONDENSER OR EXPANSION VALVE** • Verify the condition of the outlet hose on the condenser high pressure side. • Is there condensation in the hose?	Yes	Replace the condenser. (See 07-11-12 CONDENSER REMOVAL/INSTALLATION.) After performing the following servicing, go to Step 23. • Adjust the compressor oil to the specified level. • After discharging, charge with new refrigerant to the specified level.
		No	Go to the next step.
19	**INSPECT EXPANSION VALVE** • Remove the expansion valve and verify its condition. • Is there refrigerant leakage or valve clogging?	Yes	If there is foreign matter clogging the valve, remove the foreign matter.If there is refrigerant leakage or clogging, replace the expansion valve.Perform discharge, charge with new refrigerant, and then go to Step 23.
		No	Install the expansion valve, then go to Step 22.
20	**CHECK TO SEE WHETHER MALFUNCTION IS IN A/C COMPRESSOR OR ELSEWTHERE** • Do the results of the refrigerant pressure inspection in Step 4 indicate low pressure on the high pressure side and high pressure on the low pressure side?	Yes	Replace the A/C compressor, then go to Step 23. (See 07-11-10 A/C COMPRESSOR REMOVAL/INSTALLATION.)
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [FULL-AUTO AIR CONDITIONER]

STEP	INSPECTION		ACTION
21	**INSPECT EVAPORATIVE TEMPERATURE SENSOR** • Inspect the evaporator temperature sensor. (See 07-11-3 A/C UNIT DISASSEMBLY/ASSEMBLY.) • Is it normal?	Yes	Verify the evaporator temperature sensor position. (See 07-11-3 A/C UNIT DISASSEMBLY/ASSEMBLY.) Then go to Step 23.
		No	Replace the evaporator temperature sensor, then go to Step 23. (See 07-11-3 A/C UNIT DISASSEMBLY/ASSEMBLY.)
22	**INSPECT AIR MIX DOOR RELATED PART INSTALLATION** • Remove the A/C unit. (See 07-11-2 A/C UNIT REMOVAL/INSTALLATION.) • Are the air mix link, air mix crank, and air mix rod of the A/C unit correctly and securely installed to their positions?	Yes	Go to the next step.
		No	Repair or install the links, cranks and rods securely in the proper position, then go to the next step. (See 07-11-3 A/C UNIT DISASSEMBLY/ASSEMBLY.)
23	**VERIFY THAT MALFUNCTION SYMPTOM OCCURS AFTER REPAIR** • If the refrigerant discharged during inspection has not been recharged, discharge and charge with new refrigerant to the specified level. • Does cool air blow out? (Are results of refrigerant system performance test normal?)	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

NO.7 NO COOL AIR [FULL-AUTO AIR CONDITIONER]

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7	No cool air
DESCRIPTION	• Magnetic clutch does not operate.
POSSIBLE CAUSE	• Malfunction in PCM A/C cut control system • Malfunction in climate control unit • Malfunction in refrigerant pressure switch • Malfunction in PCM (A/C signal) • Malfunction in PCM (IG1 signal) • Malfunction in A/C compressor • Malfunction in A/C relay • Malfunction in evaporator temperature sensor

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harnesses are connected correctly and undamaged.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT AIR BLOW OUT** • Does air blow out?	Yes	Go to the next step.
		No	Go to Step 1 of troubleshooting indexes No.1 and 2.
2	**INSPECT A/C COMPRESSOR OPERATION** • Start engine. • Turn A/C switch and fan switch on. • Does A/C compressor operate?	Yes	Go to Step 1 of troubleshooting index No.6.
		No	Go to the next step.
3	**INSPECT FOR DTC IN PCM** • Inspect for DTCs related to the PCM on-board diagnostic system. • Are any DTCs displayed?	Yes	Go to appropriate inspection procedure.
		No	Go to the next step.
4	**INSPECT TO SEE WHETHER MALFUNCTION IS IN CLIMATE CONTROL UNIT OR ELSEWHERE** • Does cool air blow out when terminal K of climate control unit connector (20-pin, A/C signal) is grounded?	Yes	Replace climate control unit, then go to Step 17. (See 07-40A-17 CLIMATE CONTROL UNIT REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].)
		No	Release short, then go to the next step.

SYMPTOM TROUBLESHOOTING [FULL-AUTO AIR CONDITIONER]

STEP	INSPECTION		ACTION
5*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN A/C SIGNAL CIRCUIT (BETWEEN REFRIGERANT PRESSURE SWITCH AND PCM) OR ELSEWHERE** • Test voltage at following terminal of refrigerant pressure switch. — Terminal D (A/C signal) • Is voltage **approx. 12 V**?	Yes	Go to Step 7.
		No	Go to the next step.
6*	**INSPECT TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN WIRING HARNESS (BETWEEN REFRIGERANT PRESSURE SWITCH AND PCM) OR PCM** • Test voltage at A/C signal terminal 1AU of PCM. • Is voltage **approx. 12 V**?	Yes	Repair wiring harness between PCM and refrigerant pressure switch, then go to Step 17.
		No	Inspect PCM, then go to Step 17.
7	**INSPECT TO SEE WHETHER MALFUNCTION IS IN REFRIGERANT PRESSURE SWITCH, REFRIGERANT AMOUNT, OR ELSEWHERE** • Does cool air blow out when terminals C and D of refrigerant pressure switch connector are shorted?	Yes	Go to Step 9.
		No	Go to the next step.
8*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN REFRIGERANT PRESSURE SWITCH AND CLIMATE CONTROL UNIT) OR ELSEWHERE** • Test voltage at following terminal of climate control unit. — Terminal K (20-pin, A/C signal) • Is voltage **approx. 12 V**?	Yes	Go to Step 10.
		No	Repair wiring harness between refrigerant pressure switch and climate control unit, then go to Step 17.
9	**INSPECT TO SEE WHETHER MALFUNCTION IS IN REFRIGERANT PRESSURE SWITCH OR REFRIGERANT AMOUNT** • Inspect refrigerant pressure switch. • Is it okay?	Yes	If refrigerant amount is empty, replace condenser, apply vacuum to refrigerant line for **more than 30 min** using vacuum pump, and add refrigerant to specified level, then go to Step 17. (See 07-11-12 CONDENSER REMOVAL/INSTALLATION.)
		No	Replace refrigerant pressure switch, then go to Step 17. (See 07-40A-15 REFRIGERANT PRESSURE SWITCH REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].)
10	**INSPECT TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN A/C CONTROL SIGNAL CIRCUIT (BETWEEN A/C RELAY AND PCM) OR ELSEWHERE** • Does cool air blow out when terminal E of A/C relay connector (A/C control signal) is grounded?	Yes	Release short, then go to the next step.
		No	Go to Step 12.
11*	**INSPECT TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN PCM OR WIRING HARNESS (BETWEEN A/C RELAY AND PCM)** • Test voltage at the A/C relay control signal terminal 1I of PCM. • Is voltage **approx. 12 V**?	Yes	Inspect PCM, then go to Step 17.
		No	Repair wiring harness between A/C relay and PCM, then go to Step 17.
12*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN MAGNETIC CLUTCH OR ELSEWHERE** • Test voltage at the following terminal of magnetic clutch thermal protector. — Terminal A (magnetic clutch operation signal) • Is voltage **approx. 12 V**?	Yes	Inspect magnetic clutch, then go to Step 17.
		No	Go to the next step.
13	**INSPECT FUSE** • Are A/C relay power supply fuses okay?	Yes	Go to the next step.
		No	Replace fuse, then go to Step 17. If fuse burns out immediately, go to the next step.

SYMPTOM TROUBLESHOOTING [FULL-AUTO AIR CONDITIONER]

STEP	INSPECTION		ACTION
14	**INSPECT WIRING HARNESS BETWEEN FUSE BLOCK AND A/C RELAY FOR LACK OF CONTINUITY** • Test voltages at following terminals of A/C relay. — Terminal C (A/C magnetic clutch power supply) — Terminal A (A/C control signal) • Are voltages **approx. 12 V**?	Yes	Go to the next step.
		No	Repair wiring harness between fuse block and A/C relay, then go to Step 17.
15	**INSPECT TO SEE WHETHER MALFUNCTION IS IN A/C RELAY OR WIRING HARNESS (BETWEEN A/C RELAY AND MAGNETIC CLUTCH) AND EVAPORATOR TEMPERATURE SENSOR** • Test voltage at the following terminal of A/C relay. — Terminal D (magnetic clutch operation signal) • Is voltage **approx. 12 V**?	Yes	Inspect wiring harness between A/C relay and magnetic clutch. • If above wiring harness is OK, go to the next step. • If above wiring harness malfunctions, repair wiring harness, then go to Step 17.
		No	Replace A/C relay, then go to Step 17.
16	**INSPECT EVAPORATOR TEMPERATURE SENSOR** • Inspect evaporator temperature sensor. • Is it okay?	Yes	Go to the next step.
		No	Replace evaporator temperature sensor, then go to the next step.
17	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT RECUR AFTER REPAIR** • Does cool air blow out? (Are the results of refrigerant system performance test okay?)	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

NO.8 NOISE WHILE OPERATING A/C SYSTEM [FULL-AUTO AIR CONDITIONER]

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8	**Noise while operating A/C system.**
DESCRIPTION	• Noise from magnetic clutch, A/C compressor, hose or refrigerant line.
POSSIBLE CAUSE	• Magnetic clutch operation noise • A/C compressor vane noise • A/C compressor slippage noise • Hose or refrigerant line interference noise

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CHECK A/C COMPRESSOR VANE NOISE** • Is there a jingling, popping, beeping, or buzzing sound (A/C compressor vane noise)?	Yes	Go to Step 5.
		No	Go to the next step.
2	**INSPECT A/C COMPRESSOR SLIPPAGE NOISE** • Is there a squeaking or whirling sound (A/C compressor slippage noise)?	Yes	Go to Step 14.
		No	Go to the next step.
3	**INSPECT A/C COMPRESSOR INTERFERENCE NOISE** • Is there a rattling or vibrating sound (interference noise)?	Yes	Go to Step 18.
		No	Go to the next step.
4	**INSPECT MAGNETIC CLUTCH OPERATION NOISE** • Is there a clicking sound (magnetic clutch operation noise)?	Yes	Adjust clearance between pressure plate of magnetic clutch and A/C compressor pulley, then go to Step 19. (See 07-40A-11 MAGNETIC CLUTCH ADJUSTMENT [FULL-AUTO AIR CONDITIONER].)
		No	Condition is normal. (Recheck malfunction symptoms.)
5	**INSPECT A/C COMPRESSOR NOISE TIME** • Is noise heard continuously for **more than 3 s** after A/C compressor comes on?	Yes	Go to the next step.
		No	Condition is normal. (Noise occurs for **2—3 s** immediately after A/C compressor turns on.)
6	**INSPECT IDLE SPEED** • Inspect idle speed. (See 01-10-3 ENGINE TUNE-UP [L8, LF].) • Is it okay?	Yes	Go to the next step.
		No	Follow the repair instruction described in section F, then go to Step 19.

SYMPTOM TROUBLESHOOTING [FULL-AUTO AIR CONDITIONER]

STEP	INSPECTION		ACTION
7	**INSPECT REFRIGERANT AMOUNT** • Inspect refrigerant amount. • Is it okay?	Yes	Go to Step 10.
		No	Go to the next step.
8	**INSPECT REFRIGERANT LINES** • Inspect refrigerant lines. — Is piping free of damage and cracks? — Are piping connections free of oil grime? (Visual inspection) — Are piping connections free of gas leakage? — Are piping installation points on condenser free of gas leakage? — Are piping installation points on receiver/drier free of gas leakage? — Are piping installation points on A/C compressor free of gas leakage? — Are piping installation points on A/C unit free of gas leakage — Perform gas leak inspection using gas leak tester. • Are above items okay?	Yes	Go to the next step.
		No	If piping or A/C component(s) is damaged or cracked, replace then go to Step 19. If there is gas leakage, repair or replace connection and replace condenser*1, then go to Step 19.
9	**INSPECT EVAPORATOR PIPING CONNECTIONS IN A/C UNIT FOR GAS LEAKAGE** • Are piping connections for evaporator in A/C unit free of gas leakage?	Yes	Adjust refrigerant amount to specified level, then go to Step 19.
		No	If piping is damaged or cracked, replace then go to Step 19. If there is gas leakage, repair or replace connection and replace condenser*1, then go to Step 19.
10	**CHECK TO SEE WHETHER MALFUNCTION IS IN COMPRESSOR OIL OR ELSEWHERE** • Add **20 ml {20 cc, 0.8 fl oz}** of compressor oil. • Is noise heard when racing engine?	Yes	Go to the next step.
		No	Troubleshooting completed. Explain repair to customer.
11	**CHECK TO SEE WHETHER MALFUNCTION IS IN A/C COMPRESSOR OR ELSEWHERE** • Drain compressor oil. • Is it contaminated with metal particles?	Yes	Go to the next step.
		No	Replace A/C compressor, then go to Step 19. (See 07-11-10 A/C COMPRESSOR REMOVAL/INSTALLATION.)
12	**CHECK TO SEE WHETHER MALFUNCTION IS SOMEWHERE IN A/C SYSTEM OR ELSEWHERE** • Is compressor oil whitish and mixed with water?	Yes	Replace A/C compressor, evaporator, expansion valve, condenser and refrigerant line, then go to Step 19. (See 07-11-10 A/C COMPRESSOR REMOVAL/INSTALLATION.) (See 07-11-3 A/C UNIT DISASSEMBLY/ASSEMBLY.) (See 07-11-12 CONDENSER REMOVAL/INSTALLATION.) (See 07-11-13 REFRIGERANT LINE REMOVAL/INSTALLATION.)
		No	Go to the next step.
13	**INSPECT A/C COMPRESSOR OIL** • Is compressor oil darker than normal and contaminated with aluminum chips?	Yes	Replace A/C compressor and condenser, then go to Step 19. (Since A/C compressor may be worn and receiver/drier may be clogged, replacement of receiver/drier is necessary.) (See 07-11-10 A/C COMPRESSOR REMOVAL/INSTALLATION.) (See 07-11-12 CONDENSER REMOVAL/INSTALLATION.)
		No	Condition is normal. Recheck malfunction symptoms.
14	**CHECK TO SEE WHETHER MALFUNCTION IS IN A/C COMPRESSOR OR ELSEWHERE** • Is noise heard immediately after A/C compressor is stopped?	Yes	Replace A/C compressor, then go to Step 19. (A/C compressor discharge valve left open) (See 07-11-10 A/C COMPRESSOR REMOVAL/INSTALLATION.)
		No	Go to the next step.
15	**INSPECT DRIVE BELT** • Inspect drive belt. (See 01-10-5 DRIVE BELT INSPECTION [L8, LF].) • Is it okay?	Yes	Go to the next step.
		No	Adjust or replace drive belt, then go to Step 19.
16	**INSPECT DRIVE BELT CONDITION** • Is drive belt worn? • Does it have foreign material imbedded in it, or have oil on it?	Yes	Remove obstruction, remove oil, or replace drive belt, then go to Step 19.
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [FULL-AUTO AIR CONDITIONER]

STEP	INSPECTION		ACTION
17	**INSPECT MAGNETIC CLUTCH** • Inspect magnetic clutch. (See 07-40A-12 MAGNETIC CLUTCH INSPECTION [FULL-AUTO AIR CONDITIONER].) • Is it okay?	Yes	Replace A/C compressor (excluding pressure plate, A/C compressor pulley, and stator), then go to Step 19. (See 07-11-10 A/C COMPRESSOR REMOVAL/ INSTALLATION.)
		No	Replace magnetic clutch, then go to Step 19. (See 07-40A-8 MAGNETIC CLUTCH DISASSEMBLY/ ASSEMBLY [FULL-AUTO AIR CONDITIONER].)
18	**CHECK TO SEE WHETHER MALFUNCTION IS IN A/C COMPRESSOR OR REFRIGERANT LINES** • Is noise emitted from A/C compressor?	Yes	Visually inspect A/C compressor, replace appropriate parts if necessary, then go to the next step.
		No	If noise is due to refrigerant lines, repair detached or missing clips, tighten loose bolts, then go to the next step.
19	**VERIFY THAT MALFUNCTION SYMPTOM OCCURS AFTER REPAIR** • Has A/C compressor noise stopped?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

*1 : If there is gas leakage, air enters into the A/C system. The desiccant within the receiver/drier absorbs the moisture from the air and becomes saturated. If the A/C system is used in this condition, the inside of the A/C compressor will begin to rust due to this moisture, which may cause lock up or noise to occur. Therefore, replacement of the receiver/drier is necessary.

07-03B SYMPTOM TROUBLESHOOTING [MANUAL AIR CONDITIONER]

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FOREWORD [MANUAL AIR CONDITIONER] 07-03B–2
TROUBLESHOOTING INDEX [MANUAL AIR CONDITIONER] 07-03B–2
NO.1 INSUFFICIENT AIR (OR NO AIR) BLOWN FROM VENTS [MANUAL AIR CONDITIONER] 07-03B–2
NO.2 AMOUNT OF AIR BLOWN FROM VENTS DOES NOT CHANGE [MANUAL AIR CONDITIONER] 07-03B–3
NO.3 AIR INTAKE MODE DOES NOT CHANGE [MANUAL AIR CONDITIONER] 07-03B–5
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SYMPTOM TROUBLESHOOTING [MANUAL AIR CONDITIONER]

HVAC SYSTEM WIRING DIAGRAM [MANUAL AIR CONDITIONER]

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SYMPTOM TROUBLESHOOTING [MANUAL AIR CONDITIONER]

FOREWORD [MANUAL AIR CONDITIONER]

id0703c2800200

- The areas for inspection (steps) are given according to various circuit malfunctions. Use the following chart to verify the symptoms of the trouble in order to diagnose the appropriate area.

TROUBLESHOOTING INDEX [MANUAL AIR CONDITIONER]

id0703c2800300

No.	TROUBLESHOOTING ITEM	DESCRIPTION
1	Insufficient air (or no air) blown from vents.	• Problem with each vent and/or duct. • Airflow mode does not change.
2	Amount of air blown from vents does not change.	• Malfunction in blower system.
3	Air intake mode does not change.	• Air intake mode does not change when switching REC/FRESH mode.
4	No temperature control with climate control unit.	• Malfunction in A/C unit and/or climate control unit air mix system or both.
5	Windshield fogged.	• A/C compressor does not operate while airflow mode is in DEFROSTER or HEAT/DEF modes. • Air intake mode does not change to FRESH while airflow mode is in DEFROSTER or HEAT/DEF modes.
6	Air from vents not cold enough.	• Magnetic clutch operates but A/C system malfunctions.
7	No cool air.	• Magnetic clutch does not operate.
8	Noise while operating A/C system.	• Noise from magnetic clutch, A/C compressor, hose or refrigerant line.

NO.1 INSUFFICIENT AIR (OR NO AIR) BLOWN FROM VENTS [MANUAL AIR CONDITIONER]

id0703c2800400

1	**Insufficient air (or no air) blown from vents.**
DESCRIPTION	• Problem with each vent and/or duct. • Airflow mode does not change.
POSSIBLE CAUSE	• Malfunction in airflow mode actuator • Malfunction in VENT mode system • Malfunction in HEAT mode system • Malfunction in DEFROSTER mode system

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT AIRFLOW MODE ACTUATOR** • Inspect airflow mode actuator. • Is it okay?	Yes	Go to the next step.
		No	Repair or replace malfunctioning part in accordance with further inspection result.
2	**INSPECT TO SEE WHETHER MALFUNCTION IS IN VENT MODE OR OTHER MODES** • Does air blow out when in VENT mode?	Yes	Go to Step 5.
		No	Go to the next step.
3	**INSPECT VENT** • Is vent clogged?	Yes	Remove obstruction, then go to Step 9.
		No	Go to the next step.
4	**VERIFY THAT DUCT IN DASHBOARD IS INSTALLED** • Is duct in dashboard properly installed?	Yes	Inspect duct for clogging, deformity and air leakage, then go to Step 9.
		No	Install duct securely in the proper position, then go to Step 9.
5	**INSPECT TO SEE WHETHER MALFUNCTION IS IN HEAT MODE OR DEFROSTER MODE** • Does air blow out when in HEAT mode?	Yes	Go to the next step.
		No	Inspect vent for clogging, then go to Step 9.
6	**INSPECT DEFROSTER MODE** • Does air blow out when in DEFROSTER mode?	Yes	Operation is okay. Recheck malfunction symptoms.
		No	Go to the next step.
7	**INSPECT VENT** • Is vent clogged?	Yes	Remove obstruction, then go to Step 9.
		No	Go to the next step.
8	**VERIFY THAT DEFROSTER DUCT IS INSTALLED** • Is defroster duct properly installed?	Yes	Inspect duct for clogging, deformity, and air leakage, then go to the next step.
		No	Install duct securely in proper position, then go to the next step.

SYMPTOM TROUBLESHOOTING [MANUAL AIR CONDITIONER]

STEP	INSPECTION		ACTION
9	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT RECUR AFTER REPAIR** • Does air blow out?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

NO.2 AMOUNT OF AIR BLOWN FROM VENTS DOES NOT CHANGE [MANUAL AIR CONDITIONER]

id0703c2800500

2	**Amount of air blown from vents does not change.**
DESCRIPTION	• Malfunction in blower system.
POSSIBLE CAUSE	• Malfunction in A/C unit • Malfunction in blower motor • Malfunction in power MOS FET system • Malfunction in climate control unit

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harnesses are connected correctly and undamaged.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT HEATER 40 A FUSE** • Inspect HEATER 40 A fuse. • Is it okay?	Yes	Go to the next step.
		No	Replace fuse, then go to Step 15. If fuse burns out immediately, go to the next step.
2	**INSPECT TO SEE WHETHER MALFUNCTION IS IN A/C UNIT OR ELSEWHERE** • Switch the ignition to ON. • Turn the fan switch to ON position. • Recirculate air inside vehicle. • Does blower fan rotate smoothly?	Yes	Go to Step 4.
		No	Go to the next step.
3	**INSPECT AIR DIST UNIT INTAKE VENT** • Is intake vent of air dist unit clogged?	Yes	Remove obstruction, then go to Step 15.
		No	Inspect if there are any obstruction in passage between air dist unit to A/C unit, then go to Step 15.
4*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN BLOWER RELAY SYSTEM OR POWER MOS FET SYSTEM** • Switch the ignition to ON. • Turn the fan switch to OFF position. • Test voltage at the following terminal of blower motor. — Terminal B (blower motor operation signal) • Is voltage **approx. 12 V**?	Yes	Go to Step 8.
		No	Go to the next step.
5*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN FUSE BLOCK AND BLOWER RELAY) OR ELSEWHERE** • Test voltage at the following terminal of blower relay. — Terminal E (IG2 signal) — Terminal C (B+ signal) • Is voltage **approx. 12 V**?	Yes	Go to the next step.
		No	Repair wiring harness between blower relay and HEATER 40 A fuse, then go to Step 15.
6*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN BLOWER RELAY AND GROUND) OR ELSEWHERE** • Test voltage at the following terminal of blower relay. — Terminal A (GND signal) • Is voltage **approx. 0 V**?	Yes	Go to the next step.
		No	Repair wiring harness between blower relay and ground, then go to Step 15.

SYMPTOM TROUBLESHOOTING [MANUAL AIR CONDITIONER]

STEP	INSPECTION		ACTION
7*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN BLOWER RELAY AND BLOWER MOTOR) OR BLOWER RELAY** • Test voltage at the following terminal of blower relay. — Terminal D (blower motor operation signal) • Is voltage **approx. 12 V**?	Yes	Repair wiring harness between blower relay and blower motor, then go to Step 15.
		No	Replace blower relay, then go to Step 15.
8*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN BLOWER MOTOR OR ELSEWHERE** • Test voltage at the following terminal of blower motor. — Terminal B (blower motor operation signal) • Is voltage **approx. 12 V**?	Yes	Go to the next step.
		No	Inspect blower motor, then go to Step 15.
9*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN BLOWER MOTOR AND POWER MOS FET) OR ELSEWHERE** • Test voltage at the following terminal of power MOS FET. — Terminal C (blower motor operation signal) • Is voltage **approx. 12 V**?	Yes	Go to the next step.
		No	Repair wiring harness between blower motor and power MOS FET, then go to Step 15.
10*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN POWER MOS FET AND GROUND) OR ELSEWHERE** • Test voltage at the following terminal of power MOS FET. — Terminal D (power MOS FET GND) • Is voltage **approx. 0 V**?	Yes	Go to the next step.
		No	Repair wiring harness between power MOS FET and ground, then go to Step 15.
11	**INSPECT A/C UNIT** • Inspect fan in A/C unit. — Is fan free of interference with A/C unit case? — Is fan free of foreign material and obstruction? • Is fan okay?	Yes	Go to the next step.
		No	Remove obstruction, repair or replace fan and A/C unit case, then go to Step 15.
12*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN POWER MOS FET OR ELSEWHERE** • Disconnect power MOS FET connector. • Turn the fan switch to 1st position from off. • Test voltage at the following terminal of power MOS FET. — Terminal B (blower motor control signal) • Is voltage **approx. 10 V**?	Yes	Replace power MOS FET, then go to Step 15. (See 07-40B-7 POWER METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (POWER MOS FET) REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER].)
		No	Go to the next step.
13*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN POWER MOS FET AND CLIMATE CONTROL UNIT) OR ELSEWHERE** • Switch the ignition to off. • Disconnect climate control unit connector. • Inspect for continuity at the following terminals between power MOS FET and climate control unit. — Terminal B—E (20-pin, blower motor feedback signal) — Terminal A—C (20-pin, blower motor control signal) • Is there continuity?	Yes	Go to the next step.
		No	Repair wiring harness between power MOS FET and climate control unit, then go to Step 15.

SYMPTOM TROUBLESHOOTING [MANUAL AIR CONDITIONER]

STEP	INSPECTION		ACTION
14*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN CLIMATE CONTROL UNIT OR WIRING HARNESS (SHORT TO GROUND BETWEEN POWER MOS FET AND CLIMATE CONTROL UNIT)** • Inspect for continuity at the following terminal between power MOS FET and ground. — Terminal A (blower motor control signal)— ground • Is there continuity?	Yes	Repair wiring harness between power MOS FET and ground, then go to the next step.
		No	Replace climate control unit, then go to the next step. (See 07-40B-15 CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [MANUAL AIR CONDITIONER].)
15	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT RECUR AFTER REPAIR** • Is air discharged from vent?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

NO.3 AIR INTAKE MODE DOES NOT CHANGE [MANUAL AIR CONDITIONER]

id0703c2802900

3	**Air intake mode does not change.**
DESCRIPTION	• Air intake mode does not change when switching REC/FRESH mode.
POSSIBLE CAUSE	• Malfunction in air intake actuator • Malfunction in air intake door

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harnesses are connected correctly and undamaged.

Diagnostic procedure

STEP	INSPECTION		ACTION
1*	**INSPECT TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN AIR INTAKE ACTUATOR, WIRING HARNESS (BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR) OR ELSEWHERE** • Switch the ignition to ON. • Test voltages at the following terminals of climate control unit. — Terminal G (20-pin, ACTR POWER) — Terminal I (20-pin, ACTR SIGNAL) — Terminal H (20-pin, GND) (See 07-40B-15 CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER].) • Are voltages okay?	Yes	Go to the next step.
		No	Go to Step 3.
2*	**INSPECT TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN AIR INTAKE ACTUATOR OR WIRING HARNESS (BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR)** • Test voltages at the following terminals of air intake actuator. — Terminal A — Terminal C • Are voltages as shown below? — Terminal A: **approx. 0.5 V** during RECIRCULATE and **approx. 10 V** during FRESH — Terminal C: **approx. 10 V** during RECIRCULATE and **approx. 0.5 V** during FRESH	Yes	Replace air intake actuator, then go to Step 8. (See 07-40B-3 AIR INTAKE ACTUATOR REMOVAL/ INSTALLATION [MANUAL AIR CONDITIONER].)
		No	Repair wiring harness between climate control unit and air intake actuator, then go to Step 8.

SYMPTOM TROUBLESHOOTING [MANUAL AIR CONDITIONER]

STEP	INSPECTION		ACTION
3	**INSPECT TO SEE WHETHER MALFUNCTION IS IN AIR INTAKE ACTUATOR OR ELSEWHERE** • Disconnect air intake actuator connector. • Test voltages at the following terminals of climate control unit. — Terminal G (20-pin, ACTR POWER) — Terminal I (20-pin, ACTR SIGNAL) (See 07-40B-15 CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER].) • Are voltages okay?	Yes	Inspect air intake actuator, then go to Step 8.
		No	Go to the next step.
4	**INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (SHORT TO B+ BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR) OR ELSEWHERE** • Disconnect climate control unit connector. • Test voltages at the following terminals of climate control unit. — Terminal G (20-pin, ACTR POWER) — Terminal I (20-pin, ACTR SIGNAL) • Are voltages **approx. 0 V**?	Yes	Go to the next step.
		No	Repair wiring harness between climate control unit and air intake actuator, then go to Step 8.
5	**INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (SHORT TO GROUND BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR) OR ELSEWHERE** • Switch the ignition to off. • Inspect for continuity at the following terminals between climate control unit and ground. — Terminal G (20-pin, ACTR POWER) — Terminal I (20-pin, ACTR SIGNAL) • Is there continuity?	Yes	Repair wiring harness between climate control unit and air intake actuator, then go to Step 8.
		No	Go to the next step.
6	**INSPECT AIR INTAKE LINK** • Inspect air intake links. — Is there grease on link? — Are links securely and properly installed? — Are links free of obstructions and hindrances? • Are above items okay?	Yes	Go to the next step.
		No	Apply grease to links. If any links are damaged, replace air intake actuator, then go to Step 8.
7	**INSPECT TO SEE WHETHER MALFUNCTION IS IN CLIMATE CONTROL UNIT OR AIR INTAKE DOOR** • Inspect blower unit air intake door. — Is door free of obstructions, cracks, and damage? — Are doors securely and properly installed? • Are above items okay?	Yes	Replace climate control unit, then go to the next step. (See 07-40B-15 CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER].)
		No	Remove obstruction, or install doors in proper position. If any doors are cracked or damaged, replace them, then go to the next step.
8	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT RECUR AFTER REPAIR** • Does air intake mode change smoothly?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

SYMPTOM TROUBLESHOOTING [MANUAL AIR CONDITIONER]

NO.4 NO TEMPERATURE CONTROL WITH CLIMATE CONTROL UNIT [MANUAL AIR CONDITIONER]

id0702c2812400

4	**No temperature control with climate control unit.**
DESCRIPTION	• Malfunction in A/C unit and/or climate control unit air intake system.
POSSIBLE CAUSE	• A/C unit air intake link, air intake crank, air intake rod malfunction • Climate control unit rack-and-pinion, air intake wire malfunction • A/C unit air intake door malfunction • Heater piping malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT COOLANT TEMPERATURE** • Is coolant sufficiently warmed up?	Yes	Go to the next step.
		No	Warm engine up, then go to Step 8.
2	**INSPECT A/C UNIT AIR INTAKE SYSTEM** • Inspect A/C unit air intake links, air intake cranks, air intake rods, air intake actuator. — Is there grease on links and cranks? — Are links, cranks, and rods securely installed in their proper positions? • Are above items okay?	Yes	Go to the next step.
		No	Apply grease or install links, cranks, and rods securely in their proper positions, repair or replace air intake actuator, then go to Step 8.
3	**VERIFY THAT AIR INTAKE WIRE FROM A/C UNIT IS POSITIONED SECURELY AND CORRECTLY (IF AVAILABLE)** • Is air intake wire securely installed in the correct position in relation to A/C unit air intake links?	Yes	Go to the next step.
		No	Adjust air intake wire or install securely in correct position, then go to Step 8.
4	**INSPECT CLIMATE CONTROL UNIT** • Inspect climate control unit. (See 07-40B-15 CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER].) • Is climate control unit okay?	Yes	Go to the next step.
		No	Repair or replace climate control unit, then go to Step 8. (See 07-40B-15 CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER].)
5	**INSPECT A/C UNIT** • Is there any foreign material or obstruction in A/C unit air intake doors?	Yes	Remove obstruction, then go to Step 8.
		No	Go to the next step.
6	**INSPECT A/C UNIT AIR INTAKE DOORS** • Is A/C unit air intake door securely and properly installed?	Yes	Inspect air intake door for cracks or damage, then go to the next step.
		No	Install air intake door securely in proper position, then go to the next step.
7	**INSPECT HEATER LINES** • Inspect heater lines. — Is heater piping free of damage and cracks? — Are heater piping connections free of engine coolant leakage? — Are heater piping connections securely tightened? — Are heater piping installation points on A/C unit free of engine coolant leakage? • Are above items okay?	Yes	Operation is okay. Recheck malfunction symptoms.
		No	If heater piping connections is loosed, tighten connections with specified torque. Repair or replace heater piping, then go to the next step.
8	**VERIFY THAT MALFUNCTION SYMPTOM OCCURS AFTER REPAIR** • Does unit operate in every temperature setting?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

SYMPTOM TROUBLESHOOTING [MANUAL AIR CONDITIONER]

NO.5 WINDSHIELD FOGGED [MANUAL AIR CONDITIONER]

id0703c2801900

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

5	**Windshield fogged.**
DESCRIPTION	• A/C compressor does not operate while airflow mode is in DEFROSTER or HEAT/DEF modes. • Air intake mode does not change to FRESH while airflow mode is in DEFROSTER or HEAT/DEF modes.
POSSIBLE CAUSE	• Climate control unit (B+ signal) system malfunction • Air intake actuator malfunction • Climate control unit (RECIRCULATE, FRESH signal) system malfunction • Malfunction in A/C unit air intake doors

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**COOL AIR BLOW OUT INSPECTION** • When both A/C and fan switch in climate control unit are on, does cool air blow out from front vent?	Yes	Go to the next step.
		No	Go to Step 1 of troubleshooting index No.8.
2	**INSPECT CLIMATE CONTROL UNIT POWER SUPPLY FUSE FOR B+ SIGNAL** • Is climate control unit power supply fuse for B+ signal okay?	Yes	Go to the next step.
		No	Inspect for a short to ground on blown fuse circuit. Repair or replace as necessary. Install appropriate amperage fuse.
3	**INSPECT AIR INTAKE ACTUATOR** • Inspect air intake actuator. — Is there grease on link? — Is link securely and properly positioned? — Is link free of obstructions? • Are above items okay?	Yes	Go to the next step.
		No	Apply grease or install link properly and securely, remove obstruction, then go to Step 14.
*4	**INSPECT WIRING HARNESS BETWEEN FUSE BLOCK AND CLIMATE CONTROL UNIT FOR CONTINUITY** • Disconnect climate control unit connector (20-pin). • Switch the ignition to ON. • Test voltage at climate control unit connector terminal B (B+ signal). • Is voltage **approx. 12 V**?	Yes	Go to the next step.
		No	Repair wiring harness between fuse block and climate control unit, then go to Step 14.
*5	**INSPECT WIRING HARNESS BETWEEN CLIMATE CONTROL UNIT AND GROUND FOR VOLTAGE** • Test voltage at climate control unit connector terminal H (Ground). • Is voltage **approx. 0V**?	Yes	Go to the next step.
		No	Repair wiring harness between climate control unit and ground, then go to Step 14.
6	**VERIFY WHETHER MALFUNCTION IS IN A/C UNIT AIR INTAKE DOOR OR ELSEWHERE** • Switch the ignition to off. • Connect climate control unit connector (20-pin). • Remove air intake actuator. • Switch the ignition to ON. • Set fan switch to 4th position. • Does air intake mode (RECIRCULATE, FRESH) change smoothly when air intake link is operated by hand?	Yes	Go to the next step.
		No	Go to Step 12.
7	**INSPECT AIR INTAKE ACTUATOR** • Inspect air intake actuator. (See 07-02-2 DTC INSPECTION.) • Is it okay?	Yes	Go to the next step.
		No	Replace air intake actuator, go to Step 14. (See 07-40B-3 AIR INTAKE ACTUATOR REMOVAL/ INSTALLATION [MANUAL AIR CONDITIONER].)
8	**INSPECT AIR INTAKE SELECTOR SWITCH AND DEFROSTER SWITCH IN CLIMATE CONTROL UNIT** • Test voltage at climate control unit connector (20-pin) terminals G and I. • Is it okay?	Yes	Go to the next step.
		No	Replace climate control unit, then go to Step 14. (See 07-40B-15 CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [MANUAL AIR CONDITIONER].)

SYMPTOM TROUBLESHOOTING [MANUAL AIR CONDITIONER]

STEP	INSPECTION		ACTION
*9	**INSPECT WIRING HARNESS BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR FOR CONTINUITY** • Switch the ignition to off. • Is there continuity between following climate control unit connector (20-pin) terminal and air intake actuator connector terminal? — Terminal A —Terminal G (ACTR POWER) — Terminal C —Terminal I (ACTR SIGNAL)	Yes	Go to the next step.
		No	Repair wiring harness between climate control unit and air intake actuator, then go to Step 14.
*10	**INSPECT WIRING HARNESS BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR FOR SHORT TO GROUND** • Is there continuity between following climate control unit connector (20-pin) terminal and ground? — Terminal G (ACTR POWER) — Terminal I (ACTR SIGNAL)	Yes	Repair wiring harness between climate control unit and air intake actuator, then go to Step 14.
		No	Go to the next step.
*11	**INSPECT WIRING HARNESS BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR FOR SHORT TO B+** • Switch the ignition to ON. • Test voltage at following climate control unit connector (20-pin) terminal. — Terminal G (ACTR POWER) — Terminal I (ACTR SIGNAL) • Is voltage **approx. 12 V**?	Yes	Repair wiring harness between climate control unit and air intake actuator, then go to Step 14.
		No	Replace climate control unit, then go to Step 14. (See 07-40B-15 CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [MANUAL AIR CONDITIONER].)
12	**INSPECT A/C UNIT AIR INTAKE DOOR** • Is there any foreign material or obstruction in A/C unit air intake door?	Yes	Remove obstruction, then go to Step 14.
		No	Go to the next step.
13	**VERIFY THAT A/C UNIT AIR INTAKE DOOR IS POSITIONED SECURELY AND PROPERLY** • Is A/C unit air intake door securely and properly positioned?	Yes	Inspect air intake door for cracks or damage, then go to the next step.
		No	Install air intake door securely in proper position, then go to the next step.
14	**VERIFY THAT MALFUNCTION SYMPTOM OCCURS AFTER REPAIR** • Does malfunction disappear?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

NO.6 AIR FROM VENTS NOT COLD ENOUGH [MANUAL AIR CONDITIONER]

id0702c2812500

6	**Air from vents not cold enough.**
DESCRIPTION	• Magnetic clutch operates but A/C system malfunctions.
POSSIBLE CAUSE	• Drive belt malfunction • Refrigerant pressure switch malfunction • Malfunction in blower unit or condenser • Cooling fan system malfunction • Condenser or related part malfunction • A/C unit or condenser malfunction • Receiver/drier or expansion valve malfunction (valve closes too mach) • Malfunction in refrigerant lines • A/C compressor system malfunction, insufficient compressor oil • Over filling of compressor oil, malfunction in expansion valve or A/C unit air mix link system • Evaporative temperature sensor malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT REFRIGERANT SYSTEM PERFORMANCE** • Perform refrigerant system performance test. (See 07-10-6 REFRIGERANT SYSTEM PERFORMANCE TEST.) • Is the operation normal?	Yes	Operation is normal. (Recheck malfunction symptoms.)
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [MANUAL AIR CONDITIONER]

STEP	INSPECTION		ACTION
2	**INSPECT DRIVE BELT** • Inspect the drive belt. (See 01-10-5 DRIVE BELT INSPECTION [L8, LF].) • Is it normal?	Yes	Go to the next step.
		No	Adjust or replace the drive belt, then the next step. (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].)
3	**INSPECT REFRIGERANT PRESSURE SWITCH** • Inspect the refrigerant pressure switch. (See 07-40B-14 REFRIGERANT PRESSURE SWITCH INSPECTION [MANUAL AIR CONDITIONER].) • Is it normal?	Yes	Go to the next step.
		No	Replace the refrigerant pressure switch, then go to Step 23. (See 07-40B-15 CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [MANUAL AIR CONDITIONER].)
4	**CHECK TO SEE WHETHER MALFUNCTION IS IN BLOWER UNIT INTAKE AND CONDENSER OR ELSEWHERE** • Perform refrigerant pressure check. (See 07-10-5 REFRIGERANT PRESSURE CHECK.) • Are the refrigerant high-pressure and low-pressure values both high?	Yes	Go to the next step.
		No	After recording the inspection results, go to Step 9.
5	**INSPECT COOLING FAN OPERATION** • Verify the cooling fan operation. (See 01-12-12 COOLING FAN MOTOR INSPECTION [L8, LF].) • Is the cooling fan operation normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning location according to the inspection results. Then go to Step 23.
6	**VISUALLY INSPECT CONDENSER** • Is the condenser fin clogged or obstructed by foreign material?	Yes	Remove the foreign material. Repair the condenser fin. Then go to Step 23.
		No	Go to the next step.
7	**CHECK TO SEE WHETHER MALFUNCTION IS IN EXPANSION VALVE OR ELSEWHERE** • Verify the condition of the low pressure hose while the A/C is operating. • Is there frost or condensation adhering?	Yes	Replace the expansion valve. After performing the following servicing, go to Step 23. • Adjust the compressor oil to the specified level. • After discharging, charge with new refrigerant to the specified level.
		No	Go to the next step.
8	**INSPECT AIR MIX DOOR RELATED PART INSTALLATION** • Remove the A/C unit. (See 07-11-2 A/C UNIT REMOVAL/ INSTALLATION.) • Are the air mix link, air mix crank, and air mix rod of the A/C unit correctly and securely installed to their positions?	Yes	Adjust the compressor oil to the specified amount, then go to Step 23. (See 07-11-10 A/C COMPRESSOR REMOVAL/ INSTALLATION.)
		No	Repair or install the links, cranks and rods securely in the proper position, then go to Step 23.
9	**CHECK TO SEE WHETHER MALFUNCTION IS IN BLOWER UNIT AND REFRIGERANT PRESSURE LINE OR ELSEWHERE** • Are the refrigerant high-pressure and low-pressure values low?	Yes	Go to the next step.
		No	Go to Step 16.
10	**INSPECT BLOWER UNIT FOR BLOCKAGE** • Is the blower unit intake and air filter clogged?	Yes	Remove the cause of the clogging.Replace the air filter if it is clogged. Then go to Step 23.
		No	Go to the next step.
11	**CHECK TO SEE WHETHER MALFUNCTION IS REFRIGERANT LINE LEAKAGE OR ELSEWHERE** • Verify if there is gas leakage from the system hoses using the gas leak tester. • Is there gas leakage?	Yes	If there is leakage from a system hose connection area, go to Step 13.If there is leakage other than from a system hose connection area, go to Step 15.
		No	Go to the next step.
12	**VISUALLY INSPECT REFRIGERANT LINE** • Is a system hose crushed?	Yes	Replace the crushed system hose. (See 07-11-13 REFRIGERANT LINE REMOVAL/ INSTALLATION.) After performing the following servicing, go to Step 23. • Adjust the compressor oil to the specified level. • After discharging, charge with new refrigerant to the specified level.
		No	Go to Step 22.

SYMPTOM TROUBLESHOOTING [MANUAL AIR CONDITIONER]

STEP	INSPECTION		ACTION
13	**CHECK TO SEE WHETHER MALFUNCTION IS IN REFRIGERANT LINE JOINT LOOSE OR O-RING** • Tighten the system hose connection area to the specified torque. (See 07-11-13 REFRIGERANT LINE REMOVAL/INSTALLATION.) • Has the leakage stopped?	Yes	Go to the next step.
		No	Go to Step 15.
14	**VISUALLY INSPECT REFRIGERANT LINE** • Is a system hose crushed?	Yes	Replace the crushed system hose. (See 07-11-13 REFRIGERANT LINE REMOVAL/INSTALLATION.) After performing the following servicing, go to Step 23. • Adjust the compressor oil to the specified level. • After discharging, charge with new refrigerant to the specified level.
		No	Adjust the compressor oil to the specified amount, then go to Step 23. (See 07-11-10 A/C COMPRESSOR REMOVAL/INSTALLATION.)
15	**VISUALLY INSPECT REFRIGERANT LINE** • Is a system hose crushed?	Yes	Replace the O-ring of the leaking area. Replace the crushed system hose. (See 07-11-13 REFRIGERANT LINE REMOVAL/INSTALLATION.) After performing the following servicing, go to Step 23. • Adjust the compressor oil to the specified level. • After discharging, charge with new refrigerant to the specified level.
		No	Replace the O-ring of the leaking area. After performing the following servicing, go to Step 23. • Adjust the compressor oil to the specified level. • After discharging, charge with new refrigerant to the specified level.
16	**CHECK TO SEE WHETHER MALFUNCTION IS IN CONDENSER AND EXPANSION VALVE OR ELSEWHERE** • Do the results of the refrigerant pressure inspection in Step 4 indicate vacuum on the low pressure side and extremely low pressure on the high pressure side?	Yes	Go to the next step.
		No	Go to Step 20.
17	**CHECK TO SEE WHETHER MALFUNCTION IS IN EXPANSION VALVE AND RECEIVER/DRIER OR ELSEWHERE** • Is there is no refrigerant pressure on the low pressure side, or is it normal?	Yes	Replace the condenser. (See 07-11-12 CONDENSER REMOVAL/INSTALLATION.) After performing the following servicing, go to Step 23. • Adjust the compressor oil to the specified level. • After discharging, charge with new refrigerant to the specified level.
		No	Go to the next step.
18	**CHECK TO SEE WHETHER MALFUNCTION IS IN CONDENSER OR EXPANSION VALVE** • Verify the condition of the outlet hose on the condenser high pressure side. • Is there condensation in the hose?	Yes	Replace the condenser. (See 07-11-12 CONDENSER REMOVAL/INSTALLATION.) After performing the following servicing, go to Step 23. • Adjust the compressor oil to the specified level. • After discharging, charge with new refrigerant to the specified level.
		No	Go to the next step.
19	**INSPECT EXPANSION VALVE** • Remove the expansion valve and verify its condition. • Is there refrigerant leakage or valve clogging?	Yes	If there is foreign matter clogging the valve, remove the foreign matter.If there is refrigerant leakage or clogging, replace the expansion valve.Perform discharge, charge with new refrigerant, and then go to Step 23.
		No	Install the expansion valve, then go to Step 22.
20	**CHECK TO SEE WHETHER MALFUNCTION IS IN A/C COMPRESSOR OR ELSEWTHERE** • Do the results of the refrigerant pressure inspection in Step 4 indicate low pressure on the high pressure side and high pressure on the low pressure side?	Yes	Replace the A/C compressor, then go to Step 23. (See 07-11-10 A/C COMPRESSOR REMOVAL/INSTALLATION.)
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [MANUAL AIR CONDITIONER]

STEP	INSPECTION		ACTION
21	**INSPECT EVAPORATIVE TEMPERATURE SENSOR** • Inspect the evaporator temperature sensor. (See 07-11-3 A/C UNIT DISASSEMBLY/ ASSEMBLY.) • Is it normal?	Yes	Verify the evaporator temperature sensor position. (See 07-11-3 A/C UNIT DISASSEMBLY/ASSEMBLY.) Then go to Step 23.
		No	Replace the evaporator temperature sensor, then go to Step 23. (See 07-11-3 A/C UNIT DISASSEMBLY/ASSEMBLY.)
22	**INSPECT AIR MIX DOOR RELATED PART INSTALLATION** • Remove the A/C unit. (See 07-11-2 A/C UNIT REMOVAL/ INSTALLATION.) • Are the air mix link, air mix crank, and air mix rod of the A/C unit correctly and securely installed to their positions?	Yes	Go to the next step.
		No	Repair or install the links, cranks and rods securely in the proper position, then go to the next step. (See 07-11-3 A/C UNIT DISASSEMBLY/ASSEMBLY.)
23	**VERIFY THAT MALFUNCTION SYMPTOM OCCURS AFTER REPAIR** • If the refrigerant discharged during inspection has not been recharged, discharge and charge with new refrigerant to the specified level. • Does cool air blow out? (Are results of refrigerant system performance test normal?)	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

NO.7 NO COOL AIR [MANUAL AIR CONDITIONER]

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7	No cool air
DESCRIPTION	• Magnetic clutch does not operate.
POSSIBLE CAUSE	• Malfunction in PCM A/C cut control system • Malfunction in climate control unit • Malfunction in refrigerant pressure switch • Malfunction in PCM (A/C signal) • Malfunction in PCM (IG1 signal) • Malfunction in A/C compressor • Malfunction in A/C relay • Malfunction in evaporator temperature sensor

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harnesses are connected correctly and undamaged.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT AIR BLOW OUT** • Does air blow out?	Yes	Go to the next step.
		No	Go to Step 1 of troubleshooting indexes No.1 and 2.
2	**INSPECT A/C COMPRESSOR OPERATION** • Start engine. • Turn A/C switch and fan switch on. • Does A/C compressor operate?	Yes	Go to Step 1 of troubleshooting index No.6.
		No	Go to the next step.
3	**INSPECT FOR DTC IN PCM** • Inspect for DTCs related to the PCM on-board diagnostic system. • Are any DTCs displayed?	Yes	Go to appropriate inspection procedure.
		No	Go to the next step.
4	**INSPECT TO SEE WHETHER MALFUNCTION IS IN CLIMATE CONTROL UNIT OR ELSEWHERE** • Does cool air blow out when terminal K of climate control unit connector (20-pin, A/C signal) is grounded?	Yes	Replace climate control unit, then go to Step 17. (See 07-40B-15 CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [MANUAL AIR CONDITIONER].)
		No	Release short, then go to the next step.

SYMPTOM TROUBLESHOOTING [MANUAL AIR CONDITIONER]

STEP	INSPECTION		ACTION
5*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN A/C SIGNAL CIRCUIT (BETWEEN REFRIGERANT PRESSURE SWITCH AND PCM) OR ELSEWHERE** • Test voltage at following terminal of refrigerant pressure switch. — Terminal D (A/C signal) • Is voltage **approx. 12 V**?	Yes	Go to Step 7.
		No	Go to the next step.
6*	**INSPECT TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN WIRING HARNESS (BETWEEN REFRIGERANT PRESSURE SWITCH AND PCM) OR PCM** • Test voltage at A/C signal terminal 1AU of PCM. • Is voltage **approx. 12 V**?	Yes	Repair wiring harness between PCM and refrigerant pressure switch, then go to Step 17.
		No	Inspect PCM, then go to Step 17.
7	**INSPECT TO SEE WHETHER MALFUNCTION IS IN REFRIGERANT PRESSURE SWITCH, REFRIGERANT AMOUNT, OR ELSEWHERE** • Does cool air blow out when terminals C and D of refrigerant pressure switch connector are shorted?	Yes	Go to Step 9.
		No	Go to the next step.
8*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN REFRIGERANT PRESSURE SWITCH AND CLIMATE CONTROL UNIT) OR ELSEWHERE** • Test voltage at following terminal of climate control unit. — Terminal K (20-pin, A/C signal) • Is voltage **approx. 12 V**?	Yes	Go to Step 10.
		No	Repair wiring harness between refrigerant pressure switch and climate control unit, then go to Step 17.
9	**INSPECT TO SEE WHETHER MALFUNCTION IS IN REFRIGERANT PRESSURE SWITCH OR REFRIGERANT AMOUNT** • Inspect refrigerant pressure switch. • Is it okay?	Yes	If refrigerant amount is empty, replace condenser, apply vacuum to refrigerant line for **more than 30 min** using vacuum pump, and add refrigerant to specified level, then go to Step 17. (See 07-11-12 CONDENSER REMOVAL/INSTALLATION.)
		No	Replace refrigerant pressure switch, then go to Step 17. (See 07-40B-13 REFRIGERANT PRESSURE SWITCH REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER].)
10	**INSPECT TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN A/C CONTROL SIGNAL CIRCUIT (BETWEEN A/C RELAY AND PCM) OR ELSEWHERE** • Does cool air blow out when terminal E of A/C relay connector (A/C control signal) is grounded?	Yes	Release short, then go to the next step.
		No	Go to Step 12.
11*	**INSPECT TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN PCM OR WIRING HARNESS (BETWEEN A/C RELAY AND PCM)** • Test voltage at the A/C relay control signal terminal 1I of PCM. • Is voltage **approx. 12 V**?	Yes	Inspect PCM, then go to Step 17.
		No	Repair wiring harness between A/C relay and PCM, then go to Step 17.
12*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN MAGNETIC CLUTCH OR ELSEWHERE** • Test voltage at the following terminal of magnetic clutch thermal protector. — Terminal A (magnetic clutch operation signal) • Is voltage **approx. 12 V**?	Yes	Inspect magnetic clutch, then go to Step 17.
		No	Go to the next step.
13	**INSPECT FUSE** • Are A/C relay power supply fuses okay?	Yes	Go to the next step.
		No	Replace fuse, then go to Step 17. If fuse burns out immediately, go to the next step.

SYMPTOM TROUBLESHOOTING [MANUAL AIR CONDITIONER]

STEP	INSPECTION		ACTION
14	**INSPECT WIRING HARNESS BETWEEN FUSE BLOCK AND A/C RELAY FOR LACK OF CONTINUITY** • Test voltages at following terminals of A/C relay. — Terminal C (A/C magnetic clutch power supply) — Terminal A (A/C control signal) • Are voltages **approx. 12 V**?	Yes	Go to the next step.
		No	Repair wiring harness between fuse block and A/C relay, then go to Step 17.
15	**INSPECT TO SEE WHETHER MALFUNCTION IS IN A/C RELAY OR WIRING HARNESS (BETWEEN A/C RELAY AND MAGNETIC CLUTCH) AND EVAPORATOR TEMPERATURE SENSOR** • Test voltage at the following terminal of A/C relay. — Terminal D (magnetic clutch operation signal) • Is voltage **approx. 12 V**?	Yes	Inspect wiring harness between A/C relay and magnetic clutch. • If above wiring harness is OK, go to the next step. • If above wiring harness malfunctions, repair wiring harness, then go to Step 17.
		No	Replace A/C relay, then go to Step 17.
16	**INSPECT EVAPORATOR TEMPERATURE SENSOR** • Inspect evaporator temperature sensor. • Is it okay?	Yes	Go to the next step.
		No	Replace evaporator temperature sensor, then go to the next step.
17	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT RECUR AFTER REPAIR** • Does cool air blow out? (Are the results of refrigerant system performance test okay?)	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

NO.8 NOISE WHILE OPERATING A/C SYSTEM [MANUAL AIR CONDITIONER]

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8	**Noise while operating A/C system.**
DESCRIPTION	• Noise from magnetic clutch, A/C compressor, hose or refrigerant line.
POSSIBLE CAUSE	• Magnetic clutch operation noise • A/C compressor vane noise • A/C compressor slippage noise • Hose or refrigerant line interference noise

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CHECK A/C COMPRESSOR VANE NOISE** • Is there a jingling, popping, beeping, or buzzing sound (A/C compressor vane noise)?	Yes	Go to Step 5.
		No	Go to the next step.
2	**INSPECT A/C COMPRESSOR SLIPPAGE NOISE** • Is there a squeaking or whirling sound (A/C compressor slippage noise)?	Yes	Go to Step 14.
		No	Go to the next step.
3	**INSPECT A/C COMPRESSOR INTERFERENCE NOISE** • Is there a rattling or vibrating sound (interference noise)?	Yes	Go to Step 18.
		No	Go to the next step.
4	**INSPECT MAGNETIC CLUTCH OPERATION NOISE** • Is there a clicking sound (magnetic clutch operation noise)?	Yes	Adjust clearance between pressure plate of magnetic clutch and A/C compressor pulley, then go to Step 19. (See 07-40B-11 MAGNETIC CLUTCH ADJUSTMENT [MANUAL AIR CONDITIONER].)
		No	Condition is normal. (Recheck malfunction symptoms.)
5	**INSPECT A/C COMPRESSOR NOISE TIME** • Is noise heard continuously for **more than 3 s** after A/C compressor comes on?	Yes	Go to the next step.
		No	Condition is normal. (Noise occurs for **2—3 s** immediately after A/C compressor turns on.)
6	**INSPECT IDLE SPEED** • Inspect idle speed. (See 01-10-3 ENGINE TUNE-UP [L8, LF].) • Is it okay?	Yes	Go to the next step.
		No	Follow the repair instruction described in section F, then go to Step 19.

SYMPTOM TROUBLESHOOTING [MANUAL AIR CONDITIONER]

STEP	INSPECTION		ACTION
7	**INSPECT REFRIGERANT AMOUNT** • Inspect refrigerant amount. • Is it okay?	Yes	Go to Step 10.
		No	Go to the next step.
8	**INSPECT REFRIGERANT LINES** • Inspect refrigerant lines. — Is piping free of damage and cracks? — Are piping connections free of oil grime? (Visual inspection) — Are piping connections free of gas leakage? — Are piping installation points on condenser free of gas leakage? — Are piping installation points on receiver/drier free of gas leakage? — Are piping installation points on A/C compressor free of gas leakage? — Are piping installation points on A/C unit free of gas leakage — Perform gas leak inspection using gas leak tester. • Are above items okay?	Yes	Go to the next step.
		No	If piping or A/C component(s) is damaged or cracked, replace then go to Step 19. If there is gas leakage, repair or replace connection and replace condenser*1, then go to Step 19.
9	**INSPECT EVAPORATOR PIPING CONNECTIONS IN A/C UNIT FOR GAS LEAKAGE** • Are piping connections for evaporator in A/C unit free of gas leakage?	Yes	Adjust refrigerant amount to specified level, then go to Step 19.
		No	If piping is damaged or cracked, replace then go to Step 19. If there is gas leakage, repair or replace connection and replace condenser*1, then go to Step 19.
10	**CHECK TO SEE WHETHER MALFUNCTION IS IN COMPRESSOR OIL OR ELSEWHERE** • Add **20 ml {20 cc, 0.8 fl oz}** of compressor oil. • Is noise heard when racing engine?	Yes	Go to the next step.
		No	Troubleshooting completed. Explain repair to customer.
11	**CHECK TO SEE WHETHER MALFUNCTION IS IN A/C COMPRESSOR OR ELSEWHERE** • Drain compressor oil. • Is it contaminated with metal particles?	Yes	Go to the next step.
		No	Replace A/C compressor, then go to Step 19. (See 07-11-10 A/C COMPRESSOR REMOVAL/INSTALLATION.)
12	**CHECK TO SEE WHETHER MALFUNCTION IS SOMEWHERE IN A/C SYSTEM OR ELSEWHERE** • Is compressor oil whitish and mixed with water?	Yes	Replace A/C compressor, evaporator, expansion valve, condenser and refrigerant line, then go to Step 19. (See 07-11-10 A/C COMPRESSOR REMOVAL/INSTALLATION.) (See 07-11-3 A/C UNIT DISASSEMBLY/ASSEMBLY.) (See 07-11-12 CONDENSER REMOVAL/INSTALLATION.) (See 07-11-13 REFRIGERANT LINE REMOVAL/INSTALLATION.)
		No	Go to the next step.
13	**INSPECT A/C COMPRESSOR OIL** • Is compressor oil darker than normal and contaminated with aluminum chips?	Yes	Replace A/C compressor and condenser, then go to Step 19. (Since A/C compressor may be worn and receiver/drier may be clogged, replacement of receiver/drier is necessary.) (See 07-11-10 A/C COMPRESSOR REMOVAL/INSTALLATION.) (See 07-11-12 CONDENSER REMOVAL/INSTALLATION.)
		No	Condition is normal. Recheck malfunction symptoms.
14	**CHECK TO SEE WHETHER MALFUNCTION IS IN A/C COMPRESSOR OR ELSEWHERE** • Is noise heard immediately after A/C compressor is stopped?	Yes	Replace A/C compressor, then go to Step 19. (A/C compressor discharge valve left open) (See 07-11-10 A/C COMPRESSOR REMOVAL/INSTALLATION.)
		No	Go to the next step.
15	**INSPECT DRIVE BELT** • Inspect drive belt. (See 01-10-5 DRIVE BELT INSPECTION [L8, LF].) • Is it okay?	Yes	Go to the next step.
		No	Adjust or replace drive belt, then go to Step 19.
16	**INSPECT DRIVE BELT CONDITION** • Is drive belt worn? • Does it have foreign material imbedded in it, or have oil on it?	Yes	Remove obstruction, remove oil, or replace drive belt, then go to Step 19.
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [MANUAL AIR CONDITIONER]

STEP	INSPECTION		ACTION
17	**INSPECT MAGNETIC CLUTCH** • Inspect magnetic clutch. (See 07-40B-12 MAGNETIC CLUTCH INSPECTION [MANUAL AIR CONDITIONER].) • Is it okay?	Yes	Replace A/C compressor (excluding pressure plate, A/C compressor pulley, and stator), then go to Step 19. (See 07-11-10 A/C COMPRESSOR REMOVAL/ INSTALLATION.)
		No	Replace magnetic clutch, then go to Step 19. (See 07-40B-8 MAGNETIC CLUTCH DISASSEMBLY/ ASSEMBLY [MANUAL AIR CONDITIONER].)
18	**CHECK TO SEE WHETHER MALFUNCTION IS IN A/C COMPRESSOR OR REFRIGERANT LINES** • Is noise emitted from A/C compressor?	Yes	Visually inspect A/C compressor, replace appropriate parts if necessary, then go to the next step.
		No	If noise is due to refrigerant lines, repair detached or missing clips, tighten loose bolts, then go to the next step.
19	**VERIFY THAT MALFUNCTION SYMPTOM OCCURS AFTER REPAIR** • Has A/C compressor noise stopped?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

*1 : If there is gas leakage, air enters into the A/C system. The desiccant within the receiver/drier absorbs the moisture from the air and becomes saturated. If the A/C system is used in this condition, the inside of the A/C compressor will begin to rust due to this moisture, which may cause lock up or noise to occur. Therefore, replacement of the receiver/drier is necessary.

07-10 REFRIGERANT SYSTEM

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REFRIGERANT SYSTEM

REFRIGERANT SYSTEM SERVICE WARNINGS

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Handling Refrigerant

- Avoid breathing air conditioning refrigerant or lubricant vapor. Exposure may irritate eyes, nose and throat. Also, due to environmental concerns, we urge use of recovery/recycling/recharging equipment when draining R-134a from the air conditioning system. If accidental system discharge occurs, ventilate work area before resuming service.
- Do not perform pressure test or leak test for R-134a service equipment and/or vehicle air conditioning system using compressed air. Some mixtures of air and R-134a have been shown to be combustible at elevated pressures. These mixtures, if ignited, may cause injury or property damage. Additional health and safety information may be obtained from refrigerant manufacturers.
- Do not allow the refrigerant to leak near fire or any kind of heat. A poisonous gas may be generated if the refrigerant gas contacts fire or heat such as from cigarettes and heaters. When carrying out any operation that can cause refrigerant leakage, extinguish or remove the above-mentioned heat sources and maintain adequate ventilation.
- Handling liquid refrigerant is dangerous. A drop of it on the skin can result in localized frostbite. When handling the refrigerant, wear gloves and safety goggles. If refrigerant splashes into the eyes, immediately wash them with clean water and consult a doctor.

Storing Refrigerant

- The refrigerant container is highly pressurized. If it is subjected to high heat, it could explode, scattering metal fragments and liquid refrigerant that can seriously injure you. Store the refrigerant at temperatures below 40 °C {104 °F}.

REFRIGERANT SYSTEM SERVICE CAUTIONS

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Handling Insufficient Refrigerant Level

- If an insufficient refrigerant level is detected at troubleshooting, do not charge (add) the refrigerant. Because an accurate amount of refrigerant cannot be determined from the pressure indicated on the manifold gauge, never charge the refrigerant. If there is too much or too little refrigerant from the refilling, there may be secondary problems such as damage to the refrigerant cycle parts, or a decrease of cooling performance. Therefore, if it is determined that the refrigerant level is insufficient, completely remove refrigerant from the refrigerant cycle and refill with refrigerant to the specified amount.

Handling Compressor Oil

- Use only DH-PR compressor oil for this vehicle. Using a PAG oil other than DH-PR compressor oil can damage the A/C compressor.
- Do not spill DH-PR compressor oil on the vehicle. A drop of compressor oil on the vehicle surface can eat away at the paint. If oil gets on the vehicle, wipe it off immediately.
- DH-PR compressor oil (PAG oil) has a higher moisture absorption efficiency than the previously used mineral oil. If moisture mixes with the compressor oil, the refrigerant system could be damaged. Therefore, install caps immediately after using the compressor oil or removing refrigerant system parts to prevent moisture absorption.

REFRIGERANT SYSTEM

- **If the refrigerant gas is completely discharged from the system for reasons such as a malfunction during A/C operation, repair or replace the malfunctioning part, charge the refrigerant to the specified amount and always add 60 ml {60 cc, 2.03 fl oz} of compressor. If the compressor oil is not adequately replenished, the A/C compressor may quickly deteriorate, abnormal noise may develop, cooling performance may be affected or, in the worst case, the A/C compressor may seize.**

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REFRIGERANT SYSTEM GENERAL PROCEDURES

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1. Fully close the valves of the **SST** (49 C061 001A).
2. Connect the **SSTs** (49 C061 002, 49 C061 003) to the high- and low-pressure side joints of the **SST** (49 C061 001A).
3. Connect the **SSTs** (49 C061 006A, 49 C061 007) to the ends of the **SSTs** (49 C061 002, 49 C061 003).
4. Connect the **SSTs** (49 C061 006A, 49 C061 007) to the charging valves.

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REFRIGERANT CHARGING

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Caution
- **Do not exceed the specification when charging the system with refrigerant. Doing so will decrease the efficiency of the air conditioner or damage the refrigeration cycle parts.**

Charging Recycled R-134a Refrigerant

1. Connect an R-134a recovery/recycling/recharging device to the vehicle and follow the device manufacturer"s instructions.

Charging Preparation

1. Install the **SSTs** (49 C061 0A0B).
2. Connect the tap pin side of the **SST** (49 C061 004) to the air purge valve of the **SST** (49 C061 001A).
3. Connect the **SST** (49 C061 005) to the center joint of the **SST** (49 C061 001A).
4. Connect the **SST** (49 C061 005) to the vacuum pump.
5. Connect the **SST** (49 C061 004) to the refrigerant tank.
6. Place the refrigerant tank on the scale.

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Regular amount of refrigerant (approx. quantity)
450 g {15.89 oz}

Evacuation

1. Open all the valves of the **SST** (49 C061 001A).

Caution
- **Close the SST (49 C061 001A) valve immediately after stopping the vacuum pump. If the valve is left open, the vacuum pump oil will flow back into the refrigeration cycle and cause a decrease in the efficiency of the air conditioner.**

REFRIGERANT SYSTEM

2. Start the vacuum pump and let it operate for **15 min**.

dpe710zw1105

3. Verify that high- and low-pressure side readings of the **SST** (49 C061 001A) are at **–101 kPa {–760 mmHg, –29.9 inHg}**. Close each valve of the **SST** (49 C061 001A).

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Airtightness Check

1. Stop the vacuum pump and wait for **5 min**.
2. Check the high- and low-pressure side readings of the **SST** (49 C061 001A).
   - If the reading has changed, inspect for leakage and go to Evacuation. (See 07-10-2 Evacuation.)
   - If the reading has not changed, go to Charging New R-134a Refrigerant. (See 07-10-3 Charging New R-134a Refrigerant.)

Charging New R-134a Refrigerant

1. Open the valve of the refrigerant tank.
2. Weigh the refrigerant tank to charge the suitable amount of refrigerant.

Warning

- **If the refrigerant system is charged with a large amount of refrigerant when inspecting for gas leakage, and if any leakage should occur, the refrigerant will be released into the atmosphere. In order to prevent the accidental release of refrigerant which can destroy the ozone layer in the stratosphere, follow the proper procedures and charge with only a small amount of refrigerant when inspecting for gas leakage.**
- **If charging the system with refrigerant using service cans, running the engine with the high-pressure side valve open is dangerous. Pressure within the service cans will increase and the cans could explode, scattering metal fragments and liquid refrigerant that can seriously injure you. Therefore, do not open the high-pressure side valve while the engine is running.**

Caution

- **Always being charging of refrigerant from the high-pressure side. If changing is begun from the low-pressure side, the vanes of the A/C compressor will not be released and abnormal noise may result.**

REFRIGERANT SYSTEM

3. Open the high-pressure side valve of the **SST** (49 C061 001A).

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4. When the high-pressure side reading increases to **0.098 MPa {1.0 kgf/cm^2, 14 psi}**, close the low-pressure side valve of the **SST** (49 C061 001A).
5. Inspect for leakage from the cooler pipe/hose connections using the **SST** (49 C061 013).
   - If there is no leakage, go to Step 7.
   - If leakage is found at a loose joint, tighten the joint, then go to next step.
6. Inspect for leakage again.
   - If there is no leakage after tightening the joint, go to next step.
   - If there is still a leakage at the same joint, discharge the refrigerant and then repair the joint. Repeat the charging procedure from evacuation.

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Warning
- **If charging the system with refrigerant using service cans, running the engine with the high-pressure side valve open is dangerous. Pressure within the service cans will increase and the cans could explode, scattering metal fragments and liquid refrigerant that can seriously injure you. Therefore, do not open the high-pressure side valve while the engine is running.**

7. Open the high-pressure side valve of the **SST** (49 C061 001A) and charge with refrigerant until the weight of refrigerant tank has decreased **250 g {8.82 oz}** from the amount in Step 2.

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8. Close the high-pressure side valve of the **SST** (49 C061 001A).

Warning
- **If charging the system with refrigerant using service cans, running the engine with the high-pressure side valve open is dangerous. Pressure within the service cans will increase and the cans could explode, scattering metal fragments and liquid refrigerant that can seriously injure you. Therefore, do not open the high-pressure side valve while the engine is running.**

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9. Start the engine and actuate the A/C compressor.

REFRIGERANT SYSTEM

10. Open the low-pressure side valve of the **SST** (49 C061 001A) and charge with refrigerant until the weight of the refrigerant tank has decreased regular amount from the amount in Step 2.
11. Close the low-pressure side valve of the **SST** (49 C061 001A) and the valve of the refrigerant tank.
12. Stop the engine and A/C compressor.

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Leak Test

1. Inspect for leakage using the **SST** (49 C061 013).
   - If there is no leakage, go to Step 3.
   - If leakage is found at a loose joint, tighten the joint, then go to the next step.
2. Inspect for leakage again.
   - If there is no leakage after tightening the joint, go to the next step.
   - If there is still leakage at the same joint, discharge the refrigerant and then repair the joint. Repeat the charging procedure from evacuation.
3. Disconnect the **SSTs** (49 C061 006A, 49 C061 007) from the charging valves.
4. Install the caps to the charging valves.

amxzzw0000198

REFRIGERANT RECOVERY

id071000800500

1. Connect an R-134a recovery/recycling/recharging device to the vehicle and follow the device manufacturer"s instructions.

REFRIGERANT PRESSURE CHECK

id071000800600

1. Install the **SSTs** (49 C061 0A0B). (See 07-10-2 REFRIGERANT SYSTEM GENERAL PROCEDURES.)
2. Start the engine and after it is warmed up, run it at a constant **1,500 rpm**.
3. Set the fan speed MAX HI.
4. Turn the A/C switch on.
5. Set to RECIRCULATE mode.
6. Set the temperature control to MAX COLD.
7. Set to VENT mode.
8. Close all the doors and all the windows.
9. Measure the ambient temperature and high- and low- pressure side reading of the **SST** (49 C061 001A).
10. Verify that the intersection of the pressure reading of the **SST** (49 C061 001A) and ambient temperature is in the shaded zone.

REFRIGERANT SYSTEM

- If there is any malfunction, inspect the refrigerant system according to the troubleshooting chart.

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REFRIGERANT SYSTEM PERFORMANCE TEST

id071000800700

1. Inspect the refrigerant pressure. (See 07-10-5 REFRIGERANT PRESSURE CHECK.)
2. Place a dry-bulb thermometer in the driver-side center ventilator outlet.
3. Start the engine and after it is warmed up, run it at a constant **1,500 rpm**.
4. Set the fan speed to MAX HI.
5. Turn the A/C switch on.
6. Set to RECIRCULATE mode.
7. Set the temperature control to MAX COLD.
8. Set to VENT mode.
9. Close all the doors and windows.
10. Wait until the air conditioner output temperature stabilizes.
    Stabilized condition
    - The A/C compressor repeatedly turns on and off at regular intervals.
11. After the blower air is stabilized, read the dry-bulb thermometer.
12. Verify the ambient temperature.
13. Verify that the temperature reading is in the shaded zone.
    - If the there is any malfunction, inspect the refrigerant system according to the troubleshooting chart.

e5u710zw5001

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BASIC SYSTEM LOCATION INDEX

id071100800100

L.H.D.

amxzzw0000112

BASIC SYSTEM

R.H.D.

amxzzw0000112

1	Refrigerant line (See 07-11-13 REFRIGERANT LINE REMOVAL/INSTALLATION.)
2	Heater hose
3	A/C unit (See 07-11-2 A/C UNIT REMOVAL/INSTALLATION.) (See 07-11-3 A/C UNIT DISASSEMBLY/ASSEMBLY.) (See 07-11-9 EVAPORATOR INSPECTION.) (See 07-11-9 HEATER CORE INSPECTION.)

4	Air dist unit (See 07-11-6 AIR DIST UNIT REMOVAL/INSTALLATION.) (See 07-11-8 AIR DIST UNIT DISASSEMBLY/ASSEMBLY.)
5	Airflow mode main link (See 07-11-10 AIRFLOW MODE MAIN LINK REMOVAL/INSTALLATION.)
6	A/C compressor (See 07-11-10 A/C COMPRESSOR REMOVAL/INSTALLATION.)
7	Condenser (See 07-11-12 CONDENSER REMOVAL/INSTALLATION.) (See 07-11-12 CONDENSER INSPECTION.)

A/C UNIT REMOVAL/INSTALLATION

id071100800200

1. Remove battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Discharge the refrigerant from the system. (See 07-10-5 REFRIGERANT RECOVERY.) (See 07-10-2 REFRIGERANT CHARGING.)
4. Drain the engine coolant. (See 01-12-4 ENGINE COOLANT REPLACEMENT [L8, LF].)
5. Disconnect from A/C unit in the order in the table.

Caution

- **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise or other malfunction could occur. Always plug open fittings immediately after removing any refrigeration cycle parts.**

BASIC SYSTEM

L.H.D.

e5u711zw5011

R.H.D.

1	Cooler pipe No.3 (L.H.D.), cooler hose (LO) (R.H.D.) (See 07-11-13 REFRIGERANT LINE REMOVAL/INSTALLATION.)
2	Cooler pipe No.2 (See 07-11-13 REFRIGERANT LINE REMOVAL/INSTALLATION.)
3	Heater hose

amxzzw0000067

6. Remove the A/C unit and air dist unit. (See 07-11-6 AIR DIST UNIT REMOVAL/INSTALLATION.)

7. Disassembly the A/C unit as shown in the figure.
8. Install in the reverse order of removal.
9. Perform the refrigerant system performance test. (See 07-10-6 REFRIGERANT SYSTEM PERFORMANCE TEST.)
10. Inspect for engine coolant leakage. (See 01-12-5 ENGINE COOLANT LEAKAGE INSPECTION [L8, LF].)

e5u711zw5003

A/C UNIT DISASSEMBLY/ASSEMBLY

id071100800300

1. Disassemble in the order indicated in the table.

Caution

- **If a non-specified grease is used, it may result in abnormal noise or improper operation of the links. Apply only the specified grease to each link.**
- **If the air mix damper is removed and reinstalled improperly because the original installation position cannot be specified, the air mix damper and air mix actuator may be damaged when it is operated. Therefore, set the air mix to the middle position before disassembling so that the installation position can be specified.**

2. Assemble in the reverse order of disassembly.

BASIC SYSTEM

L.H.D.

amxzzw0000113

BASIC SYSTEM

R.H.D.

amxzzw0000113

1	Blower motor
2	Power MOS FET
3	Polyurethane foam (1)
4	Polyurethane foam (2)
5	Cover (1)
6	Adhesive polyurethane (1)
7	Air intake box
8	Air intake actuator
9	Air intake crank
10	Air intake door
11	Harness
12	Air mix actuator
13	Heater core

14	Adhesive polyurethane (2)
15	Cover (2) (L.H.D.)
16	A/C case (1)
17	Cover (3)
18	Expansion valve
19	Evaporator
20	Evaporator temperature sensor (See 07-11-5 Evaporator Temperature Sensor Assembly Note.)
21	Cover (4)
22	Insulator (1)
23	Air mix damper
24	A/C case (2)
25	Insulator (2)

Evaporator Temperature Sensor Assembly Note

1. Assemble the evaporator temperature sensor as shown in the figure.

BASIC SYSTEM

L.H.D.

e5u711zw5005

R.H.D.

amxzzw0000068

AIR DIST UNIT REMOVAL/INSTALLATION

id071100806900

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Discharge the refrigerant from the system. (See 07-10-5 REFRIGERANT RECOVERY.) (See 07-10-2 REFRIGERANT CHARGING.)
4. Drain the engine coolant. (See 01-12-4 ENGINE COOLANT REPLACEMENT [L8, LF].)
5. Disconnect from A/C unit in the order in the table.

Caution

- **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise or other malfunction could occur. Always plug open fittings immediately after removing any refrigeration cycle parts.**

L.H.D.

e5u711zw5011

BASIC SYSTEM

R.H.D.

1	Cooler pipe No.3 (L.H.D.), cooler hose (LO) (R.H.D.) (See 07-11-13 REFRIGERANT LINE REMOVAL/INSTALLATION.)
2	Cooler pipe No.2 (See 07-11-13 REFRIGERANT LINE REMOVAL/INSTALLATION.)
3	Heater hose

amxzzw0000068

6. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Glove compartment (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
   (3) Side wall (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
   (4) Console panel (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (5) Center panel unit (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.)
   (6) Lower panel (See 09-17-8 LOWER PANEL REMOVAL/INSTALLATION.)
   (7) Column cover (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.)
   (8) Driver-side air bag module (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
   (9) Steering wheel (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (10)Combination switch (See 09-18-21 COMBINATION SWITCH REMOVAL/INSTALLATION.)
   (11)Steering shaft (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (12)Meter hood (See 09-17-7 METER HOOD REMOVAL/INSTALLATION.)
   (13)Instrument cluster (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
   (14)Side panel (See 09-17-10 SIDE PANEL REMOVAL/INSTALLATION.)
   (15)Bonnet release lever (See 09-14-5 BONNET LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (16)Female bracket (See 09-16-12 CONVERTIBLE TOP DISASSEMBLY/ASSEMBLY.)
   (17)A-pillar trim (See 09-17-11 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (18)Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (19)Front side trim (See 09-17-11 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (20)Fuse box No.1
   (21)Dashboard (See 09-17-4 DASHBOARD REMOVAL/INSTALLATION.)
7. Remove the air dist unit and A/C unit.

e5u711zw5001

BASIC SYSTEM

8. Disassemble the air dist unit as shown in the figure.
9. Install in the reverse order of removal.
10. Perform the refrigerant system performance test. (See 07-10-6 REFRIGERANT SYSTEM PERFORMANCE TEST.)
11. Inspect for engine coolant leakage. (See 01-12-5 ENGINE COOLANT LEAKAGE INSPECTION [L8, LF].)

e5u711zw5003

AIR DIST UNIT DISASSEMBLY/ASSEMBLY

id071100807000

1. Disassemble in the order indicated in the table.

Caution

- **If a non-specified grease is used, it may result in abnormal noise or improper operation of the links. Apply only the specified grease to each link.**

L.H.D.

amxzzw0000206

BASIC SYSTEM

R.H.D.

amxzzw0000206

1	Duct (1)
2	Duct (2)
3	Airflow mode actuator
4	Bracket
5	Airflow mode main link

6	Airflow mode link set
7	Airflow mode door
8	Polyurethane form
9	Case (1)
10	Case (2)

2. Assemble in the reverse order of disassembly.

EVAPORATOR INSPECTION

id071100801500

1. Inspect the evaporator for damage, cracks and oil leakage.
   - If there is any malfunction, replace the evaporator.
2. Visually inspect the fins for bending.
   - If there is any bending, use the end of a flathead screwdriver to straighten the fins.

HEATER CORE INSPECTION

id071100801600

1. Inspect the heater core for damage, cracks and water leakage.
   - If there is any malfunction, replace the heater core.
2. Visually inspect the fins for bending.
   - If there is any bending, use the end of a flathead screwdriver to straighten the fins.
3. Visually inspect the heater hose for deformation.
   - Repair with pliers if there is deformation. If there is any malfunction, replace the heater core.

BASIC SYSTEM

AIRFLOW MODE MAIN LINK REMOVAL/INSTALLATION

id071100801800

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the airflow mode actuator.(See 07-40A-5 AIRFLOW MODE ACTUATOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].)(See 07-40B-5 AIRFLOW MODE ACTUATOR REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER].)
4. Remove the airflow mode main link as shown in the figure.
5. Install in the reverse order of removal.

e5u711zw5006

A/C COMPRESSOR REMOVAL/INSTALLATION

id071100801000

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Discharge the refrigerant from the system. (See 07-10-2 REFRIGERANT CHARGING.)
4. Remove the air cleaner. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
5. Remove the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
6. Remove the drive belt. (See 01-10-6 DRIVE BELT REPLACEMENT [L8, LF].)
7. Do not allow remaining compressor oil in the A/C compressor and pipes to spill, and remove in the order indicated in the table.

Caution

- **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise or other malfunction could occur.Always plug open fittings immediately after removing any refrigeration cycle parts.**

1	Cooler hose (LO) (See 07-11-13 REFRIGERANT LINE REMOVAL/INSTALLATION.)
2	Cooler hose (HI) (See 07-11-13 REFRIGERANT LINE REMOVAL/INSTALLATION.)
3	A/C compressor connector
4	A/C compressor (See 07-11-11 A/C Compressor Installation Note.)

8. Install in the reverse order of removal.
9. Perform the refrigerant system performance test. (See 07-10-6 REFRIGERANT SYSTEM PERFORMANCE TEST.)

e5u711zw5007

BASIC SYSTEM

A/C Compressor Installation Note

Caution

- **Due to the high moisture-absorption characteristics of the compressor oil, it may absorb moisture if left over a long period of time thereby negatively affecting A/C operation. Drain the compressor oil and refill within 10 min. of each other.**

1. Rotate new A/C compressor shaft six to eight revolutions while draining new refrigerant oil in a clean measuring device. Use this refrigerant oil to refill new A/C compressor. Do not allow refrigerant oil to become contaminated.
2. Rotate old A/C compressor shaft six to eight revolutions while draining old refrigerant oil in a separate, clean measuring device.
3. Compare those oil amounts. The amount of the oil drained from the new A/C compressor should be greater than the old one.
4. Pour the same amount oil of drained from the old A/C compressor back into the new A/C compressor.

A/C compressor oil type
DH-PR

A/C compressor oil sealed volume (approx. quantity)
130 ml {130 cc, 4.39 fl oz}

amxzzw0000068

BASIC SYSTEM

CONDENSER REMOVAL/INSTALLATION

id071100801200

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Discharge the refrigerant from the system. (See 07-10-2 REFRIGERANT CHARGING.)
4. Remove the splash shields.
5. Remove the under cover.
6. Remove the cooling pipe installation bolts.
7. Do not allow remaining compressor oil in the condenser and pipes to spill, and remove in the order indicated in the table.

Caution

- **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise or other malfunction could occur. Always plug open fittings immediately after removing any refrigeration cycle parts.**

1	Cooler hose (HI) (See 07-11-13 REFRIGERANT LINE REMOVAL/INSTALLATION.)
2	Cooler pipe No.1 (See 07-11-13 REFRIGERANT LINE REMOVAL/INSTALLATION.)
3	Condenser (See 07-11-12 Condenser Installation Note.)

8. Install in the reverse order of removal.
9. Perform the refrigerant system performance test. (See 07-10-6 REFRIGERANT SYSTEM PERFORMANCE TEST.)

amxzzw0000068

Condenser Installation Note

1. When replacing the new condenser, add compressor oil to the refrigeration cycle.

   Supplemental amount (approx. quantity)
   20 ml {20 cc, 0.7 fl oz}

CONDENSER INSPECTION

id071100801300

1. Inspect the condenser for cracks, damage, and oil leakage.
   - If there is any malfunction, replace the condenser.
2. Visually inspect the fins for clogging of foreign material.
   - If any fins are clogged, remove the foreign material.
3. Visually inspect the fins for bending.
   - If there is any bending, use the end of a flathead screwdriver to straighten fins.

BASIC SYSTEM

REFRIGERANT LINE REMOVAL/INSTALLATION

id071100803000

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Discharge the refrigerant from the system. (See 07-10-2 REFRIGERANT CHARGING.)
4. Remove the air cleaner. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
5. Remove the splash shield.
6. Remove the under cover.
7. Do not allow remaining compressor oil in the piping and connecting parts to spill, and remove in the order indicated in the table.

Caution

- **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise or other malfunction could occur. Always plug open fittings immediately after removing any refrigeration cycle parts.**

L.H.D.

amxzzw0000113

BASIC SYSTEM

R.H.D.

amxzzw0000113

1	Cooler pipe No.2 (See 07-11-14 Refrigerant Line Removal Note.) (See 07-11-15 Refrigerant Line Installation Note.)
2	Cooler pipe No.3 (L.H.D.) (See 07-11-14 Refrigerant Line Removal Note.) (See 07-11-15 Refrigerant Line Installation Note.)
3	Cooler hose (LO) (See 07-11-14 Refrigerant Line Removal Note.) (See 07-11-15 Refrigerant Line Installation Note.)

4	Cooler hose (HI) (See 07-11-14 Refrigerant Line Removal Note.) (See 07-11-15 Refrigerant Line Installation Note.)
5	Cooler pipe No.1 (See 07-11-14 Refrigerant Line Removal Note.) (See 07-11-15 Refrigerant Line Installation Note.)

8. Install in the reverse order of removal.
9. Perform the refrigerant system performance test. (See 07-10-6 REFRIGERANT SYSTEM PERFORMANCE TEST.)

Refrigerant Line Removal Note

1. Disconnect the block joint type pipes by grasping the female side of the block with pliers or similar tool and holding firmly, and then remove the connection bolt or nut.

chu0740w200

BASIC SYSTEM

Refrigerant Line Installation Note

1. Temporarily tighten the joint bolt by hand.
2. Connect the block joint type pipes by grasping the female side of the block with pliers or similar tool and holding firmly, and then tighten the connection bolt or nut with a torque wrench.

chu0740w201

07-40A CONTROL SYSTEM [FULL-AUTO AIR CONDITIONER]

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CONTROL SYSTEM [FULL-AUTO AIR CONDITIONER]

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id0740a1117400

L.H.D.

amxzzw0000113

R.H.D.

amxzzw0000113

1	Blower relay (See 09-21-6 RELAY INSPECTION.)
2	A/C relay (See 09-21-6 RELAY INSPECTION.)
3	Ambient temperature sensor (See 07-40A-13 AMBIENT TEMPERATURE SENSOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].) (See 07-40A-13 AMBIENT TEMPERATURE SENSOR INSPECTION [FULL-AUTO AIR CONDITIONER].)

4	PCM (See 01-40-9 PCM INSPECTION [L8, LF].)
5	Refrigerant pressure switch (See 07-40A-15 REFRIGERANT PRESSURE SWITCH REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].) (See 07-40A-16 REFRIGERANT PRESSURE SWITCH INSPECTION [FULL-AUTO AIR CONDITIONER].)

CONTROL SYSTEM [FULL-AUTO AIR CONDITIONER]

6	Evaporator temperature sensor (See 07-40A-15 EVAPORATOR TEMPERATURE SENSOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].) (See 07-40A-15 EVAPORATOR TEMPERATURE SENSOR INSPECTION [FULL-AUTO AIR CONDITIONER].)
7	Air mix actuator (See 07-40A-4 AIR MIX ACTUATOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].)
8	Air intake actuator (See 07-40A-3 AIR INTAKE ACTUATOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].)
9	Power MOS FET (See 07-40A-7 POWER METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (POWER MOS FET) REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].) (See 07-40A-8 POWER METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (POWER MOS FET) INSPECTION [FULL-AUTO AIR CONDITIONER].)
10	Blower motor (See 07-40A-6 BLOWER MOTOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].) (See 07-40A-6 BLOWER MOTOR INSPECTION [FULL-AUTO AIR CONDITIONER].)
11	Climate control unit (See 07-40A-17 CLIMATE CONTROL UNIT REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].) (See 07-40A-17 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].)
12	Cabin temperature sensor (See 07-40A-13 CABIN TEMPERATURE SENSOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].) (See 07-40A-14 CABIN TEMPERATURE SENSOR INSPECTION [FULL-AUTO AIR CONDITIONER].)
13	Airflow mode actuator (See 07-40A-5 AIRFLOW MODE ACTUATOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].)
14	Solar radiation sensor (See 07-40A-12 SOLAR RADIATION SENSOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].) (See 07-40A-12 SOLAR RADIATION SENSOR INSPECTION [FULL-AUTO AIR CONDITIONER].)
15	Magnetic clutch (See 07-40A-8 MAGNETIC CLUTCH DISASSEMBLY/ASSEMBLY [FULL-AUTO AIR CONDITIONER].) (See 07-40A-11 MAGNETIC CLUTCH ADJUSTMENT [FULL-AUTO AIR CONDITIONER].) (See 07-40A-12 MAGNETIC CLUTCH INSPECTION [FULL-AUTO AIR CONDITIONER].)

AIR INTAKE ACTUATOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER]

id0740a1801400

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Glove compartment (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
   (3) Side wall (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
   (4) Console panel (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (5) Center panel unit (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.)
   (6) Lower panel (See 09-17-8 LOWER PANEL REMOVAL/INSTALLATION.)
   (7) Column cover (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.)
   (8) Driver-side air bag module (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
   (9) Steering wheel (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (10)Combination switch (See 09-18-21 COMBINATION SWITCH REMOVAL/INSTALLATION.)
   (11)Steering shaft (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (12)Meter hood (See 09-17-7 METER HOOD REMOVAL/INSTALLATION.)
   (13)Instrument cluster (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
   (14)Side panel (See 09-17-10 SIDE PANEL REMOVAL/INSTALLATION.)
   (15)Bonnet release lever (See 09-14-5 BONNET LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (16)Female bracket (See 09-16-12 CONVERTIBLE TOP DISASSEMBLY/ASSEMBLY.)
   (17)A-pillar trim (See 09-17-11 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (18)Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (19)Front side trim (See 09-17-11 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (20)Fuse box No.1
   (21)Dashboard (See 09-17-4 DASHBOARD REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

CONTROL SYSTEM [FULL-AUTO AIR CONDITIONER]

L.H.D.

e5u740zw5001

R.H.D.

1	Air intake actuator connector
2	Air intake actuator

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5. Install in the reverse order of removal.

AIR MIX ACTUATOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER]

id0740a1802400

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Glove compartment (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
   (3) Side wall (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
   (4) Console panel (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (5) Center panel unit (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.)
   (6) Lower panel (See 09-17-8 LOWER PANEL REMOVAL/INSTALLATION.)
   (7) Column cover (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.)
   (8) Driver-side air bag module (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
   (9) Steering wheel (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (10)Combination switch (See 09-18-21 COMBINATION SWITCH REMOVAL/INSTALLATION.)
   (11)Steering shaft (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (12)Meter hood (See 09-17-7 METER HOOD REMOVAL/INSTALLATION.)
   (13)Instrument cluster (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
   (14)Side panel (See 09-17-10 SIDE PANEL REMOVAL/INSTALLATION.)
   (15)Bonnet release lever (See 09-14-5 BONNET LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (16)Female bracket (See 09-16-12 CONVERTIBLE TOP DISASSEMBLY/ASSEMBLY.)
   (17)A-pillar trim (See 09-17-11 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (18)Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (19)Front side trim (See 09-17-11 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (20)Fuse box No.1
   (21)Dashboard (See 09-17-4 DASHBOARD REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

CONTROL SYSTEM [FULL-AUTO AIR CONDITIONER]

L.H.D.

e5u740zw5003

R.H.D.

1	Air mix actuator
2	Air mix actuator connector

5. Install in the reverse order of removal.

amxzzw0000097

AIRFLOW MODE ACTUATOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER]

id0740a1801600

1. Remove the battery cover.
2. Disconnect the negative battery cable.(See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the lower panel.(See 09-17-8 LOWER PANEL REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

L.H.D.

e5u740zw5005

R.H.D.

1	Airflow mode actuator connector
2	Airflow mode actuator

5. Install in the reverse order of removal.

amxzzw0000097

CONTROL SYSTEM [FULL-AUTO AIR CONDITIONER]

BLOWER MOTOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER]

id0740a1800900

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the front side trim. (R.H.D.)(See 09-17-11 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

L.H.D.

e5u740zw5007

R.H.D.

amxzzw0000097

1	Blower motor connector
2	Blower motor

5. Install in the reverse order of removal.

BLOWER MOTOR INSPECTION [FULL-AUTO AIR CONDITIONER]

id0740a1801000

1. Connect battery positive voltage to blower motor terminal A, ground to terminal B, and then verify that the blower motor operates smoothly.
   - If the operation condition is not normal, replace the blower motor.

chu0740w202

CONTROL SYSTEM [FULL-AUTO AIR CONDITIONER]

POWER METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (POWER MOS FET) REMOVAL/ INSTALLATION [FULL-AUTO AIR CONDITIONER]

id0740a1800200

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the scuff plate (passenger's side) (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.) (R.H.D.)
4. Remove the front side trim (passenger's side) (See 09-17-11 FRONT SIDE TRIM REMOVAL/INSTALLATION.) (R.H.D.)
5. Partially peel back the floor covering so that the foot support can be removed. (R.H.D.)
6. Disconnect the power MOS FET connector.
7. Remove the power MOS FET as shown in the figure.

L.H.D.

e5u740zw5008

R.H.D.

8. Install in the reverse order of removal.
9. Perform the refrigerant system performance test. (See 07-10-6 REFRIGERANT SYSTEM PERFORMANCE TEST.)

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CONTROL SYSTEM [FULL-AUTO AIR CONDITIONER]

POWER METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (POWER MOS FET) INSPECTION [FULL-AUTO AIR CONDITIONER]

id0740a1800300

1. Verify that the resistance between the terminals of the power MOS FET is as shown in the table.
   - If there is any malfunction, replace the power MOS FET.

Tester lead		Resistance (kilohm) (approx. quantity)
+	–	
A	B	1,300
A	C	1,300
A	D	2.2
B	A	∞
B	C	0.12
B	D	∞
C	A	∞
C	B	0.12
C	D	∞
D	A	2.2
D	B	190
D	C	1,300

E5U740ZW5009

MAGNETIC CLUTCH DISASSEMBLY/ASSEMBLY [FULL-AUTO AIR CONDITIONER]

id0740a1800400

1. Disassemble in the order indicated in the table.

1	Bolt (See 07-40A-9 Bolt Removal/Installation Note.)
2	Pressure plate
3	Shim (See 07-40A-11 Shim Installation Note.)
4	Snap ring (See 07-40A-9 Snap Ring Removal/Installation Note.)
5	A/C compressor pulley (See 07-40A-10 A/C Compressor Pulley Removal Note.) (See 07-40A-11 A/C Compressor Pulley Installation Note.)
6	Snap ring (See 07-40A-9 Snap Ring Removal/Installation Note.)
7	Stator (See 07-40A-10 Stator Installation Note.)
8	Clamp
9	A/C compressor body

e5u740zw5010

2. Assemble in the reverse order of disassembly.
3. Adjust the magnetic clutch clearance. (See 07-40A-11 MAGNETIC CLUTCH ADJUSTMENT [FULL-AUTO AIR CONDITIONER].)

CONTROL SYSTEM [FULL-AUTO AIR CONDITIONER]

Bolt Removal/Installation Note

1. When removing or installing the bolt, lock the A/C compressor pulley against rotation using the following procedure.

Caution

- **When connecting the positive battery cable to the magnetic clutch connector, use a cable with a female terminal of the correct size. Otherwise, load will be applied to the male terminal, resulting in deformation or damage, and poor contact. In addition, the positive battery cable could disconnect from the connector resulting in a short circuit.**

(1) Apply battery positive voltage to the magnetic clutch terminal and connect the A/C compressor body to the ground.

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(2) Wrap the drive belt, which is no longer of use, tightly around the A/C compressor pulley.
(3) Hold the drive belt in place with pliers.
(4) Remove or install the bolt.

Tightening torque
11.8—14.7 N·m {1.21—1.49 kgf·m, 8.7—10.8 ft·lbf}

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Snap Ring Removal/Installation Note

1. Remove the snap ring using a snap ring pliers.

e5u740zw5024

CONTROL SYSTEM [FULL-AUTO AIR CONDITIONER]

A/C Compressor Pulley Removal Note

1. Remove the A/C compressor pulley using the **SST (49 0839 425C)**.

   Caution
   - **Be careful that the SST (49 0839 425C) tabs do not hang over the stator.**

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e5u740zw5021

Stator Installation Note

1. Align the positioning pin with the hole of A/C compressor body and insert.

e5u740zw5025

CONTROL SYSTEM [FULL-AUTO AIR CONDITIONER]

A/C Compressor Pulley Installation Note

1. Install the inner wheel of the pulley using a plastic hammer and **SST (49 B018 003)** to the compressor.

Caution

- **If the SST is not properly positioned when the A/C compressor pulley is press-fit, the A/C compressor axle will interfere with the SST, possibly damaging component parts. Verify that the SST and axle are properly positioned and perform the procedure very carefully.**

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Shim Installation Note

1. First, insert the **1 mm (0.039 in)** thick shim into the shaft.

e5u740zw5023

MAGNETIC CLUTCH ADJUSTMENT [FULL-AUTO AIR CONDITIONER]

id0740a1800500

1. Measure the clearance around the entire circumference between the pressure plate and A/C compressor pulley using a thickness gauge.
2. Inspect the clearance.
   - If not within the specification, adjust the clearance by changing the shim or the number of shims.

Magnetic clutch clearance
0.3—0.6 mm {0.012—0.023 in}

E5U740ZW5011

CONTROL SYSTEM [FULL-AUTO AIR CONDITIONER]

MAGNETIC CLUTCH INSPECTION [FULL-AUTO AIR CONDITIONER]

id0740a1800600

1. Connect battery positive voltage to magnetic clutch terminal A and ground.

E5U740ZW5012

2. Verify that the magnetic clutch turns on.
   - If the magnetic clutch does not turn on, replace the A/C compressor.

e5u740zw5013

SOLAR RADIATION SENSOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER]

id0740a1802800

1. Remove the battery cable.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Pry the solar radiation sensor from the dashboard using a flathead screwdriver wrapped with protective tape.
4. Remove in the order indicated in the table.

1	Solar radiation sensor connector
2	Solar radiation sensor

5. Install in the reverse order of removal.

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SOLAR RADIATION SENSOR INSPECTION [FULL-AUTO AIR CONDITIONER]

id0740a1802900

1. Shine a fluoresent light or expose the solar radiation sensor to natural sunlight.
2. Connect the positive (+) lead to terminal B, C and negative (-) lead to terminal A of the solar radiation, and verify that the voltage value is output.
   - If the voltage is **0 V**, replace the solar radiation sensor.

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CONTROL SYSTEM [FULL-AUTO AIR CONDITIONER]

AMBIENT TEMPERATURE SENSOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER]

id0740a1803200

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the under cover.
4. Remove in the order indicated in the table.

1	Ambient temperature sensor connector
2	Ambient temperature sensor

5. Install in the reverse order of removal.

amxzzw0000097

AMBIENT TEMPERATURE SENSOR INSPECTION [FULL-AUTO AIR CONDITIONER]

id0740a1803300

1. Measure the temperature around the ambient temperature sensor and measure the resistance between the ambient temperature sensor terminal.
   - If the characteristics of the ambient temperature sensor are not as shown in the graph, replace the ambient temperature sensor.

amxzzw0000069

CABIN TEMPERATURE SENSOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER]

id0740a1807800

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the lower panel. (See 09-17-8 LOWER PANEL REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

CONTROL SYSTEM [FULL-AUTO AIR CONDITIONER]

L.H.D.

amxzzw0000069

R.H.D.

amxzzw0000069

1	Air hose
2	Cabin temperature sensor connector
3	Cabin temperature sensor

5. Install in the reverse order of removal.

CABIN TEMPERATURE SENSOR INSPECTION [FULL-AUTO AIR CONDITIONER]

id0740a1807700

1. Measure the temperature around the cabin temperature sensor and measure the resistance between cabin temperature sensor terminal.
   - If the characteristics of the cabin temperature sensor are not as shown in the graph, replace the cabin temperature sensor.

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CONTROL SYSTEM [FULL-AUTO AIR CONDITIONER]

EVAPORATOR TEMPERATURE SENSOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER]

id0740a1801100

1. Remove the evaporator temperature sensor from the A/C unit. (See 07-11-3 A/C UNIT DISASSEMBLY/ ASSEMBLY.)

EVAPORATOR TEMPERATURE SENSOR INSPECTION [FULL-AUTO AIR CONDITIONER]

id0740a1801200

Note
- Inspect the evaporator temperature sensor when it is installed to the A/C unit.

1. Set the fan speed MAX-HI.
2. Set the temperature control to MAX COLD.
3. Set the air intake mode to RECIRCULATE.
4. Turn the A/C switch off.
5. Close all of the doors and roll up all the windows.
6. Wait for **5 min**.
7. Disconnect the evaporator temperature sensor connector.
8. Measure the temperature at the air intake.
9. Measure the resistance between evaporator temperature sensor terminals.
   - If the characteristics of the evaporator temperature sensor are not as shown in the graph, replace the evaporator temperature sensor.

e5u740zw5014

REFRIGERANT PRESSURE SWITCH REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER]

id0740a1802600

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Discharge the refrigerant from the system. (See 07-10-2 REFRIGERANT CHARGING.)
4. Remove in the order indicated in the table.

1	Refrigerant pressure switch connector
2	Refrigerant pressure switch (See 07-40A-16 Refrigerant Pressure Switch Installation Note.)

5. Install in the reverse order of removal.

e5u740zw5026

CONTROL SYSTEM [FULL-AUTO AIR CONDITIONER]

Refrigerant Pressure Switch Installation Note

1. Apply compressor oil to the O-ring joints.

REFRIGERANT PRESSURE SWITCH INSPECTION [FULL-AUTO AIR CONDITIONER]

id0740a1802700

1. Connect the manifold gauge.
2. Verify the high-pressure side reading.
3. Disconnect the refrigerant pressure switch connector.
4. Verify continuity between the terminals of the refrigerant pressure switch.
   - If the continuity is not normal, replace the refrigerant pressure switch.

e5u711zw5a09

amxzzw0000113

CONTROL SYSTEM [FULL-AUTO AIR CONDITIONER]

CLIMATE CONTROL UNIT REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER]

id0740a1807400

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the side wall. (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
4. Remove the center panel unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.)
5. Remove the climate control unit from the center panel unit.
6. Install in the reverse order of removal.

e5u740zw5105

CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER]

id0740a1802200

1. Switch the ignition to ON.
2. Connect the negative (-) lead of the tester to body ground.
3. By inserting the positive (+) lead of the tester into each climate control unit terminal, measure the voltage according to the terminal voltage table.
   - If there is any malfunction, inspect the parts under “Inspection item (s)”.
     — If the parts under “Inspection item (s)” are found to be normal, replace the climate control unit.

Terminal Voltage Table (Reference)

e5u740zw5103

Terminal	Signal name	Connected to	Measurement condition	Voltage (V)	Inspection item (s)
A	IG2	A/C 7.5 A fuse	IG SW ON	B+	• Related wiring harness • A/C 7.5 A fuse
			IG SW LOCK	1.0 or less	
B	B+	ROOM 15 A fuse	Under any condition	B+	• Related wiring harness • ROOM 15 A fuse
C	Blower fan speed control	Power MOS FET	Fan stopped	1.0 or less	• Related wiring harness • Power MOS FET
			Fan: manual LO	2.8	
			Fan: manual HI	9.9	
D	TNS signal	TNS relay	Headlight switch OFF	1.0 or less	• Related wiring harness • TNS relay • Headlight switch
			Headlight switch ON	B+	
E	Blower motor feedback	Power MOS FET	Fan stopped	B+	1. Related wiring harness 2. Power MOS FET 3. Blower motor 4. Blower relay 5. HEATER 40 A fuse 6. Power MOS FET replacement
			Fan: manual LO	8.17	
			Fan: manual HI	0.6	
F	Panel control signal	Instrument cluster	Headlight switch OFF	0	• Related wiring harness • Instrument cluster • Climate control unit: terminal voltage (D)
			Headlight switch ON	2.7	
G	Actuator power	• Air intake actuator • Air mix actuator • Airflow mode actuator	IG SW ON	B+	• Related wiring harness • Air intake actuator • Air mix actuator • Airflow mode actuator
			IG SW LOCK	1.0 or less	

CONTROL SYSTEM [FULL-AUTO AIR CONDITIONER]

Terminal	Signal name	Connected to	Measurement condition	Voltage (V)	Inspection item (s)
H	GND	Body ground	Under any condition	1.0 or less	• Related wiring harness
I	Actuator operation signal	• Air intake actuator • Air mix actuator • Airflow mode actuator	Because this terminal is for communication, good/no good judgment by terminal voltage is not possible.		• Related wiring harness • Air intake actuator • Air mix actuator • Airflow mode actuator
J	Ambient temperature output	Instrument cluster	Because this terminal is for communication, good/no good judgment by terminal voltage is not possible.		• Related wiring harness • Instrument cluster
K	A/C	Refrigerant pressure switch	A/C switch ON, fan switch at 1st	1.0 or less	• Related wiring harness • Refrigerant pressure switch • PCM: terminal voltage (1J)
			A/C switch OFF	B+	
L	Vehicle speed	Instrument cluster	Because this terminal is for communication, good/no good judgment by terminal voltage is not possible.		• Related wiring harness
M	Evaporator temperature sensor input	Evaporator temperature sensor	Compared with temperature detected by evaporator temperature sensor	Refer to graph 1	• Related wiring harness • Evaporator temperature sensor
N	Rear window defroster operation	Rear window defroster relay	Rear window defroster switch OFF	B+	• Related wiring harness • Rear window defroster relay
			Rear window defroster switch ON	1.0 or less	
O	Cabin temperature sensor input	Cabin temperature sensor	Compared with temperature detected by cabin temperature sensor	Refer to graph 3	• Related wiring harness • Cabin temperature sensor
Q	Solar radiation sensor input	Solar radiation sensor	Expose the solar radiation sensor to natural sunlight	4.7	• Related wiring harness • Inspect solar radiation sensor
			Light to solar radiation sensor block	Below 1.0	
R	Water temperature input	Instrument cluster	Because this terminal is for communication, good/no good judgment by terminal voltage is not possible.		• Related wiring harness • Instrument cluster
S	Sensor GND	• Ambient temperature sensor • Cabin temperature sensor • Evaporator temperature sensor • Solar radiation sensor	Under any condition	1.0 or less	• Related wiring harness
T	Ambient temperature sensor input	Ambient temperature sensor	Compared with temperature detected by ambient temperature sensor	Refer to graph 2	• Related wiring harness • Ambient temperature sensor

CONTROL SYSTEM [FULL-AUTO AIR CONDITIONER]

GRAPH 1 (Evaporator temperature sensor)

GRAPH 2 (Ambient temperature sensor)

GRAPH 3 (Cabin temperature sensor)

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CONTROL SYSTEM [MANUAL AIR CONDITIONER]

CONTROL SYSTEM LOCATION INDEX [MANUAL AIR CONDITIONER]

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L.H.D.

amxzzw0000113

R.H.D.

amxzzw0000113

1	Blower relay (See 09-21-6 RELAY INSPECTION.)
2	A/C relay (See 09-21-6 RELAY INSPECTION.)
3	PCM (See 01-40-9 PCM INSPECTION [L8, LF].)

4	Refrigerant pressure switch (See 07-40B-13 REFRIGERANT PRESSURE SWITCH REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER].) (See 07-40B-14 REFRIGERANT PRESSURE SWITCH INSPECTION [MANUAL AIR CONDITIONER].)

CONTROL SYSTEM [MANUAL AIR CONDITIONER]

5	Evaporator temperature sensor (See 07-40B-13 EVAPORATOR TEMPERATURE SENSOR REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER].) (See 07-40B-13 EVAPORATOR TEMPERATURE SENSOR INSPECTION [MANUAL AIR CONDITIONER].)
6	Air mix actuator (See 07-40B-4 AIR MIX ACTUATOR REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER].)
7	Air intake actuator (See 07-40B-3 AIR INTAKE ACTUATOR REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER].)
8	Power MOS FET (See 07-40B-7 POWER METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (POWER MOS FET) REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER].) (See 07-40B-8 POWER METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (POWER MOS FET) INSPECTION [MANUAL AIR CONDITIONER].)
9	Blower motor (See 07-40B-6 BLOWER MOTOR REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER].) (See 07-40B-6 BLOWER MOTOR INSPECTION [MANUAL AIR CONDITIONER].)
10	Climate control unit (See 07-40B-15 CLIMATE CONTROL UNIT REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER].) (See 07-40B-15 CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER].)
11	Airflow mode actuator (See 07-40B-5 AIRFLOW MODE ACTUATOR REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER].)
12	Magnetic clutch (See 07-40B-8 MAGNETIC CLUTCH DISASSEMBLY/ASSEMBLY [MANUAL AIR CONDITIONER].) (See 07-40B-11 MAGNETIC CLUTCH ADJUSTMENT [MANUAL AIR CONDITIONER].) (See 07-40B-12 MAGNETIC CLUTCH INSPECTION [MANUAL AIR CONDITIONER].)

AIR INTAKE ACTUATOR REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER]

id0740a2801400

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Glove compartment (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
   (3) Side wall (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
   (4) Console panel (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (5) Center panel unit (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.)
   (6) Lower panel (See 09-17-8 LOWER PANEL REMOVAL/INSTALLATION.)
   (7) Column cover (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.)
   (8) Driver-side air bag module (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
   (9) Steering wheel (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (10)Combination switch (See 09-18-21 COMBINATION SWITCH REMOVAL/INSTALLATION.)
   (11)Steering shaft (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (12)Meter hood (See 09-17-7 METER HOOD REMOVAL/INSTALLATION.)
   (13)Instrument cluster (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
   (14)Side panel (See 09-17-10 SIDE PANEL REMOVAL/INSTALLATION.)
   (15)Bonnet release lever (See 09-14-5 BONNET LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (16)Female bracket (See 09-16-12 CONVERTIBLE TOP DISASSEMBLY/ASSEMBLY.)
   (17)A-pillar trim (See 09-17-11 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (18)Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (19)Front side trim (See 09-17-11 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (20)Fuse box No.1
   (21)Dashboard (See 09-17-4 DASHBOARD REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

CONTROL SYSTEM [MANUAL AIR CONDITIONER]

L.H.D.

e5u740zw5001

R.H.D.

amxzzw0000070

1	Air intake actuator connector
2	Air intake actuator

5. Install in the reverse order of removal.

AIR MIX ACTUATOR REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER]

id0740a2802400

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Glove compartment (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
   (3) Side wall (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
   (4) Console panel (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (5) Center panel unit (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.)
   (6) Lower panel (See 09-17-8 LOWER PANEL REMOVAL/INSTALLATION.)
   (7) Column cover (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.)
   (8) Driver-side air bag module (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
   (9) Steering wheel (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (10)Combination switch (See 09-18-21 COMBINATION SWITCH REMOVAL/INSTALLATION.)
   (11)Steering shaft (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (12)Meter hood (See 09-17-7 METER HOOD REMOVAL/INSTALLATION.)
   (13)Instrument cluster (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
   (14)Side panel (See 09-17-10 SIDE PANEL REMOVAL/INSTALLATION.)
   (15)Bonnet release lever (See 09-14-5 BONNET LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (16)Female bracket (See 09-16-12 CONVERTIBLE TOP DISASSEMBLY/ASSEMBLY.)
   (17)A-pillar trim (See 09-17-11 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (18)Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (19)Front side trim (See 09-17-11 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (20)Fuse box No.1
   (21)Dashboard (See 09-17-4 DASHBOARD REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

CONTROL SYSTEM [MANUAL AIR CONDITIONER]

L.H.D.

e5u740zw5003

R.H.D.

1	Air mix actuator
2	Air mix actuator connector

5. Install in the reverse order of removal.

amxzzw0000098

AIRFLOW MODE ACTUATOR REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER]

id0740a2801600

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the lower panel (See 09-17-8 LOWER PANEL REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

L.H.D.

e5u740zw5005

R.H.D.

1	Airflow mode actuator connector
2	Airflow mode actuator

5. Install in the reverse order of removal.

amxzzw0000098

CONTROL SYSTEM [MANUAL AIR CONDITIONER]

BLOWER MOTOR REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER]

id0740a2800900

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the front side trim. (R.H.D.) (See 09-17-11 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

L.H.D.

e5u740zw5007

R.H.D.

1	Blower motor connector
2	Blower motor

amxzzw0000098

5. Install in the reverse order of removal.

BLOWER MOTOR INSPECTION [MANUAL AIR CONDITIONER]

id0740a2801000

1. Connect battery positive voltage to blower motor terminal A, ground to terminal B, and then verify that the blower motor operates smoothly.
   - If the operation condition is not normal, replace the blower motor.

chu0740w202

CONTROL SYSTEM [MANUAL AIR CONDITIONER]

POWER METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (POWER MOS FET) REMOVAL/ INSTALLATION [MANUAL AIR CONDITIONER]

id0740a2800200

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the scuff plate (passenger's side) (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.) (R.H.D.)
4. Remove the front side trim (passenger's side) (See 09-17-11 FRONT SIDE TRIM REMOVAL/INSTALLATION.) (R.H.D.)
5. Partially peel back the floor covering so that the foot support can be removed. (R.H.D.)
6. Disconnect the power MOS FET connector.
7. Remove the power MOS FET as shown in the figure.

L.H.D.

e5u740zw5008

R.H.D.

8. Install in the reverse order of removal.
9. Perform the refrigerant system performance test. (See 07-10-6 REFRIGERANT SYSTEM PERFORMANCE TEST.)

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CONTROL SYSTEM [MANUAL AIR CONDITIONER]

POWER METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (POWER MOS FET) INSPECTION [MANUAL AIR CONDITIONER]

id0740a2800300

1. Verify that the resistance between the terminals of the power MOS FET is as shown in the table.
   - If there is any malfunction, replace the power MOS FET.

Tester lead		Resistance (kilohm) (approx. quantity)
+	–	
A	B	1,300
A	C	1,300
A	D	2.2
B	A	∞
B	C	0.12
B	D	∞
C	A	∞
C	B	0.12
C	D	∞
D	A	2.2
D	B	190
D	C	1,300

E5U740ZW5009

MAGNETIC CLUTCH DISASSEMBLY/ASSEMBLY [MANUAL AIR CONDITIONER]

id0740a2800400

1. Disassemble in the order indicated in the table.

1	Bolt (See 07-40B-9 Bolt Removal/Installation Note.)
2	Pressure plate
3	Shim (See 07-40B-11 Shim Installation Note.)
4	Snap ring (See 07-40B-9 Snap Ring Removal/Installation Note.)
5	A/C compressor pulley (See 07-40B-10 A/C Compressor Pulley Removal Note.) (See 07-40B-11 A/C Compressor Pulley Installation Note.)
6	Snap ring (See 07-40B-9 Snap Ring Removal/Installation Note.)
7	Stator (See 07-40B-10 Stator Installation Note.)
8	Clamp
9	A/C compressor body

e5u740zw5010

2. Assemble in the reverse order of disassembly.
3. Adjust the magnetic clutch clearance. (See 07-40A-11 MAGNETIC CLUTCH ADJUSTMENT [FULL-AUTO AIR CONDITIONER].)

CONTROL SYSTEM [MANUAL AIR CONDITIONER]

Bolt Removal/Installation Note

1. When removing or installing the bolt, lock the A/C compressor pulley against rotation using the following procedure.

Caution

- **When connecting the positive battery cable to the magnetic clutch connector, use a cable with a female terminal of the correct size. Otherwise, load will be applied to the male terminal, resulting in deformation or damage, and poor contact. In addition, the positive battery cable could disconnect from the connector resulting in a short circuit.**

(1) Apply battery positive voltage to the magnetic clutch terminal and connect the A/C compressor body to the ground.

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(2) Wrap the drive belt, which is no longer of use, tightly around the A/C compressor pulley.
(3) Hold the drive belt in place with pliers.
(4) Remove or install the bolt.

Tightening torque
11.8—14.7 N·m {1.21—1.49 kgf·m, 8.7—10.8 ft·lbf}

amxuuw0000107

Snap Ring Removal/Installation Note

1. Remove the snap ring using a snap ring pliers.

e5u740zw5024

CONTROL SYSTEM [MANUAL AIR CONDITIONER]

A/C Compressor Pulley Removal Note

1. Remove the A/C compressor pulley using the **SST (49 0839 425C)**.

   Caution
   - **Be careful that the SST (49 0839 425C) tabs do not hang over the stator.**

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e5u740zw5021

Stator Installation Note

1. Align the positioning pin with the hole of A/C compressor body and insert.

e5u740zw5025

CONTROL SYSTEM [MANUAL AIR CONDITIONER]

A/C Compressor Pulley Installation Note

1. Install the inner wheel of the pulley using a plastic hammer and **SST (49 B018 003)** to the compressor.

Caution

- **If the SST is not properly positioned when the A/C compressor pulley is press-fit, the A/C compressor axle will interfere with the SST, possibly damaging component parts. Verify that the SST and axle are properly positioned and perform the procedure very carefully.**

amxzzw0000069

Shim Installation Note

1. First, insert the **1 mm (0.039 in)** thick shim into the shaft.

e5u740zw5023

MAGNETIC CLUTCH ADJUSTMENT [MANUAL AIR CONDITIONER]

id0740a2800500

1. Measure the clearance around the entire circumference between the pressure plate and A/C compressor pulley using a thickness gauge.
2. Inspect the clearance.
   - If not within the specification, adjust the clearance by changing the shim or the number of shims.

Magnetic clutch clearance
0.3—0.6 mm {0.012—0.023 in}

E5U740ZW5011

CONTROL SYSTEM [MANUAL AIR CONDITIONER]

MAGNETIC CLUTCH INSPECTION [MANUAL AIR CONDITIONER]

id0740a2800600

1. Connect battery positive voltage to magnetic clutch terminal A and ground.

E5U740ZW5012

2. Verify that the magnetic clutch turns on.
   - If the magnetic clutch does not turn on, replace the A/C compressor.

e5u740zw5013

CONTROL SYSTEM [MANUAL AIR CONDITIONER]

EVAPORATOR TEMPERATURE SENSOR REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER]

id0740a2801100

1. Remove the evaporator temperature sensor from the A/C unit. (See 07-11-3 A/C UNIT DISASSEMBLY/ ASSEMBLY.)

EVAPORATOR TEMPERATURE SENSOR INSPECTION [MANUAL AIR CONDITIONER]

id0740a2801200

Note
- Inspect the evaporator temperature sensor when it is installed to the A/C unit.

1. Set the fan speed MAX-HI.
2. Set the temperature control to MAX COLD.
3. Set the air intake mode to RECIRCULATE.
4. Turn the A/C switch off.
5. Close all of the doors and roll up all the windows.
6. Wait for **5 min**.
7. Disconnect the evaporator temperature sensor connector.
8. Measure the temperature at the air intake.
9. Measure the resistance between evaporator temperature sensor terminals.
   - If the characteristics of the evaporator temperature sensor are not as shown in the graph, replace the evaporator temperature sensor.

e5u740zw5014

REFRIGERANT PRESSURE SWITCH REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER]

id0740a2802600

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Discharge the refrigerant from the system. (See 07-10-2 REFRIGERANT CHARGING.)
4. Remove in the order indicated in the table.

1	Refrigerant pressure switch connector
2	Refrigerant pressure switch (See 07-40B-14 Refrigerant Pressure Switch Installation Note.)

5. Install in the reverse order of removal.

e5u740zw5026

CONTROL SYSTEM [MANUAL AIR CONDITIONER]

Refrigerant Pressure Switch Installation Note

1. Apply compressor oil to the O-ring joints.

REFRIGERANT PRESSURE SWITCH INSPECTION [MANUAL AIR CONDITIONER]

id0740a2802700

1. Connect the manifold gauge.
2. Verify the high-pressure side reading.
3. Disconnect the refrigerant pressure switch connector.
4. Verify continuity between the terminals of the refrigerant pressure switch.
   - If the continuity is not normal, replace the refrigerant pressure switch.

e5u711zw5a09

amxzzw0000113

CONTROL SYSTEM [MANUAL AIR CONDITIONER]

CLIMATE CONTROL UNIT REMOVAL/INSTALLATION [MANUAL AIR CONDITIONER]

id0740a2807400

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the side wall. (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
4. Remove the center panel unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.)
5. Remove the climate control unit from the center panel unit.
6. Install in the reverse order of removal.

e5u740zw5105

CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER]

id0740a2802200

1. Switch the ignition to ON.
2. Connect the negative (-) lead of the tester to body ground.
3. By inserting the positive (+) lead of the tester into each climate control unit terminal, measure the voltage according to the terminal voltage table.
   - If there is any malfunction, inspect the parts under “Inspection item (s)”.
     — If the parts under “Inspection item (s)” are found to be normal, replace the climate control unit.

Terminal Voltage Table (Reference)

e5u740zw5103

Terminal	Signal name	Connected to	Measurement condition	Voltage (V)	Inspection item (s)
A	IG2	A/C 7.5 A fuse	IG SW ON	B+	• Related wiring harness • A/C 7.5 A fuse
			IG SW LOCK	1.0 or less	
B	B+	ROOM 15 A fuse	Under any condition	B+	• Related wiring harness • ROOM 15 A fuse
C	Blower fan speed control	Power MOS FET	Fan stopped	1.0 or less	• Related wiring harness • Power MOS FET
			Fan: manual LO	2.8	
			Fan: manual HI	9.9	
D	TNS signal	TNS relay	Headlight switch OFF	1.0 or less	• Related wiring harness • TNS relay • Headlight switch
			Headlight switch ON	B+	
E	Blower motor feedback	Power MOS FET	Fan stopped	B+	1. Related wiring harness 2. Power MOS FET 3. Blower motor 4. Blower relay 5. HEATER 40 A fuse 6. Power MOS FET replacement
			Fan: manual LO	8.17	
			Fan: manual HI	0.6	
F	Panel control signal	Instrument cluster	Headlight switch OFF	0	• Related wiring harness • Instrument cluster • Climate control unit: terminal voltage (D)
			Headlight switch ON	2.7	
G	Actuator power	• Air intake actuator • Air mix actuator • Airflow mode actuator	IG SW ON	B+	• Related wiring harness • Air intake actuator • Air mix actuator • Airflow mode actuator
			IG SW LOCK	1.0 or less	

CONTROL SYSTEM [MANUAL AIR CONDITIONER]

Terminal	Signal name	Connected to	Measurement condition	Voltage (V)	Inspection item (s)
H	GND	Body ground	Under any condition	1.0 or less	• Related wiring harness
I	Actuator operation signal	• Air intake actuator • Air mix actuator • Airflow mode actuator	Because this terminal is for communication, good/no good judgment by terminal voltage is not possible.		• Related wiring harness • Air intake actuator • Air mix actuator • Airflow mode actuator
J	—	—	—	—	—
K	A/C	Refrigerant pressure switch	A/C switch ON, fan switch at 1st	1.0 or less	• Related wiring harness • Refrigerant pressure switch • PCM: terminal voltage (1J)
			A/C switch OFF	B+	
L	—	—	—	—	—
M	Evaporator temperature sensor input	Evaporator temperature sensor	Compared with temperature detected by evaporator temperature sensor	Refer to graph 1	• Related wiring harness • Evaporator temperature sensor
N	Rear window defroster operation	Rear window defroster relay	Rear window defroster switch OFF	B+	• Related wiring harness • Rear window defroster relay
			Rear window defroster switch ON	1.0 or less	
O	—	—	—	—	—
P	—	—	—	—	—
Q	—	—	—	—	—
R	—	—	—	—	—
S	Sensor GND	Evaporator temperature sensor	Under any condition	1.0 or less	• Related wiring harness
T	—	—	—	—	—

GRAPH 1 (Evaporator temperature sensor)

—

TECHNICAL DATA

07-50 TECHNICAL DATA

HVAC TECHNICAL DATA 07-50–1

TECHNICAL DATA

HVAC TECHNICAL DATA

id075000800100

Item			Specification
REFRIGERANT SYSTEM			
Refrigerant	Type		R-134a
	Regular amount (approx. quantity) (g {oz})		450 {15.9}
BASIC SYSTEM			
A/C compressor	Lubrication oil	Type	DH-PR
		Sealed volume (approx. quantity) (ml {cc, fl oz})	130 {130, 4.39}
CONTROL SYSTEM			
A/C compressor	Magnetic clutch clearance (mm {in})		0.3—0.6 {0.012—0.023}

SERVICE TOOLS

07-60 SERVICE TOOLS

HVAC SST 07-60–1

SERVICE TOOLS

HVAC SST

id076000800100

49 C061 0A0B Gas Charging Set 	49 C061 013 Gas Leak Tester 	49 0839 425C Bearing Puller Set
49 B018 003 Body B 	–	–

RESTRAINTS

08
SECTION

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ON-BOARD DIAGNOSTIC

AIR BAG SYSTEM WIRING DIAGRAM (ON-BOARD DIAGNOSTIC)

id080200808800

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ON-BOARD DIAGNOSTIC

FOREWORD

id080200800100

Outline

- The OBD (on-board diagnostic) system has the following functions:
  - — Malfunction detection function: Detects malfunctions in the air bag system and outputs DTCs.
  - — Data monitor function: Reads out specific input/output signals and the system status.
- Diagnostic DTCs can be read/cleared using the M-MDS.

FLOWCHART

id080200800200

- Use the following flowchart to verify the cause of the trouble.

ON-BOARD DIAGNOSTIC

Note

- When inspecting past malfunction codes, inspect only the DTCs that were indicated before beginning the inspection. A mis-diagnosis could occur as a result of new DTCs being added while performing an inspection by disconnecting related parts or connectors.
- When DTCs of the present malfunction are no longer output after present or past malfunctions or both have been repaired, be sure to clear the past malfunction from memory to prevent repair of malfunctions that have already been repaired.

amxzzw0000210

ON-BOARD DIAGNOSTIC

DTC INSPECTION

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1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select ”Self Test”.
     2. Select ”Modules”.
     3. Select ”RCM”.
   - When using the PDS (Pocket PC)
     1. Select ”Module tests”
     2. Select ”RCM”.
     3. Select ”Self Test”.
3. Verify the DTC according to the directions on the screen.
   - If any DTCs are displayed, perform troubleshooting according to the corresponding DTC inspection.
4. After completion of repairs, clear all DTCs stored in the SAS control module. (See 08-02-5 CLEARING DTC.)

CLEARING DTC

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1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select ”Self Test”.
     2. Select ”Modules”.
     3. Select ”RCM”.
   - When using the PDS (Pocket PC)
     1. Select ”Module tests”
     2. Select ”RCM”.
     3. Select ”Self Test”.
3. Verify the DTC according to the directions on the screen.
4. Press the clear button on the DTC screen to clear the DTC.
5. Turn the ignition switch to the LOCK position.
6. Turn the ignition switch to the ON position and wait for **5 s** or more
7. Perform DTC inspection (See 08-02-5 DTC TABLE.)
8. Verify that no DTCs are displayed.

DTC TABLE

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- DTCs are common for present and past malfunction diagnosis.

Note
- When DTCs not shown in the DTC table are displayed, replace the SAS control module.
- If the air bag system warning light does not illuminate or remains illuminated when the switch the ignition to ON, inspect and repair the air bag system warning light circuit, and then confirm that the air bag system warning light is operational.
- The air bag system warning light flashes the DTC pattern for five cycles, and then remains illuminated until switch the ignition to off.
- If the SAS control module configuration is performed while the SRS air bag system circuit has a malfunction, the air bag system warning light flashes. Verify that the warning light goes out approx. 15 s after the system circuit malfunction is solved.

DTC				System malfunction location	Page
M-MDS display	Air bag system warning light				
	Flashing pattern		Priority ranking		
B1047	22		6	Driver-side side air bag module assembly incorrect	(See 08-02-9 DTC B1047, B1992, B1993, B1994, B1995.)

ON-BOARD DIAGNOSTIC

DTC				System malfunction location	Page
M-MDS display	Air bag system warning light				
	Flashing pattern		Priority ranking		
B104B	63		11	Driver-side side air bag sensor assembly incorrect	(See 08-02-13 DTC B104B, B104C, B104D, B2856, B2886, B2887.)
B104C	64		12	Passenger-side side air bag sensor assembly incorrect	(See 08-02-13 DTC B104B, B104C, B104D, B2856, B2886, B2887.)
B104D	42		10	Crash zone sensor assembly incorrect	(See 08-02-13 DTC B104B, B104C, B104D, B2856, B2886, B2887.)
B104F	64		12	Passenger-side side air bag sensor system internal circuit disabled	(See 08-02-14 DTC B104F, U2018.)
B1051	63		11	Driver-side side air bag sensor system internal circuit disabled	(See 08-02-17 DTC B1051, U2017.)
B1055	23		7	Passenger-side side air bag module assembly incorrect	(See 08-02-20 DTC B1055, B1996, B1997, B1998, B1999.)
B1058 B2228 B2230 B2232 B2234	19		4	Driver-side air bag module assembly incorrect	(See 08-02-24 DTC B1058, B2228, B2230, B2232, B2234.)
B1059 B2229 B2231 B2233 B2235	21		5	Passenger-side air bag module assembly incorrect	(Se08-02-24 DTC B1059, B2229, B2231, B2233, B2235.)
B1318	—	Continuously illuminated	—	The power supply voltage decreases (less than 9 V)	(See 08-02-25 DTC B1318.)
B1342	12		3	SAS control module	(See 08-02-28 DTC B1342.)
B1869	—	Continuously illuminated	—	Air bag system warning light circuit open	(See 08-02-28 DTC B1869.)
	—	Continuously illuminated	—	Air bag system warning light circuit short to body ground	
B1871	56		12	Passenger air bag deactivation (PAD) switch system circuit disabled	(See 08-02-32 DTC B1871.)
B1877	33		8	Driver-side pre-tensioner seat belt circuit open circuit or resistance high	(See 08-02-35 DTC B1877, B1878, B1879, B1885.)
B1878				Driver-side pre-tensioner seat belt circuit short to power supply	
B1879				Driver-side pre-tensioner seat belt circuit short to body ground	

ON-BOARD DIAGNOSTIC

DTC				System malfunction location	Page
M-MDS display	Air bag system warning light				
	Flashing pattern		Priority ranking		
B1881	34		9	Passenger-side pre-tensioner seat belt circuit open circuit or resistance high	(See 08-02-38 DTC B1881, B1882, B1883, B1886.)
B1882				Passenger-side pre-tensioner seat belt circuit short to power supply	
B1883				Passenger-side pre-tensioner seat belt circuit short to body ground	
B1884	18		13	Passenger air bag deactivation (PAD) indicator circuit open or short to body ground	(See 08-02-42 DTC B1884.)
B1885	33		8	Driver-side pre-tensioner seat belt circuit resistance low	(See 08-02-35 DTC B1877, B1878, B1879, B1885.)
B1886	34		9	Passenger-side pre-tensioner seat belt circuit resistance low	(See 08-02-38 DTC B1881, B1882, B1883, B1886.)
B1916	19		4	Driver-side air bag module circuit short to power supply	(See 08-02-45 DTC B1916, B1932, B1934, B1936.)
B1925	21		5	Passenger-side air bag module circuit short to power supply	(See 08-02-48 DTC B1925, B1933, B1935, B1938.)
B1932	19		4	Driver-side air bag module circuit open circuit or resistance high	(See 08-02-45 DTC B1916, B1932, B1934, B1936.)
B1933	21		5	Passenger-side air bag module circuit open circuit or resistance high	(See 08-02-48 DTC B1925, B1933, B1935, B1938.)
B1934	19		4	Driver-side air bag module circuit resistance low	(See 08-02-45 DTC B1916, B1932, B1934, B1936.)
B1935	21		5	Passenger-side air bag module circuit resistance low	(See 08-02-48 DTC B1925, B1933, B1935, B1938.)
B1936	19		4	Driver-side air bag module circuit short to body ground	(See 08-02-45 DTC B1916, B1932, B1934, B1936.)
B1938	21		5	Passenger-side air bag module circuit short to body ground	(See 08-02-48 DTC B1925, B1933, B1935, B1938.)

ON-BOARD DIAGNOSTIC

DTC				System malfunction location	Page
M-MDS display	Air bag system warning light				
	Flashing pattern		Priority ranking		
B1992	22		6	Driver-side side air bag module circuit short to power supply	(See 08-02-9 DTC B1047, B1992, B1993, B1994, B1995.)
B1993				Driver-side side air bag module circuit short to body ground	
B1994				Driver-side side air bag module circuit open circuit or resistance high	
B1995				Driver-side side air bag module circuit resistance low	
B1996	23		7	Passenger-side side air bag module circuit short to power supply	(See 08-02-20 DTC B1055, B1996, B1997, B1998, B1999.)
B1997				Passenger-side side air bag module circuit short to body ground	
B1998				Passenger-side side air bag module circuit open circuit or resistance high	
B1999				Passenger-side side air bag module circuit resistance low	
B2226	42		10	Crash zone sensor system internal circuit disabled	(See 08-02-51 DTC B2226, B2227.)
B2227				Crash zone sensor system communication error	
B2477	54		1	Configuration error	(See 08-02-54 DTC B2477.)
B2856	42		10	Crash zone sensor system communication data error	(See 08-02-13 DTC B104B, B104C, B104D, B2856, B2886, B2887.)
B2867	31		2	Poor connection of any SAS unit connectors	(See 08-02-55 DTC B2867.)
B2886	64		12	Passenger-side side air bag sensor system communication data error	(See 08-02-13 DTC B104B, B104C, B104D, B2856, B2886, B2887.)
B2887	63		11	Driver-side side air bag sensor system communication data error	(See 08-02-13 DTC B104B, B104C, B104D, B2856, B2886, B2887.)
U2017	63		11	Driver-side side air bag sensor system communication error	(See 08-02-17 DTC B1051, U2017.)
U2018	64		12	Passenger-side side air bag sensor system communication error	(See 08-02-14 DTC B104F, U2018.)

ON-BOARD DIAGNOSTIC

DTC B1047, B1992, B1993, B1994, B1995

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System Malfunction Location

DTC M-MDS display	System Malfunction Location
B1047	Driver-side side air bag module assembly incorrect
B1992	Driver-side side air bag module circuit short to power supply
B1993	Driver-side side air bag module circuit short to body ground
B1994	Driver-side side air bag module circuit open circuit or resistance high
B1995	Driver-side side air bag module circuit resistance low

Detection Condition

Warning

- **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**

- Resistance other than **1.3–4.7 ohms** is detected in driver-side side air bag module circuit
- Wiring harness between the driver-side side air bag module and SAS control module has a malfunction

Possible Causes

- Driver-side side air bag module connector malfunction
- Open or short circuit in the wiring harness between the driver-side side air bag module and SAS control module
- Driver-side side air bag module malfunction
- SAS control module malfunction

System wiring diagram

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ON-BOARD DIAGNOSTIC

Diagnostic Procedure

Step	Inspection		Action
1	**INSPECT DRIVER-SIDE SIDE AIR BAG MODULE CONNECTOR** **Warning** • **Handling the component parts improperly can accidentally operate (deploy) the air bag module, which may seriously injure you. Read the service warnings/cautions and the workshop manual before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)** • Turn the ignition switch to the LOCK position. • Remove the battery cover. • Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/ INSTALLATION [L8, LF].) • Disconnect the driver-side side air bag module connector. • Inspect the driver-side side air bag module connection. (Corrosion, damage, and disconnected pins) • Is there any malfunction of the driver-side side air bag module connector?	Yes	Replace the driver-side side air bag module wiring harness.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC

Step	Inspection		Action
2	**INSPECT WIRING HARNESS BETWEEN SAS CONTROL MODULE AND DRIVER-SIDE SIDE AIR BAG MODULE** • Remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.) • Disconnect the clock spring connector. (See 08-10-10 CLOCK SPRING REMOVAL/INSTALLATION.) • Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.) • Disconnect the passenger-side air bag module connector. (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) • Disconnect the passenger-side seat connectors. (See 09-13-4 SEAT REMOVAL/INSTALLATION.) • Remove the back trim. (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.) • Remove the driver and passenger-side pre-tensioner seat belt connectors. (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.) • Remove the console panel. (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.) • Disconnect the SAS control module connectors. (See 08-10-9 SAS CONTROL MODULE REMOVAL/INSTALLATION.) • Inspect the wiring harnesses between SAS control module connector terminal 2J and driver-side side air bag module connector terminal A, and SAS control module connector terminal 2G and driver-side side air bag module connector terminal B for the following: — Short circuit between terminals — Short to body ground — Open circuit **Note** • Inspect for continuity while shaking the wiring harness between the SAS control module and driver-side side air bag module. • Is the wiring harness normal?	Yes	Go to the next step.
		No	Replace the wiring harness between the SAS control module and the driver-side side air bag module.

ON-BOARD DIAGNOSTIC

Step	Inspection		Action
3	**INSPECT THE WIRING HARNESS BETWEEN THE SAS CONTROL MODULE AND DRIVER-SIDE SIDE AIR BAG MODULE FOR A SHORT CIRCUIT TO THE POWER SUPPLY** • Connect the negative battery cable. • Turn the ignition switch to the ON position with SAS control module connector and driver-side side air bag module connector disconnected. • Measure the voltage of SAS control module connector terminals 2G and 2J. **Note** • Measure the voltage while shaking the wiring harness between the SAS control module and driver-side side air bag module. • Is the voltage measured?	Yes	Replace the wiring harness between the SAS control module and the driver-side side air bag module.
		No	Go to the next step.
4	**INSPECT DRIVER-SIDE SIDE AIR BAG MODULE** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait for **1min or more**. • Connect the **SST** (Fuel and thermometer checker) or apply **2 ohms** resistance to the driver-side side air bag module connector terminals A and B. • Set the **SST** (Fuel and thermometer checker) to **2 ohms**. • Except for the driver-side side air bag module connector, reconnect all disconnected connectors. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Clear the DTC for the SAS control module using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Go to the next step.
		No	Replace the driver-side side air bag module. (See 08-10-8 SIDE AIR BAG MODULE REMOVAL/ INSTALLATION.)
5	**PERFORM SAS CONTROL MODULE DTC INSPECTION** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait for **1min or more**. • Disconnect the SST (Fuel and thermometer checker) or the 2 ohms resistance. • Connect the driver-side side air bag module connector. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Clear the DTC for the SAS control module using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Replace the SAS control module. (See 08-10-9 SAS CONTROL MODULE REMOVAL/ INSTALLATION.)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC

DTC B104B, B104C, B104D, B2856, B2886, B2887

id080200809100

System Malfunction Location

DTC M-MDS display	System Malfunction Location
B104B	Driver-side air bag sensor assembly incorrect
B104C	Passenger-side air bag sensor assembly incorrect
B104D	Crash zone sensor assembly incorrect
B2856	Crash zone sensor system communication data error
B2886	Passenger-side side air bag sensor system communication data error
B2887	Driver-side side air bag sensor system communication data error

Detection Condition

Warning

- **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**

- The SAS control module detects an error of impact magnitude set in the sensor, which occurs due to installation mismatch of the crash zone sensor or side air bag sensors.

Possible Causes

- Crash zone sensor misinstalled with wrong sensor
- Driver-side side air bag sensor misinstalled with wrong sensor
- Passenger-side side air bag sensor misinstalled with wrong sensor
- SAS control module malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT EACH SENSOR FOR INSTALLATION POSITION** **Warning** • **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the air bag system components.** **(See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.)** **(See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait for **1 min or more**. • Verify that the crash zone sensor or side air bag sensor is installed in the correct position. • Is each sensor installed correctly?	Yes	Go to the next step.
		No	Install the each sensor correctly, then go to the next step.
2	**PERFORM SAS CONTROL MODULE DTC INSPECTION** • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Clear the DTC for the SAS control module using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Replace the SAS control module. (See 08-10-9 SAS CONTROL MODULE REMOVAL/ INSTALLATION.)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC

DTC B104F, U2018

id080200809200

System Malfunction Location

DTC M-MDS display	System Malfunction Location
B104F	Passenger-side side air bag sensor system internal circuit malfunction
U2018	Passenger-side side air bag sensor system communication error

Detection Condition

Warning

- **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure**

- Wiring harness between passenger-side side air bag sensor and SAS control module has a malfunction
- Passenger-side side air bag sensor has a malfunction

Possible Causes

- Passenger-side side air bag sensor connector malfunction
- Open or short circuit in the wiring harness between the passenger-side side air bag sensor and SAS control module
- Passenger-side side air bag sensor malfunction
- SAS control module malfunction

System wiring diagram

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ON-BOARD DIAGNOSTIC

Diagnostic Procedure

Step	Inspection		Action
1	**INSPECT PASSENGER-SIDE SIDE AIR BAG SENSOR CONNECTOR** **Warning** • **Handling the component parts improperly can accidentally operate (deploy) the air bag module, which may seriously injure you. Read the service warnings/cautions and the workshop manual before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)** • Turn the ignition switch to the LOCK position. • Remove the battery cover. • Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].) • Remove the tire house trim (passenger-side). (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.) • Disconnect the passenger-side side air bag sensor connector. • Inspect the passenger-side side air bag sensor connection. (Corrosion, damage, and disconnected pins) • Is there any malfunction of the passenger-side side air bag sensor connector?	Yes	Replace the passenger-side side air bag sensor wiring harness.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC

Step	Inspection		Action
2	**INSPECT WIRING HARNESS BETWEEN SAS CONTROL MODULE AND PASSENGER-SIDE SIDE AIR BAG SENSOR** • Remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.) • Disconnect the clock spring connector. (See 08-10-10 CLOCK SPRING REMOVAL/INSTALLATION.) • Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.) • Disconnect the passenger-side air bag module connector. (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) • Disconnect the driver and passenger-side seat connectors. (See 09-13-4 SEAT REMOVAL/INSTALLATION.) • Remove the back trim. (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.) • Remove the driver and passenger-side pre-tensioner seat belt connectors. (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.) • Remove the console panel. (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.) • Disconnect the SAS control module connectors. (See 08-10-9 SAS CONTROL MODULE REMOVAL/INSTALLATION.) • Inspect the wiring harnesses between SAS control module connector terminal 2X and passenger-side side air bag sensor connector terminal A, and SAS control module connector terminal 2AA and passenger-side side air bag sensor connector terminal B for the following: — Short circuit between terminals — Short to body ground — Open circuit **Note** • Inspect for continuity while shaking the wiring harness between the SAS control module and passenger-side side air bag sensor. • Is the wiring harness normal?	Yes	Go to the next step.
		No	Replace the wiring harness between the SAS control module and the passenger-side side air bag sensor.

ON-BOARD DIAGNOSTIC

Step	Inspection		Action
3	**INSPECT THE WIRING HARNESS BETWEEN THE SAS CONTROL MODULE AND PASSENGER-SIDE SIDE AIR BAG SENSOR FOR A SHORT CIRCUIT TO THE POWER SUPPLY** • Connect the negative battery cable. • Turn the ignition switch to the ON position with SAS control module connector and passenger-side air bag sensor disconnected. • Measure the voltage of SAS control module connector terminals 2X and 2AA. **Note** • Measure the voltage while shaking the wiring harness between the SAS control module and passenger-side side air bag sensor. • Is the voltage measured?	Yes	Replace the wiring harness between the SAS control module and the passenger-side side air bag sensor.
		No	Replace the passenger-side side air bag sensor, then go to the next step. (See 08-10-10 SIDE AIR BAG SENSOR REMOVAL/ INSTALLATION.)
4	**PERFORM SAS CONTROL MODULE DTC INSPECTION** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait for 1min or more. • Reconnect all disconnected connectors. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Clear the DTC for the SAS control module using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Replace the SAS control module. (See 08-10-9 SAS CONTROL MODULE REMOVAL/ INSTALLATION.)
		No	DTC troubleshooting completed.

DTC B1051, U2017

id080200809300

System Malfunction Location

DTC M-MDS display	System Malfunction Location
B1051	Driver-side side air bag sensor system internal circuit disabled
U2017	Driver-side side air bag sensor system communication error

Detection Condition

Warning

- **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure**

- Wiring harness between driver-side side air bag sensor and SAS control module has a malfunction
- Driver-side side air bag sensor has a malfunction

Possible Causes

- Driver-side side air bag sensor connector malfunction
- Open or short circuit in the wiring harness between the driver-side side air bag sensor and SAS control module
- Driver-side side air bag sensor malfunction
- SAS control module malfunction

ON-BOARD DIAGNOSTIC

System wiring diagram

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Diagnostic Procedure

Step	Inspection		Action
1	**INSPECT DRIVER-SIDE SIDE AIR BAG SENSOR CONNECTOR** **Warning** • **Handling the component parts improperly can accidentally operate (deploy) the air bag module, which may seriously injure you. Read the service warnings/cautions and the workshop manual before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)** • Turn the ignition switch to the LOCK position. • Remove the battery cover. • Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].) • Remove the tire house trim (driver-side). (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.) • Disconnect the driver-side side air bag sensor connector. • Inspect the driver-side side air bag sensor connection. (Corrosion, damage, and disconnected pins) • Is there any malfunction of the driver-side side air bag sensor connector?	Yes	Replace the driver-side side air bag sensor wiring harness.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC

Step	Inspection		Action
2	**INSPECT WIRING HARNESS BETWEEN SAS CONTROL MODULE AND DRIVER-SIDE SIDE AIR BAG SENSOR** • Remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.) • Disconnect the clock spring connector. (See 08-10-10 CLOCK SPRING REMOVAL/INSTALLATION.) • Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.) • Disconnect the passenger-side air bag module connector. (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) • Disconnect the driver and passenger-side seat connectors. (See 09-13-4 SEAT REMOVAL/INSTALLATION.) • Remove the back trim. (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.) • Remove the driver and passenger-side pre-tensioner seat belt connectors. (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.) • Remove the console panel. (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.) • Disconnect the SAS control module connectors. (See 08-10-9 SAS CONTROL MODULE REMOVAL/INSTALLATION.) • Inspect the wiring harnesses between SAS control module connector terminal 2F and driver-side side air bag sensor connector terminal A, and SAS control module connector terminal 2C and driver-side side air bag sensor connector terminal B for the following: — Short circuit between terminals — Short to body ground — Open circuit **Note** • Inspect for continuity while shaking the wiring harness between the SAS control module and driver-side side air bag sensor. • Is the wiring harness normal?	Yes	Go to the next step.
		No	Replace the wiring harness between the SAS control module and the driver-side side air bag sensor.

ON-BOARD DIAGNOSTIC

Step	Inspection		Action
3	**INSPECT THE WIRING HARNESS BETWEEN THE SAS CONTROL MODULE AND DRIVER-SIDE SIDE AIR BAG SENSOR FOR A SHORT CIRCUIT TO THE POWER SUPPLY** • Connect the negative battery cable. • Turn the ignition switch to the ON position with SAS control module connector and driver-side air bag sensor disconnected. • Measure the voltage of SAS control module connector terminals 2F and 2C. **Note** • Measure the voltage while shaking the wiring harness between the SAS control module and driver-side side air bag sensor. • Is the voltage measured?	Yes	Replace the wiring harness between the SAS control module and the driver-side side air bag sensor.
		No	Replace the driver-side side air bag sensor, then go to the next step. (See 08-10-10 SIDE AIR BAG SENSOR REMOVAL/ INSTALLATION.)
4	**PERFORM SAS CONTROL MODULE DTC INSPECTION** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait for 1min or more. • Reconnect all disconnected connectors. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Clear the DTC for the SAS control module using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Replace the SAS control module. (See 08-10-9 SAS CONTROL MODULE REMOVAL/ INSTALLATION.)
		No	DTC troubleshooting completed.

DTC B1055, B1996, B1997, B1998, B1999

id080200809400

System Malfunction Location

DTC M-MDS display	System Malfunction Location
B1055	Passenger-side side air bag module assembly incorrect
B1996	Passenger-side side air bag module circuit short to power supply
B1997	Passenger-side side air bag module circuit short to body ground
B1998	Passenger-side side air bag module circuit open circuit or resistance high
B1999	Passenger-side side air bag module circuit resistance low

Detection Condition

Warning

- **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**

- Resistance other than **1.3–4.7 ohms** detected in passenger-side side air bag module circuit
- Wiring harness between the passenger-side side air bag module and SAS control module has a malfunction

Possible Causes

- Passenger-side side air bag module connector malfunction
- Open or short circuit in the wiring harness between the passenger-side side air bag module and SAS control module
- Passenger-side side air bag module malfunction
- SAS control module malfunction

ON-BOARD DIAGNOSTIC

System wiring diagram

amxzzw0000177

Diagnostic Procedure

Step	Inspection		Action
1	**INSPECT PASSENGER-SIDE SIDE AIR BAG MODULE CONNECTOR** **Warning** • **Handling the component parts improperly can accidentally operate (deploy) the air bag module, which may seriously injure you. Read the service warnings/cautions and the workshop manual before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)** • Turn the ignition switch to the LOCK position. • Remove the battery cover. • Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].) • Disconnect the passenger-side side air bag module connector. • Inspect the passenger-side side air bag module connection. (Corrosion, damage, and disconnected pins) • Is there any malfunction of the passenger-side side air bag module connector?	Yes	Replace the passenger-side side air bag module wiring harness.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC

Step	Inspection		Action
2	**INSPECT WIRING HARNESS BETWEEN SAS CONTROL MODULE AND PASSENGER-SIDE SIDE AIR BAG MODULE** • Remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.) • Disconnect the clock spring connector. (See 08-10-10 CLOCK SPRING REMOVAL/INSTALLATION.) • Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.) • Disconnect the passenger-side air bag module connector. (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) • Disconnect the driver-side seat connectors. (See 09-13-4 SEAT REMOVAL/INSTALLATION.) • Remove the back trim. (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.) • Remove the driver and passenger-side pre-tensioner seat belt connectors. (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.) • Remove the console panel. (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.) • Disconnect the SAS control module connectors. (See 08-10-9 SAS CONTROL MODULE REMOVAL/INSTALLATION.) • Inspect the wiring harnesses between SAS control module connector terminal 2P and passenger-side side air bag module connector terminal A, and SAS control module connector terminal 2S and passenger-side side air bag module connector terminal B for the following: — Short circuit between terminals — Short to body ground — Open circuit **Note** • Inspect for continuity while shaking the wiring harness between the SAS control module and passenger-side side air bag module. • Is the wiring harness normal?	Yes	Go to the next step.
		No	Replace the wiring harness between the SAS control module and the passenger-side side air bag module.

ON-BOARD DIAGNOSTIC

Step	Inspection		Action
3	**INSPECT THE WIRING HARNESS BETWEEN THE SAS CONTROL MODULE AND PASSENGER-SIDE SIDE AIR BAG MODULE FOR A SHORT CIRCUIT TO THE POWER SUPPLY** • Connect the negative battery cable. • Turn the ignition switch to the ON position with SAS control module connector and the passenger-side side air bag module disconnected. • Measure the voltage of SAS control module connector terminals 2P and 2S. **Note** • Measure the voltage while shaking the wiring harness between the SAS control module and passenger-side side air bag module. • Is the voltage measured?	Yes	Replace the wiring harness between the SAS control module and the passenger-side side air bag module.
		No	Go to the next step.
4	**INSPECT PASSENGER-SIDE SIDE AIR BAG MODULE** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait for **1min or more**. • Connect the **SST** (Fuel and thermometer checker) or apply **2 ohms** resistance to the passenger-side side air bag module connector terminals A and B. • Set the **SST** (Fuel and thermometer checker) to **2 ohms**. • Except for the passenger-side side air bag module connector, reconnect all disconnected connectors. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Clear the DTC for the SAS control module using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Go to the next step.
		No	Replace the passenger-side side air bag module. (See 08-10-8 SIDE AIR BAG MODULE REMOVAL/ INSTALLATION.)
5	**PERFORM SAS CONTROL MODULE DTC INSPECTION** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait for 1min or more. • Disconnect the SST (Fuel and thermometer checker) or the 2 ohms resistance. • Connect the passenger-side side air bag module connector. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Clear the DTC for the SAS control module using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Replace the SAS control module. (See 08-10-9 SAS CONTROL MODULE REMOVAL/ INSTALLATION.)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC

DTC B1058, B2228, B2230, B2232, B2234

id080200809600

System Malfunction Location

DTC M-MDS display	System Malfunction Location
B1058	Driver-side air bag module assembly incorrect
B2228	
B2230	
B2232	
B2234	

Detection Condition

Warning

- **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**

- If a SAS control module of different specification is assembled
- If a different configuration setting has been performed
- SAS control module internal malfunction

Possible Causes

- SAS control module assembly incorrect
- SAS control module internal malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT SAS CONTROL MODULE** • Verify that the correct SAS control module is assembled.	Yes	Go to the next step.
		No	Replace the SAS control module. (See 08-10-9 SAS CONTROL MODULE REMOVAL/ INSTALLATION.)
2	**INSPECT SAS CONTROL MODULE** • Using the M-MDS, perform SAS control module configuration. • Are the same DTCs present?	Yes	Replace the SAS control module. (See 08-10-9 SAS CONTROL MODULE REMOVAL/ INSTALLATION.)
		No	Replace the air bag wiring harness.

DTC B1059, B2229, B2231, B2233, B2235

id080200809700

System Malfunction Location

DTC M-MDS display	System Malfunction Location
B1059	Passenger-side air bag module assembly incorrect
B2229	
B2231	
B2233	
B2235	

Detection Condition

Warning

- **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**

- If a SAS control module of different specification is assembled
- If a different configuration setting has been performed
- SAS control module internal malfunction

ON-BOARD DIAGNOSTIC

Possible Causes
- SAS control module assembly incorrect
- SAS control module internal malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT SAS CONTROL MODULE** • Verify that the correct SAS control module is assembled.	Yes	Go to the next step.
		No	Replace the SAS control module. (See 08-10-9 SAS CONTROL MODULE REMOVAL/ INSTALLATION.)
2	**INSPECT SAS CONTROL MODULE** • Using the M-MDS, perform SAS control module configuration. • Are the same DTCs present?	Yes	Replace the SAS control module. (See 08-10-9 SAS CONTROL MODULE REMOVAL/ INSTALLATION.)
		No	Replace the air bag wiring harness.

DTC B1318

id080200810000

System Malfunction Location

DTC M-MDS display	System Malfunction Location
B1318	The power supply voltage decreases **(less than 9v)**

Detection Condition

Warning
- **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**

- SAS control module power supply voltage is other than **9–16 V**

Possible Causes
- Battery malfunction
- ENGINE 15 A fuse malfunction
- Open circuit or short in the wiring harness between the SAS control module and ignition relay
- Open circuit or power supply short in the wiring harness between the SAS control module and body ground
- SAS control module malfunction

System wiring diagram

amxzzw0000177

ON-BOARD DIAGNOSTIC

Diagnostic Procedure

Step	Inspection		Action
1	**BATTERY INSPECTION** • Refer to the battery inspection and inspect the battery. (See 01-17-3 BATTERY INSPECTION [L8, LF].) • Is the battery normal?	Yes	Go to the next step.
		No	Replace or charge the battery. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2	**FUSE INSPECTION** • Turn the ignition switch to the LOCK position. • Remove the battery cover. • Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].) • Remove the ENGINE 15 A fuse. • Is the fuse normal?	Yes	Go to the next step.
		No	Replace the ENGINE 15 A fuse.
3	**INSPECT SAS CONTROL MODULE CONNECTOR** **Warning** • **Handling the component parts improperly can accidentally operate (deploy) the air bag module, which may seriously injure you. Read the service warnings/cautions and the workshop manual before handling the air bag system components.** **(See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.)** **(See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)** • Remove the console panel. (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.) • Disconnect all SAS control module connectors. • Inspect the SAS control module connection. (Corrosion, damage, and disconnected pins) • Is there any malfunction of the SAS control module connector?	Yes	Replace the SAS control module wiring harness.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC

Step	Inspection		Action
4	**INSPECT WIRING HARNESS BETWEEN IGNITION RELAY AND SAS CONTROL MODULE** • Remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.) • Disconnect the clock spring connector. (See 08-10-10 CLOCK SPRING REMOVAL/INSTALLATION.) • Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.) • Disconnect the passenger-side air bag module connector. (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) • Disconnect the driver and passenger-side seat connectors. (See 09-13-4 SEAT REMOVAL/INSTALLATION.) • Remove the back trim. (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.) • Remove the driver and passenger-side pre-tensioner seat belt connectors. (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.) • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Measure the voltage of SAS control module terminal 1W. **Note** • Measure the voltage while shaking the wiring harness between the SAS control module and ignition relay. • Is the voltage between **9–16 V**?	Yes	Go to the next step.
		No	Replace the wiring harness between the ignition relay and SAS control module.
5	**INSPECT WIRING HARNESS BETWEEN SAS CONTROL MODULE AND BODY GROUND** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait **1 min or more**. • Inspect the wiring harness between SAS control module connector terminal 1I and body ground. — Open circuit **Note** • Inspect for continuity while shaking the wiring harness between the SAS control module and body ground. • Is the wiring harness normal?	Yes	Go to the next step.
		No	Replace the wiring harness between the SAS control module and body ground.
6	**PERFORM SAS CONTROL MODULE DTC INSPECTION** • Reconnect all disconnected connectors. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Clear the DTC for the SAS control module using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Replace the SAS control module. (See 08-10-9 SAS CONTROL MODULE REMOVAL/INSTALLATION.)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC

DTC B1342

id080200801100

System Malfunction Location

DTC M-MDS display	System Malfunction Location
B1342	SAS control module

Detection Condition

Warning
- **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**

- Malfunction in the SAS control module internal circuit

Possible Causes
- SAS control module malfunction

Diagnostic Procedure

Action
Replace the SAS control module. (See 08-10-9 SAS CONTROL MODULE REMOVAL/INSTALLATION.)

DTC B1869

id080200803400

System Malfunction Location

DTC M-MDS display	System Malfunction Location
B1869	Air bag system warning light circuit open (the air bag system warning light is continuously illuminated.)
	Air bag system warning light circuit short to body ground (the air bag system warning light is never illuminated.)

Detection Condition

Warning
- **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**

- Malfunction in the air bag system warning light circuit

Possible Causes
- Open or short circuit in the wiring harness between the battery and the instrument cluster
- Open or short circuit in the wiring harness between the instrument cluster and SAS control module
- Instrument cluster malfunction
- SAS control module malfunction

ON-BOARD DIAGNOSTIC

System wiring diagram

amxzzw0000176

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT FOR CONTINUITY BETWEEN BATTERY AND INSTRUMENT CLUSTER** • Turn the ignition switch to the ON position. • Measure the voltage at instrument cluster connector terminal 2K. **Note** • Measure the voltage while shaking the wiring harness between the battery and instrument cluster. • Is the voltage **9 V or more**?	Yes	Go to the next step.
		No	Repair the related wiring harness.

ON-BOARD DIAGNOSTIC

STEP	INSPECTION		ACTION
2	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND SAS CONTROL MODULE** **Warning** • **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the air bag system components.** **(See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.)** **(See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)** • Turn the ignition switch to the LOCK position. • Remove the battery cover. • Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].) • Remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.) • Disconnect the clock spring connector. (See 08-10-10 CLOCK SPRING REMOVAL/INSTALLATION.) • Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.) • Disconnect the passenger-side air bag module connector. (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) • Disconnect the driver and passenger-side seat connectors. (See 09-13-4 SEAT REMOVAL/INSTALLATION.) • Remove the back trim. (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.) • Remove the driver and passenger-side pre-tensioner seat belt connectors. (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.) • Remove the console panel. (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.) • Disconnect the SAS control module connectors. (See 08-10-9 SAS CONTROL MODULE REMOVAL/INSTALLATION.) • Disconnect the instrument cluster connector. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.) • Inspect the wiring harness between SAS control module terminal 1R and instrument cluster terminal 2K for the following: — Short circuit between terminals — Short to body ground — Open circuit **Note** • Inspect for continuity while shaking the wiring harness between the SAS control module and instrument cluster. • Is the wiring harness normal?	Yes	Go to the next step.
		No	Replace the wiring harness between the SAS control module and the instrument cluster.

ON-BOARD DIAGNOSTIC

STEP	INSPECTION		ACTION
3	**INSPECT THE WIRING HARNESS BETWEEN THE SAS CONTROL MODULE AND INSTRUMENT CLUSTER FOR A SHORT CIRCUIT TO THE POWER SUPPLY** • Connect the negative battery cable. • Turn the ignition switch to the ON position with SAS control module connector and instrument cluster connector disconnected. • Measure the voltage of SAS control module connector terminal 1R. **Note** • Measure the voltage while shaking the wiring harness between the SAS control module and instrument cluster. • Is the voltage measured?	Yes	Replace the wiring harness between the SAS control module and the instrument cluster.
		No	Go to the next step.
4	**INSPECT AIR BAG SYSTEM WARNING LIGHT** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait for **1 min. or more**. • Connect the instrument cluster connector. • Ground instrument cluster connector terminal 2K to the body using a jumper wire. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Does the air bag system warning light illuminate?	Yes	Go to the next step.
		No	Replace the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)
5	**PERFORM SAS CONTROL MODULE DTC INSPECTION** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait for **1min or more**. • Reconnect all disconnected connectors. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Clear the DTC for the SAS control module using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Replace the SAS control module. (See 08-10-9 SAS CONTROL MODULE REMOVAL/ INSTALLATION.)
		No	DTC troubleshooting completed.

DTC B1871

id080200810100

System Malfunction Location

DTC M-MDS display	System Malfunction Location
B1871	Passenger air bag deactivation (PAD) switch system circuit disabled

Detection Condition

Warning

- **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**

- Malfunction in wiring harness between PAD switch and SAS control module
- Malfunction in PAD switch circuit

ON-BOARD DIAGNOSTIC

Possible Causes

- PAD switch connector malfunction
- PAD switch assembly incorrect
- Open or short circuit in wiring harness between PAD switch and SAS control module
- Open circuit in wiring harness between PAD switch and body ground
- SAS control module malfunction

System wiring diagram

amxzzw0000177

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT PAD SWITCH CONNECTOR** **Warning** • **Handling the component parts improperly can accidentally operate (deploy) the air bag module, which may seriously injure you. Read the service warnings/cautions and the workshop manual before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)** • Turn the ignition switch to the LOCK position. • Remove the battery cover. • Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].) • Disconnect the PAD switch connector. • Inspect the PAD switch connection. (Corrosion, damage, and disconnected pins) • Is there any malfunction of the PAD switch connector?	Yes	Replace the PAD switch wiring harness.
		No	Go to the next step.
2	**INSPECT PAD SWITCH** • Inspect the PAD switch. (See 08-10-14 PASSENGER AIR BAG DEACTIVATION (PAD) SWITCH INSPECTION.) • Is the PAD switch normal?	Yes	Go to the next step.
		No	Replace the PAD switch. (See 08-10-14 PASSENGER AIR BAG DEACTIVATION (PAD) SWITCH REMOVAL/INSTALLATION.)

ON-BOARD DIAGNOSTIC

STEP	INSPECTION		ACTION
3	**INSPECT WIRING HARNESS BETWEEN PAD SWITCH AND SAS CONTROL MODULE** • Remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.) • Disconnect the clock spring connector. (See 08-10-10 CLOCK SPRING REMOVAL/INSTALLATION.) • Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.) • Disconnect the passenger-side air bag module connector. (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) • Disconnect the driver and passenger-side seat connectors. (See 09-13-4 SEAT REMOVAL/INSTALLATION.) • Remove the back trim. (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.) • Remove the driver and passenger-side pre-tensioner seat belt connectors. (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.) • Remove the console panel. (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.) • Disconnect the SAS control module connectors. (See 08-10-9 SAS CONTROL MODULE REMOVAL/INSTALLATION.) • Inspect the wiring harness between SAS control module terminal 1Q and PAD switch terminal D, SAS control module terminal 1H and PAD switch terminal C for the following: — Short circuit between terminals — Short to body ground — Open circuit **Note** • Inspect for continuity while shaking the wiring harness between the SAS control module and PAD switch. • Is the wiring harness normal?	Yes	Go to the next step.
		No	Replace the wiring harness between the SAS control module and the PAD switch.
4	**INSPECT WIRING HARNESS BETWEEN PAD SWITCH AND BODY GROUND** • Inspect the wiring harness between PAD switch terminal E and body ground for the following: — Open circuit **Note** • Inspect for continuity while shaking the wiring harness between the SAS control module and PAD switch. • Is the wiring harness normal?	Yes	Go to the next step.
		No	Replace the wiring harness between the PAD switch and body ground.

ON-BOARD DIAGNOSTIC

STEP	INSPECTION		ACTION
5	**PERFORM SAS CONTROL MODULE DTC INSPECTION** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait for **1min or more**. • Reconnect all disconnected connectors. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Clear the DTC for the SAS control module using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Replace the SAS control module. (See 08-10-9 SAS CONTROL MODULE REMOVAL/ INSTALLATION.)
		No	DTC troubleshooting completed.

DTC B1877, B1878, B1879, B1885

id080200801400

System Malfunction Location

DTC M-MDS display	System Malfunction Location
B1877	Driver-side pre-tensioner seat belt circuit open circuit or resistance high
B1878	Driver-side pre-tensioner seat belt circuit short to power supply
B1879	Driver-side pre-tensioner seat belt circuit short to body ground
B1885	Driver-side pre-tensioner seat belt circuit resistance low

Detection Condition

Warning

- **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**

- Resistance other than **1.3–4.7 ohms** detected in driver-side pre-tensioner seat belt circuit
- Wiring harness between the driver-side pre-tensioner seat belt and SAS control module has a malfunction

Possible Causes

- Driver-side pre-tensioner seat belt connector malfunction
- Open or short circuit in the wiring harness between the driver-side pre-tensioner seat belt and SAS control module
- Driver-side pre-tensioner seat belt malfunction
- SAS control module malfunction

ON-BOARD DIAGNOSTIC

System wiring diagram

amxzzw0000176

Diagnostic Procedure

Step	Inspection		Action
1	**INSPECT DRIVER-SIDE PRE-TENSIONER SEAT BELT CONNECTOR** **Warning** • **Handling the component parts improperly can accidentally operate (deploy) the air bag module, which may seriously injure you. Read the service warnings/cautions and the workshop manual before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)** • Turn the ignition switch to the LOCK position. • Remove the battery cover. • Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].) • Remove the back trim. (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.) • Disconnect the driver-side pre-tensioner seat belt connector. • Inspect the driver-side pre-tensioner seat belt connector. (Corrosion, damage, and disconnected pins) • Is there any malfunction of the driver-side pre-tensioner seat belt connector?	Yes	Replace the driver-side pre-tensioner seat belt wiring harness.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC

Step	Inspection		Action
2	**INSPECT WIRING HARNESS BETWEEN SAS CONTROL MODULE AND DRIVER-SIDE PRE-TENSIONER SEAT BELT** • Remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.) • Disconnect the clock spring connector. (See 08-10-10 CLOCK SPRING REMOVAL/INSTALLATION.) • Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.) • Disconnect the passenger-side air bag module connector. (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) • Disconnect the driver and passenger-side seat connectors. (See 09-13-4 SEAT REMOVAL/INSTALLATION.) • Remove the passenger-side pre-tensioner seat belt connectors. (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.) • Remove the console panel. (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.) • Disconnect the SAS control module connectors. (See 08-10-9 SAS CONTROL MODULE REMOVAL/INSTALLATION.) • Inspect the wiring harnesses between SAS control module connector terminal 2D and driver-side pre-tensioner seat belt connector terminal A, and SAS control module connector terminal 2A and driver-side pre-tensioner seat belt connector terminal B for the following: — Short circuit between terminals — Short to body ground — Open circuit **Note** • Inspect for continuity while shaking the wiring harness between the SAS control module and driver-side pre-tensioner seat belt. • Is the wiring harness normal?	Yes	Go to the next step.
		No	Replace the wiring harness between the SAS control module and the driver-side pre-tensioner seat belt.
3	**INSPECT THE WIRING HARNESS BETWEEN THE SAS CONTROL MODULE AND DRIVER-SIDE PRE-TENSIONER SEAT BELT FOR A SHORT CIRCUIT TO THE POWER SUPPLY** • Connect the negative battery cable. • Turn the ignition switch to the ON position with SAS control module connector and driver-side pre-tensioner seat belt connector disconnected. • Measure the voltage of SAS control module connector terminals 2A and 2D. **Note** • Measure the voltage while shaking the wiring harness between the SAS control module and driver-side pre-tensioner seat belt. • Is the voltage measured?	Yes	Replace the wiring harness between the SAS control module and the driver-side pre-tensioner seat belt.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC

Step	Inspection		Action
4	**INSPECT DRIVER-SIDE PRE-TENSIONER SEAT BELT** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait for **1min or more**. • Connect the **SST** (Fuel and thermometer checker) or apply **2 ohms** resistance to the driver-side pre-tensioner seat belt connector terminals A and B. • Set the **SST** (Fuel and thermometer checker) to **2 ohms**. • Except for the driver-side pre-tensioner seat belt connector, reconnect all disconnected connectors. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Clear the DTC for the SAS control module using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. • (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Go to the next step.
		No	Replace the driver-side pre-tensioner seat belt. (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
5	**PERFORM SAS CONTROL MODULE DTC INSPECTION** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait for **1min or more**. • Disconnect the SST (Fuel and thermometer checker) or the 2 ohms resistance. • Connect the driver-side pre-tensioner seat belt connector. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Clear the DTC for the SAS control module using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Replace the SAS control module. (See 08-10-9 SAS CONTROL MODULE REMOVAL/ INSTALLATION.)
		No	DTC troubleshooting completed.

DTC B1881, B1882, B1883, B1886

id080200801500

System Malfunction Location

DTC M-MDS display	System Malfunction Location
B1881	Passenger-side pre-tensioner seat belt circuit open circuit or resistance high
B1882	Passenger-side pre-tensioner seat belt circuit short to power supply
B1883	Passenger-side pre-tensioner seat belt circuit short to body ground
B1886	Passenger-side pre-tensioner seat belt circuit resistance low

Detection Condition

Warning

- **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**

- Resistance other than **1.3–4.7 ohms** detected in passenger-side pre-tensioner seat belt circuit
- Wiring harness between the passenger-side pre-tensioner seat belt and SAS control module has a malfunction

ON-BOARD DIAGNOSTIC

Possible Causes

- Passenger-side pre-tensioner seat belt connector malfunction
- Open or short circuit in the wiring harness between the passenger-side pre-tensioner seat belt and SAS control module
- Passenger-side pre-tensioner seat belt malfunction
- SAS control module malfunction

System wiring diagram

amxzzw0000176

Diagnostic Procedure

Step	Inspection		Action
1	**INSPECT PASSENGER-SIDE PRE-TENSIONER SEAT BELT CONNECTOR** **Warning** • **Handling the component parts improperly can accidentally operate (deploy) the air bag module, which may seriously injure you. Read the service warnings/cautions and the workshop manual before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)** • Turn the ignition switch to the LOCK position. • Remove the battery cover. • Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].) • Remove the back trim. (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.) • Disconnect the passenger-side pre-tensioner seat belt connector. • Inspect the passenger-side pre-tensioner seat belt connector. (Corrosion, damage, and disconnected pins) • Is there any malfunction of the passenger-side pre-tensioner seat belt connector?	Yes	Replace the passenger-side pre-tensioner seat belt wiring harness.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC

Step	Inspection		Action
2	**INSPECT WIRING HARNESS BETWEEN SAS CONTROL MODULE AND PASSENGER-SIDE PRE-TENSIONER SEAT BELT** • Remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.) • Disconnect the clock spring connector. (See 08-10-10 CLOCK SPRING REMOVAL/INSTALLATION.) • Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.) • Disconnect the passenger-side air bag module connector. (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) • Disconnect the driver and passenger-side seat connectors. (See 09-13-4 SEAT REMOVAL/INSTALLATION.) • Remove the driver-side pre-tensioner seat belt connectors. (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.) • Remove the console panel. (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.) • Disconnect the SAS control module connectors. (See 08-10-9 SAS CONTROL MODULE REMOVAL/INSTALLATION.) • Inspect the wiring harnesses between SAS control module connector terminal 2Y and passenger-side pre-tensioner seat belt connector terminal A, and SAS control module connector terminal 2V and passenger-side pre-tensioner seat belt connector terminal B for the following: — Short circuit between terminals — Short to body ground — Open circuit **Note** • Inspect for continuity while shaking the wiring harness between the SAS control module and passenger-side pre-tensioner seat belt. • Is the wiring harness normal?	Yes	Go to the next step.
		No	Replace the wiring harness between the SAS control module and the passenger-side pre-tensioner seat belt.

ON-BOARD DIAGNOSTIC

Step	Inspection		Action
3	**INSPECT THE WIRING HARNESS BETWEEN THE SAS CONTROL MODULE AND PASSENGER-SIDE PRE-TENSIONER SEAT BELT FOR A SHORT CIRCUIT TO THE POWER SUPPLY** • Connect the negative battery cable. • Turn the ignition switch to the ON position with SAS control module connector and passenger-side pre-tensioner seat belt connector disconnected. • Measure the voltage of SAS control module connector terminals 2Y and 2V of SAS control module harness side connector. **Note** • Measure the voltage while shaking the wiring harness between the SAS control module and passenger-side pre-tensioner seat belt. • Is the voltage measured?	Yes	Replace the wiring harness between the SAS control module and the passenger-side pre-tensioner seat belt.
		No	Go to the next step.
4	**INSPECT PASSENGER-SIDE PRE-TENSIONER SEAT BELT** • Connect the **SST** (Fuel and thermometer checker) or apply **2 ohms** resistance to the passenger-side pre-tensioner seat belt connector terminals A and B. • Set the **SST** (Fuel and thermometer checker) to **2 ohms**. • Except for the passenger-side pre-tensioner seat belt connector, reconnect all disconnected connectors. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Clear the DTC for the SAS control module using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. • (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Go to the next step.
		No	Replace the passenger-side pre-tensioner seat belt. (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
5	**PERFORM SAS CONTROL MODULE DTC INSPECTION** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait for **1min or more**. • Disconnect the **SST** (Fuel and thermometer checker) or the **2 ohms** resistance. • Connect the passenger-side pre-tensioner seat belt connector. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Clear the DTC for the SAS control module using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Replace the SAS control module. (See 08-10-9 SAS CONTROL MODULE REMOVAL/INSTALLATION.)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC

DTC B1884

id080200804200

System Malfunction Location

DTC M-MDS display	System Malfunction Location
B1884	Passenger air bag deactivation (PAD) indicator circuit open or short to body ground

Detection Condition

Warning

- **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**

- Malfunction in passenger air bag deactivation (PAD) indicator circuit

Possible Causes

- Battery malfunction
- ENGINE 15 A fuse malfunction
- PAD indicator connector malfunction
- Open circuit in wiring harness between battery and PAD indicator
- PAD indicator malfunction
- Open or short circuit in wiring harness between PAD indicator and SAS control module
- SAS control module malfunction

System wiring diagram

amxzzw0000176

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	**BATTERY INSPECTION** • Refer to the battery inspection and inspect the battery. (See 01-17-3 BATTERY INSPECTION [L8, LF].) • Is the battery normal?	Yes	Go to the next step.
		No	Replace or charge the battery. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)

ON-BOARD DIAGNOSTIC

STEP	INSPECTION		ACTION
2	**INSPECT FUSE** • Turn the ignition switch to the LOCK position. • Remove the battery cover. • Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].) • Remove the ENGINE15 A fuse. • Is the fuse normal?	Yes	Install the fuse, then go to the next step.
		No	Replace the fuse.
3	**INSPECT PAD INDICATOR CONNECTOR** **Warning** • **Handling the component parts improperly can accidentally operate (deploy) the air bag module, which may seriously injure you. Read the service warnings/cautions and the workshop manual before handling the air bag system components.** **(See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.)** **(See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)** • Remove the decoration panel. (See 09-17-13 DECORATION PANEL REMOVAL/INSTALLATION.) • Disconnect the PAD indicator connector. (See 08-10-15 PASSENGER AIR BAG DEACTIVATION (PAD) INDICATOR REMOVAL/INSTALLATION.) • Inspect the PAD indicator connection. (Corrosion, damage, and disconnected pins) • Is there any malfunction of the PAD indicator connector?	Yes	Replace the PAD indicator wiring harness.
		No	Go to the next step.
4	**INSPECT WIRING HARNESS BETWEEN BATTERY AND PAD INDICATOR** • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Measure the PAD indicator terminal B voltage. **Note** • Measure the voltage while shaking the wiring harness between the battery and PAD indicator. • Is the voltage **9 V or more**?	Yes	Go to the next step.
		No	Repair the wiring harness between the battery and PAD indicator.
5	**INSPECT PAD INDICATOR** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait for **1 min or more**. • Remove the console panel. (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.) • Disconnect the SAS control module connectors. (See 08-10-9 SAS CONTROL MODULE REMOVAL/INSTALLATION.) • Connect the PAD indicator connector. • Ground PAD indicator connector terminal G using a jumper wire. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Does the PAD indicator illuminate?	Yes	Go to the next step.
		No	Replace the PAD indicator. (See 08-10-15 PASSENGER AIR BAG DEACTIVATION (PAD) INDICATOR REMOVAL/INSTALLATION.)

ON-BOARD DIAGNOSTIC

STEP	INSPECTION		ACTION
6	**INSPECT WIRING HARNESS BETWEEN PAD INDICATOR AND SAS CONTROL MODULE** • Remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.) • Disconnect the clock spring connector. (See 08-10-10 CLOCK SPRING REMOVAL/INSTALLATION.) • Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.) • Disconnect the passenger-side air bag module connector. (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) • Disconnect the driver and passenger-side seat connectors. (See 09-13-4 SEAT REMOVAL/INSTALLATION.) • Remove the back trim. (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.) • Remove the driver and passenger-side pre-tensioner seat belt connectors. (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.) • Inspect the wiring harness between PAD indicator terminal G and SAS control module terminal 1U for the following: — Short circuit between terminals — Short to ground — Open circuit **Note** • Inspect for continuity while shaking the wiring harness between the SAS control module and PAD indicator. • Is the wiring harness normal?	Yes	Go to the next step.
		No	Repair the wiring harness between the PAD indicator and SAS control module.
7	**PERFORM SAS CONTROL MODULE DTC INSPECTION** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait for **1min or more**. • Reconnect the disconnected connectors. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Clear the DTC for the SAS control module using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Replace the SAS control module. (See 08-10-9 SAS CONTROL MODULE REMOVAL/INSTALLATION.)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC

DTC B1916, B1932, B1934, B1936

id080200810200

System Malfunction Location

DTC M-MDS display	System Malfunction Location
B1916	Driver-side air bag module circuit short to power supply
B1932	Driver-side air bag module circuit open circuit or resistance high
B1934	Driver-side air bag module circuit resistance low
B1936	Driver-side air bag module circuit short to body ground

Detection Condition

Warning

- **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**

- Resistance **other than 1.5–4.7 ohms** detected in driver-side air bag module circuit
- Wiring harness between driver-side air bag module and SAS control module has malfunction

Possible Causes

- Clock spring connector malfunction
- Clock spring malfunction
- Open or short circuit in the wiring harness between the clock spring and SAS control module
- Driver-side air bag module malfunction
- SAS control module malfunction

System wiring diagram

amxzzw0000193

ON-BOARD DIAGNOSTIC

Diagnostic Procedure

Step	Inspection		Action
1	**INSPECT DRIVER-SIDE AIR BAG MODULE CONNECTOR (CLOCK SPRING)** **Warning** • **Handling the component parts improperly can accidentally operate (deploy) the air bag module, which may seriously injure you. Read the service warnings/cautions and the workshop manual before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait for **1min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].) • Remove the driver-side air bag module. (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) • Inspect the clock spring connector. (Corrosion, damage, and disconnected pins) • Is there any malfunction of the clock spring connector?	Yes	Replace the clock spring. (See 08-10-10 CLOCK SPRING REMOVAL/INSTALLATION.)
		No	Go to the next step.
2	**INSPECT CLOCK SPRING** • Remove the steering wheel. (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.) • Remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.) • Remove the clock spring. (See 08-10-10 CLOCK SPRING REMOVAL/INSTALLATION.) • Inspect for continuity between clock spring connector terminals 1C—3B and 1D—3A. **Note** • Inspect the clock spring wiring harness for continuity while shaking it. • Is there continuity?	Yes	Go to the next step.
		No	Replace the clock spring. (See 08-10-10 CLOCK SPRING REMOVAL/INSTALLATION.)

ON-BOARD DIAGNOSTIC

Step	Inspection		Action
3	**INSPECT WIRING HARNESS BETWEEN SAS CONTROL MODULE AND CLOCK SPRING** • Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.) • Disconnect the passenger-side air bag module connector. (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) • Disconnect the driver and passenger-side seat connectors. (See 09-13-4 SEAT REMOVAL/INSTALLATION.) • Remove the back trim. (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.) • Remove the driver and passenger-side pre-tensioner seat belt connectors. (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.) • Remove the console panel. (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.) • Disconnect the SAS control module connectors. (See 08-10-9 SAS CONTROL MODULE REMOVAL/INSTALLATION.) • Inspect the wiring harness between SAS control module connector terminal 1A and clock spring connector terminal 1C, and SAS control module connector terminal 1D and clock spring connector terminal 1D for the following: — Short circuit between terminals — Short to ground — Open circuit **Note** • Inspect for continuity while shaking the wiring harness between the SAS control module and clock spring. • Is the wiring harness normal?	Yes	Go to the next step.
		No	Replace the wiring harness between the SAS control module and clock spring.
4	**INSPECT THE WIRING HARNESS BETWEEN THE SAS CONTROL MODULE AND DRIVER-SIDE AIR BAG MODULE FOR A SHORT CIRCUIT TO THE POWER SUPPLY** • Connect the negative battery cable. • Turn the ignition switch to the ON position with SAS control module connector and clock spring connector disconnected. • Measure the voltage of SAS control module connector terminals 1A and 1D. **Note** • Measure the voltage while shaking the wiring harness between the SAS control module and driver-side air bag module. • Is the voltage measured?	Yes	Replace the wiring harness between the SAS control module and clock spring.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC

Step	Inspection		Action
5	**INSPECT DRIVER-SIDE AIR BAG MODULE** • Connect the leads of the **SST** (Fuel and thermometer checker) or apply **2 ohms** resistance to clock spring connector terminals 3A and 3B. • Set the resistance of the **SST** (Fuel and thermometer checker) to the **2 ohms** position. • Except for the driver-side air bag module connector, reconnect all disconnected connectors. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Clear DTCs using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Go to the next step.
		No	Replace the driver-side air bag module. (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
6	**PERFORM SAS CONTROL MODULE DTC INSPECTION** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait for **1min or more**. • Disconnect the SST (Fuel and thermometer checker) or the 2 ohms resistance. • Connect the driver-side air bag module connector. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Clear the DTC for the SAS control module using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Replace the SAS control module. (See 08-10-9 SAS CONTROL MODULE REMOVAL/ INSTALLATION.)
		No	DTC troubleshooting completed.

DTC B1925, B1933, B1935, B1938

id080200810300

System Malfunction Location

DTC M-MDS display	System Malfunction Location
B1925	Passenger-side air bag module circuit short to power supply
B1933	Passenger-side air bag module circuit open circuit or resistance high
B1935	Passenger-side air bag module circuit resistance low
B1938	Passenger-side air bag module circuit short to body ground

Detection Condition

Warning

- **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**

- Resistance other than **1.3–4.7 ohms** detected in passenger-side air bag module circuit
- Malfunction in the wiring harness between the passenger-side air bag module and SAS control module

Possible Causes

- Passenger-side air bag module connector malfunction
- Open or short circuit in the wiring harness between the passenger-side air bag module and the SAS control module
- Passenger-side air bag module malfunction
- SAS control module malfunction

ON-BOARD DIAGNOSTIC

System wiring diagram

amxzzw0000177

Diagnostic Procedure

Step	Inspection		Action
1	**INSPECT PASSENGER-SIDE AIR BAG MODULE CONNECTOR** **Warning** • **Handling the component parts improperly can accidentally operate (deploy) the air bag module, which may seriously injure you. Read the service warnings/cautions and the workshop manual before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].) • Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.) • Disconnect the passenger-side air bag module connector. (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) • Inspect the passenger-side air bag module connector. (Corrosion, damage, and disconnected pins) • Is there any malfunction of the passenger-side air bag module connector?	Yes	Replace the passenger-side air bag module wiring harness.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC

Step	Inspection		Action
2	**INSPECT WIRING HARNESS BETWEEN SAS CONTROL MODULE AND PASSENGER-SIDE AIR BAG MODULE** • Remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.) • Disconnect the clock spring connector. (See 08-10-10 CLOCK SPRING REMOVAL/INSTALLATION.) • Disconnect the driver and passenger-side seat connectors. (See 09-13-4 SEAT REMOVAL/INSTALLATION.) • Remove the back trim. (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.) • Remove the driver and passenger-side pre-tensioner seat belt connectors. (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.) • Remove the console panel. (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.) • Disconnect the SAS control module connectors. (See 08-10-9 SAS CONTROL MODULE REMOVAL/INSTALLATION.) • Inspect the wiring harnesses between SAS control module connector terminal 1S and passenger-side air bag module connector terminal A, and SAS control module connector terminal 1V and passenger-side air bag module connector terminal B for the following: — Short circuit between terminals — Short to body ground — Open circuit **Note** • Inspect for continuity while shaking the wiring harness between the SAS control module and passenger-side air bag module. • Is the wiring harness normal?	Yes	Go to the next step.
		No	Replace the wiring harness between the SAS control module and the passenger-side air bag module.
3	**INSPECT THE WIRING HARNESS BETWEEN THE SAS CONTROL MODULE AND PASSENGER-SIDE AIR BAG MODULE FOR A SHORT CIRCUIT TO THE POWER SUPPLY** • Connect the negative battery cable. • Turn the ignition switch to the ON position with SAS control module connector and clock spring connector disconnected. • Measure the voltage of SAS control module connector terminals 1S and 1V. **Note** • Measure the voltage while shaking the wiring harness between the SAS control module and passenger-side air bag module. • Is the voltage measured?	Yes	Replace the wiring harness between the SAS control module and the passenger-side air bag module.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC

Step	Inspection		Action
4	**INSPECT PASSENGER-SIDE AIR BAG MODULE** • Connect the **SST** (Fuel and thermometer checker) or apply **2 ohms** resistance to the passenger-side air bag module connector terminals A and B. • Set the **SST** (fuel and thermometer checker) to **2 ohms**. • Except for the passenger-side air bag module connector, reconnect all disconnected connectors. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Clear the DTC for the SAS control module using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Go to the next step.
		No	Replace the passenger-side air bag module. (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
5	**PERFORM SAS CONTROL MODULE DTC INSPECTION** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait for **1min or more**. • Disconnect the SST (Fuel and thermometer checker) or the 2 ohms resistance. • Connect the passenger-side air bag module connector. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Clear the DTC for the SAS control module using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Replace the SAS control module. (See 08-10-9 SAS CONTROL MODULE REMOVAL/INSTALLATION.)
		No	DTC troubleshooting completed.

DTC B2226, B2227

id080200810400

System Malfunction Location

DTC M-MDS display	System Malfunction Location
B2226	Crash zone sensor internal circuit disabled
B2227	Crash zone sensor system communication error

Detection Condition

Warning

- **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**

- Malfunction in the wiring harness between the crash zone sensor and SAS control module
- Malfunction in the crash zone sensor circuit

Possible Causes

- Crash zone sensor connector malfunction
- Open or short circuit in the wiring harness between the crash zone sensor and SAS control module
- Crash zone sensor malfunction
- SAS control module malfunction

ON-BOARD DIAGNOSTIC

System wiring diagram

amxzzw0000177

Diagnostic procedure

Step	Inspection		Action
1	**INSPECT CRASH ZONE SENSOR CONNECTOR** **Warning** • **Handling the component parts improperly can accidentally operate (deploy) the air bag module, which may seriously injure you. Read the service warnings/cautions and the workshop manual before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].) • Disconnect the crash zone sensor connector. (See 08-10-9 CRASH ZONE SENSOR REMOVAL/INSTALLATION.) • Inspect the crash zone sensor connector. (Corrosion, damage, and disconnected pins) • Is there any malfunction of the crash zone sensor connector?	Yes	Replace the crash zone sensor wiring harness.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC

Step	Inspection		Action
2	**INSPECT WIRING HARNESS BETWEEN SAS CONTROL MODULE AND CRASH ZONE SENSOR** • Remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.) • Disconnect the clock spring connector. (See 08-10-10 CLOCK SPRING REMOVAL/INSTALLATION.) • Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.) • Disconnect the passenger-side air bag module connector. (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) • Disconnect the driver and passenger-side seat connectors. (See 09-13-4 SEAT REMOVAL/INSTALLATION.) • Remove the back trim. (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.) • Remove the driver and passenger-side pre-tensioner seat belt connectors. (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.) • Remove the console panel. (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.) • Disconnect the SAS control module connectors. (See 08-10-9 SAS CONTROL MODULE REMOVAL/INSTALLATION.) • Inspect the wiring harnesses between SAS control module terminal 1E and crash zone sensor terminal A, SAS control module terminal 1B and crash zone sensor terminal B for the following: — Short circuit between terminals — Short to body ground — Open circuit **Note** • Inspect for continuity while shaking the wiring harness between the SAS control module and crash zone sensor. • Is the wiring harness normal?	Yes	Go to the next step.
		No	Replace the wiring harness between the SAS control module and the crash zone sensor.
3	**INSPECT THE WIRING HARNESS BETWEEN THE SAS CONTROL MODULE AND CRASH ZONE SENSOR FOR A SHORT CIRCUIT TO THE POWER SUPPLY** • Connect the negative battery cable. • Turn the ignition switch to the ON position with SAS control module and crash zone sensor connector disconnected. • Measure the voltage of SAS control module connector terminals 1B and 1E. **Note** • Measure the voltage while shaking the wiring harness between the SAS control module and crash zone sensor. • Is the voltage measured?	Yes	Replace the wiring harness between the SAS control module and the crash zone sensor.
		No	Replace the crash zone sensor, then go to the next step. (See 08-10-9 CRASH ZONE SENSOR REMOVAL/INSTALLATION.)

ON-BOARD DIAGNOSTIC

Step	Inspection		Action
4	**PERFORM SAS CONTROL MODULE DTC INSPECTION** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait for 1min or more. • Connect the crash zone sensor connector. • Connect the SAS control module connectors. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Clear the DTC for the SAS control module using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Replace the SAS control module. (See 08-10-9 SAS CONTROL MODULE REMOVAL/ INSTALLATION.)
		No	DTC troubleshooting completed.

DTC B2477

id080200810500

System Malfunction Location

- Configuration error

Detection Condition

Warning

- **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**

- SAS control module configuration setting has not been done correctly

Possible Causes

- SAS control module configuration setting not implemented
- SAS control module configuration setting invalid
- SAS control module malfunction

Diagnostic Procedure

Step	Inspection		Action
1	**PERFORM SAS CONTROL MODULE INSPECTION** • Perform the configuration for the SAS control module using the M-MDS. (See 08-10-10 SAS CONTROL MODULE CONFIGURATION.) • Clear the DTC for the SAS control module using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Perform the SAS control module configuration, then go to the next step. (See 08-10-10 SAS CONTROL MODULE CONFIGURATION.)
		No	Go to the next step.
2	**PERFORM SAS CONTROL MODULE DTC INSPECTION** • Clear the DTC for the SAS control module using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Replace the SAS control module. (See 08-10-9 SAS CONTROL MODULE REMOVAL/ INSTALLATION.)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC

DTC B2867

id080200803100

System Malfunction Location

- Poor connection of any SAS control module connectors

Detection Condition

Warning

- **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**

- No continuity between poorly connected detector bar terminals of the SAS control module

Possible Causes

- SAS control module connectors are poorly connected
- SAS control module connector malfunction
- SAS control module malfunction

System wiring diagram

amxzzw0000176

ON-BOARD DIAGNOSTIC

Diagnostic Procedure

Step	Inspection		Action
1	**INSPECT CONTACTS OF SAS CONTROL MODULE CONNECTORS** **Warning** • **Handling the component parts improperly can accidentally operate (deploy) the air bag module, which may seriously injure you. Read the service warnings/cautions and the workshop manual before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].) • Are all SAS control module connectors securely connected?	Yes	Go to the next step.
		No	Reconnect the SAS control module connectors properly.
2	**VERIFY POORLY CONNECTED DETECTOR BARS OF SAS CONTROL MODULE CONNECTORS** • Remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.) • Disconnect the clock spring connector. (See 08-10-10 CLOCK SPRING REMOVAL/INSTALLATION.) • Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.) • Disconnect the passenger-side air bag module connector. (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) • Disconnect the driver and passenger-side seat connectors. (See 09-13-4 SEAT REMOVAL/INSTALLATION.) • Remove the back trim. (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.) • Remove the driver and passenger-side pre-tensioner seat belt connectors. (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.) • Remove the console panel. (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.) • Disconnect the SAS control module connectors. (See 08-10-9 SAS CONTROL MODULE REMOVAL/INSTALLATION.) • Verify the condition of the poorly connected detector bars of the SAS control module connectors. (Corrosion, damage, and disconnected pins) • Are the poorly connected detector bars of the SAS control module connectors normal?	Yes	Go to the next step.
		No	Replace the air bag wiring harness.Turn the ignition switch to the ON position.

ON-BOARD DIAGNOSTIC

Step	Inspection		Action
3	**PERFORM SAS CONTROL MODULE DTC INSPECTION** • Reconnect the disconnected connectors. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Clear the DTC for the SAS control module using the M-MDS. (See 08-02-5 CLEARING DTC.) • Perform the DTC inspection for the SAS control module using the M-MDS. (See 08-02-5 DTC INSPECTION.) • Are the same DTCs present?	Yes	Replace the SAS control module. (See 08-10-9 SAS CONTROL MODULE REMOVAL/ INSTALLATION.)
		No	DTC troubleshooting completed.

PID/DATA MONITOR DISPLAY

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1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “DataLogger”.
     2. Select “Modules”.
     3. Select “RCM”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “RCM”.
     3. Select “DataLogger”.
3. Select the applicable PID from the PID table.
4. Verify the PID data according to the directions on the screen.

Note

- The PID data screen function is used for monitoring the calculated value of input/output signals in the module.Therefore, if the monitored value of the output parts is not within the specification, it is necessary to inspect the monitored value of input parts corresponding to the applicable output part control. In addition, because the system does not display an output part malfunction as an abnormality in the monitored value, it is necessary to inspect the output parts individually.

ON-BOARD DIAGNOSTIC

PID/DATA MONITOR TABLE

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PID/data monitor table

PID name (definition)	Unit/Condition	Operation Condition (Reference)	Terminal
CCNT_RCM (Number of continuous DTCs)	—	• DTCs detected: 1—255 • No DTCs detected: 0	—
CR2D_Comm (Driver-side side air bag sensor system communication data error)	OK/ FAULT	• Sensor normal: OK • Sensor communication malfunction: FAULT	2C, 2F
CR2D_Inter (Driver-side side air bag sensor system internal circuit disabled)	OK/ FAULT	• Sensor normal: OK • Sensor internal malfunction: FAULT	2C, 2F
CR2D_Mount (Driver-side side air bag sensor assembly incorrect)	OK/ FAULT	• Sensor normal: OK • Sensor Install malfunction: FAULT	2C, 2F
CR2D_Short (Driver-side side air bag sensor system communication error)	OK/ FAULT	• Sensor normal: OK • Sensor open or short circuit: FAULT	2C, 2F
CR2P_Comm (Passenger-side side air bag sensor system communication data error)	OK/ FAULT	• Sensor normal: OK • Sensor communication malfunction: FAULT	2X, 2AA
CR2P_Inter (Passenger-side side air bag sensor system internal circuit disabled)	OK/ FAULT	• Sensor normal: OK • Sensor internal malfunction: FAULT	2X, 2AA
CR2P_Mount (Passenger-side side air bag sensor assembly incorrect)	OK/ FAULT	• Sensor normal: OK • Sensor Install malfunction: FAULT	2X, 2AA
CR2P_Short (Passenger-side side air bag sensor system communication error)	OK/ FAULT	• Sensor normal: OK • Sensor open or short circuit: FAULT	2X, 2AA
IGN_V_2 (IG1 voltage)	V	Ignition switch is at ON: B+	—
I_PAD_SW (PAD switch status)	On/ Off	• PAD switch is at PASS AIRBAG ON position: On • PAD switch is at PASS AIRBAG OFF position: Off	—
RES_AB_D (Driver-side air bag module resistance)	ohm	Under any condition: 1.5—4.7 ohms	1A, 1D
RES_AB_P (Passenger-side air bag module resistance)	ohm	Under any condition: 1.3—4.7 ohms	1S, 1V
RES_PT_D (Driver-side pre-tensioner seat belt resistance)	ohm	Under any condition: 1.3—4.7 ohms	2A, 2D
RES_PT_P (Passenger-side pre-tensioner seat belt resistance)	ohm	Under any condition: 1.3—4.7 ohms	2V, 2Y
RES_SAB_D (Driver-side side air bag module resistance)	ohm	Under any condition: 1.3—4.7 ohms	2G, 2J
RES_SAB_P (Passenger-side side air bag module resistance)	ohm	Under any condition: 1.3—4.7 ohms	2P, 2S

08-03 SYMPTOM TROUBLESHOOTING

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SYMPTOM TROUBLESHOOTING

AIR BAG SYSTEM WIRING DIAGRAM (SYMPTOM TROUBLESHOOTING)

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SYMPTOM TROUBLESHOOTING

TROUBLESHOOTING INDEX

id080300802000

- Use the chart below to verify the symptoms of the trouble in order to diagnose the appropriate area.

No.	Troubleshooting item	Description	Page
1	Air bag system warning light does not illuminate.	Malfunction in air bag system warning light circuit (short to ground).	(See 08-03-2 NO.1 AIR BAG SYSTEM WARNING LIGHT DOES NOT ILLUMINATE.)
2	Air bag system warning light is illuminated constantly.	Malfunction in air bag system warning light circuit (open circuit or short to power supply).	(See 08-03-4 NO.2 AIR BAG SYSTEM WARNING LIGHT IS ILLUMINATED CONSTANTLY.)

NO.1 AIR BAG SYSTEM WARNING LIGHT DOES NOT ILLUMINATE

id080300800200

1	**Air bag system warning light does not illuminate.**
DETECTION CONDITION	Malfunction in air bag system warning light circuit (short to ground)
POSSIBLE CAUSE	• SAS control module malfunction • Instrument cluster (circuit board) malfunction • Short to ground circuit in wiring harness between instrument cluster and SAS control module

Diagnostic Procedure

- When performing an asterisked (*) troubleshooting inspection, slightly shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunction. If there is a problem, verify that connectors, terminals and wiring harness are connected correctly and undamaged.

STEP	INSPECTION		ACTION
1	**INSPECT OTHER WARNING AND INDICATOR LIGHTS CIRCUIT IN INSTRUMENT CLUSTER** • Turn the ignition switch to the ON position. • Do other warning and indicator lights illuminate?	Yes	Turn the ignition switch to the LOCK position., then go to the next step.
		No	Inspect instrument cluster power supply system and ground system the, then go to Step 4.

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION		ACTION
2	**INSPECT SAS CONTROL MODULE** **Warning** • **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the air bag system components.** **(See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.)** **(See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)** • Turn the ignition switch to the LOCK position. • Remove the battery cover. • Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/ INSTALLATION [L8, LF].) • Remove the column cover. • Disconnect the clock spring connector. • Remove the glove compartment. • Disconnect the passenger-side air bag module connector. (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) • Disconnect the passenger-side air bag module connector. • Disconnect the driver and passenger-side seat connectors. • Remove the back trim. • Disconnect the driver- and passenger-side pre-tensioner seat belt connectors. • Disconnect all SAS control module connectors. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Does the air bag system warning light illuminate?	Yes	Replace the SAS control module, then go to Step 4. (See 08-10-9 SAS CONTROL MODULE REMOVAL/ INSTALLATION.)
		No	Go to the next step.
*3	**INSPECT WIRING HARNESS BETWEEN SAS CONTROL MODULE AND INSTRUMENT CLUSTER FOR SHORT TO GROUND** • Turn the ignition switch to the LOCK position. • Remove the battery cover. • Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/ INSTALLATION [L8, LF].) • Disconnect the instrument cluster connector. • Is there continuity between terminal 2K of the instrument cluster connector and ground?	Yes	Replace the wiring harness, then go to Step 4.
		No	Replace the instrument cluster, then go to the next step. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION		ACTION
4	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT RECUR AFTER REPAIR** • Turn the ignition switch to the LOCK position. • Remove the battery cover. • Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/ INSTALLATION [L8, LF].) • Connect all SAS control module connectors. • Connect the driver and passenger-side pre-tensioner seat belt connectors. • Connect the driver and passenger-side seat connectors. • Connect the passenger-side air bag module connector. • Connect the clock spring connector. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Does the air bag system warning light operate properly?	Yes	Complete troubleshooting, then explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

NO.2 AIR BAG SYSTEM WARNING LIGHT IS ILLUMINATED CONSTANTLY

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2	**Air bag system warning light is illuminated constantly.**
DETECTION CONDITION	Malfunction in air bag system warning light circuit (open circuit or short to power supply).
POSSIBLE CAUSE	• Weak battery • SAS control module malfunction • Instrument cluster (circuit board) malfunction • No connection in SAS control module connector • Poor contact in instrument cluster connector (24-pin) • Open or short to power supply circuit in wiring harness between instrument cluster and SAS control module • Poor contact at terminals 1R, 1I and/or 1W of SAS control module connector • Poor contact in wiring harness between terminal 1I of SAS control module connector and ground • Poor contact in wiring harness between battery and terminal 1W of SAS control module

Diagnostic Procedure

- When performing an asterisked (*) troubleshooting inspection, slightly shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunction. If there is a problem, verify that connectors, terminals and wiring harness are connected correctly and undamaged.

STEP	INSPECTION		ACTION
1	**INSPECT BATTERY** • Measure the voltage of battery. • Is the voltage **9 V or more**?	Yes	Go to the next step.
		No	Battery is weak. Inspect charge/discharge system, then go to Step 9. (See 01-17-3 BATTERY INSPECTION [L8, LF].)

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION		ACTION
2	**VERIFY THAT SAS CONTROL MODULE CONNECTOR IS CONNECTED** **Warning** • **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the air bag system components.** **(See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.)** **(See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)** • Turn the ignition switch to the LOCK position. • Remove the battery cover. • Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/ INSTALLATION [L8, LF]. • Are all SAS control module connectors securely connected?	Yes	Go to the next step.
		No	Reconnect the connector properly, then go to Step 9.
* 3	**INSPECT WIRING HARNESS BETWEEN SAS CONTROL MODULE AND INSTRUMENT CLUSTER FOR CONTINUITY** • Remove the column cover. • Disconnect the clock spring connector. • Remove the glove compartment. • Disconnect the passenger-side air bag module connector. • Disconnect the driver and passenger-side seat connectors. • Remove the back trim. • Disconnect the driver- and passenger-side pre-tensioner seat belt connectors. • Disconnect all SAS control module connectors. • Disconnect the instrument cluster connector. • Is there continuity between SAS control module connector terminal 1R and instrument cluster connector terminal 2K?	Yes	Go to the next step.
		No	Replace the wiring harness, then go to Step 9.
* 4	**INSPECT WIRING HARNESS BETWEEN SAS CONTROL MODULE AND INSTRUMENT CLUSTER FOR SHORT TO POWER SUPPLY** • Connect the negative battery cable. • Switch the ignition to ON. • Measure the voltage at instrument cluster connector terminal 2K. • Is the voltage **9 V or more**?	Yes	Replace the wiring harness, then go to Step 9.
		No	Go to the next step.
5	**CHECK TO SEE WHETHER MALFUNCTION IS IN AIR BAG SYSTEM WARNING LIGHT IN INSTRUMENT CLUSTER** • Connect instrument cluster connector terminal 2K to ground, then reconnect the connector • Does the air bag system warning light illuminate with ignition switch ON?	Yes	Replace the instrument cluster, then go to Step 9. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION		ACTION
6	**INSPECT POWER SUPPLY CIRCUIT OF SAS CONTROL MODULE (TERMINAL 1W)** • Switch the ignition to off. • Remove the battery cover. • Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/ INSTALLATION [L8, LF].) • Connect all SAS control module connectors. • Connect the driver and passenger-side pre-tensioner seat belt connectors. • Connect the driver and passenger-side seat connectors. • Connect the passenger-side air bag module connector. • Connect the driver-side air bag module connector. • Inspect the voltage for PID/DATA monitor IGN_V_2 item using M-MDS. • Is the voltage of at least one terminal **9 V or more**?	Yes	Go to the Step 8.
		No	Go to the next step.
7	**INSPECT WIRING HARNESS BETWEEN BATTERY AND FUSE BLOCK** • Connect the negative battery cable. • Switch the ignition to ON. • Measure the voltage at instrument cluster connector terminal 1G. • Is the voltage **9 V or more**?	Yes	Go to the next step.
		No	Repair the wiring harnesses, then go to Step 9.
8	**VERIFY THAT SAS CONTROL MODULE CONNECTOR TERMINAL 1I IS GROUND** • Switch the ignition to off. • Remove the battery cover. • Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/ INSTALLATION [L8, LF].) • Remove the column cover. • Disconnect the clock spring connector. • Remove the glove compartment. • Disconnect the passenger-side air bag module connector. (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) • Disconnect the passenger-side air bag module connector. • Disconnect the driver and passenger-side seat connectors. • Remove the rear back trim. • Disconnect the driver and passenger-side pre-tensioner seat belt connectors. • Remove the center panel module. • Disconnect all SAS control module control model connectors. • Inspect the wiring harness between SAS control module connector terminal 1I and ground for the following: — Short to power supply — Open circuit • Is the wiring harness normal?	Yes	Replace the SAS control module, then go to the next step. (See 08-10-9 SAS CONTROL MODULE REMOVAL/ INSTALLATION.)
		No	Replace the wiring harnesses, then go to the next step.

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION		ACTION
9	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT RECUR AFTER REPAIR** • Switch the ignition to off. • Remove the battery cover. • Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/ INSTALLATION [L8, LF].) • Connect all SAS control module connectors. • Connect the driver and passenger-side pre-tensioner seat belt connectors. • Connect the driver and passenger-side seat connectors. • Connect the passenger-side air bag module connector. • Connect the clock spring connector. • Connect the instrument cluster connector. • Connect the negative battery cable. • Switch the ignition to ON. • Does the air bag system warning light operate properly?	Yes	Complete troubleshooting, then explain repairs to customer.
		No	Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs.

08-10 AIR BAG SYSTEM

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AIR BAG SYSTEM

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7	Passenger air bag deactivation (PAD) indicator (See 08-10-15 PASSENGER AIR BAG DEACTIVATION (PAD) INDICATOR REMOVAL/INSTALLATION.)
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AIR BAG SYSTEM

AIR BAG SYSTEM SERVICE WARNINGS

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Air Bag Module Inspection

- **Inspecting an air bag module using a tester can operate (deploy) the air bag module, which may cause serious injury. Do not use a tester to inspect an air bag module. Always use the on-board diagnostic function to diagnose the air bag module for malfunctions.**

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Air Bag Module Handling

- **Before removing the air bag module or disconnecting the air bag module connector, always turn the ignition switch to the LOCK position, disconnect the negative battery cable, and then wait for 1 min or more to allow the backup power supply of the SAS control module to deplete its stored power.**
- **Handling a live (undeployed) air bag module that is pointed toward your body could result in serious injury if the air bag module were to accidentally operate (deploy). When carrying a live (undeployed) air bag module, point the deployment surface away from your body to lessen the chance of injury in case it operates (deploys).**

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- **A live (undeployed) air bag module placed with its deployment surface to ground is dangerous. If the air bag module were to accidentally operate (deploy), it could cause serious injury. Always place a live (undeployed) air bag module with its deployment surface up.**

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Side Air Bag Module Handling

- **When a side air bag module operates (deploys) due to a collision, the interior of the seat back (pad, frame, trim) may become damaged. If a side air bag does not operate (deploy) normally from a seat back that has been reused, a serious accident may result. After a side air bag has operated (deployed), always replace both the side air bag module and the seat back (pad, frame, trim) with new parts. After servicing, verify that the seat operates normally and that the wiring harness is not caught.**

SAS control module Handling

- **Removing the SAS control module or disconnecting the SAS control module connector with the ignition switch at the ON position can activate the sensor in the SAS control module and operate (deploy) the air bags and pre-tensioner seat belts, which may cause serious injury. Before removing the SAS control module or disconnecting the SAS control module connector, always turn the ignition switch to the LOCK position, disconnect the negative battery cable, and then wait for 1 min or more to allow the backup power supply of the SAS control module to deplete its stored power.**

AIR BAG SYSTEM

- Connecting the SAS control module connector with the SAS control module not securely fixed to the vehicle is dangerous. The sensor in the SAS control module could send an electrical signal to the air bag modules and pre-tensioner seat belts. This will operate (deploy) the air bags and pre-tensioner seat belts, which may result in serious injury. Therefore, before connecting the connector, securely fix the SAS control module to the vehicle.
- Because a sensor is built into the SAS control module, once the air bags and pre-tensioner seat belts have operated (deployed) due to a collision or other causes, the SAS control module must be replaced with a new one even if the used one does not have any visible external damage or deformation. The used SAS control module may have been damaged internally which may cause improper operation. If the SAS control module is reused, the air bags and pre-tensioner seat belts may not operate (deploy) normally, which could result in a serious accident. Always replace the SAS control module with a new one. The SAS control module cannot be bench-checked or self-checked.

Crash Zone Sensor Handling

- Removing the crash zone sensor or disconnecting the crash zone sensor connector with the ignition switch at the ON position can activate the crash zone sensor and operate (deploy) the air bags and pre-tensioner seat belts, which may cause serious injury. Before removing the crash zone sensor or disconnecting the crash zone sensor connector, always turn the ignition switch to the LOCK position, disconnect the negative battery cable, and then wait for 1 min or more to allow the backup power supply of the SAS control module to deplete its stored power.
- If the crash zone sensor is subjected to shock or the sensor is disassembled, the air bags and pre-tensioner seat belts may accidentally operate (deploy) and cause injury, or the system may fail to operate normally and cause a serious accident. Do not subject the crash zone sensor to shock or disassemble the sensor.
- Because a sensor is built into the crash zone sensor, once the air bags and pre-tensioner seat belts have operated (deployed) due to a collision or other causes, the crash zone sensor must be replaced with a new one even if the used one does not have any visible external damage or deformation. If the crash zone sensor is reused, the air bags and pre-tensioner seat belts may not operate (deploy) normally, which could result in a serious accident. Always replace the crash zone sensor with a new one. The crash zone sensor cannot be bench-checked or self-checked.

Side Air Bag Sensor Handling

- Removing the side air bag sensor or disconnecting the side air bag sensor connector with the ignition switch at the ON position can activate the side air bag sensor and operate (deploy) the side air bag, which may cause serious injury. Before removing the side air bag sensor or disconnecting the side air bag sensor connector, always turn the ignition switch to the LOCK position, disconnect the negative battery cable, and then wait for 1 min or more to allow the backup power supply of the SAS control module to deplete its stored power.
- If the side air bag sensor is subjected to shock or the sensor is disassembled, the side air bag may accidentally operate (deploy) and cause injury, or the system may fail to operate normally and cause a serious accident. Do not subject the side air bag sensor to shock or disassemble the sensor.
- Because a sensor is built into the side air bag sensor, once the air bag has operated (deployed) due to a collision or other causes, the side air bag sensor must be replaced with a new one even if the used one does not have any visible external damage or deformation. If the side air bag sensor is reused, the side air bag may not operate (deploy) normally, which could result in a serious accident. Always replace the side air bag sensor with a new one. The side air bag sensor cannot be bench-checked or self-checked.

Pre-tensioner Seat Belt Inspection

- Inspecting a pre-tensioner seat belt using a tester can operate (deploy) the pre-tensioner seat belt, which may cause serious injury. Do not use a tester to inspect a pre-tensioner seat belt. Always use the on-board diagnostic function to diagnose the pre-tensioner seat belt for malfunctions.

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AIR BAG SYSTEM

AIR BAG SYSTEM SERVICE CAUTIONS

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Air Bag System Component Disassembly

- **Disassembling the air bag system components could cause it to not operate (deploy) normally. Never disassemble any air bag system components.**

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Air Bag Module, Pre-tensioner Seat Belt Handling

- **Oil, grease, or water on the air bag modules may cause the air bags and pre-tensioner seat belts to fail to operate (deploy) in an accident. Never allow oil, grease, or water to get on the air bag modules or pre-tensioner seat belts.**
- **Inserting a screwdriver or similar object into the connector of an air bag module or a pre-tensioner seat belt may damage the connector and cause the air bag module or the pre-tensioner seat belt to operate (deploy) improperly, which may cause serious injury. Never insert any foreign objects into the air bag module or seat belt connectors.**

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Air Bag Module, Pre-tensioner Seat Belt Reuse

- **Even if an air bag module or a pre-tensioner seat belt does not operate (deploy) in a collision and does not have any external signs of damage, it may have been damaged internally, which may cause improper operation. Before reusing a live (undeployed) air bag module and the pre-tensioner seat belts, always use the on-board diagnostic to diagnose the air bag module and the pre-tensioner seat belts to verify that they have no malfunction.**

Air Bag Wiring Harness Repair

- **Incorrectly repairing an air bag wiring harness can accidentally operate (deploy) the air bag module and pre-tensioner seat belts. If a problem is found in the air bag wiring harness, always replace the wiring harness with a new one.**

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AIR BAG SYSTEM

DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION

id081000801300

Warning

- **Handling the air bag module improperly can accidentally deploy the air bag module, which may seriously injure you. Read the service warnings and cautions before handling the air bag module. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**

1. Turn the ignition switch to the off position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Remove the covers.
5. Remove the bolts.
6. Using a flathead screwdriver, lift the locking device carefully, however do not remove it.

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7. Disconnect the air bag module connector.
8. Disconnect the horn switch connector.
9. Remove the driver-side air bag module.
10. Install in the reverse order of removal.
11. Turn the ignition switch to the ON position.
12. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
    - If the air bag system warning light does not operate, refer to the on-board diagnostic system (air bag system) and perform inspection of the system.

AIR BAG SYSTEM

PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION

id081000801900

Warning

- **Handling the air bag module improperly can accidentally deploy the air bag module, which may seriously injure you. Read the service warnings and cautions before handling the air bag module. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**
- **If the passenger-side air bag module is installed with debris in the module, it may be scattered when the air bag module operates (deploys), causing injury. Verify that there is no debris in the passenger-side air bag module before installation.**
- **If a damaged passenger-side air bag module is installed, the vehicle may be damaged or the passenger may be injured when the air bag module operates (deploys). Verify that the passenger-side air bag has no damage before installation.**

1. Turn the ignition switch to the LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
5. Remove the cap. (See 08-10-7 Cap Installation Note.)
6. Disconnect the connector.
7. Remove the screw A.
8. Remove the nuts.
9. Remove the brackets.
10. Remove the screw B.
11. Remove the passenger-side air bag module in the order indicated below.

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(1) Disengage the tab locks by sliding the passenger-side air bag module upward.
(2) Slide the passenger-side air bag module rearward.
(3) Remove the passenger-side air bag module by pulling it from the backside and then down.

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12. Install in the reserve order of removal.
13. Turn the ignition switch to the ON position.
14. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
    - If the air bag system warning light does not operate, refer to the on-board diagnostic system (air bag system) and perform inspection of the system.

Cap Installation Note

1. The cap cannot be reused. Replace the cap with a new one when the cap or the passenger-side air bag module has been removed.

AIR BAG SYSTEM

SIDE AIR BAG MODULE REMOVAL/INSTALLATION

id081000800800

Warning

- **Handling the air bag module improperly can accidentally operate (deploy) the air bag module, which may seriously injure you. Read the service warnings and cautions before handling the air bag module. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**
- **If the side air bag module is installed with debris in the seat back, the foreign material may be scattered when the side air bag module operates (deploys), causing injury. Verify that there is no foreign material in the seat back before installing the side air bag module.**

1. Turn the ignition switch to the LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Remove the seat. (See 09-13-4 SEAT REMOVAL/INSTALLATION.)
5. Remove the band A. (passenger-side seat only)

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6. Detach the tab as shown in the figure and remove the connector from the seat connector.
7. Remove the seat back trim and pad. (See 09-13-7 SEAT BACK TRIM REMOVAL/INSTALLATION.)

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8. Remove the band B.
9. Remove the nuts.
10. Remove the side air bag module.
11. Install in the reverse order of removal.
12. Turn the ignition switch to the ON position.
13. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
    - If the air bag system warning light does not operate, refer to the on-board diagnostic system (air bag system) and perform inspection of the system.

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AIR BAG SYSTEM

CRASH ZONE SENSOR REMOVAL/INSTALLATION

id081000800500

Warning

- **Handling the crash zone sensor improperly can accidentally deploy the air bags and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the crash zone sensor. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**

1. Turn the ignition switch to the LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Remove the front bumper. (See 09-10-7 FRONT BUMPER REMOVAL/INSTALLATION.)
5. Remove the fresh-air duct. (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
6. Remove the bolt A.
7. Remove the cover.
8. Disconnect the connector.
9. Remove the bolt B.
10. Remove the crash zone sensor.
11. Install in the reverse order of removal.
12. Turn the ignition switch to the ON position.
13. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
    - If the air bag system warning light does not operate, refer to the on-board diagnostic system (air bag system) and perform inspection of the system.

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SAS CONTROL MODULE REMOVAL/INSTALLATION

id081000801400

Warning

- **Handling the SAS control module improperly can accidentally deploy the air bag modules and pre-tensioner seat belt, which may seriously injure you. Read the service warnings and cautions before handling the air bag module. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**

Caution

- **Handling the SAS control module improperly can accidentally deploy the air bag modules and pre-tensioner seat belt, which may seriously injure you. If configuration is not completed before removing the SAS control module, DTC B2477 will be displayed.**

1. Perform SAS control module configuration when replacing it. (See 08-10-10 SAS CONTROL MODULE CONFIGURATION.)
2. Turn the ignition switch to the LOCK position.
3. Remove the battery cover.
4. Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
5. Remove the console. (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
6. Remove the side wall. (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
7. Remove the console panel. (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.)
8. Disconnect the connector
9. Remove the bolts.
10. Remove the SAS control module.
11. Install in the reverse order of removal.
12. Turn the ignition switch to the ON position.
    - If the SAS control module is replaced, turn the ignition switch to the ON position for **20 s or more** after completing the configuration.
13. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
    - If the air bag system warning light does not operate, refer to the on-board diagnostic system (air bag system) and perform inspection of the system.

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AIR BAG SYSTEM

SAS CONTROL MODULE CONFIGURATION

id081000801500

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1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “Module Programming”.
   - When using the PDS (Pocket PC)
     1. Select “Programming”.
     2. Select “Module Programming”.
3. Then, select items from the screen menu in the following order.
   1. Select “Programmable Module Installation”.
   2. Select “RCM”.
4. Perform the configuration according to the directions on the screen.
5. Retrieve DTCs by the M-MDS, then verify that there is no DTC present.
   - If a DTC (s) is detected, perform the applicable DTC inspection. (See 08-02-5 DTC TABLE.)

SIDE AIR BAG SENSOR REMOVAL/INSTALLATION

id081000804200

Warning

- **Handling the side air bag sensor improperly can accidentally operate (deploy) the air bag module, which may seriously injure you. Read the service warnings and cautions before handling the side air bag sensor. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**

1. Turn the ignition switch to the LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Remove the quarter trim. (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
5. Remove the scuff plate. (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
6. Remove the tire house trim. (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
7. Disconnect the connector.
8. Remove the bolt.
9. Remove the side air bag sensor
10. Install in the reverse order of removal.
11. Turn the ignition switch to the ON position and hold for **5 s or more**.
12. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
    - If the air bag system warning light does not operate, refer to the on-board diagnostic system (air bag system) and perform inspection of the system.

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CLOCK SPRING REMOVAL/INSTALLATION

id081000802000

1. Turn the ignition switch to the LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Remove the driver-side air bag module. (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
5. Remove the steering wheel. (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
6. Remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.)

AIR BAG SYSTEM

7. Remove the screws.
8. Disconnect the connector
9. Remove the clock spring. (See 08-10-11 Clock Spring Installation Note.)
10. Install in the reverse order of removal.
11. Turn the ignition switch to the ON position.
12. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
    - If the air bag system warning light does not operate, refer to the on-board diagnostic system (air bag system) and perform inspection of the system.

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Clock Spring Installation Note

Caution
- **If the clock spring is not adjusted, the spring wire in the clock spring could over-wind and break when the steering wheel is turned. Always adjust the clock spring after installing it.**

1. Adjust the clock spring after installing it. (See 08-10-11 CLOCK SPRING ADJUSTMENT.)

CLOCK SPRING ADJUSTMENT

id081000802100

Note
- The adjustment procedure is also specified on the caution label of the clock spring.

1. Set the front tires straight-ahead.

Caution
- **The clock spring will break if over-wound. Do not forcibly turn the clock spring.**

2. Turn the clock spring clockwise until it stops.

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AIR BAG SYSTEM

3. From the stopped position, turn the clock spring counterclockwise **2 3/4 turns**.

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4. Align the mark on the clock spring with the mark on the outer housing.

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AIR BAG SYSTEM

CLOCK SPRING INSPECTION

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1. Verify that the continuity is as indicated in the table.
   - If not as indicated in the table, replace the clock spring.

Note

- When the vehicle-side connector for the clock spring is disconnected, terminals 1C and 1D are shorted to prevent unexpected operation (deployment) of the air bag module.

○—○ : Continuity

Test condition	Terminal																			
	1C	1D	2A	2B	2C	2D	2E	2F	2G	2H	3A	3B	4A	4B	4C	4D	4E	4F	4G	4H
Under any condition	○	○									○	○								
			○										○							
				○										○						
					○										○					
						○										○				
							○										○			
								○										○		
									○										○	
										○										○

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AIR BAG SYSTEM

PASSENGER AIR BAG DEACTIVATION (PAD) SWITCH REMOVAL/INSTALLATION

id081000804100

1. Turn the ignition switch to the LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Remove the side panel. (See 09-17-10 SIDE PANEL REMOVAL/INSTALLATION.)
5. Disconnect the connector.
6. Remove the PAD switch.
7. Install in the reverse order of removal.
8. Turn the ignition switch to the ON position.
9. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
   - If the air bag system warning light does not operate, refer to the on-board diagnostic system (air bag system) and perform inspection of the system.

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PASSENGER AIR BAG DEACTIVATION (PAD) SWITCH INSPECTION

id081000804000

1. Verify that the continuity between the PAD switch terminals is as indicated in the table.
   - If not as indicated in the table, replace the PAD switch.

○—○ : Continuity

Switch position	Terminal		
	C	D	E
PASS AIRBAG OFF	○		○
PASS AIRBAG ON		○	○

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AIR BAG SYSTEM

PASSENGER AIR BAG DEACTIVATION (PAD) INDICATOR REMOVAL/INSTALLATION

id081000800400

1. Turn the ignition switch to the LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Remove the following parts:
   (1) Side wall (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
   (2) Center panel unit (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.)
   (3) Glove compartment (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
   (4) Decoration panel (See 09-17-13 DECORATION PANEL REMOVAL/INSTALLATION.)
5. Remove the screws.
6. Disconnect the connector.
7. Remove the passenger air bag deactivation (PAD) indicator.
8. Install in the reverse order of removal.

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AIR BAG MODULE AND PRE-TENSIONER SEAT BELT DEPLOYMENT PROCEDURES

id081000801100

Warning

- **A live (undeployed) air bag module or pre-tensioner seat belt may accidentally operate (deploy) when it is disposed of and cause serious injury. Do not dispose of a live (undeployed) air bag module and pre-tensioner seat belt. If the SSTs (Deployment tool and Adapter harness) are not available, consult the nearest Mazda representative for assistance.**

Caution

- **Deploying the air bag modules and pre-tensioner seat belts inside the vehicle may cause damage to the vehicle interior. When the vehicle is not to be scrapped, always deploy the air bag modules and pre-tensioner seat belts outside the vehicle.**

- If the vehicle is to be scrapped, or when disposing of any air bag modules or pre-tensioner seat belts, operate (deploy) them inside the vehicle by following the deployment procedure below and using the **SST** (Deployment tool).
- When disposing of an operated (deployed) air bag module and pre-tensioner seat belt, refer to “AIR BAG MODULE AND PRE-TENSIONER SEAT BELT DISPOSAL PROCEDURES”.

Deployment Procedure for Inside of Vehicle

1. Inspect the **SST** (Deployment tool). (See 08-10-25 INSPECTION OF SST (DEPLOYMENT TOOL).)
2. Move the vehicle to an open space, away from strong winds, and close all of the vehicle doors and windows.
3. Turn the ignition switch to the off position.
4. Remove the battery cover.
5. Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
6. Follow the procedure below for operating (deploying) the applicable air bag module or pre-tensioner seat belt.

AIR BAG SYSTEM

Driver-side Air Bag Module

1. Remove the driver-side air bag module. (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
2. Connect the **SST** (Adapter harness) to the driver-side air bag module as shown in the figure.
3. Install the driver-side air bag module. (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)

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4. Connect the **SST** (Deployment tool) to the **SST** (Adapter harness).
5. Connect both **SST** (Deployment tool) to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
6. Verify that the red lamp on both **SST** (Deployment tool) is illuminated.
7. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.

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8. Press the activation switch on the **SST** (Deployment tool) to operate (deploy) the driver-side air bag module.

   Warning
   - **The air bag module is very hot immediately after it is operated (deployed). You can get burned. Do not touch the air bag module for at least 15 min after deployment.**

9. Disconnect the **SST** (Deployment tool) from the **SST** (Adapter harness).

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Passenger-side Air Bag Module

1. Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
2. Disconnect the passenger-side air bag module connector.
3. Connect the **SST** (Adapter harness) to the passenger-side air bag module as shown in the figure.

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AIR BAG SYSTEM

4. Connect the **SST** (Deployment tool) to the **SST** (Adapter harness).
5. Connect the **SST** (Deployment tool) to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
6. Verify that the red lamp on both **SST** (Deployment tool) is illuminated.
7. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.

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8. Press the activation switch on the **SST** (Deployment tool) to operate (deploy) the passenger-side air bag module.

   Warning
   - **The air bag module is very hot immediately after it is operated (deployed). You can be burned. Do not touch the air bag module for at least 15 min after deployment.**

9. Disconnect the **SST** (Deployment tool) from the **SST** (Adapter harness).

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Side Air Bag Module

1. Disconnect the seat connector.
2. Connect the **SST** (Adapter harness) to the side air bag module as shown in the figure.

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3. Connect the **SST** (Deployment tool) to the **SST** (Adapter harness).
4. Connect the **SST** (Deployment tool) to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
5. Verify that the red lamp on the **SST** (Deployment tool) is illuminated.
6. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.

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AIR BAG SYSTEM

7. Press the activation switch on the **SST** (Deployment tool) to operate (deploy) the side air bag module.

   Warning
   - **The air bag module is very hot immediately after it is operated (deployed). You can be burned. Do not touch the air bag module for at least 15 min after deployment.**

8. Disconnect the **SST** (Deployment tool) from the **SST** (Adapter harness).

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Pre-tensioner Seat Belt

1. Remove the back trim. (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
2. Remove the pre-tensioner seat belt and connect the **SST** (Adapter harness) as shown in the figure. (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
3. Install the pre-tensioner seat belt.

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4. Connect the **SST** (Deployment tool) to the **SST** (Adapter harness).
5. Connect the **SST** (Deployment tool) to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
6. Verify that the red lamp on the **SST** (Deployment tool) is illuminated.
7. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.

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8. Press the activation switch on the **SST** (Deployment tool) to operate (deploy) the pre-tensioner seat belt.

   Warning
   - **The air bag module is very hot immediately after it is operated (deployed). You can be burned. Do not touch the air bag module for at least 15 min after deployment.**

9. Disconnect the **SST** (Deployment tool) from the **SST** (Adapter harness).

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Deployment Procedure for Outside of Vehicle

1. Inspect the **SST** (Deployment tool).
   (See 08-10-25 INSPECTION OF SST (DEPLOYMENT TOOL).)
2. Turn the ignition switch to the off position.
3. Remove the battery cover.
4. Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
5. Follow the procedure below for operating (deploying) the applicable air bag module or pre-tensioner seat belt.

AIR BAG SYSTEM

Driver-side Air Bag Module

1. Remove the driver-side air bag module. (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/ INSTALLATION.)
2. Connect the **SST** (Adapter harness) to the driver-side air bag module as shown in the figure.

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3. Place the driver-side air bag module on the center of the tire wheel with the padded surface facing up. To secure the air bag module to the tire wheel, wrap a wire (cross section **1.25 mm^2 {0.002 in^2} or more**) through the wheel and the bolt installation holes of the air bag module **at least 4 times**.

   Warning
   - **If the air bag module is not properly installed to the tire wheel, serious injury may occur when the module is operated (deployed). When installing the air bag module to the tire wheel, make sure the padded surface is facing up.**

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4. Stack three tires without wheels on top of the tire with the driver-side air bag module, and then stack another tire with a wheel on the very top.

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5. Secure the tires with wire.

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AIR BAG SYSTEM

6. Connect the **SST** (Deployment tool) to the **SST** (Adapter harness).
7. Connect both **SST** (Deployment tool) to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
8. Verify that the red lamp on both **SST** (Deployment tool) is illuminated.
9. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.

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10. Press the activation switch on the **SST** (Deployment tool) to operate (deploy) the driver-side air bag module.

    Warning
    - **The air bag module is very hot immediately after it is operated (deployed). You can be burned. Do not touch the air bag module for at least 15 min after deployment.**

11. Disconnect the **SST** (Deployment tool) from the **SST** (Adapter harness).

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Passenger-side Air Bag Module

1. Remove the passenger-side air bag module. (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/ INSTALLATION.)
2. Connect the **SST** (Adapter harness) to the passenger-side air bag module as shown in the figure.

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3. Place the padded surface of the passenger-side air bag module facing the center of the tire as shown in the figure. To secure the air bag module to the tire wheel, wrap a wire (cross section **1.25 mm^2 {0.002 in^2} or more**) through the tire and the brackets **at least 4 times** as shown in the figure.

    Warning
    - **If the air bag module is not properly secured to the tire, the tires may fall over by the impact of operation (deployment) and cause serious injury. To prevent this, secure the air bag module properly with the padded surface facing the center of the tire.**

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AIR BAG SYSTEM

4. Stack the tire with the passenger-side air bag module on top of two tires without wheels. Stack a tire without a wheel on top of the tire with the passenger-side air bag module, and then stack another tire with a wheel on the very top.

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5. Secure the tires with wire.

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6. Connect the **SST** (Deployment tool) to the **SST** (Adapter harness).
7. Connect both **SST** (Deployment tool) to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
8. Verify that the red lamp on both **SST** (Deployment tool) is illuminated.
9. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.

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10. Press the activation switch on the **SST** (Deployment tool) to operate (deploy) the passenger-side air bag module.

    Warning
    - **The air bag module is very hot immediately after it is operated (deployed). You can be burned. Do not touch the air bag module for at least 15 min after deployment.**

11. Disconnect the **SST** (Deployment tool) from the **SST** (Adapter harness).

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AIR BAG SYSTEM

Side Air Bag Module

1. Remove the side air bag module. (See 08-10-8 SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
2. Install the nuts to the side air bag module as shown in the figure, and connect the **SST** (Adapter harness).

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3. Place the padded surface of the side air bag module facing the center of the tire as shown in the figure. To secure the air bag module to the tire wheel, wrap a wire (cross section **1.25 mm^2 {0.002 in^2} or more**) through the tire and around the bolts **at least 4 times**.

   Warning
   - **If the air bag module is not properly secured to the tire, the tires may fall over by the impact of operation (deployment) and cause serious injury. To prevent this, secure the air bag module properly with the padded surface facing the center of the tire.**

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4. Connect the **SST** (Adapter harness) to the side air bag module as shown in the figure.

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5. Stack the tire with the side air bag module on top of two tires without wheels. Stack a tire without a wheel on top of the tire with the side air bag module, and then stack another tire with a wheel on the very top.

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AIR BAG SYSTEM

6. Secure the tires with wire.

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7. Connect the **SST** (Deployment tool) to the **SST** (Adapter harness).
8. Connect the **SST** (Deployment tool) to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
9. Verify that the red lamp on the **SST** (Deployment tool) is illuminated.
10. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.

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11. Press the activation switch on the **SST** (Deployment tool) to operate (deploy) the side air bag module.

    Warning
    - **The air bag module is very hot immediately after it is operated (deployed). You can be burned. Do not touch the air bag module for at least 15 min after deployment.**

12. Disconnect the **SST** (Deployment tool) from the **SST** (Adapter harness).

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Pre-tensioner Seat Belt

1. Remove the pre-tensioner seat belt. (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
2. Connect the **SST** (Adapter harness) to the pre-tensioner seat belt as shown in the figure.

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AIR BAG SYSTEM

3. Put the pre-tensioner seat belt inside the tire and secure it to the tire by wrapping a wire (cross section of **1.25 mm^2 {0.002 in^2} or more**) through the tire and the bolt installation holes **at least 4 times**.

   Warning
   - **If the pre-tensioner seat belt is not properly secured to the tire, serious injury may occur when the pre-tensioner part is deployed. When installing the pre-tensioner seat belt to the tire, make sure the pre-tensioner part is inside the tire.**

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4. Stack the tire with the pre-tensioner seat belt on top of two tires without wheels. Stack a tire without a wheel on top of the tire with the pre-tensioner seat belt, and then stack another tire with a wheel on the very top.

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5. Secure the tires with wire.

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6. Connect the **SST** (Deployment tool) to the **SST** (Adapter harness).
7. Connect the **SST** (Deployment tool) to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
8. Verify that the red lamp on the **SST** (Deployment tool) is illuminated.
9. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.

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AIR BAG SYSTEM

10. Press the activation switch on the **SST** (Deployment tool) to operate (deploy) the pre-tensioner seat belt.

    Warning
    - **The air bag module is very hot immediately after it is operated (deployed). You can be burned. Do not touch the air bag module for at least 15 min after deployment.**

11. Disconnect the **SST** (Deployment tool) from the **SST** (Adapter harness).

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AIR BAG MODULE AND PRE-TENSIONER SEAT BELT DISPOSAL PROCEDURES

id081000801200

Warning
- **A live (undeployed) air bag module or pre-tensioner seat belt may accidentally operate (deploy) when it is disposed of and cause serious injury. Always refer to the "AIR BAG MODULE AND PRE-TENSIONER SEAT BELT DEPLOYMENT PROCEDURES" and dispose of air bag modules and pre-tensioner seat belts in a deployed condition.**
- **The air bag modules and the pre-tensioner seat belts are very hot immediately after they are deployed. You can be burned. Do not touch an air bag module and pre-tensioner seat belt for at least 15 min after deployment.**
- **Pouring water on the deployed air bag module and pre-tensioner seat belt is dangerous. The water will mix with the residual gases to form a gas that can make breathing difficult. Do not pour water on the deployed air bag module and pre-tensioner seat belt.**
- **The deployed air bag module or pre-tensioner seat belt may contain deposits of sodium hydroxide, a caustic byproduct of the gas-generated combustion. If this substance gets into your eyes or on your hands, it can cause irritation and itching. When handling the deployed air bag module and pre-tensioner seat belt, wear gloves and safety glasses.**

1. Remove the deployed air bag module or pre-tensioner seat belt.
2. Put the air bag module or pre-tensioner seat belt in a plastic bag, seal the bag, and then dispose of it.

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INSPECTION OF SST (DEPLOYMENT TOOL)

id081000801000

1. Before using the **SST** (49 H066 002), inspect its operation.

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id081000801000

AIR BAG SYSTEM

Inspection Procedure

1. Follow the steps below to inspect the **SST** (49 H066 002).
   - If not as indicated in the table, replace the **SST** (49 H066 002) because it has a malfunction.

   Warning
   - **Do not use a malfunctioning SST (49 H066 002), otherwise it could cause the air bag module or pre-tensioner seat belt to accidentally operate (deploy).**

   Caution
   - **Because the permissible voltage for the SST (49 H066 002) is 12 V, do not connect a 24 V power source because it will damage the SST. Always connect only a 12 V power source.**

Step	Inspection procedure	Light condition	
		Green	Red
1	Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.	On	Off
2	Connect connectors A and B.	Off	On
3	Press the activation switch.	On	Off

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08-11 SEAT BELT

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SEAT BELT

LOCATION INDEX

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1	Buckle (See 08-11-4 BUCKLE REMOVAL/INSTALLATION.)

2	Seat belt (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.) (See 08-11-3 SEAT BELT INSPECTION.)

SEAT BELT REMOVAL/INSTALLATION

id081100804500

Warning

- **Handling the front seat belt (pre-tensioner seat belt) improperly can accidentally deploy the pre-tensioner seat belt, which may seriously injure you. Read the service warnings and cautions before handling the front seat belt (pre-tensioner seat belt). (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**

Warning

- **The side air bag sensor is attached to the lower part of the B-pillar. When working around the B-pillar, disconnect the negative battery cable or work carefully, avoiding excessive impact to the lower part of the B-pillar.**

Caution

- **The ELR (emergency locking retractor) has a spring that will unwind if the retractor cover is removed. The spring cannot be rewound by hand. If this occurs, the ELR will not work properly. Therefore, do not disassemble the retractor.**

1. Turn the ignition switch to the off position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait for **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)

SEAT BELT

4. Remove the following the parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Seat back bar garnish (front) (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
5. Using a flathead screwdriver, lift the locking device carefully, however do not remove it.
6. Disconnect the pre-tensioner seat belt connector.

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7. Remove the bolt A.
8. Remove the bolt B
9. Remove the seat belt.
10. Remove the retractor screen.
11. Install in the reverse order of removal.
12. Turn the ignition switch to the ON position.
13. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
    - If the air bag system warning light does not operate, refer to the on-board diagnostic system (air bag system) and perform inspection of the system.

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SEAT BELT

SEAT BELT INSPECTION

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Belt

1. Verify that the belt is installed properly with no twists or kinks.
2. Verify that there is no damage to the seat belt and no deformation of the metal fittings.
   - If there is any malfunction, replace the seat belt.

ELR

1. Verify that the belt can be pulled out smoothly, and that it retracts smoothly.
   - If there is any malfunction, replace the seat belt.
2. Verify that the retractor locks when the belt is pulled quickly.
   - If there is any malfunction, replace the seat belt.
3. Remove the retractor.

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4. While pulling the seat belt out, make sure that the seat belt does not lock when the retractor is tilted slowly **up to 15°** from the mounted position and locks when the retractor is tilted **40° or more**.
   - If there is any malfunction, replace the seat belt.

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Load Limiter Retractor

Warning

- **When the load limiter operates, the belt and anchor rub against each other strongly leaving wear tracks. If the seat belt is used in this state, the seat belt will not function at its full capability and there is the possibility of serious injury to passengers. Be sure to replace the seat belt once the load limiter operates.**

1. If the vehicle has been subjected to a shock in an accident, pull the belt from the retractor and confirm that there are no wear tracks (the load limiter has not operated) by visually inspecting and feeling the belt.
   - If there is any malfunction, replace the seat belt.

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SEAT BELT

BUCKLE REMOVAL/INSTALLATION

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1. Turn the ignition switch to the off position.
2. Remove the battery cover.
3. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Remove the seat. (See 09-13-4 SEAT REMOVAL/INSTALLATION.)
5. Detach the tab as shown in the figure and remove the connector from the seat connector.

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6. Remove the bolt.
7. Remove the buckle.
8. Install in the reverse order of removal.

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BUCKLE SWITCH INSPECTION

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1. Turn the ignition switch to the off position.
2. Remove the battery cover.
3. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Disconnect the buckle switch connector.
5. Inspect for continuity between the buckle switch terminals using a tester.
   - If not as indicated in the table, replace the buckle.

○—○ : Continuity

Seat belt	Terminal	
	A	B
Fastened		
Unfastened	○	○

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08-60 SERVICE TOOLS

RESTRAINTS SST 08-60–1

SERVICE TOOLS

RESTRAINTS SST

id086000800100

49 H066 002 Deployment tool 	49 B066 004 Adapter harness 	49 L066 002 Adapter harness
49 N088 0A0 Fuel and Thermometer checker 	—	—

BODY & ACCESSORIES

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09-02A ON-BOARD DIAGNOSTIC [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

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ON-BOARD DIAGNOSTIC [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

FOREWORD [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5960100

- Malfunction diagnosis occurs automatically when the ignition switch is turned from the LOCK (ACC) to the ON (START) position.
- If the results of the malfunction diagnosis show a malfunction, the security light displays a DTC and the PCM stores the DTC. DTCs stored in the PCM can be verified using the M-MDS.
- DTCs for the immobilizer system that are stored in the PCM are cleared when the ignition switch is turned from the ON to the LOCK (ACC) position.
- There are certain DTCs which can only be verified using the M-MDS, not the security light.
- The PID/data monitor function can be used to verify the number of keys registered for a single vehicle.
- If DTCs are not displayed even though the engine does not start, perform the following symptom troubleshooting:
  —01-03-14 NO.3 WILL NOT CRANK [L8, LF]

ON-BOARD DIAGNOSTIC [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

Caution

- **Always use the M-MDS to verify DTCs even if the DTCs are verified by the security light display. If the security light has a malfunction, it is possible that a DTC may not be properly displayed.**
- **Always use the M-MDS to verify DTCs because there are certain DTCs which cannot be verified using the security light.**
- **If any of the following items are touching or near the key head, signal communication between the key and vehicle is negatively affected, resulting in the engine not starting. Do not start the engine if any of the following items are touching or near the key head.**
  - **Any metallic object**
  - **Spare keys or keys for other vehicles equipped with an immobilizer system**
  - **Any electronic device, or any credit or other cards with magnetic strips**

Note

- If multiple DTCs are detected as a result of malfunction diagnosis, only the DTC with the lowest number of those detected will be displayed by the security light. The PCM stores multiple DTCs at the same time.
- If two or more immobilizer system DTCs are verified, first repair the part indicated by the security light displayed DTC. After repairing one location, turn the ignition switch from the LOCK to the ON position and perform an immobilizer system malfunction diagnosis.

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DTC INSPECTION [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

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Security Light

1. Turn the ignition switch to the ON position.
2. Verify the security light state.
   - If there is any malfunction:
     - After any malfunction is detected, the security light will function as follows **for approx. 1 min**.
       - DTC 16 and lower: Flashes
       - DTC 21 and higher: Illuminated
   - If there is no malfunction:
     - The security light illuminates **for approx. 3 s** and goes out.
3. When any malfunction has been detected, read DTCs via flashing patterns displayed after the security light flashes or is illuminated **for approx. 1 min**.
   - Perform troubleshooting according to the corresponding DTC inspection.

Note

- A verified DTC is flashed 10 times repeatedly by the security light.
- If multiple DTCs are verified, the security light displays only the smallest DTC.

M-MDS

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “Self Test”.
     2. Select “Modules”.
     3. Select “IC”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “IC”.
     3. Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
   - If any DTCs are displayed, perform troubleshooting according to the corresponding DTC inspection. When several DTCs are detected, repair the malfunctioning location based on the DTC displayed by the security light. (See 09-02A-4 DTC TABLE [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].)

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ON-BOARD DIAGNOSTIC [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

Note
- Because of the possibility that one malfunction cause could result in several DTCs being detected, erase the DTCs after the repair is completed, and then check for DTCs again.

4. After completion of repairs, clear all DTCs stored in the Instrument cluster and PCM. (See 09-02A-4 CLEARING DTC [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].)

CLEARING DTC [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

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e5u914aw4013

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “Self Test”.
     2. Select “Modules”.
     3. Select “IC”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “IC”.
     3. Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
4. Press the clear button on the DTC screen to clear the DTC.
5. Turn the ignition switch to the LOCK position.
6. Turn the ignition switch to the ON position and wait for **5 s or more**.
7. Perform DTC inspection. (See 09-02A-3 DTC INSPECTION [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].)
8. Verify that no DTCs are displayed.

DTC TABLE [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5960500

DTC				Detection condition	Page
Security light flashing pattern		M-MDS display*			
		Instrument cluster	PCM		
11		B1681	P1260	No detected communication with the coil antenna	09-02A-5 SECURITY LIGHT 11, DTC B1681/ P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]
12		B2103	P1260	• Coil antenna malfunction • The PCM determined a malfunction in the coil antenna even though it is normal.	09-02A-7 SECURITY LIGHT 12, DTC B2103/ P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]
13		B1600	P1260	The key ID number data cannot be read.	09-02A-8 SECURITY LIGHT 13, DTC B1600/ P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]
		B2431	P1260	Key ID number registration error	09-02A-9 SECURITY LIGHT 13, DTC B2431/ P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]
14		B1602	P1260	The instrument cluster cannot read key ID number data normally.	09-02A-10 SECURITY LIGHT 14, DTC B1602/ P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]
15		B1601	P1260	The instrument cluster has detected unregistered key ID number.	09-02A-11 SECURITY LIGHT 15, DTC B1601/ P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

ON-BOARD DIAGNOSTIC [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

DTC				Detection condition	Page
Security light flashing pattern		M-MDS display*			
		Instrument cluster	PCM		
16		U2510	P1260	Communication error between the instrument cluster and the PCM (no response)	09-02A-12 SECURITY LIGHT 16, DTC U2510/P1260, U1147/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]
		U1147	P1260	Communication error between the instrument cluster and the PCM (mismatched conditions)	
21		B1213	P1260	Only one key ID number is registered.	09-02A-12 SECURITY LIGHT 21, DTC B1213/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]
22		B2141	P1260	Communication error between the instrument cluster and the PCM (data transfer error)	09-02A-13 SECURITY LIGHT 22, DTC B2141/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]
23		B2139	P1260	ID number data in the PCM and the instrument cluster do not match.	09-02A-14 SECURITY LIGHT 23, DTC B2139/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]
Not illuminated		B1342	-	Instrument cluster malfunction	09-02A-5 DTC B1342 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

* : The letters at the beginning of each DTC are only displayed when using the M-MDS, and refer to the following: B= Body system, P= Powertrain system, U= Network communication system.

DTC B1342 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5920500

DTC: B1342	Instrument cluster malfunction
DETECTION CONDITION	• Instrument cluster malfunction
POSSIBLE CAUSE	• Instrument cluster malfunction

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	**EXAMINE INSTRUMENT CLUSTER AND PCM** • Is the DTC displayed? — M-MDS: B1342	Yes	Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.) (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.)
		No	DTC troubleshooting completed.

SECURITY LIGHT 11, DTC B1681/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5800600

DTC	**Security light flashing pattern**		**11**	**No detected communication with coil antenna.**
	M-MDS display	**Instrument cluster**	**B1681**	
		PCM	**P1260**	
POSSIBLE CAUSE				• The coil antenna connector is pulled out • Coil antenna malfunction • Instrument cluster malfunction • Related wiring harnesses malfunction

ON-BOARD DIAGNOSTIC [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

System wiring diagram

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Diagnostic Procedure

STEP	INSPECTION		ACTION
1	**INSPECT COIL ANTENNA POWER SUPPLY SYSTEM** • Disconnect the coil antenna connector. • Turn the ignition switch to the ON position. • Measure the voltage at coil antenna terminal D. — Is the voltage **8 V or more**?	Yes	Go to the next step.
		No	Repair the wiring harness.
2	**INSPECT WIRING HARNESS BETWEEN COIL ANTENNA AND GROUND** • Turn the ignition switch to the LOCK position. • Inspect the wiring harness between coil antenna terminal C and ground for the following: — Short to power supply — Open circuit • Is the wiring harness normal?	Yes	Go to the next step.
		No	Repair the wiring harness.
3	**INSPECT COIL ANTENNA INPUT SIGNAL CIRCUIT** • Connect the coil antenna connector. • Turn the ignition switch to the ON position. • Measure the voltage at coil antenna terminal B. — Is the voltage **8 V or more**?	Yes	Go to Step 7.
		No	Go to the next step.
4	**INSPECT COIL ANTENNA INPUT SIGNAL CIRCUIT** • Turn the ignition switch to the LOCK position. • Disconnect the instrument cluster connector. • Turn the ignition switch to the ON position. • Measure the voltage at instrument cluster terminal 2S. — Is the voltage **8 V or more**?	Yes	Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.) (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.)
		No	Go to the next step.
5	**INSPECT COMMUNICATION CIRCUIT (INPUT) FOR CONTINUITY** • Turn the ignition switch to the LOCK position. • Is there continuity between coil antenna terminal B and instrument cluster terminal 2S?	Yes	Go to the next step.
		No	Repair the wiring harness.

ON-BOARD DIAGNOSTIC [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

STEP	INSPECTION		ACTION
6	**INSPECT COIL ANTENNA INPUT SIGNAL CIRCUIT** • Measure the resistance between coil antenna terminal B and ground. — Is the resistance **10 kilohms or more**?	Yes	Replace the coil antenna. (See 09-14-33 COIL ANTENNA REMOVAL/ INSTALLATION.)
		No	Repair the wiring harness.
7	**INSPECT COIL ANTENNA OUTPUT SIGNAL CIRCUIT** • Connect the coil antenna connector and the instrument cluster connector. • Turn the ignition switch to the ON position. • Measure the voltage at coil antenna terminal A. — Is the voltage **8 V or more**?	Yes	Replace the coil antenna. (See 09-14-33 COIL ANTENNA REMOVAL/ INSTALLATION.)
		No	Go to the next step.
8	**INSPECT COIL ANTENNA OUTPUT SIGNAL CIRCUIT** • Turn the ignition switch to the LOCK position. • Disconnect the coil antenna connector. • Turn the ignition switch to the ON position. • Measure the voltage at coil antenna terminal A. — Is the voltage **8 V or more**?	Yes	Replace the coil antenna. (See 09-14-33 COIL ANTENNA REMOVAL/ INSTALLATION.)
		No	Go to the next step.
9	**INSPECT COMMUNICATION CIRCUIT (OUTPUT) FOR CONTINUITY** • Turn the ignition switch to the LOCK position. • Disconnect the instrument cluster connector. • Is there continuity between coil antenna terminal A and instrument cluster terminal 2Q?	Yes	Repair the wiring harness.
		No	Go to the next step.
10	**INSPECT COIL ANTENNA OUTPUT SIGNAL CIRCUIT** • Measure the resistance between instrument cluster terminal 2Q and ground. — Is the resistance **10 kilohms or more**?	Yes	Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.) (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.)
		No	Repair the wiring harness.

SECURITY LIGHT 12, DTC B2103/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5800700

DTC	**Security light flashing pattern**		**12**	• **Coil antenna malfunction** • **PCM determined a malfunction in coil antenna even though it is normal.**
	M-MDS display	**Instrument cluster**	**B2103**	
		PCM	**P1260**	
POSSIBLE CAUSE				• Poor connection of the coil antenna connector • Coil antenna malfunction • PCM malfunction

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	**INSPECT CONNECTOR CONNECTION** • Are the coil antenna connector and the instrument cluster connector securely connected?	Yes	Replace the coil antenna, then go to the next step. (See 09-14-33 COIL ANTENNA REMOVAL/ INSTALLATION.)
		No	Connect the connector securely.
2	**INSPECT PCM** • Turn the ignition switch to the ON position. • Is the DTC displayed? — Security light: 12 — M-MDS: B2103/P1260	Yes	Replace the PCM and perform the resetting procedure for the immobilizer system when replacing the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) (See 09-14-33 COIL ANTENNA REMOVAL/ INSTALLATION.)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

SECURITY LIGHT 13, DTC B1600/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5800800

DTC	Security light flashing pattern		13	Key ID number data cannot be read
	M-MDS display	Instrument cluster	B1600	
		PCM	P1260	
POSSIBLE CAUSE				• If any of the following items are touching or near key head, signal communication between key and vehicle is negatively affected, resulting in engine not starting. —Spare EXAMPLES: METAL RING LYING ON KEY HEAD METAL PART OF ANOTHER KEY TOUCHING KEY HEAD KEY IS NEAR OR TOUCHING ANOTHER IMMOBILIZER SYSTEM KEY keys —Keys for other vehicles equipped with an immobilizer system —Any metallic object —Any electronic device, or any credit or other card with magnetic strips • No transponder in the key • Transponder malfunction (Key ID number is not output) • Coil antenna malfunction • Instrument cluster malfunction

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	**VERIFY DTC** • Is B1600/P1260 displayed?	Yes	Go to Step 3.
		No	Go to the next step.
2	**VERIFY DTC** • Is B2431/P1260 displayed?	Yes	Perform the DTC inspection for “SECURITY LIGHT: 13, M-MDS: B2431/P1260”. (See 09-02A-9 SECURITY LIGHT 13, DTC B2431/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].)
		No	Go to the next step.
3	**VERIFY WHETHER KEY IS VALID OR NOT** • Are there any keys with which the engine can be started, other than the key that is a cause of the displayed DTC?	Yes	Go to Step 5.
		No	Go to the next step.
4	**VERIFY WHETHER MALFUNCTION IS IN KEY OR COIL ANTENNA** • Using the M-MDS, register an additional key. (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.) • Using the registered key, turn the ignition switch to the ON position. • Verify the DTC using the M-MDS. — Is B1600/P1260 displayed again?	Yes	Replace the coil antenna, then go to Step 6. (See 09-14-33 COIL ANTENNA REMOVAL/INSTALLATION.)
		No	• Dispose of the malfunctioning key. • Register a new key if necessary. (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.)

ON-BOARD DIAGNOSTIC [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

STEP	INSPECTION		ACTION
5	**VERIFY WHETHER MALFUNCTION IS IN KEY OR COIL ANTENNA** • Using another valid key, turn the ignition switch to the ON position. • Verify the DTC Using the M-MDS. — Is B1600/P1260 displayed again?	Yes	Replace the coil antenna, then go to the next step. (See 09-14-33 COIL ANTENNA REMOVAL/ INSTALLATION.)
		No	• Dispose of the malfunctioning key. • Register a new key if necessary. (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.)
6	**INSPECT INSTRUMENT CLUSTER** • Using the registered key, turn the ignition switch to the ON position. — Is B1600/P1260 displayed again?	Yes	Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.) (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.)
		No	DTC troubleshooting completed.

SECURITY LIGHT 13, DTC B2431/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5800900

DTC	**Security light flashing pattern**		**13**	**Key ID number registration error**
	M-MDS display	**Instrument cluster**	**B2431**	
		PCM	**P1260**	
POSSIBLE CAUSE				• Any of the following items are touching or near the key head. — Spare EXAMPLES: METAL RING LYING ON KEY HEAD METAL PART OF ANOTHER KEY TOUCHING KEY HEAD KEY IS NEAR OR TOUCHING ANOTHER IMMOBILIZER SYSTEM KEY keys — Keys for other vehicles equipped with an immobilizer system — Any metallic object — Any electronic device, or any credit or other cards with magnetic strips • Errors during key ID number registration procedure

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	**VERIFY DTC** • Is B2431/P1260 displayed?	Yes	Go to Step 3.
		No	Go to the next step.
2	**VERIFY DTC** • Is B1600/P1260 displayed?	Yes	Perform the DTC inspection for “SECURITY LIGHT: 13, M-MDS: B1600/P1260”. (See 09-02A-8 SECURITY LIGHT 13, DTC B1600/ P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].)
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

STEP	INSPECTION		ACTION
3	**INSPECT INSTRUMENT CLUSTER** • Using the M-MDS, clear the key ID number and re-register it. (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.) **Note** • Two or more keys must be registered to start the engine. • Using the registered key, turn the ignition switch to the ON position. • Verify the DTC Using the M-MDS. — Is B2431/P1260 displayed again?	Yes	Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.) (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.)
		No	DTC troubleshooting completed.

SECURITY LIGHT 14, DTC B1602/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5801000

DTC	**Security light flashing pattern**		**14**	**The instrument cluster cannot read key ID number data normally.**
	M-MDS display	**Instrument cluster**	**B1602**	
		PCM	**P1260**	
POSSIBLE CAUSE				• Any of the following items are touching or near the key head. — Spare EXAMPLES: METAL RING LYING ON KEY HEAD METAL PART OF ANOTHER KEY TOUCHING KEY HEAD KEY IS NEAR OR TOUCHING ANOTHER IMMOBILIZER SYSTEM KEY keys — Keys for other vehicles equipped with an immobilizer system — Any metallic object — Any electronic device, or any credit or other cards with magnetic strips • Transponder (key) malfunction • Coil antenna malfunction • Instrument cluster malfunction

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	**VERIFY WHETHER KEY IS VALID OR NOT** • Using another registered key, turn the ignition switch to the ON position. • If there is not another registered key, register an additional key using the M-MDS and turn the ignition key to the ON position using the registered key. (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.) • Is the DTC displayed again? — Security light: 14 — M-MDS: B1602/P1260	Yes	Replace the coil antenna, then go to the next step. (See 09-14-33 COIL ANTENNA REMOVAL/INSTALLATION.)
		No	• Dispose of the malfunctioning key. • Register a new key if necessary. (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.)

ON-BOARD DIAGNOSTIC [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

STEP	INSPECTION		ACTION
2	**INSPECT INSTRUMENT CLUSTER** • Using another registered key, turn the ignition switch to the ON position. • Is the DTC displayed again? — Security light: 14 — M-MDS: B1602/P1260	Yes	Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.) (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.)
		No	DTC troubleshooting completed.

SECURITY LIGHT 15, DTC B1601/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5801100

DTC	**Security light flashing pattern**		**15**	**The instrument cluster has detected unregistered key ID number.**
	M-MDS display	**Instrument cluster**	**B1601**	
		PCM	**P1260**	
POSSIBLE CAUSE				• No keys have been programmed after replacing instrument cluster. • Unprogrammed key used • Attempt made to program a ninth key • Instrument cluster malfunction

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	**VERIFY NUMBER OF REGISTERED KEYS** • Using the M-MDS, perform the PID/data monitor inspection and confirm the number of registered keys. (See 09-02A-15 PID/DATA MONITOR TABLE [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].) • Are one or more keys registered?	Yes	Go to the next step.
		No	Go to Step 3.
2	**VERIFY NUMBER OF REGISTERED KEYS** • Using the M-MDS, perform the PID/data monitor inspection and confirm the number of registered keys. (See 09-02A-15 PID/DATA MONITOR TABLE [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].) • Are eight keys registered?	Yes	Using the M-MDS, clear the key ID numbers as necessary, then go to the next step.
		No	Go to the next step.
3	**INSPECT INSTRUMENT CLUSTER** • Using the M-MDS, register the key ID number. (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.) **Note** • Two or more keys must be registered to start the engine. • Using the registered key, turn the ignition switch to the ON position. • Is the DTC displayed again? — Security light: 15 — M-MDS: B1601/P1260	Yes	Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.) (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

SECURITY LIGHT 16, DTC U2510/P1260, U1147/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5801200

DTC	**Security light flashing pattern**		**16**	• **Communication error between the instrument cluster and the PCM (no response)** • **Communication error between the instrument cluster and the PCM (mismatched conditions)**
	M-MDS display	**Instrument cluster**	**U2510 U1147**	
		PCM	**P1260**	
POSSIBLE CAUSE				• Malfunction in wiring harness (CAN line) between instrument cluster and PCM • PCM malfunction • Instrument cluster malfunction

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	**VERIFY DTC** • Are either U0073, or both, displayed, by either the instrument cluster or the PCM, or both?	Yes	Perform troubleshooting according to the corresponding DTC inspection. (See 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].) (See 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
		No	Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.) (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.) Go to the next step.
2	**VERIFY DTC** • Using the registered key, turn the ignition switch to the ON position. • Is the DTC displayed? — Security light: 16 — M-MDS: U2510 or U1147/P1260	Yes	Replace the PCM and perform the resetting procedure for the immobilizer system when replacing the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.)
		No	DTC troubleshooting completed.

SECURITY LIGHT 21, DTC B1213/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5801300

DTC	**Security light flashing pattern**		**21**	**Only one key ID number is registered.**
	M-MDS display	**Instrument cluster**	**B1213**	
		PCM	**P1260**	
POSSIBLE CAUSE				Only one key has been programmed.

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	**VERIFY NUMBER OF REGISTERED KEYS** • Using the M-MDS, perform the PID/data monitor inspection and confirm the number of registered keys. (See 09-02A-15 PID/DATA MONITOR TABLE [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].) • Are two or more keys registered?	Yes	Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.) (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.)
		No	• Using the M-MDS, clear the key ID number and register a new key if necessary. (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.) • Go to the next step.

ON-BOARD DIAGNOSTIC [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

STEP	INSPECTION		ACTION
2	**VERIFY DTC** • Using the registered key, turn the ignition switch to the ON position. • Is the DTC displayed again? — Security light: 21 — M-MDS: B1213/P1260	Yes	Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.) (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.)
		No	DTC troubleshooting completed.

SECURITY LIGHT 22, DTC B2141/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5801400

DTC	**Security light flashing pattern**		**22**	**Communication error between the instrument cluster and the PCM (data transfer error)**
	M-MDS display	**Instrument cluster**	**B2141**	
		PCM	**P1260**	
POSSIBLE CAUSE				• Malfunction in the wiring harness (CAN line) between the instrument cluster and the PCM • Instrument cluster malfunction • PCM malfunction

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	**VERIFY DTC** • Are either U1900 or U0073, or both displayed, by either the instrument cluster or the PCM, or both?	Yes	Perform troubleshooting according to the corresponding DTC inspection. (See 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].) (See 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
		No	Go to the next step.
2	**VERIFY DTC** • Using the registered key, turn the ignition switch to the ON position. • Is the DTC displayed? — Security light: 22 — M-MDS: B2141/P1260	Yes	• Replace the PCM and perform the resetting procedure for the immobilizer system when replacing the PCM. (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.) • Go to the next step.
		No	DTC troubleshooting completed.
3	**EXAMINE INSTRUMENT CLUSTER AND PCM** • Is the DTC displayed again? — Security light: 22 — M-MDS: B2141/P1260	Yes	• Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.) (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.) • Go to the next step.
		No	DTC troubleshooting completed.
4	**EXAMINE PCM** • Is the DTC displayed again? — Security light: 22 — M-MDS: B2141/P1260	Yes	• Replace the PCM and perform the resetting procedure for the immobilizer system when replacing the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

SECURITY LIGHT 23, DTC B2139/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5801500

DTC	Security light flashing pattern		23	ID number data in the PCM and the instrument cluster do not match.
	M-MDS display	Instrument cluster	B2139	
		PCM	P1260	
POSSIBLE CAUSE				• Necessary procedures were not performed using the M-MDS after replacing the PCM. • Instrument cluster malfunction • PCM malfunction

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	**VERIFY DTC** • Are either U1900 or U0073, or both, displayed, by either the instrument cluster or the PCM, or both?	Yes	Perform troubleshooting according to the corresponding DTC inspection. (See 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].) (See 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
		No	Go to the next step.
2	**EXAMINE INSTRUMENT CLUSTER AND PCM** • Perform procedures for when replacing the PCM only. (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.) • Using the registered key, turn the ignition switch to the ON position. • Is the DTC displayed? — Security light: 23 — M-MDS: B2139/P1260	Yes	• Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.) (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.) • Go to the next step.
		No	DTC troubleshooting completed.
3	**VERIFY DTC** • Is the DTC displayed again? — Security light: 23 — M-MDS: B2139/P1260	Yes	• Replace the PCM and perform the resetting procedure for the immobilizer system when replacing the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].) (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.)
		No	DTC troubleshooting completed.

PID/DATA MONITOR INSPECTION [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5845900

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “DataLogger”.
     2. Select “Modules”.
     3. Select “IC”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “IC”.
     3. Select “DataLogger”.
3. Select the applicable PID from the PID table.
4. Verify the PID data according to the directions on the screen.

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Note

- The PID data screen function is used for monitoring the calculated value. Therefore, if the monitored value of the output parts is not within the specification, inspection of the monitored value of input parts corresponding to applicable output part control is necessary. In addition, because the system does not display output part malfunction as abnormality in the monitored value, it is necessary to inspect the output part individually.

ON-BOARD DIAGNOSTIC [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

PID/DATA MONITOR TABLE [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5846000

PID name (definition)	Detection condition
NUMKEYS (Number of key ID numbers registered in the instrument cluster)	Number of key ID numbers registered: 0—8

09-02B ON-BOARD DIAGNOSTIC [INSTRUMENT CLUSTER]

DTC INSPECTION
[INSTRUMENT CLUSTER] 09-02B–1
CLEARING DTC
[INSTRUMENT CLUSTER] 09-02B–1
DTC TABLE
[INSTRUMENT CLUSTER] 09-02B–2
DTC B1342
[INSTRUMENT CLUSTER] 09-02B–3
DTC B2477
[INSTRUMENT CLUSTER] 09-02B–3
DTC B2840
[INSTRUMENT CLUSTER] 09-02B–4
System Wiring Diagram **09-02B–4**
DTC U0028
[INSTRUMENT CLUSTER] 09-02B–6
DTC U2023
[INSTRUMENT CLUSTER] 09-02B–7
DTC U2064
[INSTRUMENT CLUSTER] 09-02B–7
Diagnostic Procedure **09-02B–8**

ON-BOARD DIAGNOSTIC [INSTRUMENT CLUSTER]

DTC INSPECTION [INSTRUMENT CLUSTER]

id0902e8960300

amxzzw0000086

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “Self Test”.
     2. Select “Modules”.
     3. Select “IC”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “IC”.
     3. Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
   - If any DTCs are displayed, perform troubleshooting according to the corresponding DTC inspection.
4. After completion of repairs, clear all DTCs stored in the instrument cluster. (See 09-02B-1 CLEARING DTC [INSTRUMENT CLUSTER].)

CLEARING DTC [INSTRUMENT CLUSTER]

id0902e8960400

amxzzw0000086

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “Self Test”.
     2. Select “Modules”.
     3. Select “IC”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “IC”.
     3. Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
4. Press the clear button on the DTC screen to clear the DTC.
5. Turn the ignition switch to the LOCK position.
6. Turn the ignition switch to the ON position and wait for **5 s or more**.
7. Perform DTC inspection. (See 09-02B-1 DTC INSPECTION [INSTRUMENT CLUSTER].)
8. Verify that no DTCs are displayed.

ON-BOARD DIAGNOSTIC [INSTRUMENT CLUSTER]

DTC TABLE [INSTRUMENT CLUSTER]

id0902e8960500

DTC	Description	Page
B1213	Only one key ID number is registered.	(See 09-02A-12 SECURITY LIGHT 21, DTC B1213/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].)
B1342	Instrument cluster malfunction	(See 09-02B-3 DTC B1342 [INSTRUMENT CLUSTER].)
B1600	The key ID number data cannot be read.	(See 09-02A-8 SECURITY LIGHT 13, DTC B1600/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].)
B1601	The instrument cluster has detected unregistered key ID number.	(See 09-02A-11 SECURITY LIGHT 15, DTC B1601/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].)
B1602	The instrument cluster cannot read key ID number data normally.	(See 09-02A-10 SECURITY LIGHT 14, DTC B1602/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].)
B1681	No detected communication with the coil antenna	(See 09-02A-5 SECURITY LIGHT 11, DTC B1681/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].)
B2103	• Coil antenna malfunction • The PCM determined a malfunction in the coil antenna even though it is normal.	(See 09-02A-7 SECURITY LIGHT 12, DTC B2103/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].)
B2139	ID number data in the PCM and the instrument cluster do not match.	(See 09-02A-14 SECURITY LIGHT 23, DTC B2139/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].)
B2141	Communication error between the instrument cluster and the PCM (data transfer error)	(See 09-02A-13 SECURITY LIGHT 22, DTC B2141/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].)
B2431	Key ID number registration error	(See 09-02A-9 SECURITY LIGHT 13, DTC B2431/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].)
B2477	Instrument cluster configuration not performed	(See 09-02B-3 DTC B2477 [INSTRUMENT CLUSTER].)
B2840	Ambient temperature sensor circuit malfunction	(See 09-02B-4 DTC B2840 [INSTRUMENT CLUSTER].)
U0028	Invalid data received from climate control unit	(See 09-02B-6 DTC U0028 [INSTRUMENT CLUSTER].)
U0073	HS-CAN Bus off	(See 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].) (See 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
U0100	Communication error to PCM	
U0101	Communication error to TCM	
U0121	Communication error to ABS	
U0127	Communication failure between instrument cluster and keyless receiver	(See 02-02-8 DTC U0127.)
U0207	Communication error to power retractable hardtop control module	(See 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].) (See 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
U0214	Communication error to keyless control module	
U2023	Abnormal message from PCM	(See 09-02B-7 DTC U2023 [INSTRUMENT CLUSTER].)
U2064	Warning light illumination request signal from other modules	(See 09-02B-7 DTC U2064 [INSTRUMENT CLUSTER].)
U2197	Vehicle speed signal communication error	(See 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].) (See 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
U2510	Communication error between the instrument cluster and the PCM (no response)	(See 09-02A-12 SECURITY LIGHT 16, DTC U2510/P1260, U1147/P1260 [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].)

ON-BOARD DIAGNOSTIC [INSTRUMENT CLUSTER]

DTC B1342 [INSTRUMENT CLUSTER]

id0902e8920500

DTC B1342	• **Instrument cluster malfunction**
DETECTION CONDITION	• Malfunction in the instrument cluster internal circuit
POSSIBLE CAUSE	• Instrument cluster malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT INSTRUMENT CLUSTER** • Clear the DTC from the memory. • Turn the ignition switch to the LOCK position. • Turn the ignition switch to the ON position. • Is B1342 displayed?	Yes	Replace the instrument cluster.
		No	DTC troubleshooting completed.

DTC B2477 [INSTRUMENT CLUSTER]

id0902e8352800

DTC B2477	• **Instrument cluster configuration not performed**
DETECTION CONDITION	• Configuration write failure is detected. (i.e. instrument cluster is replaced)
POSSIBLE CAUSE	• Configuration procedure has not been performed. • Instrument cluster malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM INSTRUMENT CLUSTER CONFIGURATION** • Perform instrument cluster configuration. • Is B2477 displayed?	Yes	Replace the instrument cluster.
		No	Go to the next step.
2	**VERIFY TROUBLESHOOTING OF DTC B2477 COMPLETED** • Clear the DTC from the memory. • Is B2477 displayed?	Yes	Go to the applicable DTC inspection.
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [INSTRUMENT CLUSTER]

DTC B2840 [INSTRUMENT CLUSTER]

id0902e8165400

DTC B2840	Ambient temperature sensor circuit malfunction
DETECTION CONDITION	Open or short circuit in wiring harness between ambient temperature sensor and instrument cluster
POSSIBLE CAUSES	• Open or short circuit in wiring harness between ambient temperature sensor and instrument cluster • Ambient temperature sensor malfunction • Instrument cluster malfunction

System Wiring Diagram

amxzzw0000230

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	**INSPECT AMBIENT TEMPERATURE SENSOR CONNECTOR CONDITION** • Turn the ignition switch to the LOCK position. • Disconnect the ambient temperature sensor connector. (See 07-40A-13 AMBIENT TEMPERATURE SENSOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].) • Inspect the connector and terminals (corrosion, damage, pin disconnection). • Are the connector and terminals normal?	Yes	Go to the next step.
		No	Repair/replace the connector or terminal. After repair procedure, go to Step 9.
2	**INSPECT AMBIENT TEMPERATURE SENSOR** • Inspect the ambient temperature sensor. (See 07-40A-13 AMBIENT TEMPERATURE SENSOR INSPECTION [FULL-AUTO AIR CONDITIONER].) • Is the ambient temperature sensor normal?	Yes	Go to the next step.
		No	Replace the ambient temperature sensor. (See 07-40A-13 AMBIENT TEMPERATURE SENSOR REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].) After replacement, go to Step 9.
3	**INSPECT AMBIENT TEMPERATURE SENSOR CIRCUIT FOR SHORT TO GROUND** • Inspect the wiring harness for continuity between ambient temperature sensor connector terminal B and body ground. • Is there continuity?	Yes	Repair/replace the malfunctioning vehicle wiring harness. After repair procedure, go to Step 9.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [INSTRUMENT CLUSTER]

STEP	INSPECTION		ACTION
4	**INSPECT AMBIENT TEMPERATURE SENSOR CIRCUIT FOR OPEN CIRCUIT** • Turn the ignition switch to the ON position. • Measure the voltage at ambient temperature sensor connector terminal B. • Is the voltage **5 V**?	Yes	Go to Step 6.
		No	Go to the next step.
5	**INSPECT AMBIENT TEMPERATURE SENSOR CIRCUIT FOR OPEN CIRCUIT** • Measure the voltage at instrument cluster terminal 1I. • Is the voltage 5 **V**?	Yes	Repair/replace the malfunctioning vehicle wiring harness. After repair procedure, go to Step 9.
		No	Go to Step 8.
6	**INSPECT AMBIENT TEMPERATURE SENSOR CIRCUIT FOR OPEN CIRCUIT** • Turn the ignition switch to the LOCK position. • Inspect the wiring harness for continuity between ambient temperature sensor connector terminal A and body ground. • Is there continuity?	Yes	Go to Step 9.
		No	Go to the next step.
7	**INSPECT AMBIENT TEMPERATURE SENSOR CIRCUIT FOR OPEN CIRCUIT** • Inspect for continuity between instrument cluster terminal 2P and body ground. • Is there continuity?	Yes	Repair/replace the malfunctioning vehicle wiring harness. After repair procedure, go to Step 9.
		No	Go to the next step.
8	**VERIFY INSTRUMENT CLUSTER CONNECTOR CONDITION** • Disconnect the instrument cluster connector. • Inspect the connector and terminals (corrosion, damage, pin disconnection). • Are the connector and terminals normal?	Yes	Go to the next step.
		No	Repair/replace the connector or terminal. After repair procedure, go to the next step.
9	**VERIFY THAT SAME DTC IS NOT OUTPUT AGAIN** • Reconnect the disconnected connectors. • Clear the DTC. (See 08-02-5 CLEARING DTC.) • VERIFY DTCs. (See 08-02-5 DTC INSPECTION.) • Is DTC B2840 output?	Yes	Repeat the inspection from Step 1. • If the malfunction does not recur, go to the next step. • If the malfunction recurs, replace the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)
		No	Go to the next step.
10	**VERIFY THAT NO OTHER DTCs ARE PRESENT** • Verify other DTC displayed. • Are any other DTCs output?	Yes	Perform the corresponding DTC inspection.
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [INSTRUMENT CLUSTER]

DTC U0028 [INSTRUMENT CLUSTER]

id0902e8496500

DTC U0028	Invalid data received from climate control unit (ambient temperature signal)
DETECTION CONDITION	Climate control unit malfunction or circuit malfunction
POSSIBLE CAUSE	• Open circuit in wiring harness between instrument cluster terminal 1I and climate control unit terminal J • Short to power supply in wiring harness between instrument cluster terminal 1I and climate control unit terminal J • Short to GND in wiring harness between instrument cluster terminal 1I and climate control unit terminal J • Climate control unit malfunction • Instrument cluster malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT CLIMATE CONTROL UNIT CONNECTOR** • Turn the ignition switch to the LOCK position. • Disconnect the climate control unit connector. • Inspect the climate control unit connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the terminal, then go to Step 6.
		No	Go to the next step.
2	**INSPECT INSTRUMENT CLUSTER CONNECTOR** • Disconnect the instrument cluster connector. • Inspect the instrument cluster connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion). • Is there any malfunction?	Yes	Repair or replace the terminal, then go to Step 6.
		No	Go to the next step.
3	**INSPECT CLIMATE CONTROL UNIT SIGNAL CIRCUIT FOR OPEN CIRCUIT** • Inspect for continuity between instrument cluster terminal 1I (wiring harness-side) and climate control unit terminal J (wiring harness-side) • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 6.
4	**INSPECT CLIMATE CONTROL UNIT SIGNAL CIRCUIT FOR SHORT TO GND** • Inspect for continuity between instrument cluster terminal 1I (wiring harness-side) and body GND. • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to GND, then go to Step 6.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [INSTRUMENT CLUSTER]

STEP	INSPECTION		ACTION
5	**INSPECT CLIMATE CONTROL UNIT SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY** • Turn the ignition switch to the ON position (Engine off). • Measure the voltage between instrument cluster terminal 1I (wiring harness-side) and body GND. • Is the voltage **B+**?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to the next step.
		No	Replace the climate control unit, then go to the next step. (See 07-40A-17 CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [FULL-AUTO AIR CONDITIONER].)
6	**VERIFY TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the instrument cluster memory using the M-MDS. • Turn the ignition switch to the LOCK position then the ON position. • Is the same DTC present?	Yes	Replace the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)
		No	Troubleshooting completed.

DTC U2023 [INSTRUMENT CLUSTER]

id0902e8595600

DTC U2023	• **Abnormal message from PCM**
DETECTION CONDITION	• Correct data cannot be received from PCM
POSSIBLE CAUSE	• PCM malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT FOR PCM MALFUNCTION** • Turn the ignition switch to LOCK position. • Using the M-MDS, perform the DTC inspection for the PCM. (See 01-02-6 ON-BOARD DIAGNOSTIC TEST [L8, LF].) • Are any DTCs detected?	Yes	Go to applicable DTC inspection. (See 01-02-12 DTC TABLE [L8, LF].)
		No	Go to the next step.
2	**VERIFY THAT THE SAME DTC IS NOT PRESENT** • Clear the DTCs from the memory. (See 09-02B-1 CLEARING DTC [INSTRUMENT CLUSTER].) • Are the same DTCs present?	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
		No	Go to the next step.
3	**VERIFY THAT NO OTHER DTCS ARE PRESENT** • Are any other DTCs output?	Yes	Go to the applicable DTC inspection. (See 09-02B-1 DTC INSPECTION [INSTRUMENT CLUSTER].)
		No	DTC troubleshooting completed.

DTC U2064 [INSTRUMENT CLUSTER]

id0902e8840600

DTC U2064	**Warning light illumination request signal from other modules**
DETECTION CONDITION	• Receive warning light illumination request signal
POSSIBLE CAUSE	• CAN-related module malfunction

Caution

- **DTC U2064 is registered to the instrument cluster by a request from other modules and does not indicate a malfunction in the instrument cluster itself.**
- **DTC U2064 may not be cleared during engine starting even if DTC clearing is done using the M-MDS. When clearing DTC U2064, execute with the ignition switch in the ON position (Engine off).**

ON-BOARD DIAGNOSTIC [INSTRUMENT CLUSTER]

Diagnostic Procedure

1. Verify the freeze frame data according to the following procedure:
   (1) Connect the M-MDS to DLC-2.

   Note
   - Freeze frame data of the instrument cluster can be displayed by the IDS (laptop PC)

   (2) After the vehicle is identified, select the following items from the initial screen of the M-MDS.
      1. Select “Electrical”.
      2. Select “IC Service Functions”.
2. Determine which unit is thought to be malfunctioning based on the freeze frame data.

   Note
   - If several warning light illumination requests are received, they will be recorded in one freeze frame data.

amxzzw0000086

Freeze frame data		Warning light illumination request unit			
		PCM	TCM	DSC HU/CM	ABS HU/CM
Illuminated warning light	Generator warning light	×	—	—	—
	Brake system warning light	—	—	×	×
	ABS warning light	—	—	×	×
	AT warning light	—	×	—	—
Meter, gauge control status	Speedometer	—	—	—	—
	Tachometer	—	—	—	—
	Water temperature gauge	—	—	—	—

3. Inspect the malfunctioning part.
   - Repair or replace if necessary.
4. Clear the DTC from the memory.
5. Turn the ignition switch to LOCK position then ON position.
6. Verify that the DTC U2064 is displayed using the M-MDS.
   - If DTC U2064 is displayed, go back to Step 1.

09-02C ON-BOARD DIAGNOSTIC [AUDIO]

CLEARING DTC [AUDIO] 09-02C–1
DTC TABLE [AUDIO] 09-02C–1
STARTING PROCEDURE FOR ON-BOARD DIAGNOSTIC TEST MODE [AUDIO] 09-02C–3
SUPPLIER IDENTIFICATION PROCEDURE [AUDIO] 09-02C–3
Identification Using the Label or Inscribed Lettering **09-02C–3**
Verify Using the Diagnostic Assist Function **09-02C–4**
DIAGNOSTIC ASSIST FUNCTION [AUDIO] 09-02C–5
Display Inspection **09-02C–5**
Switch Inspection **09-02C–5**
Speaker Inspection **09-02C–6**
Radio Reception Condition Inspection **09-02C–7**
Antenna Control Condition Inspection **09-02C–8**
Audio Amplifier Control Condition Inspection **09-02C–9**
Center Panel Specification Inspection **09-02C–10**
Audio Amplifier Specification Inspection **09-02C–11**
Audio Amplifier (With Bose®) Identify Inspection **09-02C–11**

ON-BOARD DIAGNOSTIC [AUDIO]

CLEARING DTC [AUDIO]

id0902f6855600

Caution

- **Before clearing the memory, be sure to enter all of the DTCs displayed in the on-board diagnostic test mode in the Audio Repair Order Form.**

1. Launch the on-board diagnostic test mode. (See 09-02C-3 STARTING PROCEDURE FOR ON-BOARD DIAGNOSTIC TEST MODE [AUDIO].)
2. While pressing the POWER/VOLUME switch, simultaneously press the AUDIO CONT/TUNE switch for **2 s or more**.
3. To stop the on-board diagnostic test mode, turn the ignition switch to the LOCK position.

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DTC TABLE [AUDIO]

id0902f6855700

Screen display DTC (When starting on-board diagnostic test function)	Malfunction description	Inferred cause/verified content	Reference
09: Er20	Audio does not function	Voltage at audio unit is low.	(See 09-03E-6 NO.2 NO POWER TO THE ENTIRE AUDIO SYSTEM [ENTIRE AUDIO SYSTEM].)
09: Er21	Audio unclear or no audio from radio and CD	• Verify the symptoms described by the customer (such as occurrence frequency and mode). • Short to ground in the wiring harness between the audio unit and speakers. • Audio unit malfunction	(See 09-03E-12 NO.5 SOUND BREAK-UP OR POOR SOUND QUALITY [ENTIRE AUDIO SYSTEM].)

ON-BOARD DIAGNOSTIC [AUDIO]

Screen display DTC (When starting on-board diagnostic test function)	Malfunction description	Inferred cause/verified content	Reference
09: Er22	Radio not receiving signal	• Verify the sometimes described by the customer (such as time and place of occurrence, and radio frequency). • Audio unit malfunction	(See 09-03F-3 NO.1 NO RADIO RECEPTION (AM/FM)/NO OR LOW VOLUME [RADIO].)
10: Er01	MP3/WMA (windows media audio) applicable CD player cannot implement insert and eject commands.	• Defective CD (curved, broken or foreign material stuck/attached, etc.) • MP3/WMA (windows media audio) applicable CD player malfunction	(See 09-03G-3 NO.1 CD PLAYER/CHANGER DOES NOT LOAD THE CD OR EJECTS THE CD IMMEDIATELY [CD PLAYER/CHANGER].)
10: Er02	Cannot change tracks.	• Defective CD (curved, broken or foreign material stuck/attached, etc.) • MP3/WMA (windows media audio) applicable CD player malfunction	(See 09-03G-10 NO.11 TRACK CHANGE IS INOPERATIVE [CD PLAYER/CHANGER].)
10: Er07	CD cannot playback (cannot operate)	• CD incompatible (CD used by customer) • Recurs no matter the type of CD (no non-compatible CD)	(See 09-03G-4 NO.3 CD PLAYER/CHANGER DOES NOT PLAY THE CD/NO SOUND [CD PLAYER/CHANGER].)
16: Er12*	• Communication error between audio unit and HF/TEL unit	CAN system.	(See 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].) (See 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
21: Er17 21: Er18	Operation differs from the selected switch	Verify the center panel and audio unit assembly.	Launch the center panel destination mode. (See 09-02C-5 DIAGNOSTIC ASSIST FUNCTION [AUDIO].)
21: Er19	Communication error between audio unit and center panel	• Verify conditions such as the non-operation of all audio switches or the non-operation of any particular switch. • Center panel (audio switch system) malfunction	Launch the switch inspection mode. (See 09-02C-5 DIAGNOSTIC ASSIST FUNCTION [AUDIO].)
22: Er01	MP3/WMA (windows media audio) applicable CD changer cannot implement insert and eject commands.	• Defective CD (curved, broken or foreign material stuck/attached, etc.) • MP3/WMA (windows media audio) applicable CD changer malfunction	(See 09-03G-3 NO.1 CD PLAYER/CHANGER DOES NOT LOAD THE CD OR EJECTS THE CD IMMEDIATELY [CD PLAYER/CHANGER].)

ON-BOARD DIAGNOSTIC [AUDIO]

Screen display DTC (When starting on-board diagnostic test function)	Malfunction description	Inferred cause/verified content	Reference
22: Er02	Cannot change tracks.	• Defective CD (curved, broken or foreign material stuck/ attached, etc.) • MP3/WMA (windows media audio) applicable CD changer malfunction	(See 09-03G-10 NO.11 TRACK CHANGE IS INOPERATIVE [CD PLAYER/CHANGER].)
22: Er07	CD cannot playback (cannot operate)	• CD incompatible (CD used by customer) • Recurs no matter the type of CD (no non-compatible CD)	(See 09-03G-4 NO.3 CD PLAYER/CHANGER DOES NOT PLAY THE CD/NO SOUND [CD PLAYER/CHANGER].)
no Err	—	DTC is not recorded.	—

* : With HF/TEL system

STARTING PROCEDURE FOR ON-BOARD DIAGNOSTIC TEST MODE [AUDIO]

id0902f6855500

Note
- All DTCs displayed in the on-board diagnostic test mode should be entered in the Audio Repair Order Form.

1. Turn the ignition switch to the ACC or ON position.
2. Turn the center panel unit power to OFF.
3. While pressing the POWER/VOLUME switch, simultaneously press the AUX switch and the RPT/PRESET switch 4 for **2 s or more**.

   Note
   - If several DTCs are in the memory, they can be displayed using the SEEK/TRACK switch (up or down).

4. To stop the on-board diagnostic test mode, turn the ignition switch to the LOCK position.

amxzzw0000077

SUPPLIER IDENTIFICATION PROCEDURE [AUDIO]

id0902f6803800

Note
- The supplier can vary with the module. When asking the supplier (service center) for repair or replacement, identify the supplier and fill in the Audio Repair Order Form with the following procedures.

Identification Using the Label or Inscribed Lettering

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the lower panel. (See 09-17-8 LOWER PANEL REMOVAL/INSTALLATION.)
4. Remove the side wall. (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
5. Remove the center panel unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.)
6. Verify the supplier by referring to the label attached to each unit.

ON-BOARD DIAGNOSTIC [AUDIO]

Verify Using the Diagnostic Assist Function

1. Turn the ignition switch to the ACC or ON position.
2. Turn the center panel unit power to ON.
3. While pressing the POWER/VOLUME switch, simultaneously press the RDM/PRESET switch 5 for **3 s or more**.

amxzzw0000085

4. Identify the supplier code by referring to the display.

Supplier code	Supplier name
01	SANYO Automedia
02	Panasonic
03	Clarion
04	Pioneer
05	VISTEON

amxzzw0000111

Note

- The supplier code can also be identified from the DTC displays screen.

amxzzw0000078

5. Cancel the diagnostic assist function by either turning off the center panel unit power or by ignition to the switched off.

ON-BOARD DIAGNOSTIC [AUDIO]

DIAGNOSTIC ASSIST FUNCTION [AUDIO]

id0902f6804500

Display Inspection

1. Turn the ignition switch to the ACC or ON position.
2. Turn the center panel unit power to ON.
3. While pressing the POWER/VOLUME switch, simultaneously press the SEEK/TRACK switch (UP) for **approx. 0.2 s**.
4. Inspect according to the following table:

amxzzw0000086

Inspection	Display	Action	
• Launch the display inspection mode. • The characters displayed on the display are not truncated or faint.		Yes	Display is normal.
		No	Replace the center panel. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.)

5. Cancel the diagnostic assist function by either turning off the center panel unit power or by ignition to the switched off.

Switch Inspection

1. Turn the ignition switch to the ACC or ON position.
2. Turn the center panel unit power to ON.
3. While pressing the POWER/VOLUME switch, simultaneously press the PRESET switch 3 for **approx. 0.2 s**.
4. Inspect according to the following table:

amxzzw0000087

Inspection	Display	Action	
• Launch the switch inspection mode. • Operate all of the switches (press). • Does the buzzer sound? • Does the dial rotation direction correspond with the direction displayed in information display?	Switch name or dial rotation direction	Yes	The switch is normal.
		No	Verify the switch. (See 09-03E-3 CONFIRMATION STEP 1: CENTER PANEL SWITCH CONFIRMATION [ENTIRE AUDIO SYSTEM].)

ON-BOARD DIAGNOSTIC [AUDIO]

5. Cancel the diagnostic assist function by either turning off the center panel unit power or by ignition to the switched off.

Speaker Inspection

1. Turn the ignition switch to the ACC or ON position.
2. Turn the center panel unit power to ON.
3. While pressing the POWER/VOLUME switch, simultaneously press the AUTO-M switch for **approx. 0.2 s**.
4. Inspect according to the following table:

amxzzw0000087

Inspection	Display	Action	
• Launch the speaker inspection mode. • Does each speaker output sound in the following order?: **Without Bose®** 1. Door speaker (LH) and tweeter (LH) (with 6 speaker type) 2. Door speaker (RH) and tweeter (RH) (with 6 speaker type) 3. Rear speaker (RH) 4. Rear speaker (LH) **With Bose®** 1. Door speaker (LH) and door upper speaker (LH) and center speaker 2. Door speaker (RH) and door upper speaker (RH) and center speaker 3. Rear speaker (RH) 4. Rear speaker (LH)	—	Yes	The speakers and the wiring harness between the audio unit and speakers are normal.
		No	• If no sound is produced from all of the speakers. (See 09-03E-7 NO.3 NO SOUND FROM ALL SPEAKERS [ENTIRE AUDIO SYSTEM].) • If no sound is produced from some of the speakers. (See 09-03E-9 NO.4 NO SOUND FROM SOME SPEAKERS [ENTIRE AUDIO SYSTEM].)

5. Cancel the diagnostic assist function by either turning off the center panel unit power or by ignition to the switched off.

ON-BOARD DIAGNOSTIC [AUDIO]

Radio Reception Condition Inspection

1. Turn the ignition switch to the ACC or ON position.
2. Turn the center panel unit power to ON.
3. Tune in the radio.
4. While pressing the POWER/VOLUME switch, simultaneously press the M/PRESET switch 2 for **approx. 0.2 s**.
5. Inspect according to the following table:

Caution

- **Even if the system is normal, radio reception may be difficult depending on where the system is inspected (indoors/ outdoors, or conditions at the location). Before inspecting the system, verify that radio reception is adequate.**
- **When performing the inspection, select the best area for receiving radio frequencies.**

amxzzw0000087

Inspection	Display	Action
Start the radio reception condition inspection mode.	S-METER 10 — S-METER 5	Manual antenna, antenna feeder and audio unit are normal.
	S-METER 4 — S-METER 3	Change frequencies and re-perform the inspection.
	S-METER 2 — S-METER 0	Inspect the manual antenna and antenna feeder. (See 09-20-13 MANUAL ANTENNA INSPECTION.) (See 09-20-16 ANTENNA FEEDER NO.1 INSPECTION.) (See 09-20-20 ANTENNA FEEDER NO.2 INSPECTION.) • If either the manual antenna or the antenna feeder is not normal, replace the malfunctioning part. (See 09-20-12 MANUAL ANTENNA REMOVAL/INSTALLATION.) (See 09-20-14 ANTENNA FEEDER NO.1 REMOVAL/INSTALLATION.) (See 09-20-16 ANTENNA FEEDER NO.2 REMOVAL/INSTALLATION.) • If the manual antenna and antenna feeder are normal, replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ASSEMBLY.)

6. Cancel the diagnostic assist function by either turning off the center panel unit power or by switch the ignition to off.

ON-BOARD DIAGNOSTIC [AUDIO]

Antenna Control Condition Inspection

1. Turn the ignition switch to the ACC or ON position.
2. Turn the center panel unit power to ON.
3. Tune in the radio.
4. While pressing the POWER/VOLUME switch, simultaneously press the AM switch for **approx. 0.2 s or more**.
5. Inspect according to the following table:

amxzzw0000087

Inspection	Display	Action	
Start antenna control condition inspection mode.	ANT-ON	Sound quality good.	System is okay.
		Sound quality poor.	Inspect the manual antenna and antenna feeder. (See 09-20-13 MANUAL ANTENNA INSPECTION.) (See 09-20-16 ANTENNA FEEDER NO.1 INSPECTION.) (See 09-20-20 ANTENNA FEEDER NO.2 INSPECTION.)
	ANT-OFF	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.)	

6. Cancel the diagnostic assist function by either turning off the center panel unit power or by switch the ignition to off.

ON-BOARD DIAGNOSTIC [AUDIO]

Audio Amplifier Control Condition Inspection

1. Turn the ignition switch to the ACC or ON position.
2. Turn the center panel unit power to ON.
3. While pressing the AUTO-M switch, simultaneously press the CD switch for **approx. 0.2 s or more**.
4. Inspect according to the following table:

amxzzw0000087

Inspection	Display	Action
Start audio amplifier control condition inspection mode.	AMP-ON	System is okay.
	AMP-OFF	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ASSEMBLY.)

5. Cancel the diagnostic assist function by either turning off the center panel unit power or by switch the ignition to off.

ON-BOARD DIAGNOSTIC [AUDIO]

Center Panel Specification Inspection

1. Turn the ignition switch to the ACC or ON position.
2. Turn the center panel unit power to ON.
3. While pressing the POWER/VOLUME switch, simultaneously press the PRESET switch 6 for **approx. 2 s or more**.
4. Inspect according to the following table:

amxzzw0000087

Inspection	Display	Action	
• Launch the center panel destination mode. • Is there a match to the destination?	P—01(ID)—00(code)	Yes	The center panel is normal.
		No	Replace the center panel. (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ASSEMBLY.)

ID	Specification	Code	Destination
01	MX-5	00	Japan
		01	Australia
		02	4A region (With AM frequency pitch: 9KHz pitch)
		03	USA
		04	Europe (With DIS)
		05	Europe (Without DIS)
		06	4A region (With AM frequency pitch: 5KHz pitch (with DIS))
		07	4A region (With AM frequency pitch: 5KHz pitch (without DIS))

5. Cancel the diagnostic assist function by either turning off the center panel unit power or by switch the ignition to off.

ON-BOARD DIAGNOSTIC [AUDIO]

Audio Amplifier Specification Inspection

1. Turn the ignition switch to the ACC or ON position.
2. Turn the center panel unit power to ON.
3. While pressing the POWER/VOLUME switch, simultaneously press the SEEK/TRACK switch (down) for **approx. 3 s or more**.
4. Inspect according to the following table:

amxzzw0000087

Inspection	Display	Action	
• Launch audio amplifier specification inspection mode. • Verify the audio amplifier specification. • Dose the audio amplifier specification correspond.	**Without Bose®** •N (Normal) **With Bose®** •L (Line out)	Yes	System is okay.
		No	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ASSEMBLY.)

5. Cancel the diagnostic assist function by either turning off the center panel unit power or by switch the ignition to off.

Audio Amplifier (With Bose®) Identify Inspection

1. Turn the ignition switch to the ACC or ON position.
2. Turn the center panel unit power to ON.
3. While pressing the POWER/VOLUME switch, simultaneously press the AUTO-M switch and RPT/PRESET switch 4 for **approx. 2 s or more**.
4. Inspect according to the following table:

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Inspection	Display	Action	
• Launch audio amplifier (With Bose®) identify inspection mode. • Dose the audio amplifier specification correspond.	**With normal seat** •The rear speaker sounds. **With leather seat** •The door speaker sounds.	Yes	Audio amplifier is okay.
		No	Replace the audio amplifier. (See 09-20-6 AUDIO AMPLIFIER REMOVAL/INSTALLATION.)

5. Cancel the diagnostic assist function by either turning off the center panel unit power or by switch the ignition to off.

09-02D ON-BOARD DIAGNOSTIC [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM]

STARTING PROCEDURE FOR ON-BOARD DIAGNOSTIC TEST MODE [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM] 09-02D–1
CLEARING DTC [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM] 09-02D–2
DTC TABLE [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM] 09-02D–2
DIAGNOSTIC ASSIST FUNCTION [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM] 09-02D–3
Connection Condition Verification **09-02D–3**
HF/TEL Unit Software Version Verification. **09-02D–3**
Password Reset **09-02D–4**

ON-BOARD DIAGNOSTIC [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM]

STARTING PROCEDURE FOR ON-BOARD DIAGNOSTIC TEST MODE [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM]

id0902g0358300

Note
- All DTCs displayed in the on-board diagnostic test mode should be entered in the Audio Repair Order Form

1. Turn the ignition switch to the ACC or ON position.
2. Turn the center panel unit power to OFF.
3. While pressing the POWER/VOLUME switch, simultaneously press the H/PRESET switch 1 and the PRESET switch 6 for **3 s or more**.

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Note
- If several DTCs are in the memory, they can be displayed using the SEEK/TRACK switch (up or down).

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4. To stop the on-board diagnostic test mode, turn the ignition switch to the LOCK position.

ON-BOARD DIAGNOSTIC [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM]

CLEARING DTC [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM]

id0902g0400300

Caution

- **Before clearing the memory, be sure to enter all of the DTCs displayed in the on-board diagnostic test mode in the Audio Repair Order Form.**

1. Launch the on-board diagnostic test mode. (See 09-02D-1 STARTING PROCEDURE FOR ON-BOARD DIAGNOSTIC TEST MODE [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM].)
2. While pressing the AUTO-M switch, simultaneously press the RPT/PRESET switch 4 for **2 s or more**.
3. To stop the on-board diagnostic test mode, turn the ignition switch to the LOCK position.

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DTC TABLE [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM]

id0902g0363000

Screen display DTC (When starting on-board diagnostic function)	Malfunction description	Inferred cause/verified content	Reference
26: Er81	HF/TEL function does not operate.	CAN system	(See 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].) (See 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
26: Er82	Sound from microphone not heard	Short to power supply in wiring harness between microphone (Input signal) and HF/TEL unit	(See 09-03I-1 FOREWORD [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM].)
26: Er83	Sound from microphone not heard	Short to GND/power supply in microphone power supply circuit	(See 09-03I-1 FOREWORD [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM].)
26: Er84	Call transmission and receiving is impossible	Any of the following is detected: • The microphone power supply circuit is not connected. • Open circuit in the microphone input circuit • Microphone input circuit short to body ground	(See 09-03I-1 FOREWORD [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM].)
26: Er85	Call transmission and receiving is impossible	• Poor contact in the voice recognition/hands-free switch or HF/TEL unit connector • Voice recognition/hands-free switch malfunction	(See 09-03I-1 FOREWORD [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM].)
26: Er86	HF/TEL function does not operate.	HF/TEL unit malfunction	Replace the HF/TEL unit. (See 09-20-22 HANDS-FREE TELEPHONE (HF/TEL) UNIT REMOVAL/INSTALLATION.)
no Err	—	DTC is not recorded.	—

ON-BOARD DIAGNOSTIC [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM]

DIAGNOSTIC ASSIST FUNCTION [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM]

id0902g0804500

Connection Condition Verification

1. Turn the ignition switch to the ACC or ON position.
2. Turn the center panel unit power to OFF.
3. While pressing the POWER/VOLUME switch, simultaneously press the RPT/PRESET switch 4 and SEEK/TRACK switch (down) for **3 s or more**.

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4. Verify the connected unit.
5. Cancel the diagnostic assist function by either turning off the center panel unit power or by switch the ignition to off.

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HF/TEL Unit Software Version Verification

1. Turn the ignition switch to the ACC or ON position.
2. Turn the center panel unit power to OFF.
3. While pressing the POWER/VOLUME switch, simultaneously press the PRESET switch 6 and SEEK/TRACK switch (down) for **3 s or more**.

amxzzw0000096

4. Verify the software version.
5. Cancel the diagnostic assist function by either turning off the center panel unit power or by switch the ignition to off.

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ON-BOARD DIAGNOSTIC [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM]

Password Reset

1. Turn the ignition switch to the ACC or ON position.
2. Turn the center panel unit power to OFF.
3. While pressing the AUTO-M switch, simultaneously press the M/PRESET switch 2 for **3 s or more**.

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4. Verify the “PASSWD_CLEAR” is displayed in the display.
5. Cancel the diagnostic assist function by either turning off the center panel unit power or by switch the ignition to off.

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09-02E ON-BOARD DIAGNOSTIC [POWER RETRACTABLE HARDTOP]

DTC INSPECTION [POWER RETRACTABLE HARDTOP]. 09-02E–1
CLEARING DTC [POWER RETRACTABLE HARDTOP]. 09-02E–1
DTC TABLE [POWER RETRACTABLE HARDTOP]. 09-02E–2
DTC B1342 [POWER RETRACTABLE HARDTOP]. 09-02E–2
DTC B1317/B1318 [POWER RETRACTABLE HARDTOP]. 09-02E–3
DTC B293E/B293D/B294C/B293F [POWER RETRACTABLE HARDTOP] 09-02E–4
DTC B294D/B294E [POWER RETRACTABLE HARDTOP]. 09-02E–6
DTC B294F [POWER RETRACTABLE HARDTOP]. 09-02E–9
Fig.1 . . . . . 09-02E–11
DTC U0030/U0031 [POWER RETRACTABLE HARDTOP] 09-02E–11
DTC B296A/U294B/B293C/B293B [POWER RETRACTABLE HARDTOP] 09-02E–12
DTC B296B [POWER RETRACTABLE HARDTOP] 09-02E–15
DTC B296D [POWER RETRACTABLE HARDTOP] 09-02E–16
DTC B296C [POWER RETRACTABLE HARDTOP] 09-02E–17
PID/DATA MONITOR DISPLAY [POWER RETRACTABLE HARDTOP] 09-02E–18
PID/DATA MONITOR TABLE [POWER RETRACTABLE HARDTOP] 09-02E–19

ON-BOARD DIAGNOSTIC [POWER RETRACTABLE HARDTOP]

DTC INSPECTION [POWER RETRACTABLE HARDTOP]

id0902j2960300

amxzzw0000149

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “Self Test”.
     2. Select “Modules”.
     3. Select “RHT”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “RHT”.
     3. Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
   - If any DTCs are displayed, perform troubleshooting according to the corresponding DTC inspection.
4. After completion of repairs, clear all DTCs stored in the power retractable hardtop control module. (See 09-02E-1 CLEARING DTC [POWER RETRACTABLE HARDTOP])

CLEARING DTC [POWER RETRACTABLE HARDTOP]

id0902j2960400

amxzzw0000149

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “Self Test”.
     2. Select “Modules”.
     3. Select “RHT”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “RHT”.
     3. Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
4. Press the clear button on the DTC screen to clear the DTC.
5. Turn the ignition switch to the LOCK position.
6. Turn the ignition switch to the ON position and wait for **5 s or more**.
7. Perform DTC inspection. (See 09-02E-1 DTC INSPECTION [POWER RETRACTABLE HARDTOP].)
8. Verify that no DTCs are displayed.

ON-BOARD DIAGNOSTIC [POWER RETRACTABLE HARDTOP]

DTC TABLE [POWER RETRACTABLE HARDTOP]

id0902j2960500

DTC M-MDS display	description	Page
B1342	Power retractable hardtop control module internal malfunction	(See 09-02E-2 DTC B1342 [POWER RETRACTABLE HARDTOP].)
B1317	Battery power supply voltage increases (17.5 V or more)	(See 09-02E-3 DTC B1317/B1318 [POWER RETRACTABLE HARDTOP].)
B1318	Battery power supply voltage decreases (less than 7.5 V)	
B296D	Hall sensor low power supply voltage	(See 09-02E-16 DTC B296D [POWER RETRACTABLE HARDTOP].)
U0030	Power window communication error (during power retractable hardtop operation)	(See 09-02E-11 DTC U0030/U0031 [POWER RETRACTABLE HARDTOP].)
U0031	Power window communication error (during power retractable hardtop not operation)	
B296A	Roof motor pulse signal error (RH)	(See 09-02E-12 DTC B296A/U294B/B293C/B293B [POWER RETRACTABLE HARDTOP].)
U294B	Roof motor pulse signal error (LH)	
B293C	Deck panel motor pulse signal error (RH)	
B293B	Deck panel motor pulse signal error (RL)	
B293E	Roof motor circuit malfunction (RH)	(See 09-02E-4 DTC B293E/B293D/B294C/B293F [POWER RETRACTABLE HARDTOP].)
B293D	Roof motor circuit malfunction (LH)	
B294C	Deck panel motor circuit malfunction (RH)	
B293F	Deck panel motor circuit malfunction (LH)	
B294D	Roof motor opening angle does not match (Pulse count number do not match)	(See 09-02E-6 DTC B294D/B294E [POWER RETRACTABLE HARDTOP].)
B294E	Deck panel motor opening angle does not match (Pulse count number do not match)	
B294F	Power retractable hardtop/deck panel limit switch malfunction	(See 09-02E-9 DTC B294F [POWER RETRACTABLE HARDTOP].)
B296B	Top lock switch malfunction	(See 09-02E-15 DTC B296B [POWER RETRACTABLE HARDTOP].)
B296C	Power retractable hardtop switch malfunction	(See 09-02E-17 DTC B296C [POWER RETRACTABLE HARDTOP].)
U0073	CAN system communication error	(See 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].) (See 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
U0100	Communication error to PCM	
U0101	Communication error to TCM	
U2197	Vehicle speed signal communication error	

DTC B1342 [POWER RETRACTABLE HARDTOP]

id0902j2920500

DTC B1342	Power retractable hardtop control module internal malfunction
POSSIBLE CAUSE	• Malfunction in the power retractable hardtop control module internal circuit

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT THE POWER RETRACTABLE HARDTOP CONTROL MODULE** • Clear the DTC from the power retractable hardtop control module memory using the M-MDS. • Turn the ignition switch to the ON position. • Is the DTC displayed? — B1342	Yes	Replace the power retractable hardtop control module. (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE REMOVAL/INSTALLATION.)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [POWER RETRACTABLE HARDTOP]

DTC B1317/B1318 [POWER RETRACTABLE HARDTOP]

id0902j2350700

DTC	**B1317**	**Battery power supply voltage increases (17.5 V or more)**
	B1318	**Battery power supply voltage decreases (less than 7.5 V)**
DETECTION CONDITION		• If the power retractable hardtop control module power supply voltage is not **within 7.5—17.5 V**. **Note** • The system recovery condition after detecting DTC B1317/1318 is that the battery voltage is in the **8.5—16.5 V** range. Verify that the battery voltage is **8.5—16.5 V** when inspecting.
POSSIBLE CAUSE		• ROOM 15 A fuse malfunction • Battery malfunction • Open or short circuit in wiring harness between battery and power retractable hardtop control module • Power retractable hardtop control module malfunction

POWER RETRACTABLE HARDTOP CONTROL MODULE
WIRING HARNESS SIDE CONNECTOR

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT THE FUSE** • Remove the ROOM 15 A fuse. • Is the fuse normal?	Yes	Go to the next step.
		No	Replace the fuse.
2	**INSPECT THE BATTERY** • Measure the battery positive voltage. • Is the voltage **8.5 V—16.5 V**?	Yes	Go to the next step.
		No	The battery has a malfunction. Inspect the charge/discharge system.
3	**INSPECT WIRING HARNESS BETWEEN BATTERY AND POWER RETRACTABLE HARDTOP CONTROL MODULE** • Turn the ignition switch to the ON position. • Measure the power retractable hardtop control module terminal 1X voltage. • Is the voltage **8.5 V—16.5 V**?	Yes	Replace the power retractable hardtop control module. (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE REMOVAL/INSTALLATION.)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC [POWER RETRACTABLE HARDTOP]

DTC B293E/B293D/B294C/B293F [POWER RETRACTABLE HARDTOP]

id0902j2861200

DTC	B293E	Roof motor circuit malfunction (RH)
	B293D	Roof motor circuit malfunction (LH)
	B294C	Deck panel motor circuit malfunction (RH)
	B293F	Deck panel motor circuit malfunction (LH)
DETECTION CONDITION		• Motor circuit malfunction
POSSIBLE CAUSE		• RHT L 30 A fuse malfunction • RHT R 30 A fuse malfunction • Open or short circuit in wiring harness between roof/deck panel motor and power retractable hardtop control module • Roof/deck panel motor malfunction • Power retractable hardtop control module malfunction

POWER RETRACTABLE HARDTOP CONTROL MODULE WIRING HARNESS SIDE CONNECTOR

ROOF MOTOR WIRING HARNESS SIDE CONNECTOR

DECK PANEL MOTOR WIRING HARNESS SIDE CONNECTOR

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT THE FUSE** • Remove the RHT L 30 A and RHT R 30 A fuse. • Is the fuse normal?	Yes	Go to the next step.
		No	Replace the fuse.
2	**INSPECT THE WIRING HARNESS BETWEEN BATTERY AND POWER RETRACTABLE HARDTOP CONTROL MODULE** • Turn the ignition switch to the ON position. • Refer to the power retractable hardtop control module inspection and measure the voltage between power retractable hardtop control module connector terminals 2A and 2B. (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE INSPECTION.) • Are the terminal voltages normal?	Yes	Go to the next step.
		No	Repair or replace the wiring harness.
3	**INSPECT THE WIRING HARNESS BETWEEN POWER RETRACTABLE HARDTOP CONTROL MODULE AND GROUND** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable. • Disconnect the power retractable hardtop control module connector. • Inspect for continuity between power retractable hardtop control module terminal 2E and body ground, and terminal 2F and body ground. • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness.
4	**INSPECT THE ROOF/DECK PANEL MOTOR** • Inspect the roof/deck panel motor. (See 09-16-32 ROOF MOTOR INSPECTION.) (See 09-16-39 DECK PANEL MOTOR INSPECTION.) • Is the roof/deck panel motor normal?	Yes	Go to the next step.
		No	Replace the roof/deck panel motor. (See 09-16-33 ROOF MOTOR REMOVAL/INSTALLATION.) (See 09-16-38 DECK PANEL MOTOR REMOVAL/INSTALLATION.)

ON-BOARD DIAGNOSTIC [POWER RETRACTABLE HARDTOP]

STEP	INSPECTION		ACTION
5	**INSPECT THE WIRING HARNESS BETWEEN ROOF/DECK PANEL MOTOR AND POWER RETRACTABLE HARDTOP CONTROL MODULE** • Disconnect the roof/deck panel motor connector. • Disconnect the power retractable hardtop control module connector. • Inspect the following wiring harnesses for an open or short circuit. — Between power retractable hardtop control module connector terminal 3L and roof motor connector (LH) terminal E, and between power retractable hardtop control module connector terminal 3D and roof motor connector (LH) terminal A — Between power retractable hardtop control module connector terminal 3A and roof motor connector (RH) terminal E, and between power retractable hardtop control module connector terminal 3I and roof motor connector (RH) terminal A — Between power retractable hardtop control module connector terminal 3H and deck panel motor connector (LH) terminal A, and between power retractable hardtop control module connector terminal 3P and deck panel motor connector (LH) terminal E — Between power retractable hardtop control module connector terminal 3M and deck panel motor connector (RH) terminal A, and between power retractable hardtop control module connector terminal 3E and deck panel motor connector (RH) terminal E • Is the wiring harness normal?	Yes	Replace the power retractable hardtop control module. (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE REMOVAL/INSTALLATION.)
		No	Repair or replace the wiring harness.

ON-BOARD DIAGNOSTIC [POWER RETRACTABLE HARDTOP]

DTC B294D/B294E [POWER RETRACTABLE HARDTOP]

id0902j2861600

DTC	B294D	**Roof motor opening angle does not match (Pulse count number does not match)**
	B294E	**Deck panel motor opening angle does not match (Pulse count number do not match)**
DETECTION CONDITION		• The left and right pulse count number exceeds a certain level
POSSIBLE CAUSE		• Foreign material caught in mechanism • Damage to the link • Roof/deck panel motor malfunction • Open short circuit in wiring harness between roof/deck panel motor and power retractable hardtop control module

POWER RETRACTABLE HARDTOP CONTROL MODULE
WIRING HARNESS SIDE CONNECTOR

DECK PANEL MOTOR WIRING
HARNESS SIDE CONNECTOR

ROOF MOTOR WIRING
HARNESS SIDE CONNECTOR

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**FOREIGN MATERIAL INSPECTION** • Is there any malfunction which stops the motor mechanically?	Yes	Go to the next step.
		No	Remove the foreign material.
2	**INSPECT THE ROOF/ROOF MOTOR/DECK PANEL LINK** • Is there any damage to the roof, roof motor, or deck panel link?	Yes	Go to the next step.
		No	Replace the middle roof panel or deck panel link. **Note** • The roof motor link is integrated with the middle roof panel. (See 09-16-48 MIDDLE ROOF PANEL REMOVAL/INSTALLATION.) (See 09-16-37 DECK PANEL DISASSEMBLY/ASSEMBLY.)
3	**INSPECT THE ROOF/DECK PANEL MOTOR** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable. • Inspect the roof/deck panel motor. (See 09-16-32 ROOF MOTOR INSPECTION.) (See 09-16-39 DECK PANEL MOTOR INSPECTION.) • Is the roof/deck panel motor normal?	Yes	Go to the next step.
		No	Replace the roof/deck panel motor. (See 09-16-33 ROOF MOTOR REMOVAL/INSTALLATION.) (See 09-16-38 DECK PANEL MOTOR REMOVAL/INSTALLATION.)

ON-BOARD DIAGNOSTIC [POWER RETRACTABLE HARDTOP]

STEP	INSPECTION		ACTION
4	**INSPECT THE WIRING HARNESS BETWEEN ROOF/DECK PANEL MOTOR AND POWER RETRACTABLE HARDTOP CONTROL MODULE** • Disconnect the roof/deck panel motor connector. • Disconnect the power retractable hardtop control module connector. • Inspect the following wiring harnesses for an open or short circuit. — Between power retractable hardtop control module connector terminal 3L and roof motor connector (LH) terminal E, and between power retractable hardtop control module connector terminal 3D and roof motor connector (LH) terminal A — Between power retractable hardtop control module connector terminal 3A and roof motor connector (RH) terminal E, and between power retractable hardtop control module connector terminal 3I and roof motor connector (RH) terminal A — Between power retractable hardtop control module connector terminal 3H and deck panel motor connector (LH) terminal A, and between power retractable hardtop control module connector terminal 3P and deck panel motor connector (LH) terminal E — Between power retractable hardtop control module connector terminal 3M and deck panel motor connector (RH) terminal A, and between power retractable hardtop control module connector terminal 3M and roof motor connector (RH) terminal E • Is the wiring harness normal?	Yes	Go to the next step.
		No	Repair or replace the wiring harness.
5	**INSPECT THE WIRING HARNESS BETWEEN ROOF/DECK PANEL MOTOR AND POWER RETRACTABLE HARDTOP CONTROL MODULE** • Inspect the sensor power supply wiring harness for an open or short circuit. — Power retractable hardtop control module connector terminal 1G—Roof motor connector (RH) terminal B — Power retractable hardtop control module connector terminal 1G—Roof motor connector (LH) terminal B — Power retractable hardtop control module connector terminal 1G—Deck panel motor connector (RH) terminal D — Power retractable hardtop control module connector terminal 1G—Deck panel motor connector (LH) terminal D • Is the wiring harness normal?	Yes	Go to the next step.
		No	Repair or replace the wiring harness.

ON-BOARD DIAGNOSTIC [POWER RETRACTABLE HARDTOP]

STEP	INSPECTION		ACTION
6	**INSPECT THE WIRING HARNESS BETWEEN ROOF/DECK PANEL MOTOR AND POWER RETRACTABLE HARDTOP CONTROL MODULE** • Inspect the sensor communication wiring harness for an open or short circuit. — Power retractable hardtop control module connector terminal 1I—Roof motor connector (RH) terminal D — Power retractable hardtop control module connector terminal 1M—Roof motor connector (LH) terminal D — Power retractable hardtop control module connector terminal 1O—Deck panel motor connector (LH) terminal F — Power retractable hardtop control module connector terminal 1K—Deck panel motor connector (RH) terminal F • Is the wiring harness normal?	Yes	Go to the next step.
		No	Repair or replace the wiring harness.
7	**INSPECT THE WIRING HARNESS BETWEEN ROOF/DECK PANEL MOTOR AND POWER RETRACTABLE HARDTOP CONTROL MODULE** • Inspect the sensor ground wiring harness for an open or short circuit. — Power retractable hardtop control module connector terminal 1Q—Roof motor connector (RH) terminal F — Power retractable hardtop control module connector terminal 1Q—Roof motor connector (LH) terminal F — Power retractable hardtop control module connector terminal 1Q—Deck panel motor connector (LH) terminal B — Power retractable hardtop control module connector terminal 1Q—Deck panel motor connector (RH) terminal B • Is the wiring harness normal?	Yes	Replace the power retractable hardtop control module. (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE REMOVAL/INSTALLATION.)
		No	Repair or replace the wiring harness.

ON-BOARD DIAGNOSTIC [POWER RETRACTABLE HARDTOP]

DTC B294F [POWER RETRACTABLE HARDTOP]

id0902j2861800

DTC B294F	Power retractable hardtop/deck panel limit switch malfunction
DETECTION CONDITION	• There is a discrepancy in the signals from each limit switch.
POSSIBLE CAUSE	• Foreign material caught in mechanism • Power retractable hardtop/deck panel limit switch malfunction • Open or short circuit in wiring harness between power retractable hardtop/deck panel limit switch and power retractable hardtop control module

POWER RETRACTABLE HARDTOP CONTROL MODULE WIRING HARNESS SIDE CONNECTOR

POWER RETRACTABLE HARDTOP LIMIT SWITCH WIRING HARNESS SIDE CONNECTOR

DECK PANEL LIMIT SWITCH WIRING HARNESS SIDE CONNECTOR

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**FOREIGN MATERIAL INSPECTION** • Is there any malfunction which stops the motor mechanically?	Yes	Go to the next step.
		No	Remove foreign material.
2	**INSPECT THE POWER RETRACTABLE HARDTOP/DECK PANEL LIMIT SWITCH** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable. • Inspect the power retractable hardtop/deck panel limit switch. (See 09-16-35 POWER RETRACTABLE HARDTOP LIMIT SWITCH INSPECTION.) (See 09-16-40 DECK PANEL LIMIT SWITCH INSPECTION.) • Is the power retractable hardtop/deck panel limit switch normal?	Yes	Go to the next step.
		No	Replace the power retractable hardtop/deck panel limit switch. (See 09-16-33 POWER RETRACTABLE HARDTOP LIMIT SWITCH REMOVAL/INSTALLATION.) (See 09-16-40 DECK PANEL LIMIT SWITCH REMOVAL/INSTALLATION.)

ON-BOARD DIAGNOSTIC [POWER RETRACTABLE HARDTOP]

STEP	INSPECTION		ACTION
3	**INSPECT THE WIRING HARNESS BETWEEN POWER RETRACTABLE HARDTOP CONTROL MODULE AND POWER RETRACTABLE HARDTOP/DECK PANEL LIMIT SWITCH** • Disconnect the power retractable hardtop/deck panel limit switch connector. • Disconnect the power retractable hardtop control module connector. • Inspect the following wiring harnesses for an open or short circuit. — Between power retractable hardtop control module connector terminal 1T and power retractable hardtop limit switch connector terminal A, and between power retractable hardtop control module connector terminal 1V and power retractable hardtop limit switch connector terminal B — Between power retractable hardtop control module connector terminal 1R and power retractable hardtop limit switch connector terminal C, and between power retractable hardtop control module connector terminal 1V and power retractable hardtop limit switch connector terminal D — Between power retractable hardtop control module connector terminal 3F and deck panel limit switch connector terminal A, and between power retractable hardtop control module connector terminal 1V and deck panel limit switch connector terminal B — Between power retractable hardtop control module connector terminal 3O and deck panel limit switch limit switch connector terminal C, and between power retractable hardtop control module connector terminal 1V and deck panel limit switch connector terminal D • Is the wiring harness normal?	Yes	Go to the next step.
		No	Repair or replace the related wiring harness.
4	**INSPECT THE LIMIT SWITCH** • Using the M-MDS, verify the following PID/DATA monitor. (See 09-02E-19 PID/DATA MONITOR TABLE [POWER RETRACTABLE HARDTOP].) — RHT_OP — RHT_CL — DECK_OP — DECK_CL • Are the ON/OFF combinations of the open/close switches as shown in Fig.1? (See 09-02E-9 DTC B294F [POWER RETRACTABLE HARDTOP].)	Yes	Clear the DTC and perform the DTC inspection again. • If the malfunction recurs, replace the power retractable hardtop control module. (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE REMOVAL/INSTALLATION.)
		No	Replace the middle roof panel or deck panel link. **Note** • The roof motor link is integrated with the middle roof panel. (See 09-16-48 MIDDLE ROOF PANEL REMOVAL/INSTALLATION.) (See 09-16-37 DECK PANEL DISASSEMBLY/ASSEMBLY.)

ON-BOARD DIAGNOSTIC [POWER RETRACTABLE HARDTOP]

Fig.1

CONDITION		POWER RETRACTABLE HARDTOP LIMIT SWITCH		DECK PANEL LIMIT SWITCH	
POWER RETRACTABLE HARDTOP	DECK PANEL	POWER RETRACTABLE HARDTOP CLOSE POSITION SWITCH	POWER RETRACTABLE HARDTOP OPEN POSITION SWITCH	DECK PANEL CLOSE POSITION SWITCH	DECK PANEL OPEN POSITION SWITCH
Half open	Half open	OFF	OFF	ON	OFF
Half open	Fully closed	OFF	OFF	OFF	OFF
Half open	Fully open	OFF	OFF	ON	ON
Fully open	Half open	OFF	ON	ON	OFF
Fully closed	Half open	ON	OFF	ON	OFF
Fully open	Fully open	OFF	ON	ON	ON
Fully closed	Fully closed	ON	OFF	OFF	OFF

amxzzw0000099

DTC U0030/U0031 [POWER RETRACTABLE HARDTOP]

id0902j2860600

DTC	**U0030**	**Power window communication error (during power retractable hardtop operation)**
	U0031	**Power window communication error (during power retractable hardtop not operation)**
DETECTION CONDITION		• U0030: Open notify signal cannot be received. • U0031: Open notify signal is received continuously for **30 s or more**.
POSSIBLE CAUSE		• Power window main switch malfunction • Open or short circuit in wiring harness between power retractable hardtop control module and power window main switch • Power retractable hardtop control module malfunction

POWER RETRACTABLE HARDTOP CONTROL MODULE WIRING HARNESS SIDE CONNECTOR

POWER WINDOW MAIN SWITCH CONNECTOR

ON-BOARD DIAGNOSTIC [POWER RETRACTABLE HARDTOP]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT THE POWER WINDOW SYSTEM** • Operate the power window system using the power window main switch. • Does the power window system operate?	Yes	Go to the next step.
		No	Inspect the power window main switch. (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.)
2	**INSPECT THE WIRING HARNESS BETWEEN POWER RETRACTABLE HARDTOP CONTROL MODULE AND POWER WINDOW MAIN SWITCH** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable. • Disconnect the power retractable hardtop control module and power window main switch connector. • Inspect for continuity between power retractable hardtop control module connector terminal 1E and power window main switch terminal 1A, and between power retractable hardtop control module connector terminal 1C and power window main switch terminal 1H. • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness.
3	**INSPECT THE POWER RETRACTABLE HARDTOP CNTROL MODULE** • Connect the negative battery cable. • Clear the DTC from the power retractable hardtop control module memory using the M-MDS. • Turn the ignition switch to the ON position. • Operate the power retractable hardtop. • Is the DTC displayed? — U0030 or U0031	Yes	Replace the power retractable hardtop control module. (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE REMOVAL/INSTALLATION.)
		No	DTC troubleshooting completed.

DTC B296A/U294B/B293C/B293B [POWER RETRACTABLE HARDTOP]

id0902j2860800

DTC	**B296A**	**Roof motor pulse signal error (RH)**
	U294B	**Roof motor pulse signal error (LH)**
	B293C	**Deck panel motor pulse signal error (RH)**
	B293B	**Deck panel motor pulse signal error (LH)**
DETECTION CONDITION		• Pulse is not output after the motor drive signal is output.
POSSIBLE CAUSE		• Foreign material caught in mechanism • RHT L 30 A fuse malfunction • RHT R 30 A fuse malfunction • Roof motor malfunction • Deck panel motor malfunction • Open or short circuit in wiring harness between roof/deck panel motor and power retractable hardtop control module • Power retractable hardtop control module malfunction

POWER RETRACTABLE HARDTOP CONTROL MODULE WIRING HARNESS SIDE CONNECTOR

ROOF MOTOR WIRING HARNESS SIDE CONNECTOR

DECK PANEL MOTOR WIRING HARNESS SIDE CONNECTOR

ON-BOARD DIAGNOSTIC [POWER RETRACTABLE HARDTOP]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**FOREIGN MATERIAL INSPECTION** • Is there any malfunction which stops the motor mechanically?	Yes	Go to the next step.
		No	Remove foreign material.
2	**INSPECT THE FUSE** • Remove the RHT L 30 A and RHT R 30 A fuse. • Is the fuse normal?	Yes	Go to the next step.
		No	Replace the fuse.
3	**INSPECT THE ROOF/DECK PANEL MOTOR** • Inspect the roof/deck panel motor. (See 09-16-32 ROOF MOTOR INSPECTION.) (See 09-16-39 DECK PANEL MOTOR INSPECTION.) • Is the roof/deck panel motor normal?	Yes	Go to the next step.
		No	Replace the roof/deck panel motor. (See 09-16-33 ROOF MOTOR REMOVAL/INSTALLATION.) (See 09-16-38 DECK PANEL MOTOR REMOVAL/INSTALLATION.)
4	**INSPECT THE WIRING HARNESS BETWEEN BATTERY AND POWER RETRACTABLE HARDTOP CONTROL MODULE** • Turn the ignition switch to the ON position. • Refer to the power retractable hardtop control module inspection and measure the voltage between power retractable hardtop control module connector terminals 2A and 2B. (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE INSPECTION.) • Are the terminal voltages normal?	Yes	Go to the next step.
		No	Repair or replace the wiring harness.
5	**INSPECT THE WIRING HARNESS BETWEEN POWER RETRACTABLE HARDTOP CONTROL MODULE AND GROUND** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable. • Disconnect the power retractable hardtop control module connector. • Inspect for continuity between power retractable hardtop control module terminal 2E and body ground, and terminal 2F and body ground. • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness.

ON-BOARD DIAGNOSTIC [POWER RETRACTABLE HARDTOP]

STEP	INSPECTION		ACTION
6	**INSPECT THE WIRING HARNESS BETWEEN ROOF/DECK PANEL MOTOR AND POWER RETRACTABLE HARDTOP CONTROL MODULE** • Disconnect the roof/deck panel motor connector. • Disconnect the power retractable hardtop control module connector. • Inspect the following wiring harnesses for an open or short circuit. — Between power retractable hardtop control module connector terminal 3L and roof motor connector (LH) terminal E, and between power retractable hardtop control module connector terminal 3D and roof motor connector (LH) terminal A — Between power retractable hardtop control module connector terminal 3A and roof motor connector (RH) terminal E, and between power retractable hardtop control module connector terminal 3I and roof motor connector (RH) terminal A — Between power retractable hardtop control module connector terminal 3H and deck panel motor connector (LH) terminal A, and between power retractable hardtop control module connector terminal 3P and deck panel motor connector (LH) terminal E — Between power retractable hardtop control module connector terminal 3M and deck panel motor connector (RH) terminal A, and between power retractable hardtop control module connector terminal 3E and deck panel motor connector (RH) terminal E • Is the wiring harness normal?	Yes	Go to the next step.
		No	Repair or replace the wiring harness.
7	**INSPECT THE WIRING HARNESS BETWEEN ROOF/DECK PANEL MOTOR AND POWER RETRACTABLE HARDTOP CONTROL MODULE** • Disconnect the roof/deck panel motor connector. • Disconnect the power retractable hardtop control module connector. • Inspect the sensor power supply wiring harness for an open or short circuit. — Power retractable hardtop control module connector terminal 1G—Roof motor connector (RH) terminal B — Power retractable hardtop control module connector terminal 1G—Roof motor connector (LH) terminal B — Power retractable hardtop control module connector terminal 1G—Deck panel motor connector (RH) terminal D — Power retractable hardtop control module connector terminal 1G—Deck panel motor connector (LH) terminal D • Is the wiring harness normal?	Yes	Go to the next step.
		No	Repair or replace the wiring harness.

ON-BOARD DIAGNOSTIC [POWER RETRACTABLE HARDTOP]

STEP	INSPECTION		ACTION
8	**INSPECT THE WIRING HARNESS BETWEEN ROOF/DECK PANEL MOTOR AND POWER RETRACTABLE HARDTOP CONTROL MODULE** • Inspect the sensor communication wiring harness for an open or short circuit. — Power retractable hardtop control module connector terminal 1I—Roof motor connector (RH) terminal D — Power retractable hardtop control module connector terminal 1M—Roof motor connector (LH) terminal D — Power retractable hardtop control module connector terminal 1O—Deck panel motor connector (LH) terminal F — Power retractable hardtop control module connector terminal 1K—Deck panel motor connector (RH) terminal F • Is the wiring harness normal?	Yes	Go to the next step.
		No	Repair or replace the wiring harness.
9	**INSPECT THE WIRING HARNESS BETWEEN ROOF/DECK PANEL MOTOR AND POWER RETRACTABLE HARDTOP CONTROL MODULE** • Inspect the sensor ground wiring harness for an open or short circuit. — Power retractable hardtop control module connector terminal 1Q—Roof motor connector (RH) terminal F — Power retractable hardtop control module connector terminal 1Q—Roof motor connector (LH) terminal F — Power retractable hardtop control module connector terminal 1Q—Deck panel motor connector (LH) terminal B — Power retractable hardtop control module connector terminal 1Q—Deck panel motor connector (RH) terminal B • Is the wiring harness normal?	Yes	Replace the power retractable hardtop control module. (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE REMOVAL/INSTALLATION.)
		No	Repair or replace the wiring harness.

DTC B296B [POWER RETRACTABLE HARDTOP]

id0902j2861900

DTC B296B	Top lock switch malfunction
DETECTION CONDITION	• Top lock switch is detected to be on while the power retractable hardtop is open.
POSSIBLE CAUSE	• Foreign material caught in mechanism • Top lock switch malfunction • Wiring harness between top lock switch and power retractable hardtop control module • Power retractable hardtop control module malfunction

POWER RETRACTABLE HARDTOP CONTROL MODULE WIRING HARNESS SIDE CONNECTOR

TOP LOCK SWITCH WIRING HARNESS SIDE CONNECTOR

ON-BOARD DIAGNOSTIC [POWER RETRACTABLE HARDTOP]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**FOREIGN MATERIAL INSPECTION** • Is there any foreign material which turns the switch on mechanically?	Yes	Go to the next step.
		No	Remove foreign material.
2	**INSPECT THE TOP LOCK SWITCH** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable. • Inspect the top lock switch. (See 09-14-14 TOP LOCK SWITCH INSPECTION.) • Is the top lock switch normal?	Yes	Go to the next step.
		No	Replace the striker. (See 09-16-12 CONVERTIBLE TOP DISASSEMBLY/ ASSEMBLY.)
3	**INSPECT THE WIRING HARNESS BETWEEN POWER RETRACTABLE HARDTOP CONTROL MODULE AND TOP LOCK SWITCH** • Disconnect the top lock switch connector. • Inspect the wiring harness between power retractable hardtop control module terminal connector 1D and top lock switch connector terminal A for a short to ground. • Is the wiring harness normal?	Yes	Replace the power retractable hardtop control module. (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE REMOVAL/INSTALLATION.)
		No	Repair or replace the related wiring harness.

DTC B296D [POWER RETRACTABLE HARDTOP]

id0902j2031700

DTC B296D	Hall sensor low power supply voltage
DETECTION CONDITION	• Power supply voltage to the Hall sensor is **5 V or less**.
POSSIBLE CAUSE	• Battery malfunction • Open or short circuit in wiring harness between power retractable hardtop control module and roof/ deck panel motor • Power retractable hardtop control module malfunction

POWER RETRACTABLE HARDTOP CONTROL MODULE WIRING HARNESS SIDE CONNECTOR

ROOF MOTOR WIRING HARNESS SIDE CONNECTOR

DECK PANEL MOTOR WIRING HARNESS SIDE CONNECTOR

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT THE BATTERY** • Measure the battery positive voltage. • Is the measured voltage **7.5 V or more**?	Yes	Go to the next step.
		No	The battery has a malfunction. Inspect the charge/discharge system.
2	**INSPECT THE WIRING HARNESS BETWEEN POWER RETRACTABLE HARDTOP CONTROL MODULE AND ROOF/DECK PANEL MOTOR** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable. • Disconnect the power retractable hardtop control module and roof/deck panel motor connector. • Inspect for continuity between power retractable hardtop control module connector terminal 1G and following terminals: — Roof motors connector terminal B — Deck panel motors connector terminal D • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness.

ON-BOARD DIAGNOSTIC [POWER RETRACTABLE HARDTOP]

STEP	INSPECTION		ACTION
3	**INSPECT THE POWER RETRACTABLE HARDTOP CONTROL MODULE** • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Push the power retractable hardtop switch. • Measure the power retractable hardtop control module connector terminal 1G voltage. • Is the measured voltage **5.0 V or more**?	Yes	DTC troubleshooting completed.
		No	Replace the power retractable hardtop control module. (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE REMOVAL/INSTALLATION.)

DTC B296C [POWER RETRACTABLE HARDTOP]

id0902j2032400

DTC B296C	Power retractable hardtop switch malfunction
DETECTION CONDITION	• Power retractable hardtop switch signal is **1 V or less**. • Power retractable hardtop switch is detected to be stuck in on.
POSSIBLE CAUSE	• Power retractable hardtop switch malfunction • Open/close signals are input simultaneously for **30 s or more**. • Open or short circuit in wiring harness between power retractable hardtop switch and power retractable hardtop control module • Power retractable hardtop control module malfunction

POWER RETRACTABLE HARDTOP CONTROL MODULE WIRING HARNESS SIDE CONNECTOR

POWER RETRACTABLE HARDTOP SWITCH WIRING HARNESS SIDE CONNECTOR

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT THE POWER RETRACTABLE HARDTOP SWITCH** • Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable. • Inspect the power retractable hardtop switch. (See 09-16-26 POWER RETRACTABLE HARDTOP SWITCH INSPECTION.) • Is the power retractable hardtop switch normal?	Yes	Go to the next step.
		No	Replace the power retractable hardtop switch. (See 09-16-26 POWER RETRACTABLE HARDTOP SWITCH REMOVAL/INSTALLATION.)
2	**INSPECT THE WIRING HARNESS BETWEEN POWER RETRACTABLE HARDTOP CONTROL MODULE AND POWER RETRACTABLE HARDTOP SWITCH** • Disconnect the power retractable hardtop switch connector. • Inspect the wiring harness between power retractable hardtop control module connector terminal 1H and power retractable hardtop switch connector terminal F for a short to ground. • Is the wiring harness normal?	Yes	Replace the power retractable hardtop control module. (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE REMOVAL/INSTALLATION.)
		No	Repair or replace the related wiring harness.

ON-BOARD DIAGNOSTIC [POWER RETRACTABLE HARDTOP]

PID/DATA MONITOR DISPLAY [POWER RETRACTABLE HARDTOP]

id0902j2031300

amxzzw0000149

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “DataLogger”.
     2. Select “Modules”.
     3. Select “RHT”.
   - When using the PDS (Pocket PC)
     1. Select “Module Tests”.
     2. Select “RHT”.
     3. Select “DataLogger”.
3. Select the applicable PID from the PID table.
4. Verify the PID data according to the directions on the screen.

Note

- The PID data screen function is used for monitoring the calculated value. Therefore, if the monitored value of the output parts is not within the specification, inspection of the monitored value of input parts corresponding to the applicable output part control is necessary. In addition, because the system does not display an output part malfunction as an abnormality in the monitored value, it is necessary to inspect the output part individually.

ON-BOARD DIAGNOSTIC [POWER RETRACTABLE HARDTOP]

PID/DATA MONITOR TABLE [POWER RETRACTABLE HARDTOP]

id0902j2846000

PID/data monitor table

PID name (definition)	Unit/Operation	Operation Condition (Reference)	Terminal
DTC_CNT (Number of continuous DTCs)	–	• DTCs detected: 1—255 • No DTCs detected: 0	–
VPWR (Module supply voltage)	V	Ignition switch is at ON: B+	1X
VSS (Vehicle speed)	KPH, MPH	• Vehicle stopped: 0 KPH {0 MPH} • Vehicle speed 25 km/h {16 mph}: 25 KPH {16 MPH}	–
RHT_OP (Power retractable hardtop limit switch (Open position))	On/Off	• When power retractable hardtop is fully opened (Power retractable hardtop open position switch is on): On • Others (Power retractable hardtop open position switch is off): Off	1T
RHT_CL (Power retractable hardtop limit switch (Close position))	On/Off	• When power retractable hardtop is fully closed (Power retractable hardtop close position switch is on): On • Others (Power retractable hardtop close position switch is off): Off	1R
DECK_OP (Deck panel limit switch (Open position))	On/Off	• When deck panel is fully opened (Deck panel open position switch is on): On • Others (Deck panel open position switch is off): Off	3F
DECK_CL (Deck panel limit switch (Close position))	On/Off	• When deck panel is fully closed (Deck panel close position switch is off): On • Others (Deck panel close position switch is on): Off	3O
SW_OP (Power retractable hardtop open switch)	On/Off	• When power retractable hardtop open switch is pressed: On • When power retractable hardtop open switch is released: Off	1H
SW_CL (Power retractable hardtop close switch)	On/Off	• When power retractable hardtop close switch is pressed: On • When power retractable hardtop close switch is released: Off	1H
SW_STRIKER (Top lock switch)	On/Off	• When top lock is locked: On • When top lock is unlocked: Off	1D
SW_TRUNK (Trunk lid opener switch)	On/Off	• Trunk lid is open: On • Trunk lid is closed: Off	1F
TR_OP_CTL (Trunk opener control)	On/Off	• Power retractable hardtop operating (Trunk lid open operation is disabled): On • Power retractable hardtop not operated (Trunk lid open operation is enabled): Off	–
Indicator (Power retractable hardtop indicator light)	On/Off	• When power retractable hardtop indicator light is illuminated: On • When power retractable hardtop indicator light is turned off: Off	2C

09-02F ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)] **09-02F–1**
Troubleshooting Procedure **09-02F–2**
DTC TABLE [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)] **09-02F–3**
DETERMINING MALFUNCTIONING PART (HS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)] **09-02F–4**
DTC Output Pattern and Malfunctioning Part **09-02F–5**
A. **09-02F–6**
B. **09-02F–7**
C **09-02F–8**
D **09-02F–9**
E. **09-02F–10**
F. **09-02F–11**
G **09-02F–12**
H **09-02F–13**
I **09-02F–14**
J **09-02F–15**
K. **09-02F–16**
DETERMINING MALFUNCTIONING PART (MS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)] **09-02F–16**
DTC Output Pattern and Malfunctioning Part **09-02F–17**
A **09-02F–17**
B **09-02F–18**
M-MDS AND VEHICLE NOT COMMUNICATING [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)] **09-02F–18**
Detection Condition. **09-02F–18**
Possible Causes **09-02F–18**
Wiring Diagram **09-02F–19**
Diagnostic Procedure **09-02F–19**
DTC U0073, U1900 [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)] **09-02F–21**
Diagnostic procedure **09-02F–22**
DTC 16:Er12 [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)] **09-02F–23**
Diagnostic procedure **09-02F–24**

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

id0902j3845700

- If the CAN system is considered to be the cause of the malfunction based on the repair order form and the malfunctioning symptom, follow the 09-02F-2 Troubleshooting Procedure.
- DTCs are also output due to a control module or sensor malfunction, or incorrect power supply. Verify the output DTCs and first inspect the DTCs not shown in 09-02F-3 DTC TABLE [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].
- If there is an open circuit in the communication lines, it is possible that signal error DTCs may be output in addition to communication error DTCs. Perform 09-02F-4 DETERMINING MALFUNCTIONING PART (HS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)], 09-02F-16 DETERMINING MALFUNCTIONING PART (MS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)] if the communication error and signal error DTCs are output simultaneously.

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

Troubleshooting Procedure

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*1 : 09-02F-3 DTC TABLE [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]
*2 : 09-02F-21 DTC U0073, U1900 [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]
*3 : 09-02F-23 DTC 16:Er12 [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]
*4 : 09-02F-4 DETERMINING MALFUNCTIONING PART (HS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)] / 09-02F-16 DETERMINING MALFUNCTIONING PART (MS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]
*5 : 09-02F-18 M-MDS AND VEHICLE NOT COMMUNICATING [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

DTC TABLE [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

id0902j3845800

HS-CAN

DTC Output Unit (M-MDS display)	DTC	Malfunction location	Reference for inspection procedure
PCM (PCM)	U0073*1	CAN system communication error	(See 09-02F-21 DTC U0073, U1900 [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].)
	U0101	Communication error to TCM	(See 09-02F-4 DETERMINING MALFUNCTIONING PART (HS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].)
	U0121	Communication error to ABS HU/CM (With ABS) Communication error to DSC HU/CM (With DSC)	
	U0155	Communication error to instrument cluster	
TCM*2 (TCM)	U0073*1	CAN system communication error	(See 09-02F-21 DTC U0073, U1900 [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].)
	U0100	Communication error to PCM	(See 09-02F-4 DETERMINING MALFUNCTIONING PART (HS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].)
	U0121	Communication error to ABS HU/CM (With ABS) Communication error to DSC HU/CM (With DSC)	
ABS HU/CM*3 (ABS)	U0073*1	CAN system communication error	(See 09-02F-21 DTC U0073, U1900 [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].)
	U1900*1	Communication error to other module	
	U2023	Abnormal message from PCM	(See 04-02A-20 DTC U2023 [ABS].)
DSC HU/CM*4 (ABS)	U0073*1	CAN system communication error	(See 09-02F-21 DTC U0073, U1900 [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].)
	U0100	Communication error to PCM	(See 09-02F-4 DETERMINING MALFUNCTIONING PART (HS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].)
	U0101	Communication error to TCM	
	U0155	Communication error to instrument cluster	
	U1900*1	Communication error to other module	(See 09-02F-21 DTC U0073, U1900 [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].)
	U2023	Abnormal message from PCM	(See 04-02B-34 DTC U2023 [DYNAMIC STABILITY CONTROL (DSC)].)
Power retractable hardtop control module (RHT)*5	U0073*1	CAN system communication error	(See 09-02F-21 DTC U0073, U1900 [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].)
	U0100	Communication error to PCM	(See 09-02F-4 DETERMINING MALFUNCTIONING PART (HS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].)
	U0101	Communication error to TCM	
	U2197	Vehicle speed signal communication error	
Instrument cluster (IC)	U0073*1	Module communication error	(See 09-02F-21 DTC U0073, U1900 [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].)
	U0100	Communication error to PCM	(See 09-02F-4 DETERMINING MALFUNCTIONING PART (HS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].)
	U0101	Communication error to TCM	
	U0121	Communication error to ABS HU/CM (With ABS) Communication error to DSC HU/CM (With DSC)	
	U0207	Communication error to power retractable hardtop control module	
	U0214	Communication error to keyless control module	
	U2023	Abnormal message from PCM	(See 09-02B-7 DTC U2023 [INSTRUMENT CLUSTER].)
	U2197	Vehicle speed signal communication error	(See 09-02F-4 DETERMINING MALFUNCTIONING PART (HS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].)

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

*1 : If only the target DTCs are displayed, perform the corresponding DTC inspection without determining the open circuit location.
*2 : AT
*3 : with ABS
*4 : with DSC
*5 : with power retractable hardtop

MS-CAN

DTC Output Unit	DTC	Malfunction location	Reference for inspection procedure
Audio unit	16:Er12*1	Communication error between audio unit and HF/TEL unit	(See 09-02F-23 DTC 16:Er12 [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].)
HF/TEL unit	26:Er81	CAN system communication error	(See 09-02F-16 DETERMINING MALFUNCTIONING PART (MS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].)

*1 : If only the target DTCs are displayed, perform the corresponding DTC inspection without determining the open circuit location.

DETERMINING MALFUNCTIONING PART (HS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

id0902j3846700

Caution

- **If the malfunctioning part is detected in the communication line, before disconnecting the related connector for inspection, press the connector in the connection direction to verify that there is no looseness or disconnection.**
- **When disconnecting the connector, verify that there is no damage, deformation, or corrosion of the connector terminals.**

1. Verify the CAN system-related module DTCs and the failed module on the M-MDS screen.
2. Refer to “09-02F-5 DTC Output Pattern and Malfunctioning Part” and find the area linked from the malfunctioning part.

Note

- A hyphen (-) in the DTC output pattern cell indicates that the DTC may be displayed depending on the malfunction detection conditions. If it is not displayed, the malfunctioning part can be determined by checking only the crosses (×).
- If any of the following DTCs is displayed alone, perform the applicable DTC inspection. (See 09-02F-3 DTC TABLE [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].)
  — ABS HU/CM: U2023
  — DSC HU/CM: U2023
  — Instrument cluster: U2023

3. Inspect the possible cause and inspection item of the applicable malfunctioning part.
4. Perform the DTC inspection after the repair procedure.
   - If any DTC is displayed, return to 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

DTC Output Pattern and Malfunctioning Part

Cross (×): Displayed
Hyphen (-): May or may not be displayed

M-MDS display		DTC output pattern and malfunctioning part										
DTC output module	DTC	09-02F-6 A	09-02F-7 B	09-02F-8 C	09-02F-9 D	09-02F-10 E	09-02F-11 F	09-02F-12 G	09-02F-13 H	09-02F-14 I	09-02F-15 J	09-02F-16 K
PCM (PCM)	U0101		×									
	U0121				×	×						
	U0155											×
TCM*1 (TCM)	U0100	×										
	U0121				×	×						
ABS*2 (ABS HU/CM)	U2023	-		-								
ABS*3 (DSC HU/CM)	U0100	×		×								
	U0101		×	×								
	U0155											×
	U2023	-		-								
RHT*4 (Power retractable hardtop control module)	U0100	×		×			×					
	U0101		×	×			×					
	U2197	-		-			-					
IC (Instrument cluster)	U0100	×		×			×		×		×	
	U0101		×	×			×		×		×	
	U0121				×	×	×		×		×	
	U0207							×	×		×	
	U0214									×	×	
	U2023	-		-			-		-		-	
	U2197	-		-			-		-		-	
M-MDS display module		"Fail" display pattern										
PCM		×		×			×		×		×	
TCM			×	×			×		×		×	
ABS					×	×	×		×		×	
RHT								×	×		×	
IC												×

*1 : AT
*2 : Vehicles with ABS
*3 : Vehicles with DSC
*4 : Vehicles with power retractable hardtop system

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

A

Possible cause

- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness between PCM and branch A
- PCM malfunction

System wiring diagram

amxzzw0000158

Inspection item

- PCM connector
- Wiring harness between PCM terminal 1AM and branch A
- Wiring harness between PCM terminal 1AI and branch A
- PCM

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

B

Possible cause

- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness between TCM and branch A
- TCM malfunction

System wiring diagram

amxzzw0000158

Inspection item

- TCM connector
- Wiring harness between TCM terminal 1G and branch A
- Wiring harness between TCM terminal 1C and branch A
- TCM

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

C

Possible cause

- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness between branch A and branch B

System wiring diagram

amxzzw0000158

Inspection item

- Wiring harness between branch A and branch B

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

D

Possible cause

- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness between ABS HU/CM and branch B
- ABS HU/CM malfunction

System wiring diagram

amxzzw0000158

Inspection item

- ABS HU/CM connector
- Wiring harness between ABS HU/CM terminal Z and branch B
- Wiring harness between ABS HU/CM terminal Y and branch B
- ABS HU/CM

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

E

Possible cause

- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness between DSC HU/CM and branch B
- DSC HU/CM malfunction

System wiring diagram

amxzzw0000158

Inspection item

- DSC HU/CM connector
- Wiring harness between DSC HU/CM terminal X and branch B
- Wiring harness between DSC HU/CM terminal W and branch B
- DSC HU/CM

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

F

Possible cause

- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring branch B and connector C-08
- Open circuit in wiring connector C-08 and branch C
- Connector C-08 malfunction

System wiring diagram

amxzzw0000159

Inspection item

- Connector C-08
- Wiring harness between branch B and connector C-08
- Wiring harness between connector C-08 and branch C

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

G

Possible cause

- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring power retractable hardtop control module and branch C
- Power retractable hardtop control module malfunction

System wiring diagram

amxzzw0000159

Inspection item

- Power retractable hardtop control module connector
- Wiring harness between power retractable hardtop control module terminal 1S and branch C
- Wiring harness between power retractable hardtop control module terminal 1U and branch C
- Power retractable hardtop control module

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

H

Possible cause

- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness between branch C and connector C-08
- Open circuit in wiring harness between connector C-08 and connector C-05
- Open circuit in wiring harness between connector C-05 and branch D
- Connector C-08 malfunction
- Connector C-05 malfunction

System wiring diagram

amxzzw0000159

Inspection item

- Connector C-08
- Connector C-05
- Wiring harness between branch C and connector C-08
- Wiring harness between connector C-08 and connector C-05
- Wiring harness between connector C-08 and branch D

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

I

Possible cause

- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness between keyless control module and branch D
- Keyless control module malfunction

System wiring diagram

amxzzw0000159

Inspection item

- Keyless control module connector
- Wiring harness between keyless control module terminal 4AA and branch D
- Wiring harness between keyless control module terminal 4Z and branch D
- Keyless control module

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

J

Possible cause

- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness between branch D and connector C-11
- Open circuit in wiring harness between connector C-11 and branch E
- Connector C-11 malfunction

System wiring diagram

amxzzw0000159

Inspection item

- Connector C-11
- Wiring harness between branch D and connector C-11
- Wiring harness between connector C-11 and branch E

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

K

Possible cause

- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness between instrument cluster and branch E
- Instrument cluster malfunction

System wiring diagram

amxzzw0000159

Inspection item

- Instrument cluster connector
- Wiring harness between instrument cluster terminal 1J and branch E
- Wiring harness between instrument cluster terminal 1L and branch E
- Instrument cluster

DETERMINING MALFUNCTIONING PART (MS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

id0902j3846800

Caution

- **If the malfunctioning part is detected in the communication line, before disconnecting the related connector for inspection, press the connector in the connection direction to verify that there is no looseness or disconnection.**
- **When disconnecting the connector, verify that there is no damage, deformation, or corrosion of the connector terminals.**

1. Verify DTCs of the modules related to the CAN system.
2. Apply the following items to the 09-02F-17 DTC Output Pattern and Malfunctioning Part, and then verify the reference to the malfunctioning location.
   - Communication error DTCs
   - Malfunctioning module
3. Inspect the possible cause and inspection item of the applicable malfunctioning part.
4. Perform the DTC inspection after the repair procedure.
   - If any DTC is displayed, return to 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

DTC Output Pattern and Malfunctioning Part

Cross (×): Displayed

DTC display		DTC output pattern and malfunctioning location	
DTC output module	DTC	09-02F-17 A	09-02F-18 B
HF/TEL unit	26:Er81		×

A
Possible cause
- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness between audio unit and connector C-14
- Open circuit in wiring harness between connector C-14 and branch A
- Open circuit in wiring harness between branch A and resistor
- Audio unit malfunction
- Resistor malfunction

System wiring diagram

amxzzw0000189

Inspection item
- Audio unit connector
- Resistor connector
- Connector C-14
- Wiring harness between audio unit terminal 1O and connector C-14
- Wiring harness between audio unit terminal 1Q and connector C-14
- Wiring harness between connector C-14 and branch A
- Wiring harness between resistor terminal A and branch A
- Wiring harness between resistor terminal B and branch A
- Audio unit
- Resistor

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

B
Possible cause
- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness between HF/TEL unit and branch A
- HF/TEL unit malfunction

System wiring diagram

amxzzw0000189

Inspection item
- HF/TEL unit connector
- Wiring harness between HF/TEL unit terminal Q and branch A
- Wiring harness between HF/TEL unit terminal R and branch A
- HF/TEL unit

M-MDS AND VEHICLE NOT COMMUNICATING [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

id0902j3037400

Caution
- **Perform the following on-board diagnosis according to 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)] troubleshooting procedure.**

Detection Condition
- Possible causes of communication errors between the M-MDS and vehicle include communication circuit interruption due to an open circuit in the CAN communication wiring harness, or poor contact of connector terminals, or a BUS OFF condition due to a short circuit in the CAN communication wiring harness.

Possible Causes
- Open circuit in wiring harness between PCM and DLC-2
- Improper insertion of PCM, connector C-08, connector C-05, or connector C-11 damage, deformation, corrosion, or disconnection of connector terminals
- Short circuit in wiring harness between CAN system-related module CAN_L and CAN_H lines
- Short circuit to power supply in wiring harness between CAN system-related module
- Short circuit to ground in wiring harness between CAN system-related module
- Short circuit to power supply in CAN system-related module internal CAN lines
- Short circuit to ground in CAN system-related module internal CAN lines
- Damage, deformation, corrosion, or disconnection of DLC-2
- PCM power supply is not normal
- PCM ground is not normal
- PCM internal resistance is not normal
- CAN system-related module malfunction

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

Wiring Diagram

amxzzw0000158

Diagnostic Procedure

Caution

- **When disconnecting the connector, verify that there is no looseness, damage, deformation, corrosion, or poor connection of the connector terminals.**

Step	Inspection		Action
1	**VERIFICATION BEFORE SERVICING** • Is there communication between the M-MDS and vehicle?	Yes	Go to the next step.
		No	Go back to FOREWORD [MULTIPLEX COMMUNICATION SYSTEM]. (See 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].)
2	**VERIFY THAT M-MDS AND DLC-2 ARE CONNECTED** • Verify the connection condition between the M-MDS and DLC-2. • Are the connector terminals normal without damage, deformation, corrosion, or disconnection?	Yes	Go to the next step.
		No	Correct the connection condition, then go to Step 12.
3	**VERIFY PCM POWER SUPPLY CONDITION** • Refer to the PCM terminal voltage table and inspect the terminal voltage and fuse condition. (See 01-40-9 PCM INSPECTION [L8, LF].) • Is the power supply condition normal?	Yes	Go to the next step.
		No	Repair or replace the fuse or wiring harness, then go to Step 12.
4	**VERIFY PCM BODY GROUND CONDITION** • Inspect the PCM body ground wiring harness and ground point. • Are the ground and ground point normal?	Yes	Go to the next step.
		No	Repair or replace the wiring harness, then go to Step 12.
5	**INSPECT PCM CONNECTOR TERMINAL** • Disconnect the negative battery cable. • Disconnect the PCM connector. • Are the PCM connector terminal normal without damage, deformation, corrosion, or disconnection?	Yes	Go to the next step.
		No	Repair the connector terminal if necessary, then go to Step 12.

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

Step	Inspection		Action
6	**INSPECT PCM** • Measure the resistance between the following PCM connector terminals: — Between terminal 1AM and terminal 1AI (part side) • Is the resistance 118-130 ohms?	Yes	Go to the next step.
		No	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
7	**VERIFY THAT THERE IS NO OPEN CIRCUIT IN CAN COMMUNICATION WIRING HARNESS** **Caution** • **When inspecting the DLC-2, touch it with a paper clip or similar thin pin without directly inserting a tester into the terminals.** • Verify the continuity between the following terminals: — Between DLC-2 terminal F and PCM terminal 1AM — Between DLC-2 terminal E and PCM terminal 1AI • Is there continuity?	Yes	Go to the next step.
		No	There is an open circuit in the CAN communication wiring harness. Repair or replace it, then go to Step 12.
8	**VERIFY THAT THERE IS NO SHORT CIRCUIT IN CAN COMMUNICATION WIRING HARNESS** **Caution** • **When inspecting the DLC-2, touch it with a paper clip or similar thin pin without directly inserting a tester into the terminals.** • Measure the resistance between the terminals. — Between DLC-2 terminal F and DLC-2 terminal E • Is the resistance 60 ohms or less?	Yes	There is an open circuit in the CAN communication wiring harness. Repair or replace it, then go to Step 12.
		No	Go to the next step.
9	**VERIFY NO SHORT CIRCUIT TO GROUND IN CAN COMMUNICATION WIRING HARNESS** **Caution** • **When inspecting the DLC-2, touch it with a paper clip or similar thin pin without directly inserting a tester into the terminals.** • Verify the continuity between the following terminals: — Between DLC-2 terminal F and ground — Between DLC-2 terminal E and ground — Between PCM terminal 1AM and ground — Between PCM terminal 1AI and ground • Is there continuity?	Yes	There is a short circuit to ground in the CAN communication wiring harness. Repair or replace it, then go to Step 12.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

Step	Inspection		Action
10	**VERIFY NO SHORT CIRCUIT TO POWER SUPPLY SYSTEM IN CAN COMMUNICATION WIRING HARNESS** **Caution** • **When inspecting the DLC-2, touch it with a paper clip or similar thin pin without directly inserting a tester into the terminals.** • Verify the continuity between the following terminals: — Between DLC-2 terminal F and DLC-2 terminal A — Between DLC-2 terminal E and DLC-2 terminal A — Between PCM terminal 1AM and PCM terminal 1BA — Between PCM terminal 1AI and PCM terminal 1BA • Is there continuity?	Yes	There is a short circuit to the power supply system in the CAN communication wiring harness. Repair or replace it, then go to Step 12.
		No	Go to the next step.
11	**INSPECT CAN-RELATED MODULES OTHER THAN PCM** • Remove only one of the CAN-related modules other than those related to the PCM. • Connect the negative battery cable. • Connect the M-MDS to the DLC-2. • Does the M-MDS recognize the vehicle?	Yes	Replace the removed module.
		No	Inspect all of the CAN-related modules other than those related to the PCM using the same procedure. After inspecting all of the modules, go to the next step.
12	**PERFORM VEHICLE IDENTIFICATION** • Connect the M-MDS to the DLC-2. • Does the M-MDS recognize the vehicle?	Yes	DTC troubleshooting completed.
		No	Replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)

DTC U0073, U1900 [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

id0902j3847700

DTC	**U0073**	**Module communication error**
	U1900	**CAN system communication error**
DETECTION CONDITION		**Warning** • **Perform the following on-board diagnosis according to 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)] troubleshooting procedure.** • CAN system-related harness malfunction • CAN system-related module malfunction
POSSIBLE CAUSE		• Open or short circuit in wiring harness • Malfunction of connectors between PCM, TCM, ABS HU/CM, DSC HU/CM, power retractable hardtop control module, keyless control module, steering angle sensor and instrument cluster • PCM malfunction • TCM malfunction • ABS HU/CM malfunction • DSC HU/CM malfunction • Power retractable hardtop control module malfunction • Keyless control module malfunction • Steering angle sensor malfunction • Instrument cluster malfunction

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

DTC	U0073	Module communication error
	U1900	CAN system communication error

Diagnostic procedure

Caution

- **When disconnecting the connector, verify that there is no looseness, damage, deformation, corrosion, or poor connection of the connector terminals.**

Step	Inspection		Action
1	VERIFICATION BEFORE SERVICING • Are any DTCs, except the following, displayed? — U0073 — U1900	Yes	Determine the open circuit location referring to 09-02F-4 DETERMINING MALFUNCTIONING PART (HS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].
		No	Go to the next step.
2	INSPECTION OF CONTROL MODULE CONNECTOR OUTPUTTING DTCs • Inspect the terminal condition of the control module connector outputting DTCs and the mid-connector. • Are the connector terminals normal without damage, deformation, corrosion, or disconnection?	Yes	Go to the next step.
		No	Repair or replace the connector, then go to Step 9.
3	INSPECTION OF POWER SUPPLY OF CONTROL MODULE OUTPUTTING DTCs • Refer to the terminal voltage table of the control module outputting DTCs or use the PID/data monitoring function to inspect the terminal voltage and fuse condition. • Is the power supply voltage normal?	Yes	Go to the next step.
		No	Repair or replace the connector, then go to Step 9.
4	INSPECTION OF BODY GROUND CONDITION OF CONTROL MODULE OUTPUTTING DTCs • Inspect the body ground wires and ground point of the control module outputting DTCs. • Are the ground and ground point normal?	Yes	Go to the next step.
		No	Repair or replace the connector, then go to Step 9.

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

Step	Inspection		Action
5	CAN SYSTEM RELATED WIRING HARNESS INSPECTION • CAN system related wiring harness inspection: —Short to ground —Short to power supply —Short between twisted pair wiring harness —Open circuit • Is the wiring harness normal?	Yes	Go to the next step.
		No	Repair or replace the connector, then go to Step 9.
6	INSPECT PCM • Disconnect the PCM connector. • Measure the resistance between the following PCM connector terminals: —Between terminal 1AM and terminal 1AI (part side) • Is the resistance 118-130 ohms?	Yes	Go to the next step.
		No	Replace the PCM, then go to Step 9. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
7	INSPECT INSTRUMENT CLUSTER • Disconnect the instrument cluster connector. • Measure the resistance between the following instrument cluster connector terminals: — Between terminal 1J and terminal 1L (part side) • Is the resistance 118-130 ohms?	Yes	Go to the next step.
		No	Replace the instrument cluster, then go to Step 9. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)
8	CAN RELATED MODULE VERIFICATION • Remove only one of the CAN-related modules. • Clear DTCs using the M-MDS. • Inspect the DTCs of all modules using the M-MDS. • Are DTCs U0073, U1900 displayed?	Yes	Reinstall the removed module, remove another module and perform the same inspection. Inspect all of the CAN-related modules using the same procedure. After inspecting all of the modules, go to the next step.
		No	Replace the removed module.
9	AFTER REPAIR VERIFICATION • Connect all of the modules. • Clear DTCs using the M-MDS. • Inspect the DTCs using the M-MDS. • Are DTCs displayed?	Yes	Perform the CAN system on-board diagnosis again according to the troubleshooting procedure (See 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].)
		No	DTC troubleshooting completed.

DTC 16:Er12 [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

id0902j3847800

DTC	16Er:12	CAN system communication error
DETECTION CONDITION		**Warning** • **Perform the following on-board diagnosis according to 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)] troubleshooting procedure.** • CAN system-related harness malfunction • CAN system-related module malfunction
POSSIBLE CAUSE		• Open or short circuit in wiring harness • Malfunction of connectors between audio unit, HF/TEL unit, and resistor • Audio unit malfunction • HF/TEL unit malfunction • Resistor malfunction

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)]

Diagnostic procedure

Caution

- **When disconnecting the connector, verify that there is no looseness, damage, deformation, corrosion, or poor connection of the connector terminals.**

Step	Inspection		Action
1	VERIFICATION BEFORE SERVICING • Are any DTCs, except the following, displayed? — 16:Er12	Yes	Determine the open circuit location referring to 09-02F-16 DETERMINING MALFUNCTIONING PART (MS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].
		No	Go to the next step.
2	INSPECTION OF CONTROL MODULE CONNECTOR OUTPUTTING DTCs • Inspect the terminal condition of the control module connector outputting DTCs and the mid-connector. • Are the connector terminals normal without damage, deformation, corrosion, or disconnection?	Yes	Go to the next step.
		No	Repair or replace the connector, then go to Step 9.
3	INSPECTION OF POWER SUPPLY OF CONTROL MODULE OUTPUTTING DTCs • Refer to the terminal voltage table of the control module outputting DTCs to inspect the terminal voltage and fuse condition. • Is the power supply voltage normal?	Yes	Go to the next step.
		No	Repair or replace the connector, then go to Step 9.
4	INSPECTION OF BODY GROUND CONDITION OF CONTROL MODULE OUTPUTTING DTCs • Inspect the body ground wires and ground point of the control module outputting DTCs. • Are the ground and ground point normal?	Yes	Go to the next step.
		No	Repair or replace the connector, then go to Step 9.
5	CAN SYSTEM RELATED WIRING HARNESS INSPECTION • CAN system related wiring harness inspection: — Short to ground — Short to power supply — Short between twisted pair wiring harness — Open circuit • Is the wiring harness normal?	Yes	Go to the next step.
		No	Repair or replace the connector, then go to Step 9.
6	INSPECT AUDIO UNIT • Disconnect the audio unit connector. • Measure the resistance between the following audio unit connector terminals: — Between terminal 1O and terminal 1Q (part side) • Is the resistance 118-130 ohms?	Yes	Go to the next step.
		No	Replace the audio unit, then go to Step 9. (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.)
7	INSPECT RESISTOR • Disconnect the resistor connector. • Measure the resistance between the following resistor connector terminals: — Between terminal A and terminal B (part side) • Is the resistance 118-130 ohms?	Yes	Go to the next step.
		No	Replace the resistor, then go to Step 9.
8	CAN RELATED MODULE VERIFICATION • Remove only one of the CAN-related modules. • Clear DTCs. • Inspect the DTCs of all modules. • Are DTCs 16:Er12 displayed?	Yes	Reinstall the removed module, remove another module and perform the same inspection. Inspect all of the CAN-related modules using the same procedure. After inspecting all of the modules, go to the next step.
		No	Replace the removed module.
9	AFTER REPAIR VERIFICATION • Connect all of the modules. • Clear DTCs. • Inspect the DTCs. • Are DTCs displayed?	Yes	Perform the CAN system on-board diagnosis again according to the troubleshooting procedure (See 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].)
		No	DTC troubleshooting completed.

09-02G ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)] **09-02G–1**
Troubleshooting Procedure **09-02G–2**
DTC TABLE [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)] **09-02G–3**
DETERMINING MALFUNCTIONING PART (HS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)] **09-02G–4**
DTC Output Pattern and Malfunctioning Part **09-02G–5**
A **09-02G–6**
B **09-02G–7**
C **09-02G–8**
D **09-02G–9**
E **09-02G–10**
F **09-02G–11**
G **09-02G–12**
H **09-02G–13**
I **09-02G–14**
J **09-02G–15**
DETERMINING MALFUNCTIONING PART (MS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)] **09-02G–15**
DTC Output Pattern and Malfunctioning Part **09-02G–16**
A **09-02G–16**
B **09-02G–17**
M-MDS AND VEHICLE NOT COMMUNICATING [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)] **09-02G–17**
Detection Condition **09-02G–17**
Possible Causes **09-02G–17**
Wiring Diagram **09-02G–18**
Diagnostic Procedure **09-02G–18**
DTC U0073, U1900 [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)] **09-02G–20**
Diagnostic procedure **09-02G–21**
DTC 16:Er12 [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)] **09-02G–22**
Diagnostic procedure **09-02G–23**

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

id0902j4845700

- If the CAN system is considered to be the cause of the malfunction based on the repair order form and the malfunctioning symptom, follow the 09-02G-2 Troubleshooting Procedure.
- DTCs are also output due to a control module or sensor malfunction, or incorrect power supply. Verify the output DTCs and first inspect the DTCs not shown in 09-02G-3 DTC TABLE [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].
- If there is an open circuit in the communication lines, it is possible that signal error DTCs may be output in addition to communication error DTCs. Perform 09-02G-4 DETERMINING MALFUNCTIONING PART (HS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)], 09-02G-15 DETERMINING MALFUNCTIONING PART (MS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)] if the communication error and signal error DTCs are output simultaneously.

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

Troubleshooting Procedure

amxzzw0000146

*1 : 09-02G-3 DTC TABLE [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]
*2 : 09-02G-20 DTC U0073, U1900 [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]
*3 : 09-02G-22 DTC 16:Er12 [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]
*4 : 09-02G-4 DETERMINING MALFUNCTIONING PART (HS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)] / 09-02G-15 DETERMINING MALFUNCTIONING PART (MS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]
*5 : 09-02G-17 M-MDS AND VEHICLE NOT COMMUNICATING [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

DTC TABLE [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

id0902j4845800

HS-CAN

DTC Output Unit (M-MDS display)	DTC	Malfunction location	Reference for inspection procedure
PCM (PCM)	U0073*1	CAN system communication error	(See 09-02G-20 DTC U0073, U1900 [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
	U0101	Communication error to TCM	(See 09-02G-4 DETERMINING MALFUNCTIONING PART (HS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
	U0121	Communication error to ABS HU/CM (With ABS) Communication error to DSC HU/CM (With DSC)	
	U0155	Communication error to instrument cluster	
ABS HU/CM*2 (ABS)	U0073*1	CAN system communication error	(See 09-02G-20 DTC U0073, U1900 [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
	U1900*1	Communication error to other module	
	U2023	Abnormal message from PCM	(See 04-02A-20 DTC U2023 [ABS].)
DSC HU/CM*3 (ABS)	U0073*1	CAN system communication error	(See 09-02G-20 DTC U0073, U1900 [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
	U0100:00	Communication error to PCM	(See 09-02G-4 DETERMINING MALFUNCTIONING PART (HS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
	U0101:00	Communication error to TCM	
	U0155:00	Communication error to instrument cluster	
	U01900*1	Communication error to other module	(See 09-02G-20 DTC U0073, U1900 [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
	U02023	Abnormal message from PCM	(See 04-02B-34 DTC U2023 [DYNAMIC STABILITY CONTROL (DSC)].)
Power retractable hardtop control module*4 (RHT)	U0073*1	CAN system communication error	(See 09-02G-20 DTC U0073, U1900 [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
	U0100	Communication error to PCM	(See 09-02G-4 DETERMINING MALFUNCTIONING PART (HS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
	U0101	Communication error to TCM	
	U2197	Vehicle speed signal communication error	
TCM*5 (TCM)	U0073*1	CAN system communication error	(See 09-02G-20 DTC U0073, U1900 [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
	U0100	Communication error to PCM	(See 09-02G-4 DETERMINING MALFUNCTIONING PART (HS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
	U0121	Communication error to ABS HU/CM (With ABS) Communication error to DSC HU/CM (With DSC)	
Instrument cluster (IC)	U0073*1	Module communication error	(See 09-02G-20 DTC U0073, U1900 [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
	U0100	Communication error to PCM	(See 09-02G-4 DETERMINING MALFUNCTIONING PART (HS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
	U0101	Communication error to TCM	
	U0121	Communication error to ABS HU/CM (With ABS) Communication error to DSC HU/CM (With DSC)	
	U0207	Communication error to power retractable hardtop control module	
	U0214	Communication error to keyless control module	
	U2023	Abnormal message from PCM	(See 09-02B-7 DTC U2023 [INSTRUMENT CLUSTER].)
	U2197	Vehicle speed signal communication error	(See 09-02G-4 DETERMINING MALFUNCTIONING PART (HS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

*1 : If only the target DTCs are displayed, perform the corresponding DTC inspection without determining the open circuit location.
*2 : with ABS
*3 : with DSC
*4 : with power retractable hardtop
*5 : AT

MS-CAN

DTC Output Unit	DTC	Malfunction location	Reference for inspection procedure
Audio unit	16:Er12*1	Communication error between audio unit and HF/TEL unit	(See 09-02G-22 DTC 16:Er12 [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
HF/TEL unit	26:Er81	CAN system communication error	(See 09-02G-15 DETERMINING MALFUNCTIONING PART (MS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)

*1 : If only the target DTCs are displayed, perform the corresponding DTC inspection without determining the open circuit location.

DETERMINING MALFUNCTIONING PART (HS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

id0902j4846700

Caution

- **If the malfunctioning part is detected in the communication line, before disconnecting the related connector for inspection, press the connector in the connection direction to verify that there is no looseness or disconnection.**
- **When disconnecting the connector, verify that there is no damage, deformation, or corrosion of the connector terminals.**

1. Verify the CAN system-related module DTCs and the failed module on the M-MDS screen.
2. Refer to "09-02G-5 DTC Output Pattern and Malfunctioning Part" and find the area linked from the malfunctioning part.

Note

- A hyphen (-) in the DTC output pattern cell indicates that the DTC may be displayed depending on the malfunction detection conditions. If it is not displayed, the malfunctioning part can be determined by checking only the crosses (×).
- If any of the following DTCs is displayed alone, perform the applicable DTC inspection. (See 09-02G-3 DTC TABLE [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
  — ABS HU/CM: U2023
  — DSC HU/CM: U2023
  — Instrument cluster: U2023

3. Inspect the possible cause and inspection item of the applicable malfunctioning part.
4. Perform the DTC inspection after the repair procedure.
   - If any DTC is displayed, return to 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

DTC Output Pattern and Malfunctioning Part

Cross (×): Displayed
Hyphen (-): May or may not be displayed

M-MDS display		DTC output pattern and malfunctioning part									
DTC output module	DTC	09-02G-6 A	09-02G-7 B	09-02G-8 C	09-02G-9 D	09-02G-10 E	09-02G-11 F	09-02G-12 G	09-02G-13 H	09-02G-14 I	09-02G-15 J
PCM (PCM)	U0101							×			
	U0121		×	×							
	U0155										×
ABS*1 (ABS HU/CM)	U2023	-									
ABS*2 (DSC HU/CM)	U0100	×									
	U0101							×			
	U0155										×
	U2023	-									
RHT*3 (Power retractable hardtop)	U0100	×			×						
	U0101							×			
	U2197	-			-						
TCM*4 (TCM)	U0100	×			×		×				
	U0121		×	×	×		×				
IC (Instrument cluster)	U0100	×			×		×			×	
	U0101							×		×	
	U0121		×	×	×		×			×	
	U0207					×	×			×	
	U0241								×	×	
	U2023	-			-		-			-	
	U2197	-			-		-			-	
M-MDS display module		"Fail" display pattern									
PCM		×			×		×			×	
ABS			×	×	×		×			×	
RHT						×	×			×	
TCM								×		×	
IC											×

*1 : Vehicles with ABS
*2 : Vehicles with DSC
*3 : Vehicles with power retractable hardtop system
*4 : AT

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

A

Possible cause

- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness between PCM and branch A
- PCM malfunction

System wiring diagram

amxzzw0000095

Inspection item

- PCM connector
- Wiring harness between PCM terminal 1AM and branch A
- Wiring harness between PCM terminal 1AI and branch A
- PCM

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

B

Possible cause

- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness between ABS HU/CM and branch A
- ABS HU/CM malfunction

System wiring diagram

amxzzw0000095

Inspection item

- ABS HU/CM connector
- Wiring harness between ABS HU/CM terminal Z and branch A
- Wiring harness between ABS HU/CM terminal Y and branch A
- ABS HU/CM

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

C

Possible cause

- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness between DSC HU/CM and branch A
- DSC HU/CM malfunction

System wiring diagram

amxzzw0000095

Inspection item

- DSC HU/CM connector
- Wiring harness between DSC HU/CM terminal X and branch A
- Wiring harness between DSC HU/CM terminal W and branch A
- DSC HU/CM

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

D

Possible cause

- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness between branch A and connector C-08
- Open circuit in wiring harness between connector C-08 and branch B
- Connector C-08 malfunction

System wiring diagram

amxzzw0000095

Inspection item

- Connector C-08
- Wiring harness between branch A and connector C-08
- Wiring harness between connector C-08 and branch B

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

E

Possible cause

- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness between power retractable hardtop control module and branch B
- Power retractable hardtop control module malfunction

System wiring diagram

amxzzw0000095

Inspection item

- Power retractable hardtop control module connector
- Wiring harness between power retractable hardtop control module terminal 1S and branch B
- Wiring harness between power retractable hardtop control module terminal 1U and branch B
- Power retractable hardtop control module

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

F

Possible cause

- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness branch B and connector C-08
- Open circuit in wiring harness connector C-08 and connector C-05
- Open circuit in wiring harness connector C-05 and branch C
- Connector C-08 malfunction
- Connector C-05 malfunction

System wiring diagram

amxzzw0000095

Inspection item

- Connector C-08
- Connector C-05
- Wiring harness between branch B and connector C-08
- Wiring harness between connector C-08 and connector C-05
- Wiring harness between connector C-05 and branch C

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

G

Possible cause

- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness between TCM and branch C
- TCM malfunction

System wiring diagram

amxzzw0000096

Inspection item

- TCM connector
- Wiring harness between TCM terminal 1G and branch C
- Wiring harness between TCM terminal 1C and branch C
- TCM

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

H

Possible cause

- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness between keyless control module and branch C
- Keyless control module malfunction

System wiring diagram

amxzzw0000096

Inspection item

- Keyless control module connector
- Wiring harness between keyless control module terminal 4AA and branch C
- Wiring harness between Keyless control module terminal 4Z and branch C
- Keyless control module

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

I

Possible cause

- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness between branch C and connector C-11
- Open circuit in wiring harness between connector C-11 and branch D
- Connector C-11 malfunction

System wiring diagram

amxzzw0000096

Inspection item

- Connector C-11
- Wiring harness between branch C and connector C-11
- Wiring harness between connector C-11 and branch D

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

J

Possible cause

- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness between instrument cluster and branch D
- Instrument cluster malfunction

System wiring diagram

amxzzw0000096

Inspection item

- Instrument cluster connector
- Wiring harness between instrument cluster terminal 1J and branch D
- Wiring harness between instrument cluster terminal 1L and branch D
- Instrument cluster

DETERMINING MALFUNCTIONING PART (MS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

id0902j4846800

Caution

- **If the malfunctioning part is detected in the communication line, before disconnecting the related connector for inspection, press the connector in the connection direction to verify that there is no looseness or disconnection.**
- **When disconnecting the connector, verify that there is no damage, deformation, or corrosion of the connector terminals.**

1. Verify DTCs of the modules related to the CAN system.
2. Apply the following items to the 09-02G-16 DTC Output Pattern and Malfunctioning Part, and then verify the reference to the malfunctioning location.
   - Communication error DTCs
   - Malfunctioning module
3. Inspect the possible cause and inspection item of the applicable malfunctioning part.
4. Perform the DTC inspection after the repair procedure.
   - If any DTC is displayed, return to 09-02F-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (L.H.D.)].

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

DTC Output Pattern and Malfunctioning Part

Cross (×): Displayed

DTC display		DTC output pattern and malfunctioning location	
DTC output module	DTC	09-02G-16 A	09-02G-17 B
HF/TEL unit	26:Er81		×

A
Possible cause
- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness between audio unit and connector C-14
- Open circuit in wiring harness between connector C-14 and branch A
- Open circuit in wiring harness between branch A and resistor
- Audio unit malfunction
- Resistor malfunction

System wiring diagram

amxzzw0000100

Inspection item
- Audio unit connector
- Resistor connector
- Connector C-14
- Wiring harness between audio unit terminal 1O and connector C-14
- Wiring harness between audio unit terminal 1Q and connector C-14
- Wiring harness between connector C-14 and branch A
- Wiring harness between resistor terminal A and branch A
- Wiring harness between resistor terminal B and branch A
- Audio unit
- Resistor

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

B
Possible cause
- Connector terminal disconnection, poor contact, damage, deformation, corrosion
- Open circuit in wiring harness between HF/TEL unit and branch A
- HF/TEL unit malfunction

System wiring diagram

amxzzw0000100

Inspection item
- HF/TEL unit connector
- Wiring harness between HF/TEL unit terminal Q and branch A
- Wiring harness between HF/TEL unit terminal R and branch A
- HF/TEL unit

M-MDS AND VEHICLE NOT COMMUNICATING [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

id0902j4037400

Caution
- **Perform the following on-board diagnosis according to 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)] troubleshooting procedure.**

Detection Condition
- Possible causes of communication errors between the M-MDS and vehicle include communication circuit interruption due to an open circuit in the CAN communication wiring harness, or poor contact of connector terminals, or a BUS OFF condition due to a short circuit in the CAN communication wiring harness.

Possible Causes
- Open circuit in wiring harness between PCM and DLC-2
- Improper insertion of PCM, connector C-08, connector C-05, or connector C-11 damage, deformation, corrosion, or disconnection of connector terminals
- Short circuit in wiring harness between CAN system-related module CAN_L and CAN_H lines
- Short circuit to power supply in wiring harness between CAN system-related module
- Short circuit to ground in wiring harness between CAN system-related module
- Short circuit to power supply in CAN system-related module internal CAN lines
- Short circuit to ground in CAN system-related module internal CAN lines
- Damage, deformation, corrosion, or disconnection of DLC-2
- PCM power supply is not normal
- PCM ground is not normal
- PCM internal resistance is not normal
- CAN system-related module malfunction

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

Wiring Diagram

amxzzw0000058

Diagnostic Procedure

Caution

- **When disconnecting the connector, verify that there is no looseness, damage, deformation, corrosion, or poor connection of the connector terminals.**

Step	Inspection		Action
1	**VERIFICATION BEFORE SERVICING** • Is there communication between the M-MDS and vehicle?	Yes	Go to the next step.
		No	Go back to FOREWORD [MULTIPLEX COMMUNICATION SYSTEM]. (See 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
2	**VERIFY THAT M-MDS AND DLC-2 ARE CONNECTED** • Verify the connection condition between the M-MDS and DLC-2. • Are the connector terminals normal without damage, deformation, corrosion, or disconnection?	Yes	Go to the next step.
		No	Correct the connection condition, then go to Step 12.
3	**VERIFY PCM POWER SUPPLY CONDITION** • Refer to the PCM terminal voltage table and inspect the terminal voltage and fuse condition. (See 01-40-9 PCM INSPECTION [L8, LF].) • Is the power supply condition normal?	Yes	Go to the next step.
		No	Repair or replace the fuse or wiring harness, then go to Step 12.
4	**VERIFY PCM BODY GROUND CONDITION** • Inspect the PCM body ground wiring harness and ground point. • Are the ground and ground point normal?	Yes	Go to the next step.
		No	Repair or replace the wiring harness, then go to Step 12.
5	**INSPECT PCM CONNECTOR TERMINAL** • Disconnect the negative battery cable. • Disconnect the PCM connector. • Are the PCM connector terminal normal without damage, deformation, corrosion, or disconnection?	Yes	Go to the next step.
		No	Repair the connector terminal if necessary, then go to Step 12.

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

Step	Inspection		Action
6	**INSPECT PCM** • Measure the resistance between the following PCM connector terminals: — Between terminal 1AM and terminal 1AI (part side) • Is the resistance 118-130 ohms?	Yes	Go to the next step.
		No	Replace the PCM, then go to the next step. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
7	**VERIFY THAT THERE IS NO OPEN CIRCUIT IN CAN COMMUNICATION WIRING HARNESS** **Caution** • **When inspecting the DLC-2, touch it with a paper clip or similar thin pin without directly inserting a tester into the terminals.** • Verify the continuity between the following terminals: — Between DLC-2 terminal F and PCM terminal 1AM — Between DLC-2 terminal E and PCM terminal 1AI • Is there continuity?	Yes	Go to the next step.
		No	There is an open circuit in the CAN communication wiring harness. Repair or replace it, then go to Step 12.
8	**VERIFY THAT THERE IS NO SHORT CIRCUIT IN CAN COMMUNICATION WIRING HARNESS** **Caution** • **When inspecting the DLC-2, touch it with a paper clip or similar thin pin without directly inserting a tester into the terminals.** • Measure the resistance between the terminals. — Between DLC-2 terminal F and DLC-2 terminal E • Is the resistance 60 ohms or less?	Yes	There is an open circuit in the CAN communication wiring harness. Repair or replace it, then go to Step 12.
		No	Go to the next step.
9	**VERIFY NO SHORT CIRCUIT TO GROUND IN CAN COMMUNICATION WIRING HARNESS** **Caution** • **When inspecting the DLC-2, touch it with a paper clip or similar thin pin without directly inserting a tester into the terminals.** • Verify the continuity between the following terminals: — Between DLC-2 terminal F and ground — Between DLC-2 terminal E and ground — Between PCM terminal 1AM and ground — Between PCM terminal 1AI and ground • Is there continuity?	Yes	There is a short circuit to ground in the CAN communication wiring harness. Repair or replace it, then go to Step 12.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

Step	Inspection		Action
10	**VERIFY NO SHORT CIRCUIT TO POWER SUPPLY SYSTEM IN CAN COMMUNICATION WIRING HARNESS** **Caution** • **When inspecting the DLC-2, touch it with a paper clip or similar thin pin without directly inserting a tester into the terminals.** • Verify the continuity between the following terminals: — Between DLC-2 terminal F and DLC-2 terminal A — Between DLC-2 terminal E and DLC-2 terminal A — Between PCM terminal 1AM and PCM terminal 1BA — Between PCM terminal 1AI and PCM terminal 1BA • Is there continuity?	Yes	There is a short circuit to the power supply system in the CAN communication wiring harness. Repair or replace it, then go to Step 12.
		No	Go to the next step.
11	**INSPECT CAN-RELATED MODULES OTHER THAN PCM** • Remove only one of the CAN-related modules other than those related to the PCM. • Connect the negative battery cable. • Connect the M-MDS to the DLC-2. • Does the M-MDS recognize the vehicle?	Yes	Replace the removed module.
		No	Inspect all of the CAN-related modules other than those related to the PCM using the same procedure. After inspecting all of the modules, go to the next step.
12	**PERFORM VEHICLE IDENTIFICATION** • Connect the M-MDS to the DLC-2. • Does the M-MDS recognize the vehicle?	Yes	DTC troubleshooting completed.
		No	Replace the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)

DTC U0073, U1900 [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

id0902j4847700

DTC	**U0073**	**Module communication error**
	U1900	**CAN system communication error**
DETECTION CONDITION		**Warning** • **Perform the following on-board diagnosis according to 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)] troubleshooting procedure.** • CAN system-related harness malfunction • CAN system-related module malfunction
POSSIBLE CAUSE		• Open or short circuit in wiring harness • Malfunction of connectors between PCM, ABS HU/CM, DSC HU/CM, power retractable hardtop control module, TCM, keyless control module, steering angle sensor and instrument cluster • PCM malfunction • ABS HU/CM malfunction • DSC HU/CM malfunction • Power retractable hardtop control module malfunction • TCM malfunction • Keyless control module malfunction • Steering angle sensor malfunction • Instrument cluster malfunction

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

DTC	U0073	Module communication error
	U1900	CAN system communication error

Diagnostic procedure

Caution

- **When disconnecting the connector, verify that there is no looseness, damage, deformation, corrosion, or poor connection of the connector terminals.**

Step	Inspection		Action
1	VERIFICATION BEFORE SERVICING • Are any DTCs, except the following, displayed? — U0073 — U1900	Yes	Determine the open circuit location referring to 09-02G-4 DETERMINING MALFUNCTIONING PART (HS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].
		No	Go to the next step.
2	INSPECTION OF CONTROL MODULE CONNECTOR OUTPUTTING DTCs • Inspect the terminal condition of the control module connector outputting DTCs and the mid-connector. • Are the connector terminals normal without damage, deformation, corrosion, or disconnection?	Yes	Go to the next step.
		No	Repair or replace the connector, then go to Step 9.
3	INSPECTION OF POWER SUPPLY OF CONTROL MODULE OUTPUTTING DTCs • Refer to the terminal voltage table of the control module outputting DTCs or use the PID/data monitoring function to inspect the terminal voltage and fuse condition. • Is the power supply voltage normal?	Yes	Go to the next step.
		No	Repair or replace the connector, then go to Step 9.
4	INSPECTION OF BODY GROUND CONDITION OF CONTROL MODULE OUTPUTTING DTCs • Inspect the body ground wires and ground point of the control module outputting DTCs. • Are the ground and ground point normal?	Yes	Go to the next step.
		No	Repair or replace the connector, then go to Step 9.

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

Step	Inspection		Action
5	CAN SYSTEM RELATED WIRING HARNESS INSPECTION • CAN system related wiring harness inspection: — Short to ground — Short to power supply — Short between twisted pair wiring harness — Open circuit • Is the wiring harness normal?	Yes	Go to the next step.
		No	Repair or replace the connector, then go to Step 9.
6	INSPECT PCM • Disconnect the PCM connector. • Measure the resistance between the following PCM connector terminals: — Between terminal 1AM and terminal 1AI (part side) • Is the resistance 118-130 ohms?	Yes	Go to the next step.
		No	Replace the PCM, then go to Step 9. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)
7	INSPECT INSTRUMENT CLUSTER • Disconnect the instrument cluster connector. • Measure the resistance between the following instrument cluster connector terminals: — Between terminal 1J and terminal 1L (part side) • Is the resistance 118-130 ohms?	Yes	Go to the next step.
		No	Replace the instrument cluster, then go to Step 9. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
8	CAN RELATED MODULE VERIFICATION • Remove only one of the CAN-related modules. • Clear DTCs using the M-MDS. • Inspect the DTCs of all modules using the M-MDS. • Are DTCs U0073, U1900 displayed?	Yes	Reinstall the removed module, remove another module and perform the same inspection. Inspect all of the CAN-related modules using the same procedure. After inspecting all of the modules, go to the next step.
		No	Replace the removed module.
9	AFTER REPAIR VERIFICATION • Connect all of the modules. • Clear DTCs using the M-MDS. • Inspect the DTCs using the M-MDS. • Are DTCs displayed?	Yes	Perform the CAN system on-board diagnosis again according to the troubleshooting procedure (See 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
		No	DTC troubleshooting completed.

DTC 16:Er12 [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

id0902j4847800

DTC	16Er:12	CAN system communication error
DETECTION CONDITION		**Warning** • **Perform the following on-board diagnosis according to 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)] troubleshooting procedure.** • CAN system-related harness malfunction • CAN system-related module malfunction
POSSIBLE CAUSE		• Open or short circuit in wiring harness • Malfunction of connectors between audio unit, HF/TEL unit, and resistor • Audio unit malfunction • HF/TEL unit malfunction • Resistor malfunction

ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)]

Diagnostic procedure

Caution

- **When disconnecting the connector, verify that there is no looseness, damage, deformation, corrosion, or poor connection of the connector terminals.**

Step	Inspection		Action
1	VERIFICATION BEFORE SERVICING • Are any DTCs, except the following, displayed? — 16:Er12	Yes	Determine the open circuit location referring to 09-02G-15 DETERMINING MALFUNCTIONING PART (MS-CAN) [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].
		No	Go to the next step.
2	INSPECTION OF CONTROL MODULE CONNECTOR OUTPUTTING DTCs • Inspect the terminal condition of the control module connector outputting DTCs and the mid-connector. • Are the connector terminals normal without damage, deformation, corrosion, or disconnection?	Yes	Go to the next step.
		No	Repair or replace the connector, then go to Step 9.
3	INSPECTION OF POWER SUPPLY OF CONTROL MODULE OUTPUTTING DTCs • Refer to the terminal voltage table of the control module outputting DTCs to inspect the terminal voltage and fuse condition. • Is the power supply voltage normal?	Yes	Go to the next step.
		No	Repair or replace the connector, then go to Step 9.
4	INSPECTION OF BODY GROUND CONDITION OF CONTROL MODULE OUTPUTTING DTCs • Inspect the body ground wires and ground point of the control module outputting DTCs. • Are the ground and ground point normal?	Yes	Go to the next step.
		No	Repair or replace the connector, then go to Step 9.
5	CAN SYSTEM RELATED WIRING HARNESS INSPECTION • CAN system related wiring harness inspection: — Short to ground — Short to power supply — Short between twisted pair wiring harness — Open circuit • Is the wiring harness normal?	Yes	Go to the next step.
		No	Repair or replace the connector, then go to Step 9.
6	INSPECT AUDIO UNIT • Disconnect the audio unit connector. • Measure the resistance between the following audio unit connector terminals: — Between terminal 1O and terminal 1Q (part side) • Is the resistance 118-130 ohms?	Yes	Go to the next step.
		No	Replace the audio unit, then go to Step 9. (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.)
7	INSPECT RESISTOR • Disconnect the resistor connector. • Measure the resistance between the following resistor connector terminals: — Between terminal A and terminal B (part side) • Is the resistance 118-130 ohms?	Yes	Go to the next step.
		No	Replace the resistor, then go to Step 9.
8	CAN RELATED MODULE VERIFICATION • Remove only one of the CAN-related modules. • Clear DTCs. • Inspect the DTCs of all modules. • Are DTCs 16:Er12 displayed?	Yes	Reinstall the removed module, remove another module and perform the same inspection. Inspect all of the CAN-related modules using the same procedure. After inspecting all of the modules, go to the next step.
		No	Replace the removed module.
9	AFTER REPAIR VERIFICATION • Connect all of the modules. • Clear DTCs. • Inspect the DTCs. • Are DTCs displayed?	Yes	Perform the CAN system on-board diagnosis again according to the troubleshooting procedure (See 09-02G-1 FOREWORD [MULTIPLEX COMMUNICATION SYSTEM (R.H.D.)].)
		No	DTC troubleshooting completed.

09-03A SYMPTOM TROUBLESHOOTING [POWER WINDOW SYSTEM]

POWER WINDOW SYSTEM WIRING DIAGRAM [POWER WINDOW SYSTEM] 09-03A–2
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SYMPTOM TROUBLESHOOTING CHART [POWER WINDOW SYSTEM] 09-03A–3
POWER WINDOW SYSTEM TROUBLESHOOTING QUESTIONNAIRE [POWER WINDOW SYSTEM] 09-03A–4
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No.2 THE DRIVER'S SIDE POWER WINDOW IS INOPERATIVE [POWER WINDOW SYSTEM] 09-03A–7
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No.5 ABNORMAL NOISE WHILE THE DOOR GLASS IS OPENIGN OR CLOSING [POWER WINDOW SYSTEM] 09-03A–10

SYMPTOM TROUBLESHOOTING [POWER WINDOW SYSTEM]

POWER WINDOW SYSTEM WIRING DIAGRAM [POWER WINDOW SYSTEM]

id0903a0805200

amxzzw0000219

SYMPTOM TROUBLESHOOTING [POWER WINDOW SYSTEM]

FOREWORD [POWER WINDOW SYSTEM]

id0903a0822600

Troubleshooting Procedure

amxzzw0000078

- Slightly shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions.

SYMPTOM TROUBLESHOOTING CHART [POWER WINDOW SYSTEM]

id0903a0812700

No.	Malfunction symptom
1	09-03A-5 No.1 THE AUTO OPEN FUNCTION ON THE DRIVER'S AND PASSENGER'S SIDE POWER WINDOW IS INOPERATIVE [POWER WINDOW SYSTEM]
2	09-03A-7 No.2 THE DRIVER'S SIDE POWER WINDOW IS INOPERATIVE [POWER WINDOW SYSTEM]
3	09-03A-8 No.3 THE PASSENGER'S SIDE POWER WINDOW IS INOPERATIVE [POWER WINDOW SYSTEM]
4	09-03A-9 No.4 ALL POWER WINDOWS ARE INOPERATIVE [POWER WINDOW SYSTEM]
5	09-03A-10 No.5 ABNORMAL NOISE WHILE THE DOOR GLASS IS OPENIGN OR CLOSING [POWER WINDOW SYSTEM]

SYMPTOM TROUBLESHOOTING [POWER WINDOW SYSTEM]

POWER WINDOW SYSTEM TROUBLESHOOTING QUESTIONNAIRE [POWER WINDOW SYSTEM]

id0903a0835500

Date :

When did the malfunction first occur ?			
Whether conditions	☐Fair weather ☐Cloudy ☐Rain ☐Snow ☐Other ( )	Outside temperature	Approx. F°
Driving conditions	☐ Driving ☐Stopped (Engine is : ☐Running ☐ Stopped)		
Duplicate symptom	☐YES ☐NO	Frequency	☐ Always ☐ Sometimes (times/month)
Road conditions	☐City ☐Outer city ☐Freeway ☐Other ( ) / ☐Paved ☐ Dirt road		

*Follow the appropriate diagnostic procedures shown below or perform the basic troubleshooting flow.

☐ (No.1) The auto open/close function on the driver's side and passenger's side power window

☐ (No.2) The driver's side power window is inoperative.

☐ (No.3) The passenger's side power window is inoperative.

☐ (No.4) All power windows are inoperative.

☐ (No.5) Abnormal noise while the door glass is opening or closing.

☐Other (Describe the symptom below if the symptom does not appear in the above list.)

Please describe the conditions when the malfunction occurs.
(Example) : When the outer mirrors are operated

Please describe the conditions under which the system returns to normal operation after malfunctioning.
(Example) : The ignition switch is turned to the ON position after inserting the ignition key into the key cylinder

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SYMPTOM TROUBLESHOOTING [POWER WINDOW SYSTEM]

POWER WINDOW SYSTEM PRELIMINARY INSPECTION [POWER WINDOW SYSTEM]

id0903a0831700

Manual Open/close Function Inspection

STEP	INSPECTION		ACTION
1	• Turn the ignition switch to the ON position. • Operate the driver's side power window using the manual open/close function on the power window main switch. • Does the driver's side power window operate properly?	Yes	Go to the next step.
		No	• Inspect the following items: — Power window main switch power supply fuse — Power window main switch ground wiring harness — Power window main switch power supply wiring harness — Wiring harness between power window main switch and driver-side power window motor — Power window main switch (driver's-side power window control is malfunctioning) — Driver-side power window motor • Repair or replace the malfunctioning part, then go to the next step.
2	• Operate the passenger's side power window using the power window main switch. • Does the passenger's side power window operate properly?	Yes	• Manual open/close function is normal. • Perform the auto open/close function inspection.
		No	• Inspect the following items: — Wiring harness between power window main switch and passenger's-side power window motor — Power window main switch (passenger's-side power window control is malfunctioning) — Passenger-side power window motor • Repair or replace the malfunctioning part, then go to the next step.

Auto Open Function Inspection

STEP	INSPECTION		ACTION
1	• Turn the ignition switch to the ON position. • Operate the power window using the auto open function on the power window main switch. • Do each the driver's power window operate properly?	Yes	Go to the next step.
		No	• Go to 09-03A-5 No.1 THE AUTO OPEN FUNCTION ON THE DRIVER'S AND PASSENGER'S SIDE POWER WINDOW IS INOPERATIVE [POWER WINDOW SYSTEM].)
2	• Operate the power window main switch to the close position while the power window is opening. • Does the power window operation stop?	Yes	• Auto open/close function is normal. • Perform the IG-OFF timer function inspection.
		No	• Replace the power window main switch (power window control unit is malfunctioning.)

No.1 THE AUTO OPEN FUNCTION ON THE DRIVER'S AND PASSENGER'S SIDE POWER WINDOW IS INOPERATIVE [POWER WINDOW SYSTEM]

id0903a0870000

1	The auto open function on the driver's side and passenger's side power window is inoperative
POSSIBLE CAUSE	• No power supply to power window main switch • Power window main switch malfunction (power window control unit malfunction, auto switch malfunction) • Power window motor malfunction • Malfunction in wiring harness between power window motor and power window main switch

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Turn the ignition switch to the ON position. • Operate driver and passenger side power window using automatic open function on the power window main switch. • Do each side power window open normally?	Yes	The power window system is normal.
		No	Automatic open function does not operate both sides: Go to the next step. Automatic open function does not operate driver side or passenger side: Go to Step 4.
2	• Turn the ignition switch to ON position. • Measure the voltage between power window main switch following terminal and ground. — Terminal B (Auto on both driver and passenger side) • Is the voltage **B+**?	Yes	Go to the next step.
		No	Repair or replace for open circuit.

SYMPTOM TROUBLESHOOTING [POWER WINDOW SYSTEM]

STEP	INSPECTION		ACTION
3	• Turn the ignition switch to LOCK position. • Disconnect the power window main switch connector. • Verify that the continuity between following power window main switch terminal and ground. —Terminal G (Auto on both driver and passenger side) • Is there continuity?	Yes	Inspect the power window main switch. (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.) (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.) Replace the power window main switch if necessary.
		No	Repair or replace for open circuit.
4	• Turn the ignition switch to ON position. • Operate suspected side power window using manual open function on the power window main switch. • Do suspected side power window open normally?	Yes	Replace the power window main switch. (Power window control unit malfunction.) (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.) (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.)
		No	Go to the next step.
5	• Turn the ignition switch to LOCK position. • Disconnect the power window main switch and suspected side power window motor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion etc.) • Is there any malfunction?	Yes	Go to the next step.
		No	Repair or replace malfunctioning part.
6	• :Inspect for open or short circuit in wiring harness between suspected side power window motor and power window main switch. **L.H.D. model driver's side (Auto on both driver and passenger side):** —Terminal I (main switch) - terminal G (motor) —Terminal J (main switch) - terminal A (motor) **L.H.D. model passenger's side (Auto on both driver and passenger side):** —Terminal D (main switch) - terminal G (motor) —Terminal F (main switch) - terminal A (motor) **R.H.D. model driver's side:** —Terminal D (main switch) - terminal G (motor) —Terminal F (main switch) - terminal A (motor) **R.H.D. model passenger's side:** —Terminal I (main switch) - terminal G (motor) —Terminal J (main switch) - terminal A (motor) • Is the open or short circuit detected?	Yes	Repair or replace for open or short circuit.
		No	Go to the next step.
7	• Inspect suspected side power window motor. (See 09-12-7 POWER WINDOW MOTOR INSPECTION.) • Is the power window motor normal?	Yes	Replace the power window main switch.Replace the power window main switch. (power window control unit malfunction, auto switch malfunction) (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.) (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.)
		No	Replace the power window motor. (See 09-12-6 POWER WINDOW REGULATOR REMOVAL/ INSTALLATION.)

SYMPTOM TROUBLESHOOTING [POWER WINDOW SYSTEM]

No.2 THE DRIVER'S SIDE POWER WINDOW IS INOPERATIVE [POWER WINDOW SYSTEM]

id0903a0831100

2	The driver's side power window is inoperative.
POSSIBLE CAUSE	• Power supply circuit or ground circuit malfunction — Burnt fuse (B+) — Open or short circuit in wiring harness between fuse (B+) and power window main switch — Open or short circuit in wiring harness between power window main switch and power window motor — Open or short circuit in wiring harness between power window main switch and ground • Power window main switch malfunction • Power window motor malfunction • Power window regulator malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Turn the ignition switch to the ON position. • Does the LED on the power window main switch illuminate?	Yes	Go to Step 5.
		No	Go to the next step.
2	• Operate passenger's side power window using the power window main switch. • Does the power window operate properly?	Yes	Go to the next step.
		No	Inspect for an open or short circuit in the following wiring harnesses. Inspect the connector connections (damage/pulled-out pins, corrosion): • P.WIND 20 A fuse—Power window main switch terminal B (Auto on both driver and passenger side) • Power window main switch terminal G (Auto on both driver and passenger side)—ground. Repair or replace if necessary.
3	• Is the P.WIND 20 A fuse normal?	Yes	Replace the power window main switch. (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.) (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.)
		No	Inspect the following: • Short circuit in B+ power supply wiring harness • Short circuit in power window motor Repair or replace if necessary. Replace with the appropriate standard fuse. Then, go to the next step.
4	• Initialize the power window system. • Operate the power window system. • Do the power windows operate properly?	Yes	Troubleshooting is completed.
		No	Re-confirm the symptom and go to Step 1.
5	• Measure the voltage at the power window main switch. (power window motor output terminal) while operating the power window using the power window main switch. • Is the voltage B+? **L.H.D.model (Auto on both driver and passenger side):** open: terminal J/close: terminal I **R.H.D.model:** open: terminal F/close: terminal D	Yes	Go to the next step.
		No	Replace the power window main switch. (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.) (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.)
6	• Measure the voltage at the power window motor. (battery power supply terminal) while operating the power window using the power window main switch. • Is the voltage B+? (Open: terminal A/ close: terminal G)	Yes	Go to the next step.
		No	Inspect for an open or short circuit in the wiring harness between the power window main switch and the power window motor. Inspect the power window main switch and power window motor connector connections. (damage/pulled-out pins, corrosion) Repair or replace if necessary.

SYMPTOM TROUBLESHOOTING [POWER WINDOW SYSTEM]

STEP	INSPECTION		ACTION
7	• Operate the driver's side power window using the power window main switch. • Does the power window motor operate (rotate)? **Caution** • **If the power window motor temperature is high, the motor may not rotate due to the motor internal bimetal function. Leave it untouched for about 3 min to cool it down, then reinspect.**	Yes	Go to the next step.
		No	Replace the power window motor. (See 09-12-6 POWER WINDOW REGULATOR REMOVAL/ INSTALLATION.)
8	• Remove the door glass from the carrier plate. • Make sure that the door glass moves smoothly using your hand. • Does the door glass move smoothly?	Yes	Replace the power window regulator. (See 09-12-6 POWER WINDOW REGULATOR REMOVAL/ INSTALLATION.)
		No	Inspect for a bent regulator guide or other possible malfunction. If normal, replace the door glass run-channel.

No.3 THE PASSENGER'S SIDE POWER WINDOW IS INOPERATIVE [POWER WINDOW SYSTEM]

id0903a0870100

3	The passenger's side power window is inoperative
POSSIBLE CAUSE	• power supply circuit malfunction — Open or short circuit in wiring harness between power window main switch and passenger's side power window motor • Power window main switch malfunction • Passenger's side power window motor malfunction • Passenger's side power window regulator malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Turn the ignition switch to the ON position. • Operate the driver's side power window using the power window main switch. • Does the power window operate properly?	Yes	Go to the next step.
		No	Go to the symptom 09-03A-9 No.4 ALL POWER WINDOWS ARE INOPERATIVE [POWER WINDOW SYSTEM] troubleshooting procedure.
2	• Measure the voltage at the power window main switch. (power window motor output terminal) while operating the passenger's side power window using the power window main switch. • Is the voltage **B+**? **L.H.D. model (Auto on both driver and passenger side):** Open: terminal F/close: terminal D **R.H.D. model:** Open: terminal J/close terminal I	Yes	Go to the next step.
		No	Replace the power window main switch. (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.) (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.)
3	• Measure the voltage at the power window motor. (battery power supply terminal) while operating the passenger's side power window using the power window main switch. • Is the voltage **B+**? (Open: terminal A/close: terminal G)	Yes	Go to the next step.
		No	Inspect for an open or short circuit in the wiring harness between the power window main switch and the power window motor. Inspect the power window main switch and power window motor connector connections. (damage/pulled-out pins, corrosion) Repair or replace as necessary.
4	• Operate the passenger's side power window using the power window main switch. • Does the power window motor operate (rotate)? **Caution** • **If the power window motor temperature is high, the motor may not rotate due to the motor internal bimetal function. Leave it untouched for about 3 min to cool it, then reinspect.**	Yes	Go to the next step.
		No	Replace the power window motor. (See 09-12-6 POWER WINDOW REGULATOR REMOVAL/ INSTALLATION.)

SYMPTOM TROUBLESHOOTING [POWER WINDOW SYSTEM]

STEP	INSPECTION		ACTION
5	• Remove the door glass from carrier plate. • Make sure that the door glass moves smoothly • Does the door glass move smoothly?	Yes	Replace the power window regulator. (See 09-12-6 POWER WINDOW REGULATOR REMOVAL/ INSTALLATION.)
		No	Inspect for a bent regulator guide or other possible malfunction. If normal, replace the door glass run-channel.

No.4 ALL POWER WINDOWS ARE INOPERATIVE [POWER WINDOW SYSTEM]

id0903a0870200

4	All power windows are inoperative.
POSSIBLE CAUSE	• Power supply circuit or ground circuit malfunction — Burnt fuse (B+) — Open or short circuit in wiring harness between ignition switch (IG1) and power window main switch — Open or short circuit in wiring harness between power window main switch and power window motor — Open or short circuit in wiring harness between power window main switch and ground • Power window main switch malfunction (switch malfunction) • Power window motor malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Operate all power windows other than driver's side window using the power window main switch. • Does any power window operate?	Yes	Go to Step 5.
		No	Go to the next step.
2	• Operate the driver's side power window using the power window main switch. • Does the power window operate?	Yes	Go to the next step.
		No	Inspect for an open circuit in the wiring harness between the power window main switch and the body ground. Inspect the power window main switch connector connection. (damage/pulled-out pins, corrosion) Repair or replace if necessary
3	• Is the P.WIND 20 A fuse normal?	Yes	Replace with the appropriate standard fuse. If the fuse is melted, inspect the wiring harness for a short to ground. Repair or replace the wiring harness, then replace the fuse.
		No	Replace the power window main switch. (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.) (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.)
4	• Remove the door glass from the carrier plate. • Make sure that the door glass moves smoothly using your hand. • Does the door glass move smoothly?	Yes	Replace the power window regulator guide.
		No	Inspect for a bent regulator guide or other possible malfunction. If normal, replace the glass run channel
5	**Note** • Do not operate the power window main switch during the following inspection. • Inspect the continuity between power window main switch terminal (up-side I, D (Auto on both driver and passenger side)) and ground. • Is there continuity?	Yes	Go to the next step.
		No	Replace the power window main switch. (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.) (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.)
6	**Note** • Do not operate the power window main switch during the following inspection. • Inspect the continuity between power window main switch terminal (down-side F, J (Auto on both driver and passenger side)) and ground. • Is there continuity?	Yes	Inspect for an open or short circuit in the wiring harness between the power window main switch. Inspect the power window main switch connector connections. (damage/pulled-out pins, corrosion) Repair or replace if necessary.
		No	Replace the power window main switch. (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.) (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.)

SYMPTOM TROUBLESHOOTING [POWER WINDOW SYSTEM]

No.5 ABNORMAL NOISE WHILE THE DOOR GLASS IS OPENIGN OR CLOSING [POWER WINDOW SYSTEM]

id0903a0870300

5	Abnormal noise while the door glass is opening or closing
POSSIBLE CAUSE	• Installation screw is loose between the door glass and carrier plate. • Deformity in the power window regulator plastic part due to use. — Scratching, wear marks to the power window regulator resin part due to twisting of the cable. — Gear deformity in the power window motor. **Note** • Identify the location of the noise using a stethoscope or similar device.

Diagnostic procedure

Noise type	Time of occurrence	Possible cause	Location of noise	Action
Clanking noise	Door glass begins to move	Insufficiently tightened installation screw between the door glass and carrier plate.	Between door glass lower edge and carrier plate.	Securely tighten the installation screw.
Groaning noise (Sound increases due to use)	While door glass is operating	Vibration caused by wear on the resin part from cable twisting due to use of the power window regulator. **Note** • Noise does not occur if a roller is equipped to power window regulator resin part.	Power window regulator	Replace the power window regulator (See 09-12-6 POWER WINDOW REGULATOR REMOVAL/ INSTALLATION.)
Whining noise		Gear inside power window motor is deformed due to use.	Gear in power window motor	Replace the power window motor (See 09-12-6 POWER WINDOW REGULATOR REMOVAL/ INSTALLATION.)
Clicking noise (Periodic noise)				

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09-03B SYMPTOM TROUBLESHOOTING [HEADLIGHT AUTO LEVELING SYSTEM]

SYMPTOM TROUBLESHOOTING CHART [HEADLIGHT AUTO LEVELING SYSTEM] 09-03B–1
No.1 AUTO LEVELING WARNING LIGHT ILLUMINATES WHEN THE IGNITION SWITCH TURNED TO ON POSITION [HEADLIGHT AUTO LEVELING SYSTEM] 09-03B–1
No.2 AUTO LEVELING SYSTEM DOES NOT ADJUST OPTICAL AXIS OF THE HEADLIGHTS FOR VEHICLE POSTURE [HEADLIGHT AUTO LEVELING SYSTEM] 09-03B–3

SYMPTOM TROUBLESHOOTING [HEADLIGHT AUTO LEVELING SYSTEM]

SYMPTOM TROUBLESHOOTING CHART [HEADLIGHT AUTO LEVELING SYSTEM]

id0903d0812700

NO.	SYMPTOM	DESCRIPTION
1	09-03B-1 No.1 AUTO LEVELING WARNING LIGHT ILLUMINATES WHEN THE IGNITION SWITCH TURNED TO ON POSITION [HEADLIGHT AUTO LEVELING SYSTEM]	—
2	09-03B-3 No.2 AUTO LEVELING SYSTEM DOES NOT ADJUST OPTICAL AXIS OF THE HEADLIGHTS FOR VEHICLE POSTURE [HEADLIGHT AUTO LEVELING SYSTEM]	• Auto leveling does not adjust optical axis of the headlights for cargo and passenger weight conditions when the vehicle speed **above 30 km/h {19 mph}**. • Left or right side auto leveling does not operate.

No.1 AUTO LEVELING WARNING LIGHT ILLUMINATES WHEN THE IGNITION SWITCH TURNED TO ON POSITION [HEADLIGHT AUTO LEVELING SYSTEM]

id0903d0930100

1	**Auto leveling warning light illuminates when the ignition switch turned to ON position**
POSSIBLE CAUSE	• Headlight auto leveling function related electrical part the malfunction — Front and/or rear auto leveling sensor related part the malfunction • Front and/or rear auto leveling control module power supply voltage excessive low • Front and/or rear auto leveling sensor signal voltage excessive high or low • Front and/or rear auto leveling sensor the malfunction — Auto leveling control module the malfunction — Auto leveling control module power supply voltage is excessive high • Vehicle speed signal is above **180 km/h {112 mph} or more** — Instrument cluster the malfunction — Short to power supply circuit between instrument cluster terminal 2O and auto leveling control module terminal R • Auto leveling warning light control circuit the malfunction — Instrument cluster the malfunction — Short to GND between instrument cluster terminal 2J and auto leveling control module terminal V

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	**VERIFY THAT THE FRONT AND REAR AUTO LEVELING SENSER INSTALLATION** • Verify that the front and rear auto leveling sensor installation. • Is there any bend, damage or dislocated link at the bracket?	Yes	Repair or replace the malfunctioning part.
		No	Go to the next step.
2	**INSPECT AUTO LEVELING CONTROL MODULE POWER SUPPLY VOLTAGE** • Turn the ignition switch to ON position. • Measure the voltage between auto leveling control module terminal H and GND. • Is the voltage **B+**?	Yes	Go to the next step.
		No	Repair or replace for open circuit between the ignition switch and auto leveling control module terminal H.

SYMPTOM TROUBLESHOOTING [HEADLIGHT AUTO LEVELING SYSTEM]

STEP	INSPECTION		ACTION
3	**INSPECT AUTO LEVELING CONTROL MODULE GND CIRCUIT FOR OPEN** • Turn the ignition switch to OFF. • Disconnect the auto leveling control module connector. • Verify that continuity between auto leveling control module terminal F and GND. • Is there continuity?	Yes	Connector the auto leveling control module connector, then go to Step 5.
		No	Go to the next step.
4	**INSPECT GND POINT** • Verify that the GND point for auto leveling control module. • Is there loose or poor connection at GND point?	Yes	Retighten the GND point.
		No	Repair or replace for open circuit between auto leveling control module terminal F and GND.
5	**INSPECT IF THE MALFUNCTION IS IN FRONT AUTO LEVELING SENSOR OR ELSEWHERE** • Turn the ignition switch to ON position. • Turn the headlight to ON. • Measure the voltage between auto leveling control module terminal G and GND. • Is the voltage **0.25—4.75 V**?	Yes	Go to the next step.
		No	Go to Step 9.
6	**INSPECT IF THE MALFUNCTION IS IN REAR AUTO LEVELING SENSOR OR ELSEWHERE** • Turn the ignition switch to ON position. • Turn the headlight to ON. • Measure the voltage between auto leveling control module terminal E and GND. • Is the voltage **0.25—4.75 V**?	Yes	Go to Step 11.
		No	Go to the next step.
7	**INSPECT THE REAR AUTO LEVELING SENSOR SIGNAL CIRCUIT** • Inspect the wiring harness between auto leveling control module terminal E and rear auto leveling sensor terminal D. • Is there open or short circuit detected?	Yes	Repair or replace for open short circuit.
		No	Go to the next step.
8	**INSPECT REAR AUTO LEVELING SENSOR** • Inspect the rear auto leveling sensor. (See 09-18-30 REAR AUTO LEVELING SENSOR INSPECTION.) • Is the rear auto leveling sensor normal?	Yes	Repair or replace for open circuit at following. • Between auto leveling control module terminal M and rear auto leveling sensor terminal A. • Between auto leveling control module terminal D and rear auto leveling sensor terminal B.
		No	Replace the rear auto leveling sensor. (See 09-18-30 REAR AUTO LEVELING SENSOR REMOVAL/INSTALLATION.)
9	**INSPECT IF THE MALFUNCTION IS IN AUTO LEVELING SENSOR POWER OR GND CIRCUIT OR ELSEWHERE** • Turn the ignition switch to ON position. • Turn the headlight to ON. • Measure the voltage between auto leveling control module terminal E and GND. • Is the voltage **0.25—4.75 V**?	Yes	Go to the next step.
		No	Repair or replace for open circuit at following. • Between auto leveling control module terminal M and front auto leveling sensor terminal A. • Between auto leveling control module terminal M and rear auto leveling sensor terminal A. • Between auto leveling control module terminal D and front auto leveling sensor terminal D. • Between auto leveling control module terminal D and rear auto leveling sensor terminal B.
10	**INSPECT FRONT AUTO LEVELING SENSOR SIGNAL CIRCUIT** • Inspect the wiring harness between auto leveling control module terminal G and front auto leveling control sensor terminal C. • Is there open or short circuit detected?	Yes	Repair or replace for open or short circuit.
		No	Inspect the front auto leveling sensor. (See 09-18-29 FRONT AUTO LEVELING SENSOR INSPECTION.) (See 09-18-29 FRONT AUTO LEVELING SENSOR REMOVAL/INSTALLATION.)
11	**INSPECT IF THE MALFUNCTION IS IN AUTO LEVELING WARNING LIGHT CONTROL CIRCUIT OR ELSEWHERE** • Turn the ignition switch to OFF. • Disconnect the auto leveling control module and instrument cluster connectors. • Verify that continuity between auto leveling control module terminal V and GND. • Is there continuity?	Yes	Repair or replace for short to GND circuit.
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [HEADLIGHT AUTO LEVELING SYSTEM]

STEP	INSPECTION		ACTION
12	**INSPECT IF THE MALFUNCTION IS IN INSTRUMENT CLUSTER** • Turn the ignition switch to OFF. • Connect the instrument cluster connector (with auto leveling control module connector disconnected). • Short to GND at auto leveling control module terminal V using the jumper wire. • Turn the ignition switch to ON position. • Dose the auto leveling warning light illuminate?	Yes	Go to the next step.
		No	Replace the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)
13	**INSPECT IF THE MALFUNCTION IS IN VEHICLE SPEED SIGNAL CIRCUIT OR ELSEWHERE** • Turn the ignition switch to OFF. • Disconnect the auto leveling control module connector. • Turn the ignition switch to ON position. • Measure the voltage between auto leveling control module terminal R and GND. • Is the voltage **B+**?	Yes	Repair or replace for short to power supply.
		No	Replace the auto leveling control module. (See 09-18-28 AUTO LEVELING CONTROL MODULE REMOVAL/INSTALLATION.)

No.2 AUTO LEVELING SYSTEM DOES NOT ADJUST OPTICAL AXIS OF THE HEADLIGHTS FOR VEHICLE POSTURE [HEADLIGHT AUTO LEVELING SYSTEM]

id0903d0930000

2	**Auto leveling does not adjust optical axis of the headlights for vehicle posture**
POSSIBLE CAUSE	• Headlight leveling actuator the malfunction • Auto leveling control module the malfunction • Front and/or rear leveling sensor the malfunction • Improper installation of front and/or rear auto leveling sensor • Open or short circuit in wiring between auto leveling control module terminal R and instrument cluster terminal 2O

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY AUTO LEVELING WARNING LIGHT ILLUMINATION** • Turn the ignition switch to ON position. • Verify that the auto leveling warning light condition. • Does the auto leveling warning light illuminate from turning the ignition switch to ON **3 seconds after**?	Yes	Perform the symptom “No.1 Auto leveling warning light illuminates when the ignition switch to ON position” troubleshooting procedure.
		No	Go to the next step.
2	**INSPECT IF THE MALFUNCTION IS IN AUTO LEVELING SENSOR OR ELSEWHERE** • Is the malfunction appeared both side?	Yes	Go to Step 5.
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [HEADLIGHT AUTO LEVELING SYSTEM]

STEP	INSPECTION		ACTION
3	**INSPECT IF THE MALFUNCTION IS IN WIRING HARNESS BETWEEN AUTO LEVELING CONTROL MODULE AND HEADLIGHT LEVELING ACTUATOR** • Inspect for open or short circuit in wiring harness at auto leveling function does not operate. **Right-side:** — Auto leveling control module terminal I—front combination light (right-side) terminal G — Auto leveling control module terminal J—front combination light (right-side) terminal F — Auto leveling control module terminal L—front combination light (right-side) terminal H **Left-side:** — Auto leveling control module terminal K—front combination light (left-side) terminal G — Auto leveling control module terminal J—front combination light (left-side) terminal F — Auto leveling control module terminal L—front combination light (left-side) terminal H • Is open or short circuit detected?	Yes	Repair or replace for open or short circuit.
		No	Go to the next step.
4	**INSPECT IF THE MALFUNCTION IS IN HEADLIGHT LEVELING ACTUATOR OR ELSEWHERE** • Replace the suspected side front combination light. (See 09-18-5 FRONT COMBINATION LIGHT REMOVAL/INSTALLATION.) • Does the auto leveling adjust optical axis of the headlight for vehicle posture?	Yes	Troubleshooting completed. (The malfunction is in headlight leveling actuator.)
		No	Replace the auto leveling control module. (See 09-18-28 AUTO LEVELING CONTROL MODULE REMOVAL/INSTALLATION)
5	**INSPECT IF THE MALFUNCTION IS IN WIRING HARNESS BETWEEN AUTO LEVELING CONTROL MODULE AND HEADLIGHT LEVELING ACTUATOR** • Inspect for open or short circuit in wiring harness. **Right-side:** — Auto leveling control module terminal I—front combination light (right-side) terminal G — Auto leveling control module terminal J—front combination light (right-side) terminal F **Left-side:** — Auto leveling control module terminal K—front combination light (left-side) terminal G — Auto leveling control module terminal J—front combination light (left-side) terminal F • Is open or short circuit detected?	Yes	Repair or replace for open or short circuit.
		No	Go to the next step.
6	**INSPECT FRONT AND REAR AUTO LEVELING SENSOR INSTALLATION** • Inspect front and rear auto leveling sensor installation (bend or damaged of bracket, or dislocated link). • Are front and rear auto leveling sensor installed properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part, or install properly.

SYMPTOM TROUBLESHOOTING [HEADLIGHT AUTO LEVELING SYSTEM]

STEP	INSPECTION		ACTION
7	**INSPECT FRONT AUTO LEVELING SENSOR** • Inspect the front auto leveling sensor. (See 09-18-29 FRONT AUTO LEVELING SENSOR INSPECTION.) • Is the front auto leveling sensor normal?	Yes	Go to the next step.
		No	Replace the front auto leveling sensor. (See 09-18-29 FRONT AUTO LEVELING SENSOR REMOVAL/INSTALLATION.)
8	**INSPECT REAR AUTO LEVELING SENSOR** • Inspect the rear auto leveling sensor. (See 09-18-30 REAR AUTO LEVELING SENSOR INSPECTION.) • Is the rear auto leveling sensor normal?	Yes	Go to the next step.
		No	Replace the rear auto leveling sensor. (See 09-18-30 REAR AUTO LEVELING SENSOR REMOVAL/INSTALLATION.)
9	**INSPECT IF THE MALFUNCTION IS IN VEHICLE SPEED SIGNAL LINE OR ELSEWHERE** • Turn the ignition switch to OFF. • Disconnect the auto leveling control module connector. • Turn the ignition switch to ON position. • Measure the voltage between auto leveling control module harness side connector terminal R and GND. • Is the voltage **B+**?	Yes	Repair or replace for short to power supply.
		No	Go to the next step.
10	**INSPECT IF THE MALFUNCTION IS IN VEHICLE SPEED SIGNAL LINE OR ELSEWHERE** • Turn the ignition switch to OFF. • Disconnect auto leveling control module and instrument cluster connectors. • Verify that the continuity for following: — Auto leveling control module terminal R-GND (**normal condition: not continuity**) — Auto leveling control module terminal R-instrument cluster terminal 2O (**normal condition: continuity**) • Are there continuity.	Yes	Replace the auto leveling control module. (See 09-18-28 AUTO LEVELING CONTROL MODULE REMOVAL/INSTALLATION.)
		No	Repair or replace for open or short circuit.

09-03C SYMPTOM TROUBLESHOOTING [KEYLESS ENTRY SYSTEM]

KEYLESS ENTRY SYSTEM WIRING DIAGRAM [KEYLESS ENTRY SYSTEM] 09-03C–2
SYMPTOM TROUBLESHOOTING CHART [KEYLESS ENTRY SYSTEM] 09-03C–3
KEYLESS ENTRY SYSTEM PRELIMINARY INSPECTION [KEYLESS ENTRY SYSTEM] 09-03C–3
KEYLESS ENTRY SYSTEM ON-BOARD DIAGNOSIS [KEYLESS ENTRY SYSTEM] 09-03C–4
NO.1 ONE OR MORE ON-BOARD DIAGNOSTIC FUNCTIONS INOPERATIVE [KEYLESS ENTRY SYSTEM] 09-03C–5
Diagnostic procedure 09-03C–5
NO.2 ALL ON-BOARD DIAGNOSTIC FUNCTIONS INOPERATIVE [KEYLESS ENTRY SYSTEM] 09-03C–7
NO.3 TRANSMITTER ID CODE CANNOT BE REPROGRAMMED [KEYLESS ENTRY SYSTEM] 09-03C–9

SYMPTOM TROUBLESHOOTING [KEYLESS ENTRY SYSTEM]

KEYLESS ENTRY SYSTEM WIRING DIAGRAM [KEYLESS ENTRY SYSTEM]

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SYMPTOM TROUBLESHOOTING [KEYLESS ENTRY SYSTEM]

SYMPTOM TROUBLESHOOTING CHART [KEYLESS ENTRY SYSTEM]

id0903d2812700

No.	Troubleshooting item	Description
1	One or more on-board diagnostic functions inoperative	• Malfunction in trunk lid opener system, horn system, hazard warning light system, or door lock linkage system
2	All on-board diagnostic functions inoperative	• Malfunction in keyless control module power supply circuit, door switch circuit, keyless control module ground circuit
3	Transmitter ID code cannot be reprogrammed	• Malfunction in transmitter battery, transmitter, keyless receiver bracket, keyless receiver bracket ground screw, or keyless control module circuit.

KEYLESS ENTRY SYSTEM PRELIMINARY INSPECTION [KEYLESS ENTRY SYSTEM]

id0903d2800300

- Perform the following preliminary inspection before troubleshooting.

STEP	INSPECTION		ACTION
1	• Is an after-market system installed?	Yes	Perform troubleshooting according to the after-market keyless entry system manual.
		No	Go to the next step.
2	• Did the customer activate the keyless entry system with the key inserted into the steering lock?	Yes	• Explain to the customer that the system does not work with the key inserted into the steering lock. • Go to the next step.
		No	Go to the next step.
3	• Did the customer use the keyless entry system in particular area, such as being near TV towers, power plants, power lines, or factories?	Yes	Attempt to lock/unlock the doors with the transmitter in a non-interference area. **If system operates:** • Area of operation is suspect. Explain effect of outside interference on the transmitter to the customer. **If system does not operate:** • Go to the next step.
		No	Go to the next step.
4	• Are any of the following after-market electrical parts on the vehicle? — Cellular phone — Radio-wave equipment — Remote engine starter — TV	Yes	Disconnect the after-market electrical part connectors and attempt to lock/unlock the doors with the transmitter. **If system operates:** • The after-market electrical parts are interfering with the keyless entry system. **If system does not operate:** • Go to the next step.
		No	Go to the next step.
5	• Perform the on-board diagnostic function. (See 09-03C-4 KEYLESS ENTRY SYSTEM ON-BOARD DIAGNOSIS [KEYLESS ENTRY SYSTEM].) • Does the on-board diagnostic function work?	Yes	Go to the next step.
		No	• Go to Step 1 of troubleshooting NO. 1. (See 09-03C-5 NO.1 ONE OR MORE ON-BOARD DIAGNOSTIC FUNCTIONS INOPERATIVE [KEYLESS ENTRY SYSTEM].) • Go to Step 1 of troubleshooting NO. 2. (See 09-03C-7 NO.2 ALL ON-BOARD DIAGNOSTIC FUNCTIONS INOPERATIVE [KEYLESS ENTRY SYSTEM].)
6	• Attempt to reprogram the transmitter ID code. • Can the transmitter ID code be reprogrammed?	Yes	The system is normal.
		No	Go to Step 1 of troubleshooting NO. 3. (See 09-03C-9 NO.3 TRANSMITTER ID CODE CANNOT BE REPROGRAMMED [KEYLESS ENTRY SYSTEM].)

SYMPTOM TROUBLESHOOTING [KEYLESS ENTRY SYSTEM]

KEYLESS ENTRY SYSTEM ON-BOARD DIAGNOSIS [KEYLESS ENTRY SYSTEM]

id0903d2800400

Note

- When the trunk lid opener cancel switch is at the ON position, the trunk lid does not unlock even when the trunk lid button is pressed. Verify that the trunk lid cancel switch is at the OFF position when performing the on-board diagnostic test.
- The trunk lid opener cancel switch is located in the trunk compartment.
- “All doors” includes the trunk lid.

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SYMPTOM TROUBLESHOOTING [KEYLESS ENTRY SYSTEM]

NO.1 ONE OR MORE ON-BOARD DIAGNOSTIC FUNCTIONS INOPERATIVE [KEYLESS ENTRY SYSTEM]

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1	One or more on-board diagnostic functions inoperative
DESCRIPTION	• Malfunction in trunk lid opener system, horn system, hazard warning light system, or door lock linkage system
POSSIBLE CAUSE	• Malfunction in trunk lid opener system — Trunk lid opener relay circuit malfunction — Keyless control module malfunction • Malfunction in horn system — Horn circuit malfunction — Keyless control module malfunction — Malfunction in wiring harness between keyless control module and horn relay • Malfunction in hazard warning light system — Hazard warning light circuit — Keyless control module malfunction — Malfunction in wiring harness between keyless control module and hazard warning lights — Malfunction in wiring harness between keyless control module and flasher control module • Malfunction in door lock linkage • Malfunction in keyless control module door lock/unlock signal circuit — Keyless control module malfunction

- When performing an asterisked (*) troubleshooting inspection, slightly shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, verify that the connectors, terminals and wiring harnesses are connected correctly and undamaged.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT HORN AND HAZARD WARNING LIGHT OPERATION DURING ON-BOARD DIAGNOSIS** • Do all of the following items work during on-board diagnostic function operation? — Hazard warning lights flash. — Horns sounds intermittently. — Trunk lid opens.	Yes	Go to Step 11.
		No	Go to the next step.
2	**INSPECT HAZARD WARNING LIGHT OPERATION DURING ON-BOARD DIAGNOSIS** • Do the hazard warning lights flash during on-board diagnostic function operation?	Yes	Go to Step 5.
		No	Go to the next step.
3	**INSPECT HAZARD WARNING LIGHT CIRCUIT** • Do the hazard warning lights flash when hazard warning switch is on?	Yes	Go to the next step.
		No	Inspect the hazard warning light circuit.
*4	**INSPECT IF MALFUNCTION IS IN WIRING HARNESS (BETWEEN KEYLESS CONTROL MODULE AND FLASHER CONTROL MODULE) OR KEYLESS CONTROL MODULE** • Measure the voltage at keyless control module connector terminal 4N during on-board diagnostic function operation. — When hazard warning lights flashed: **Alternates between B+ and below 1.0 V** • Is the voltage as above?	Yes	Reinspect the malfunction symptoms, then repeat from Step 1 if malfunction recurs.
		No	• Inspect the wiring harness between the keyless control module and flasher control module. — If the wiring harness is normal, replace the keyless control module and reprogram the transmitter ID code, then go to Step 14. — If the wiring harness is malfunctioning, repair the wiring harness, then go to Step 14.
5	**INSPECT HORN OPERATION DURING ON-BOARD DIAGNOSIS** • Dose horn sound intermittently during on-board diagnostic function operation?	Yes	Go to Step 8.
		No	Go to the next step.
6	**INSPECT HORN CIRCUIT** • Does horn sound when the horn switch on the vehicle is pressed?	Yes	Go to the next step.
		No	Inspect the horn circuit.

SYMPTOM TROUBLESHOOTING [KEYLESS ENTRY SYSTEM]

STEP	INSPECTION		ACTION
*7	**INSPECT IF MALFUNCTION IS IN WIRING HARNESS (NO CONTINUITY BETWEEN KEYLESS CONTROL MODULE AND HORN RELAY) OR KEYLESS CONTROL MODULE** • Turn the ignition switch to the LOCK position. • Disconnect the keyless control module connector and horn relay connector. • Is there continuity between keyless control module connector terminal 3R and horn relay connector?	Yes	Replace the keyless control module and reprogram the keyless control module ID code, then go to Step 14.
		No	Repair the wiring harness between the keyless control module and horn relay, then go to Step 14.
8	**CHECK TRUNK LID OPERATION DURING ON-BOARD DIAGNOSIS** • Does the trunk lid open during on-board diagnostic function operation?	Yes	Go to Step 11.
		No	Go to the next step.
9	**INSPECT TRUNK LID OPENER SYSTEM** • Does the trunk lid open by the trunk lid opener switch?	Yes	Go to the next step.
		No	Inspect the trunk lid opener system.
*10	**INSPECT IF MALFUNCTION IS IN TRUNK LID OPENER RELAY CIRCUIT OR KEYLESS CONTROL MODULE** • Disconnect the keyless control module connector. • Measure the voltage at keyless control module connector terminal 4O. • Is the voltage **approx. 12 V**?	Yes	Replace the keyless control module and the reprogram transmitter ID code, then go to Step 14.
		No	Inspect the trunk lid opener relay circuit.
11	**VERIFY THAT ALL DOORS LOCK AND UNLOCK DURING ON-BOARD DIAGNOSIS** • Do all doors unlock and lock during on-board diagnostic function operation?	Yes	Reinspect the malfunction symptoms, then repeat from Step 1 if the malfunction recurs.
		No	Go to the next step.
12	**INSPECT DOOR LOCK LINKAGE** • Operate the door lock knob and verify the door locks and unlocks manually. • Does every door lock system work?	Yes	Go to the next step.
		No	Inspect the door lock linkage.
*13	**INSPECT IF MALFUNCTION IS IN DOOR LOCK ACTUATOR, KEYLESS CONTROL MODULE GROUND CIRCUIT OR ELSEWHERE** • Measure the voltage at keyless control module connector terminals 1C and 1A. — All doors locked: **Cycles 1.0 V or less →B+→1.0 V or less** (terminal 1A) — All doors unlocked: **Cycles B+→1.0 V or less→B+** (terminal 1C) • Is the voltage as above?	Yes	Reinspect the malfunction symptoms, then repeat from Step 1 if the malfunction recurs.
		No	• Inspect the keyless control module the connector. • Inspect the wiring harness between the keyless control module and door lock actuator. — If the above parts are normal, go to the next step. — If any of above parts are malfunctioning, repair the malfunctioning part.
14	**REINSPECT MALFUNCTION SYMPTOM AFTER REPAIR** • Does the keyless entry system operate properly?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Reinspect the malfunction symptoms, then repeat from Step 1 if malfunction recurs.

SYMPTOM TROUBLESHOOTING [KEYLESS ENTRY SYSTEM]

NO.2 ALL ON-BOARD DIAGNOSTIC FUNCTIONS INOPERATIVE [KEYLESS ENTRY SYSTEM]

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- When performing an asterisked (*) troubleshooting inspection, slightly shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, verify that the connectors, terminals and wiring harnesses are connected correctly and undamaged.

2	All on-board diagnostic functions inoperative
DESCRIPTION	• Malfunction in keyless control module power supply circuit, door switch circuit, trunk lid compartment light circuit, keyless control module ground circuit, or keyless receiver.
POSSIBLE CAUSE	• Malfunction in IG1 or B+ signal circuit of keyless control module — Keyless control module power supply fuse malfunction — Malfunction in wiring harness between keyless control module power supply fuses and keyless control module • Malfunction in door open/closed signal circuit of keyless control module — Door switch system malfunction — Keyless control module malfunction — Malfunction in wiring harness between keyless control module and door switch • Malfunction in trunk lid open signal circuit of keyless control module — Trunk lid compartment light switch system malfunction — Keyless control module malfunction — Malfunction in wiring harness between keyless control module and trunk lid compartment light switch • Malfunction in keyless control module GND signal circuit — Malfunction in wiring harness between keyless control module and ground • Malfunction in keyless receiver — Keyless receiver malfunction — Malfunction in wiring harness between keyless control module and keyless receiver

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT KEYLESS CONTROL MODULE POWER SUPPLY FUSES** • Are the keyless control module power supply fuses normal?	Yes	Go to the next step.
		No	Inspect for a short to ground in circuit of blown fuse. Repair or replace if necessary. Install an appropriate amperage fuse.
2	**INSPECT DOOR SWITCH INSTALLATION** • Are the door switches installed securely?	Yes	Go to the next step.
		No	Install the door switches securely, then go back to Step 5 of KEYLESS ENTRY SYSTEM PRELIMINARY INSPECTION.
*3	**INSPECT IF MALFUNCTION IS IN WIRING HARNESS (NO CONTINUITY BETWEEN FUSE BLOCK AND KEYLESS CONTROL MODULE) OR ELSEWHERE** • Turn the ignition switch to the ON position. • Measure the voltage at the following keyless control module terminals: — IG1 signal (terminal 3B) — B+ signal (terminal 1F) • Is the voltage **B+**?	Yes	Go to the next step.
		No	Repair the wiring harness between the fuse block and keyless control module, then go to Step 12.
*4	**INSPECT IF MALFUNCTION IS IN WIRING HARNESS (SHORT TO B+ BETWEEN FUSE BLOCK AND KEYLESS CONTROL MODULE, OR BETWEEN KEYLESS CONTROL MODULE AND GROUND) OR ELSEWHERE** • Turn the ignition switch to the LOCK position. • Disconnect the keyless control module connector. • Measure the voltage at the following keyless control module connector terminal: — IG1 signal (terminal 3B) • Is the voltage **B+**?	Yes	Repair the malfunctioning wiring harness, then go to Step 13.
		No	Go to the next step.
*5	**INSPECT IF MALFUNCTION IS IN WIRING HARNESS (NO CONTINUITY BETWEEN KEYLESS CONTROL MODULE AND GROUND) OR ELSEWHERE** • Is there continuity between keyless control module connector terminal 3C and ground?	Yes	Go to the next step.
		No	Repair the wiring harness between the keyless control module and ground, then go to Step 12.

SYMPTOM TROUBLESHOOTING [KEYLESS ENTRY SYSTEM]

STEP	INSPECTION		ACTION
6	**INSPECT FOR CHECK CODE 04 IN INSTRUMENT CLUSTER** • Inspect the door switch using the instrument cluster input/output check mode. (See 09-22-6 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.) • Is DTC 04 displayed?	Yes	Go to the next step.
		No	Repair the door switch system using the DTC 04 inspection procedure, then go to Step 12.
7	**INSPECT KEYLESS CONTROL MODULE OR WIRING HARNESS (BETWEEN KEYLESS CONTROL MODULE AND DOOR SWITCHES, TRUNK LID COMPARTMENT LIGHT SWITCH FOR CONTINUITY)** • Open the driver-side door. • Is there continuity between keyless control module connector terminal 4Q, 4T, 3Z and ground?	Yes	Replace the keyless control module and reprogram the keyless control module ID code, then go to the next step.
		No	Repair the wiring harness between the keyless control module, door switches, and trunk lid compartment light switch, then go to the next step.
8	**INSPECT IF MALFUNCTION IS IN WIRING HARNESS (NO CONTINUITY BETWEEN FUSE BLOCK AND KEYLESS RECEIVER) OR ELSEWHERE** • Turn the ignition switch to the ON position. • Measure the voltage at the following keyless receiver terminal: — RF receiver power (terminal 1A) • Is the voltage **B+**?	Yes	Go to the next step.
		No	Repair the wiring harness between the fuse block and keyless receiver, then go to Step 12.
9	**INSPECT IF MALFUNCTION IS IN WIRING HARNESS (NO CONTINUITY BETWEEN KEYLESS RECEIVER AND GROUND) OR ELSEWHERE** • Is there continuity between keyless receiver connector terminal 1E and ground?	Yes	Go to the next step.
		No	Repair the wiring harness between the keyless receiver and ground, then go to Step 12.
10	**INSPECT IF MALFUNCTION IS IN WIRING HARNESS (NO CONTINUITY BETWEEN KEYLESS RECEIVER AND KEYLESS CONTROL MODULE) OR ELSEWHERE** • Turn the ignition switch to the ON position. • Disconnect the keyless receiver connector and keyless control module. • Is there continuity between the following terminals? — Terminal 1A—terminal 3S — Terminal 1C—terminal 3U	Yes	Go to the next step.
		No	Repair the wiring harness between the keyless receiver and keyless control module, then go to Step 12.
11	**INSPECT IF MALFUNCTION IS IN WIRING HARNESS (NO CONTINUITY BETWEEN KEYLESS RECEIVER AND KEYLESS CONTROL MODULE) OR KEYLESS CONTROL MODULE** • Measure the voltage at keyless control module terminal 3U. — When transmitter operated: • Any transmitter button is operated without key in steering lock (key reminder switch off): 5 V→1.0 V or less • Key is in steering lock (key reminder switch on):5 V • Is the voltage normal?	Yes	Replace the keyless control module, then go to the next step.
		No	Replace the keyless receiver, then go to the next step.
12	**REINSPECT MALFUNCTION SYMPTOM AFTER REPAIR** • Does the keyless entry system operate properly?	Yes	Troubleshooting completed. Explain repairs to the customer.
		No	Reinspect the malfunction symptoms, then repeat from Step 1 if the malfunction recurs.

SYMPTOM TROUBLESHOOTING [KEYLESS ENTRY SYSTEM]

NO.3 TRANSMITTER ID CODE CANNOT BE REPROGRAMMED [KEYLESS ENTRY SYSTEM]

id0903d2800800

3	Transmitter ID code cannot be reprogrammed
DESCRIPTION	• Malfunction in transmitter battery, transmitter, keyless receive bracket, keyless receive bracket ground screw, or keyless control module circuit. keyless receive circuit.
POSSIBLE CAUSE	• Malfunction in transmitter battery, transmitter, keyless receive bracket, keyless receive bracket ground screw, or keyless control module, or keyless receive.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT TRANSMITTER BATTERY INSTALLATION AND TYPE** • Visually inspect the transmitter battery. • Are the below items correct? — Transmitter battery installation (correct polarity) — Battery type (CR1620)	Yes	Go to the next step.
		No	Install the transmitter battery properly or replace with the specified transmitter battery (CR1620), then go to Step 12.
2	**INSPECT TRANSMITTER BATTERY TERMINALS FOR RUST AND POOR CONNECTION** • Visually inspect the transmitter. — Is there rust on the transmitter battery terminals (positive or negative)? — Is there poor connection between the terminals and battery?	Yes	Replace the transmitter battery or repair the transmitter battery terminal, then go to Step 13.
		No	Go to the next step.
3	**INSPECT TRANSMITTER BATTERY** • Inspect the transmitter battery. • Is the battery voltage normal?	Yes	Go to the next step.
		No	Replace the transmitter battery, then go to Step 12.
4	**INSPECT KEYLESS RECEIVE BRACKET INSTALLATION** • Is the keyless receive bracket installed securely?	Yes	Go to the next step.
		No	Install bracket securely, then go back to Step 6 of KEYLESS ENTRY SYSTEM PRELIMINARY inspection.
5	**INSPECT GROUND SCREW INSTALLATION BETWEEN KEYLESS RECEIVE AND KEYLESS RECEIVE BRACKET** • Are the keyless receive and keyless receive bracket connected securely to the ground screw?	Yes	Go to the next step.
		No	Install the screw securely, then go back to Step 6 of KEYLESS ENTRY SYSTEM PRELIMINARY inspection.
6	**INSPECT IF MALFUNCTION IS IN TRANSMITTER BATTERY OR ELSEWHERE** • Replace with a transmitter battery known to be good. • Does the keyless entry system operate properly?	Yes	Replace the transmitter battery, then go to Step 12.
		No	Go to the next step.
7	**INSPECT IF MALFUNCTION IS IN TRANSMITTER OR KEYLESS CONTROL MODULE** • Reprogram the keyless control module ID code using another known good transmitter. • Does the keyless entry system operate properly?	Yes	Replace the transmitter and reprogram the transmitter ID code, then go to Step 12.
		No	Go to the next step.
8	**INSPECT IF MALFUNCTION IS IN WIRING HARNESS (NO CONTINUITY BETWEEN FUSE BLOCK AND KEYLESS RECEIVER) OR ELSEWHERE** • Measure the voltage at the following keyless receiver terminal: — Power supply signal (terminal 1A) • Is the voltage **B+**?	Yes	Go to the next step.
		No	Repair the wiring harness between the fuse block and keyless receiver, then go to Step 12.
9	**INSPECT IF MALFUNCTION IS IN WIRING HARNESS (NO CONTINUITY BETWEEN KEYLESS RECEIVER AND GROUND) OR ELSEWHERE** • Is there continuity between keyless receiver connector terminal 1E and ground?	Yes	Go to the next step.
		No	Repair the wiring harness between the keyless receiver and ground, then go to Step 12.

SYMPTOM TROUBLESHOOTING [KEYLESS ENTRY SYSTEM]

STEP	INSPECTION		ACTION
10	**INSPECT IF MALFUNCTION IS IN WIRING HARNESS (NO CONTINUITY BETWEEN KEYLESS RECEIVER AND KEYLESS CONTROL MODULE) OR ELSEWHERE** • Disconnect the keyless receiver connector and keyless control module. • Is there continuity between the following terminals? — Terminal 1A—terminal 3S — Terminal 1C—terminal 3U	Yes	Go to the next step.
		No	Repair the wiring harness between the keyless receiver and keyless control module, then go to Step 12.
11	**INSPECT IF MALFUNCTION IS IN WIRING HARNESS (NO CONTINUITY BETWEEN KEYLESS RECEIVER AND KEYLESS CONTROL MODULE) OR KEYLESS CONTROL MODULE** • Measure the voltage at keyless control module terminal 3U. — When transmitter operated: • Any transmitter button is operated without key in steering lock (key reminder switch off): **5 V→1.0 V or less** • Key is in steering lock (key reminder switch on): **5 V** • Is the voltage normal?	Yes	Replace the keyless control module, then go to the next step.
		No	Replace the keyless receiver, then go to the next step.
12	**REINSPECT MALFUNCTION SYMPTOM AFTER REPAIR** • Does the keyless entry system operate properly?	Yes	Troubleshooting completed. Explain repairs to the customer.
		No	Reinspect the malfunction symptoms, then repeat from Step 1 if the malfunction recurs.

09-03D SYMPTOM TROUBLESHOOTING [INSTRUMENT CLUSTER]

SYMPTOM TROUBLESHOOTING [INSTRUMENT CLUSTER] 09-03D–1
QUICK DIAGNOSTIC CHART [INSTRUMENT CLUSTER] 09-03D–2
NO. 1 FUEL GAUGE NEEDLE POSITION INCORRECT [INSTRUMENT CLUSTER] 09-03D–3
NO. 2 ALL METERS AND GAUGES DO NOT OPERATE [INSTRUMENT CLUSTER] 09-03D–4
NO. 3 ABS WARNING LIGHT ILLUMINATES [INSTRUMENT CLUSTER] 09-03D–4
NO. 4 MIL ILLUMINATES [INSTRUMENT CLUSTER] 09-03D–5
NO. 5 BRAKE SYSTEM WARNING LIGHT ILLUMINATES [INSTRUMENT CLUSTER] 09-03D–6
NO. 6 INSTRUMENT CLUSTER ILLUMINATION DOES NOT ILLUMINATE [INSTRUMENT CLUSTER] 09-03D–7
NO. 7 SPEEDOMETER INDICATION IS DEFECTIVE [INSTRUMENT CLUSTER] 09-03D–8
NO. 8 TACHOMETER INDICATION IS DEFECTIVE [INSTRUMENT CLUSTER] 09-03D–9
NO. 9 WATER TEMPERATURE GAUGE INDICATION IS DEFECTIVE [INSTRUMENT CLUSTER] 09-03D–10
NO. 10 OIL PRESSURE GAUGE INDICATION IS DEFECTIVE (OIL PRESSURE GAUGE NEEDLE DOES NOT MOVE FROM THE L POSITION OR LESS) [INSTRUMENT CLUSTER] 09-03D–11

SYMPTOM TROUBLESHOOTING [INSTRUMENT CLUSTER]

SYMPTOM TROUBLESHOOTING [INSTRUMENT CLUSTER]

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No.	TROUBLESHOOTING ITEM	PAGE
1	Fuel gauge needle position incorrect	(See 09-03D-3 NO. 1 FUEL GAUGE NEEDLE POSITION INCORRECT [INSTRUMENT CLUSTER].)
2	All meters and gauges do not operate	(See 09-03D-4 NO. 2 ALL METERS AND GAUGES DO NOT OPERATE [INSTRUMENT CLUSTER].)
3	ABS warning light illuminates	(See 09-03D-4 NO. 3 ABS WARNING LIGHT ILLUMINATES [INSTRUMENT CLUSTER].)
4	MIL illuminates	(See 09-03D-5 NO. 4 MIL ILLUMINATES [INSTRUMENT CLUSTER].)
5	Brake system warning light illuminates	(See 09-03D-6 NO. 5 BRAKE SYSTEM WARNING LIGHT ILLUMINATES [INSTRUMENT CLUSTER].)
6	Instrument cluster illumination does not illuminate	(See 09-03D-7 NO. 6 INSTRUMENT CLUSTER ILLUMINATION DOES NOT ILLUMINATE [INSTRUMENT CLUSTER].)
7	Speedometer indication is defective	(See 09-03D-8 NO. 7 SPEEDOMETER INDICATION IS DEFECTIVE [INSTRUMENT CLUSTER].)
8	Tachometer indication is defective	(See 09-03D-9 NO. 8 TACHOMETER INDICATION IS DEFECTIVE [INSTRUMENT CLUSTER].)
9	Water temperature gauge indication is defective	(See 09-03D-10 NO. 9 WATER TEMPERATURE GAUGE INDICATION IS DEFECTIVE [INSTRUMENT CLUSTER].)
10	Oil pressure gauge indication is defective (oil pressure gauge needle does not move from the L position or less)	(See 09-03D-11 NO. 10 OIL PRESSURE GAUGE INDICATION IS DEFECTIVE (OIL PRESSURE GAUGE NEEDLE DOES NOT MOVE FROM THE L POSITION OR LESS) [INSTRUMENT CLUSTER].)

SYMPTOM TROUBLESHOOTING [INSTRUMENT CLUSTER]

QUICK DIAGNOSTIC CHART [INSTRUMENT CLUSTER]

id0903d5830200

X: Applicable

No.	Troubleshooting item \ Possible factor	Poor connection of fuel gauge sender unit connector, terminal damage	Poor connection of instrument cluster connector, terminal damage	Fuel gauge sender unit	Instrument cluster	Fuel gauge sender unit is improperly installed	Open or short circuit in wiring harness between instrument cluster and GND	Open or short circuit in wiring harness between instrument cluster and fuel gauge sender unit	Fuse malfunction (METER)	Open or short circuit in power supply (IG1) wiring harness	Open or short circuit in GND wiring harness ABS HU/CM or DSC HU/CM	Poor connection of ABS HU/CM or DSC HU/CM connector, terminal damage	ABS HU/CM or DSC HU/CM	Short circuit in wiring harness between CAN-L, CAN-H and GND	Open circuit in CAN wiring harness (CAN-L, CAN-H)	CAN wiring harness (CAN-L, CAN-H) short each other	Poor connection of PCM connector, terminal damage	PCM	Poor connection of brake fluid level sensor connector, terminal damage	Brake fluid level sensor	Poor connection of Parking brake switch connector, terminal damage	Parking brake switch	Fuse malfunction (ROOM, ILLUMI)	Poor connection of oil pressure switch connector, terminal damage	Oil pressure switch
1	Fuel gauge needle position incorrect	X	X	X	X	X	X	X																		
2	All meters and gauges do not operate		X		X				X	X	X															
3	ABS warning light illuminates		X		X							X	X	X	X	X										
4	MIL illuminates		X		X									X	X	X	X	X								
5	Brake system warning light illuminates		X		X							X	X	X	X	X			X	X	X	X				
6	Instrument cluster illumination does not illuminate		X		X																		X			
7	Speedometer indication is defective		X		X							X	X	X	X	X	X	X								
8	Tachometer indication is defective		X		X									X	X	X	X	X								
9	Water temperature gauge indication is defective		X		X									X	X	X	X	X								
10	Oil pressure gauge indication is defective (oil pressure gauge needle does not move from the L position or less)		X		X									X	X	X	X	X							X	X

e5u903hw3o01

SYMPTOM TROUBLESHOOTING [INSTRUMENT CLUSTER]

NO. 1 FUEL GAUGE NEEDLE POSITION INCORRECT [INSTRUMENT CLUSTER]

id0903d5807400

1	Fuel gauge needle position incorrect
POSSIBLE CAUSE	• Fuel gauge sender unit malfunction • Instrument cluster malfunction • Connector or pin malfunction • Fuel gauge sender unit is improperly installed • Open or short circuit in wiring harness between instrument cluster and GND • Open or short circuit in wiring harness between instrument cluster and fuel gauge sender unit

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Turn the ignition switch to the ON position. • Is there any malfunction in the fuel gauge such as the needle not moving from the E mark, or the needle does not point to the F mark even if the fuel tank is full? • Does the high engine coolant temperature warning light illuminate or flash from 3 to 30 s when the ignition is switched ON?	Yes	Troubleshooting completed.
		No	Go to the next step.
2	• Start the instrument cluster input/output check mode. • Select the check code 22. • Display value is **7—206**?	Yes	Go to the next step.
		No	Go to Step 4.
3	• Perform the check code 23 inspection. • Is there any malfunction?	Yes	Replace the instrument cluster.
		No	Go to the next step.
4	• Perform the check code 22 inspection. • Is there any malfunction?	Yes	Go to the next step.
		No	Go to Step 6.
5	• Turn the ignition switch to LOCK position. • Inspect the instrument cluster connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion). • Are the terminals normal? 	Yes	Replace the instrument cluster.
		No	Repair or replace the terminal.
6	• Turn the ignition switch to LOCK position. • Remove the instrument cluster. • Disconnect the instrument cluster connector. • Inspect for continuity between the following wiring harnesses. — 2R terminal—GND — 2T terminal—GND • Is there continuity?	Yes	Repair or replace the wiring harness between the instrument cluster and GND.
		No	Go to the next step.
7	• Turn the ignition switch to LOCK position. • Inspect the fuel gauge sender unit connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion). • Are the terminals normal?	Yes	Go to the next step.
		No	Repair or replace the terminal.
8	• Turn the ignition switch to LOCK position. • Inspect for continuity following the wiring harness between instrument cluster and fuel gauge sender unit. — 2R terminal—C terminal — 2T terminal—A terminal • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness between the instrument cluster and the fuel gauge sender unit.
9	• Turn the ignition switch to LOCK position. • Is the fuel gauge sender unit installed properly?	Yes	Inspect the fuel gauge sender unit.
		No	Reinstall the fuel gauge sender unit.

SYMPTOM TROUBLESHOOTING [INSTRUMENT CLUSTER]

NO. 2 ALL METERS AND GAUGES DO NOT OPERATE [INSTRUMENT CLUSTER]

id0903d5807500

2	All meters and gauges do not operate
POSSIBLE CAUSE	• Instrument cluster malfunction • Connector or pin malfunction • Fuse malfunction • Open or short circuit in power supply (IG1) wiring harness • Open or short circuit in GND wiring harness

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Turn the ignition switch to the ON position. • Inspect the following: — Does the odometer/tripmeter illuminate? — Does the fuel gauge operate? — Does the MIL turn off within **approx. 3 s**?	Yes	Troubleshooting completed.
		No	Go to the next step.
2	• Inspect the METER fuse. • Is the fuse normal?	Yes	Go to the next step.
		No	Replace the fuse. • If the fuse is melted, inspect the wiring harness for a short to ground. Repair or replace the wiring harness, then replace the fuse.
3	• Turn the ignition switch to LOCK position. • Remove the instrument cluster. • Disconnect the instrument cluster connector. • Inspect the voltage between instrument cluster wiring harness-side connector terminal 1G and terminal 1E. • Turn the ignition switch to the ON position. • Is the voltage **B+**?	Yes	Go to the next step.
		No	Inspect the suspect wiring harness, then repair or replace.
4	• Turn the ignition switch to LOCK position. • Inspect the instrument cluster connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion). • Are the terminals normal?	Yes	Replace the instrument cluster.
		No	Repair or replace the terminal.

NO. 3 ABS WARNING LIGHT ILLUMINATES [INSTRUMENT CLUSTER]

id0903d5807600

3	ABS warning light illuminates
POSSIBLE CAUSE	• ABS HU/CM or DSC HU/CM malfunction • Instrument cluster malfunction • Connector or pin malfunction • Short circuit in wiring harness between CAN-L, CAN-H and GND • Open circuit in CAN wiring harness (CAN-L, CAN-H) • CAN wiring harness (CAN-L, CAN-H) short each other

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Start the engine. • Does the ABS warning light turn off?	Yes	Troubleshooting completed.
		No	Go to the next step.
2	• Are there a number of warning lights illuminated?	Yes	Go to Step 4.
		No	Go to the next step.
3	• Start the instrument cluster input/output check mode. • Does the ABS warning light turn off with a check code other than 26?	Yes	Inspect the ABS HU/CM or DSC HU/CM.
		No	Replace the instrument cluster.

SYMPTOM TROUBLESHOOTING [INSTRUMENT CLUSTER]

STEP	INSPECTION		ACTION
4	• Disconnect the negative battery cable. • Measure the resistance between the DLC-2 terminals F and E. • Is the resistance **below 60 ohms**?	Yes	Go to the next step.
		No	Go to Step 6.
5	• Inspect the DLC-2 terminals F and E for short to power supply or GND. • Is there any malfunction?	Yes	Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part.
		No	Replace the instrument cluster.
6	• Turn the ignition switch to LOCK position. • Inspect the instrument cluster connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion). • Are the terminals normal? 	Yes	Go to the next step.
		No	Repair or replace the terminal.
7	• Disconnect the negative battery cable. • Measure the resistance between the instrument cluster connector terminals 1J and 1L. • Is the resistance **114—126 ohms**?	Yes	Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part.
		No	Replace the instrument cluster.

NO. 4 MIL ILLUMINATES [INSTRUMENT CLUSTER]

id0903d5807700

4	MIL illuminates
POSSIBLE CAUSE	• PCM malfunction • Instrument cluster malfunction • Connector or pin malfunction • Short circuit in wiring harness between CAN-L, CAN-H and GND • Open circuit in CAN wiring harness (CAN-L, CAN-H) • CAN wiring harness (CAN-L, CAN-H) short each other

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Start the engine. • Does the MIL turn off?	Yes	Troubleshooting completed.
		No	Go to the next step.
2	• Are there a number of warning lights illuminated?	Yes	Go to Step 4.
		No	Go to the next step.
3	• Start the instrument cluster input/output check mode. • Does the MIL turn off with a check code other than 26?	Yes	Inspect the PCM.
		No	Replace the instrument cluster.
4	• Disconnect the negative battery cable. • Measure the resistance between the DLC-2 terminals F and E. • Is the resistance **below 60 ohms**?	Yes	Go to the next step.
		No	Go to Step 6.
5	• Inspect the DLC-2 terminals F and E for short to power supply or GND. • Is there any malfunction?	Yes	Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part.
		No	Replace the instrument cluster.

SYMPTOM TROUBLESHOOTING [INSTRUMENT CLUSTER]

STEP	INSPECTION		ACTION
6	• Turn the ignition switch to LOCK position. • Inspect the instrument cluster connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion). • Are the terminals normal? 	Yes	Go to the next step.
		No	Repair or replace the terminal.
7	• Disconnect the negative battery cable. • Measure the resistance between the instrument cluster connector terminals 1J and 1L. • Is the resistance **114—126 ohms**?	Yes	Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part.
		No	Replace the instrument cluster.

NO. 5 BRAKE SYSTEM WARNING LIGHT ILLUMINATES [INSTRUMENT CLUSTER]

id0903d5807800

5	Brake system warning light illuminates
POSSIBLE CAUSE	• ABS HU/CM or DSC HU/CM malfunction • Brake fluid level sensor malfunction • Parking brake switch malfunction • Instrument cluster malfunction • Connector or pin malfunction • Short circuit in wiring harness between CAN-L, CAN-H and GND • Open circuit in CAN wiring harness (CAN-L, CAN-H) • CAN wiring harness (CAN-L, CAN-H) short each other

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Start the engine. • Release the parking brake. • Does the brake system warning light turn off?	Yes	Troubleshooting completed.
		No	Go to the next step.
2	• Are there a number of warning lights illuminated?	Yes	Go to Step 5.
		No	Go to the next step.
3	• Does the brake fluid need replenishment?	Yes	Add brake fluid.
		No	Go to the next step.
4	• Start the instrument cluster input/output check mode. • Does the brake system warning light turn off with a check code other than 26?	Yes	Inspect the ABS HU/CM, DSC HU/CM, brake fluid level sensor, parking brake switch or connectors.
		No	Replace the instrument cluster.
5	• Disconnect the negative battery cable. • Measure the resistance between the DLC-2 terminals F and E. • Is the resistance **below 60 ohms**?	Yes	Go to the next step.
		No	Go to Step 7.
6	• Disconnect the negative battery cable. • Inspect the DLC-2 terminals F and E for short to power supply or GND. • Is there any malfunction?	Yes	Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part.
		No	Replace the instrument cluster.

SYMPTOM TROUBLESHOOTING [INSTRUMENT CLUSTER]

STEP	INSPECTION		ACTION
7	• Turn the ignition switch to LOCK position. • Inspect the instrument cluster connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion). • Are the terminals normal? 	Yes	Go to the next step.
		No	Repair or replace the terminal.
8	• Disconnect the negative battery cable. • Measure the resistance between the instrument cluster connector terminals 1J and 1L. • Is the resistance **114—126 ohms**?	Yes	Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part.
		No	Replace the instrument cluster.

NO. 6 INSTRUMENT CLUSTER ILLUMINATION DOES NOT ILLUMINATE [INSTRUMENT CLUSTER]

id0903d5807900

6	**Instrument cluster illumination does not illuminate**
POSSIBLE CAUSE	• Instrument cluster malfunction • Connector or pin malfunction • Fuse malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Turn the light switch to the TNS position. • Does the instrument cluster illumination turn on?	Yes	Troubleshooting completed.
		No	Go to the next step.
2	• Does the non-illumination include the entire instrument cluster?	Yes	Go to the next step.
		No	Replace the instrument cluster.
3	• Inspect the ROOM and ILLUMI fuse. • Are the fuses normal?	Yes	Go to the next step.
		No	Replace the fuse. • If the fuse is melted, inspect the wiring harness for short to ground. Repair or replace the wiring harness, then replace the fuse.
4	• Turn the ignition switch to LOCK position. • Inspect the instrument cluster connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion). • Are the terminals normal? 	Yes	Replace the instrument cluster.
		No	Repair or replace the terminal.

SYMPTOM TROUBLESHOOTING [INSTRUMENT CLUSTER]

NO. 7 SPEEDOMETER INDICATION IS DEFECTIVE [INSTRUMENT CLUSTER]

id0903d5808000

7	Speedometer indication is defective
POSSIBLE CAUSE	• ABS HU/CM or DSC HU/CM malfunction • PCM malfunction • Instrument cluster malfunction • Connector or pin malfunction • Short circuit in wiring harness between CAN-L, CAN-H and GND • Open circuit in CAN wiring harness (CAN-L, CAN-H) • CAN wiring harness (CAN-L, CAN-H) short each other

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Start the engine, and drive the vehicle. — Does the speedometer needle move smoothly? — Does the speedometer needle indicate correct speed?	Yes	Troubleshooting completed.
		No	Go to the next step.
2	• Do the tachometer, the water temperature gauge, and the oil pressure gauge operate normally?	Yes	Go to the next step.
		No	Go to Step 4.
3	• Start the instrument cluster input/output check mode. • Inspect the speedometer using the check code 12. • Is the speedometer normal?	Yes	Inspect the ABS HU/CM, DSC HU/CM, or connectors.
		No	Replace the instrument cluster.
4	• Start the engine. • Does the ABS warning light turn off?	Yes	Inspect the PCM or connectors.
		No	Replace the instrument cluster.
5	• Disconnect the negative battery cable. • Measure the resistance between the DLC-2 terminals F and E. • Is the resistance below 60 ohms?	Yes	Go to the next step.
		No	Go to Step 7.
6	• Disconnect the negative battery cable. • Inspect the DLC-2 terminals F and E for short to power supply or GND. • Is there any malfunction?	Yes	Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part.
		No	Replace the instrument cluster.
7	• Turn the ignition switch to LOCK position. • Inspect the instrument cluster connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion). • Are the terminals normal? 	Yes	Go to the next step.
		No	Repair or replace the terminal.
8	• Disconnect the negative battery cable. • Measure the resistance between the instrument cluster connector terminals 1J and 1L. • Is the resistance **114—126 ohms**?	Yes	Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part.
		No	Replace the instrument cluster.

SYMPTOM TROUBLESHOOTING [INSTRUMENT CLUSTER]

NO. 8 TACHOMETER INDICATION IS DEFECTIVE [INSTRUMENT CLUSTER]

id0903d5808100

8	Tachometer indication is defective
POSSIBLE CAUSE	• PCM malfunction • Instrument cluster malfunction • Connector or pin malfunction • Short circuit in wiring harness between CAN-L, CAN-H and GND • Open circuit in CAN wiring harness (CAN-L, CAN-H) • CAN wiring harness (CAN-L, CAN-H) short each other

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Start the engine. — Does the tachometer needle move smoothly? — Does the tachometer needle indicate correct engine speed?	Yes	Troubleshooting completed.
		No	Go to the next step.
2	• Do the speedometer, the water temperature gauge, and the oil pressure gauge operate normally?	Yes	Go to the next step.
		No	Go to Step 4.
3	• Start the instrument cluster input/output check mode. • Inspect the tachometer using the check code 13. • Is the tachometer normal?	Yes	Inspect the PCM or connectors.
		No	Replace the instrument cluster.
4	• Start the engine. • Does the ABS warning light turn off?	Yes	Inspect the PCM or connectors.
		No	Replace the instrument cluster.
5	• Disconnect the negative battery cable. • Measure the resistance between the DLC-2 terminals F and E. • Is the resistance below 60 ohms?	Yes	Go to the next step.
		No	Go to Step 7.
6	• Disconnect the negative battery cable. • Inspect the DLC-2 terminals F and E for short to power supply or GND. • Is there any malfunction?	Yes	Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part.
		No	Replace the instrument cluster.
7	• Turn the ignition switch to LOCK position. • Inspect the instrument cluster connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion). • Are the terminals normal? 	Yes	Go to the next step.
		No	Repair or replace the terminal.
8	• Disconnect the negative battery cable. • Measure the resistance between the instrument cluster connector terminals 1J and 1L. • Is the resistance **114—126 ohms**?	Yes	Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part.
		No	Replace the instrument cluster.

SYMPTOM TROUBLESHOOTING [INSTRUMENT CLUSTER]

NO. 9 WATER TEMPERATURE GAUGE INDICATION IS DEFECTIVE [INSTRUMENT CLUSTER]

id0903d5808200

9	Water temperature gauge indication is defective
POSSIBLE CAUSE	• PCM malfunction • Instrument cluster malfunction • Connector or pin malfunction • Short circuit in wiring harness between CAN-L, CAN-H and GND • Open circuit in CAN wiring harness (CAN-L, CAN-H) • CAN wiring harness (CAN-L, CAN-H) short each other

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Start the engine. • Does the water temperature gauge needle move to medium range gradually and stay there?	Yes	Troubleshooting completed.
		No	Go to the next step.
2	• Do the speedometer, the tachometer, and the oil pressure gauge operate normally?	Yes	Go to the next step.
		No	Go to Step 4.
3	• Start the instrument cluster input/output check mode. • Inspect the water temperature gauge using the check code 25. • Is the water temperature gauge normal?	Yes	Inspect the PCM or connectors.
		No	Replace the instrument cluster.
4	• Start the engine. • Does the ABS warning light turn off?	Yes	Inspect the PCM or connectors.
		No	Replace the instrument cluster.
5	• Disconnect the negative battery cable. • Measure the resistance between the DLC-2 terminals F and E. • Is the resistance **below 60 ohms**?	Yes	Go to the next step.
		No	Go to Step 7.
6	• Disconnect the negative battery cable. • Inspect the DLC-2 terminals F and E for short to power supply or GND. • Is there any malfunction?	Yes	Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part.
		No	Replace the instrument cluster.
7	• Turn the ignition switch to LOCK position. • Inspect the instrument cluster connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion). • Are the terminals normal? 	Yes	Go to the next step.
		No	Repair or replace the terminal.
8	• Disconnect the negative battery cable. • Measure the resistance between the instrument cluster connector terminals 1J and 1L. • Is the resistance **114—126 ohms**?	Yes	Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part.
		No	Replace the instrument cluster.

SYMPTOM TROUBLESHOOTING [INSTRUMENT CLUSTER]

NO. 10 OIL PRESSURE GAUGE INDICATION IS DEFECTIVE (OIL PRESSURE GAUGE NEEDLE DOES NOT MOVE FROM THE L POSITION OR LESS) [INSTRUMENT CLUSTER]

id0903d5858100

10	**Oil pressure gauge indication is defective (oil pressure gauge needle does not move from the L position or less)**
POSSIBLE CAUSE	• PCM malfunction • Instrument cluster malfunction • Oil pressure switch malfunction • Connector or pin malfunction • Short circuit in wiring harness between CAN-L, CAN-H and GND • Open circuit in CAN wiring harness (CAN-L, CAN-H) • CAN wiring harness (CAN-L, CAN-H) short each other

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Start the engine. • Does the oil pressure gauge needle indicate L position or more?	Yes	Troubleshooting completed.
		No	Go to the next step.
2	• Do the speedometer, the tachometer, and the water temperature gauge operate normally?	Yes	Go to the next step.
		No	Go to Step 5.
3	• Does the engine oil need replenishment?	Yes	Add the engine oil.
		No	Go to the next step.
4	• Start the instrument cluster input/output check mode. • Inspect the oil pressure gauge using the check code 28. • Is the oil pressure gauge normal?	Yes	Inspect the PCM, oil pressure switch, or connectors.
		No	Replace the instrument cluster.
5	• Start the engine. • Does the ABS warning light turn off?	Yes	Inspect the PCM or connectors.
		No	Go to the next step.
6	• Disconnect the negative battery cable. • Measure the resistance between the DLC-2 terminals F and E. • Is the resistance below 60 ohms?	Yes	Go to the next step.
		No	Go to Step 8.
7	• Disconnect the negative battery cable. • Inspect the DLC-2 terminals F and E for short to power supply or GND. • Is there any malfunction?	Yes	Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part.
		No	Replace the instrument cluster.
8	• Turn the ignition switch to LOCK position. • Inspect the instrument cluster connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion). • Are the terminals normal? 	Yes	Go to the next step.
		No	Repair or replace the terminal.
9	• Disconnect the negative battery cable. • Measure the resistance between the instrument cluster connector terminals 1J and 1L. • Is the resistance **114—126 ohms**?	Yes	Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part.
		No	Replace the instrument cluster.

09-03E SYMPTOM TROUBLESHOOTING [ENTIRE AUDIO SYSTEM]

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SYMPTOM TROUBLESHOOTING [ENTIRE AUDIO SYSTEM]

FOREWORD [ENTIRE AUDIO SYSTEM]

id0903e2822600

Note

- Note down all radio programs set by the customer prior to the repairs. Reset all radio programs and adjust the time after the repairs.

Troubleshooting Index

No.	Symptom	Possible DTC
1	09-03E-4 NO.1 AF NOISE OR POP NOISE AT ALL SOURCES (RADIO, CD) [ENTIRE AUDIO SYSTEM]	09:Er20, 09:Er21
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SYMPTOM TROUBLESHOOTING [ENTIRE AUDIO SYSTEM]

Quick Diagnostic Chart (Entire Audio System)

X: Applicable

Possible factor \ Troubleshooting item	1 AF noise or POP noise at all sources (Radio, CD)	2 No power to the entire audio system	3 No sound from all the speakers	4 No sound from some speakers	5 Sound break-up or poor sound quality	6 Volume increases/decreases while driving the vehicle	7 ALC function is inoperative	8 AudioPilot® 2 function is inoperative	9 No audio system illumination
Low vehicle battery voltage	X								
Jammed radio signals from after market equipment	X								
Speaker malfunction (e. g., foreign material penetration, damage)	X		X	X	X				
Improper speaker installation	X				X				
Poor connection of center panel unit connector, terminal damage	X	X		X					X
Antenna malfunction (e.g., poor ground)	X								
Audio unit malfunction	X	X	X	X	X	X	X		X
Audio amplifier malfunction (with Bose®)	X		X	X	X	X		X	
Open or short circuit in wiring harness between audio amplifier and ground (with Bose®)	X								
Burnt fuse (B+)		X							
Burnt fuse (ACC)		X							
Open or short circuit in power supply (B+) wiring harness		X							
Open or short circuit in power supply (ACC) wiring harness		X							
Short circuit in wiring harness between center panel unit and speaker (without Bose®)			X	X					
Open circuit in wiring harness between center panel unit and speaker (without Bose®)				X					
Open or short circuit in wiring harness between audio amplifier and speaker (with Bose®)			X	X					
Open or short circuit in wiring harness between audio amplifier and audio unit (with Bose®)			X	X					
Poor connection of audio amplifier connector, terminal damage (with Bose®)	X		X	X				X	
Short circuit inside speaker			X	X					
Door trim and/or package trim vibration					X				
Open or short circuit in vehicle speed signal wiring harness (e.g., instrument cluster)							X	X	
Burnt fuse (TNS signal)									X
Open or short circuit in TNS signal wiring harness									X
Center panel malfunction									X
Open or short circuit in AudioPilot® 2 microphone signal wiring harness (with Bose®)								X	
Open or short circuit in AudioPilot® 2 signal wiring harness (with Bose®)								X	

amxzzw00002321

SYMPTOM TROUBLESHOOTING [ENTIRE AUDIO SYSTEM]

CONFIRMATION STEP 1: CENTER PANEL SWITCH CONFIRMATION [ENTIRE AUDIO SYSTEM]

id0903e2892800

- Verify the customer complaint and identify the malfunction as occurring from either the center panel or the audio unit.

How to activate center panel switch confirmation mode

1. Turn the ignition switch to the ACC or ON position.
2. Turn the center panel unit power to ON.
3. While pressing the POWER/VOLUME switch, simultaneously press the PRESET switch 3 for **approx. 0.2 s**.
4. The audio panel switch confirmation mode is now activated.

STEP	INSPECTION		ACTION
1	• Press each button on the center panel. • Does the buzzer sound when a button is pressed?	Yes	Verify the customer complaint and then go to the appropriate symptom troubleshooting procedure.
		No	Go to the next step.
2	• Disassemble and reassemble the center panel and audio unit. • Activate the center panel switch confirmation mode. • Does the buzzer sound when a button is pressed?	Yes	Go to the next step.
		No	Replace the center panel. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.)
3	• Does the audio system operate properly?	Yes	The system is normal.
		No	Verify the customer complaint and then go to the appropriate symptom troubleshooting procedure.

CONFIRMATION STEP 2: AUDIO CONTROL SWITCH CONFIRMATION [ENTIRE AUDIO SYSTEM]

id0903e2802900

- Verify the customer complaint and identify the malfunction as occurring from either the audio control switch or the audio unit.

STEP	INSPECTION		ACTION
1	• Is the symptom related to either the audio control switch or the audio unit operation?	Yes	Verify the customer complaint and then go to the appropriate symptom troubleshooting procedure.
		No	**The symptom is related to the audio unit operation:** • Follow “Confirmation Step 1”. **The symptom is related to the audio control switch operation:** • Go to the next step.
2	• Disconnect the audio unit connector (24-pin). • Inspect both the audio unit and the wiring harness-side connectors for a poor connection. (such as damaged/pulled-out pins, corrosion) — Terminal 1N (ST SW1) — Terminal 1P (ST SW2) • Are all the pins normal?	Yes	Go to the next step.
		No	**If the audio unit side connector is malfunctioning:** • Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.) **If the wiring harness-side connector is malfunctioning:** • Repair or replace the pins and/or the connector.
3	• Inspect the continuity between audio unit wiring harness-side connector terminals 1N and 1P while operating the audio control switch. • Does the resistance change?	Yes	Verify the customer complaint and then go to the appropriate symptom troubleshooting procedure.
		No	Go to the next step.
4	• Turn the ignition switch to the LOCK position. • Remove the audio control switch. • Inspect the continuity between the audio unit wiring harness-side connector (24-pin) terminal and the audio control switch wiring harness-side connector (8-pin) terminal. — Terminal 1N (24-pin) — Terminal G (8-pin) — Terminal 1P (24-pin) — Terminal H (8-pin) • Is there continuity?	Yes	Replace the audio control switch. (See 09-20-21 AUDIO CONTROL SWITCH REMOVAL/ INSTALLATION.)
		No	Repair or replace the related wiring harnesses.

SYMPTOM TROUBLESHOOTING [ENTIRE AUDIO SYSTEM]

NO.1 AF NOISE OR POP NOISE AT ALL SOURCES (RADIO, CD) [ENTIRE AUDIO SYSTEM]

id0903e2817600

1	AF noise or POP noise at all sources (Radio, CD)
Possible DTC	09:Er20, 09:Er21
POSSIBLE CAUSE	• Low vehicle battery voltage. • Jammed radio signals from after market equipment. • Speaker malfunction (e.g., foreign material penetration, damage) • Improper speaker installation • Audio unit malfunction • Audio amplifier malfunction (with Bose®) • Poor connection of center panel unit connector, terminal damage • Poor connection of audio amplifier connector, terminal damage (with Bose®) • Antenna malfunction (e.g., poor ground) • Open or short circuit in wiring harness between audio amplifier and ground (with Bose®) **Note** • AF noise is a snapping noise that generally occurs during ON/OFF switching operations of electrical equipment other than the audio unit, or a continual rasping noise that occurs when electrical equipment is operated. This is caused by noise interference in the power supply wiring, signal wiring, speaker cable or head of cassette deck. Therefore noise can be heard regardless of radio wave conditions or the audio volume position. The noise will start after one click from the minimum position of the volume button but normally does not change even when volume is turned to a higher position. • POP noise is snapping or popping noise that occurs during ON/OFF switching operation of the audio unit, or when switching from radio to CD. Even a normal audio unit sometimes emits a little noise depending on the conditions.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Inspect the vehicle battery voltage. • Is the vehicle battery voltage normal? **Specification:** **Ignition switch ON: 11.5 V or more** **Idle: 12.5 V or more**	Yes	Go to the next step.
		No	Charge the battery, then go to the next step.
2	• Turn the center panel unit power to ON. • Is there any noise?	Yes	Go to the next step.
		No	The system is normal. Explain to the customer that the vehicle battery voltage was low.
3	• Are any of the following after-market equipment installed? (Inspect especially near the antenna) — Radar detector — Remote engine starter — Anti-theft device — Other	Yes	Go to the next step.
		No	Go to the step 5.
4	• Remove the after-market equipment. • Turn the center panel unit power to ON. • Is there any noise?	Yes	Go to the next step.
		No	The system is normal. The after-market electrical devices might be the cause of the noise.
5	• Is there noise coming from all the speakers?	Yes	Go to the step 7.
		No	Go to the next step.
6	• Inspect the suspect speaker. • Is the speaker normal?	Yes	Go to the next step.
		No	**If there is any foreign material adhering to the speaker:** • Remove the foreign material from the speaker. **If the speaker is malfunctioning:** • Replace the speaker. (See 09-20-8 DOOR SPEAKER REMOVAL/INSTALLATION.) (See 09-20-10 REAR SPEAKER REMOVAL/INSTALLATION.) (See 09-20-9 CENTER SPEAKER REMOVAL/INSTALLATION.) (See 09-20-11 TWEETER/DOOR UPPER SPEAKER REMOVAL/INSTALLATION.) **If the speaker is not installed properly:** • Install the speaker properly.

SYMPTOM TROUBLESHOOTING [ENTIRE AUDIO SYSTEM]

STEP	INSPECTION		ACTION
7	• Attempt to duplicate the symptom on another vehicle. • Does the noise level improve compared to the customer's vehicle?	Yes	Go to the next step.
		No	The system is normal. Explain the noise generation mechanism to the customer. **Note** • The noise level that may be heard varies depending on the operating speed of the audio power and/or mode switches.
8	• Turn the ignition switch to the LOCK position. • Remove the center panel unit (without Bose®) or the audio amplifier (with Bose®). • Inspect the connection of the audio unit connector (without Bose®, 24-pin) or the audio amplifier connector (with Bose®, 16-pin) (for sound signal line). • Is the connector connected securely?	Yes	Go to the next step.
		No	Repair or replace the terminal or connector. Go to the next step.
9	• Is there any noise?	Yes	Go to the next step.
		No	The system is normal.
10	• Inspect the ground condition of the manual antenna. • Is the ground condition normal?	Yes	Repair or replace the manual antenna. Go to the next step.
		No	Go to the next step.
11	• Is there any noise?	Yes	**Without Bose®** • Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ASSEMBLY.) **With Bose®** • Replace the audio amplifier if any of the following occur: (See 09-20-6 AUDIO AMPLIFIER REMOVAL/INSTALLATION.) — The noise occurs from a specific speaker. — Noise occurs when the volume is minimized. • Replace the audio unit if any of the following occur: (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ASSEMBLY.) — The noise occurs from two or more speakers. — No noise occurs when the volume is minimized.
		No	The system is normal.

SYMPTOM TROUBLESHOOTING [ENTIRE AUDIO SYSTEM]

NO.2 NO POWER TO THE ENTIRE AUDIO SYSTEM [ENTIRE AUDIO SYSTEM]

id0903e2817800

2	No power to the entire audio system
Possible DTC	09:Er20
POSSIBLE CAUSE	• Burnt fuse (B+) • Burnt fuse (ACC) • Poor connection of audio unit connector, terminal damage • Open or short circuit in power supply (B+) wiring harness • Open or short circuit in power supply (ACC) wiring harness • Audio unit malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Turn the ignition switch to the LOCK position. • Inspect the following fuses: — ROOM 15 A — ACC 7.5 A • Are the fuses normal?	Yes	Go to the next step.
		No	Replace with the appropriate standard fuse. • If the fuse is melted, inspect the wiring harness for a short to ground. Repair or replace the wiring harness, then replace the fuse.
2	• Remove the center panel unit. • Inspect the connection of the audio unit connector (24-pin). • Disconnect the audio unit connector and inspect both the center panel unit and the wiring harness-side connectors for a poor connection. (such as damaged/pulled-out pins, corrosion). — Terminal 1B (B+) — Terminal 1R (ACC) — Terminal 1W (GND) • Are all the pins normal?	Yes	Go to the next step.
		No	**If audio unit connector has a poor connection:** • Securely connect the audio unit connector. **If the audio unit side connector is malfunctioning:** • Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.) **If the wiring harness-side connector is malfunctioning:** • Repair or replace the pins and/or the connector.
3	• Connect the audio unit connector. • Inspect the voltage for the power supply line (B+, ACC). **Specification:** **Ignition switch ON: 11.5 V or more** **Idle: 12.5 V or more** • Is the voltage normal?	Yes	Go to the next step.
		No	Inspect and repair or replace the suspect wiring harness. Charge the battery, if necessary.
4	• Turn the ignition switch to the LOCK position. • Remove the audio unit connector (24-pin). • Inspect the continuity between audio unit wiring harness-side connector terminal 1W and the ground. • Is there continuity?	Yes	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.)
		No	Repair or replace the wiring harness.

SYMPTOM TROUBLESHOOTING [ENTIRE AUDIO SYSTEM]

NO.3 NO SOUND FROM ALL SPEAKERS [ENTIRE AUDIO SYSTEM]

id0903e2803200

Vehicles Without Bose®

3	No sound from all speakers
Possible DTC	09:Er20, 09:Er21, 10:Er07, 22:Er07
POSSIBLE CAUSE	• Short circuit in wiring harness between center panel unit and speaker • Short circuit inside speaker • Audio unit malfunction • Speaker malfunction (e.g., foreign material penetration, damage)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Press the AUDIO CONT/TUNE switch for **2 s or more**. • Play the CD or radio. • Adjust the volume between “10” and “15”. • Is there any sound?	Yes	The system is normal.
		No	Go to the next step.
2	• Turn the ignition switch to the LOCK position. • Remove the center panel unit. • Disconnect the audio unit connector (24-pin). • Inspect the continuity between the audio unit wiring harness-side connector terminal and ground: **For door speakers** — Terminal 1A (LH+) — GND — Terminal 1C (LH-) — GND — Terminal 1D (RH+) — GND — Terminal 1F (RH-) — GND **For rear speakers** — Terminal 1V (LH+) — GND — Terminal 1X (LH-) — GND — Terminal 1S (RH+) — GND — Terminal 1U (RH-) — GND — Is there continuity?	Yes	Repair or replace the related wiring harnesses or the speaker. **Note** • If there is a short circuit between the speaker wiring harnesses or the speaker lead wire and ground, the protector circuit inside the audio unit operates to cut the sound.
		No	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.)

Vehicles With Bose®

3	No sound from all the speakers
Possible DTC	09:Er20, 09:Er21, 10:Er07, 22:Er07
POSSIBLE CAUSE	• Speaker malfunction (e.g., foreign material penetration, damage) • Open or short circuit in wiring harness between audio amplifier and center panel unit. • Open or short circuit in wiring harness between audio amplifier and speaker • Short circuit inside speaker • Audio amplifier malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Press the AUDIO CONT/TUNE switch for **2 s or more**. • Play the CD or radio. • Adjust the volume between “10” and “15”. • Is there any sound?	Yes	The system is normal.
		No	Go to the next step.
2	• Measure the voltage at audio amplifier terminal 1A (8-pin). (vehicle wiring harness-side) • Is the voltage B+?	Yes	Go to the step 4.
		No	Repair or replace the wiring harness between the audio amplifier and fuse. Go to the next step.
3	• Is there any sound?	Yes	The system is normal.
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [ENTIRE AUDIO SYSTEM]

STEP	INSPECTION		ACTION
4	• Turn the ignition switch to the LOCK position. • Disconnect the audio amplifier connector (8-pin, 16-pin) and the speaker connector. • Inspect the continuity between the following terminals of the audio amplifier connector and the speaker connector: **For door speaker** — Terminal 1H (LH+)— Terminal B — Terminal 1G (LH-)— Terminal A — Terminal 1D (RH-)— Terminal B — Terminal 1C (RH+)— Terminal A **For door upper speaker** — Terminal 2D (LH+)— Terminal B — Terminal 2B (LH-)— Terminal A — Terminal 2M (RH+)— Terminal B — Terminal 2O (RH-)— Terminal A **For rear speakers** — Terminal 2E (+)— Terminal B — Terminal 2G (-)— Terminal A **For center speakers** — Terminal 2I (+)— Terminal B — Terminal 2K (-)— Terminal A — Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the related wiring harnesses.
4	• Turn the ignition switch to the LOCK position. • Disconnect the audio amplifier connector (8-pin, 16-pin). • Inspect the continuity between the audio amplifier connector and ground: **For door speakers** — Terminal 1H (LH+) — GND — Terminal 1G (LH-) — GND — Terminal 1D (RH+) — GND — Terminal 1C (RH-) — GND **For door upper speakers** — Terminal 2D (LH+) — GND — Terminal 2B (LH-) — GND — Terminal 2M (RH+) — GND — Terminal 2O (RH-) — GND **For rear speakers** — Terminal 2E (OUT+) — GND — Terminal 2G (OUT-) — GND **For center speaker** — Terminal 2I (OUT+) — GND — Terminal 2K (OUT-) — GND — Is there continuity?	Yes	Repair or replace the related wiring harnesses or the speaker. **Note** • If there is a short circuit between the speaker wiring harnesses or the speaker lead wire and ground, the protector circuit inside the audio unit operates to cut the sound.
		No	Go to the next step.
5	• Turn the ignition switch to the LOCK position. • Disconnect the audio amplifier connector (16-pin) and audio unit connector (24-pin). • Inspect the continuity between audio amplifier terminal 3A (vehicle wiring harness-side) and the audio unit terminal 1J (vehicle wiring harness-side). — Is there continuity?	Yes	Replace the audio amplifier. (See 09-20-6 AUDIO AMPLIFIER REMOVAL/ INSTALLATION.)
		No	Repair or replace the wiring harness between the audio amplifier and the audio unit. Go to the next step.
6	• Is there any sound?	Yes	The system is normal.
		No	Replace the audio amplifier. (See 09-20-6 AUDIO AMPLIFIER REMOVAL/ INSTALLATION.)

SYMPTOM TROUBLESHOOTING [ENTIRE AUDIO SYSTEM]

NO.4 NO SOUND FROM SOME SPEAKERS [ENTIRE AUDIO SYSTEM]

id0903e2818100

Vehicles Without Bose®

4	No sound from some speakers
Possible DTC	—
POSSIBLE CAUSE	• Short circuit inside speaker • Open or short circuit in wiring harness between center panel unit and speaker • Poor connection of audio unit connector, terminal damage • Audio unit malfunction • Speaker malfunction (e.g., foreign material penetration, damage)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Turn the ignition switch to the ACC or ON position. • Turn the center panel unit power to ON. • Play the CD or radio. • Adjust the volume between “10” and “15”. • While pressing the POWER/VOLUME switch, simultaneously press the AUTO-M switch for **approx. 0.2 s**. • Is there any speaker that does not output sound?	Yes	**If no sound from some speaker:** • Go to the next step. **If no sound at all:** • Go to the troubleshooting of “No.3 No sound from all speakers”.
		No	The troubleshooting is completed.
2	• Does the same speaker output no sound if the audio source is changed? (Radio, CD)	Yes	Go to the next step.
		No	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.) **Note** • If a different speaker outputs no sound, the audio unit is malfunctioning.
3	• Turn the ignition switch to the LOCK position. • Inspect the connection of the audio unit connector (24-pin). (for sound signal line) • Is the connector connected securely?	Yes	Go to the next step.
		No	Connect the audio unit connector (24-pin) securely.
4	• Turn the ignition switch to the LOCK position. • Remove the center panel unit. • Disconnect the audio unit connector (24-pin). • Inspect the continuity between the audio unit wiring harness-side connector and ground. **For door speakers** — Terminal 1A (LH+) — GND — Terminal 1C (LH-) — GND — Terminal 1D (RH+) — GND — Terminal 1F (RH-) — GND **For rear speakers** — Terminal 1V (LH+) — GND — Terminal 1X (LH-) — GND — Terminal 1S (RH+) — GND — Terminal 1U (RH-) — GND • Is there continuity?	Yes	Repair or replace the related wiring harnesses or speaker.
		No	Go to the next step. **Note** • If there is a short circuit between the speaker wiring harnesses or the speaker lead wire and ground, the protector circuit inside the audio unit operates to cut the sound.

SYMPTOM TROUBLESHOOTING [ENTIRE AUDIO SYSTEM]

STEP	INSPECTION		ACTION
5	• Disconnect the speaker connector (2-pin) and inspect the resistance of speaker. • Inspect the continuity between the audio unit wiring harness-side connector terminal and speaker wiring harness-side connector: **Audio unit—front speaker** — Terminal 1A (LH+)—terminal B — Terminal 1C (LH-)—terminal A — Terminal 1D (RH+)—terminal B — Terminal 1F (RH-)—terminal A **Audio unit—rear speaker** — Terminal 1V (LH+)—terminal A — Terminal 1X (LH-)—terminal B — Terminal 1S (RH+)—terminal A — Terminal 1U (RH-)—terminal B • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the suspect wiring harness or speaker.
6	• Inspect the suspect speaker. • Is the speaker normal? **Note** • If the speaker lead wire contacts either the ground or vehicle frame, replace the speaker.	Yes	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.)
		No	Replace the speaker.

Vehicles With Bose®

4	No sound from some speakers
Possible DTC	—
POSSIBLE CAUSE	• Short circuit inside speaker • Audio unit malfunction • Poor connection of center panel unit connector, terminal damage • Poor connection of audio amplifier connector • Open or short circuit in wiring harness between audio amplifier and speaker • Open or short circuit in wiring harness between audio amplifier and center panel unit • Audio amplifier malfunction • Speaker malfunction (e.g., foreign material penetration, damage)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Turn the ignition switch to the ACC or ON position. • Turn the center panel unit power to ON. • Play the CD or radio. • Adjust the volume between “10” and “15”. • While pressing the POWER/VOLUME switch, simultaneously press the AUTO-M switch for **approx. 0.2 s**. • Is there any speaker that does not output sound?	Yes	**If there is no sound from some speakers:** • Go to the next step. **If there is no sound at all:** • Go to troubleshooting “No.3 No sound from all speakers”.
		No	The troubleshooting is completed.
2	• Does the same speaker output no sound if the audio source is changed? (Radio, CD)	Yes	Go to the next step.
		No	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.) **Note** • If a different speaker outputs no sound, the audio unit is malfunctioning.
3	• Turn the ignition switch to the LOCK position. • Inspect the connection of the audio unit connector (24-pin). (For sound signal line) • Is the connector connected securely?	Yes	Go to the next step.
		No	Connect the audio unit connector (24-pin) securely.

SYMPTOM TROUBLESHOOTING [ENTIRE AUDIO SYSTEM]

STEP	INSPECTION		ACTION
4	• Turn the ignition switch to the LOCK position. • Remove the center panel unit. • Disconnect the audio unit connector (24-pin). • Inspect the continuity between the audio unit wiring harness-side connector and ground. **For door speakers** — Terminal 1A (LH+) — GND — Terminal 1C (LH-) — GND — Terminal 1D (RH+) — GND — Terminal 1F (RH-) — GND **For rear speakers** — Terminal 1S (LH+) — GND — Terminal 1U (LH-) — GND — Terminal 1V (RH+) — GND — Terminal 1X (RH-) — GND • Is there continuity?	Yes	Go to the next step.
		No	Go to the step 6.
5	• Inspect the continuity between the following terminals of the audio amplifier wiring harness-side connector (16-pin) and the audio unit wiring harness-side connector (24-pin). **For door speakers** — Terminal 3D (LH+) — Terminal 1A (LH+) — Terminal 3C (LH-) — Terminal 1C (LH-) — Terminal 3F (RH+) — Terminal 1D (RH+) — Terminal 3E (RH-) — Terminal 1F (RH-) **For rear speakers** — Terminal 3H (LH+) — Terminal 1S (LH+) — Terminal 3G (LH-) — Terminal 1U (LH-) — Terminal 3J (RH+) —Terminal 1V (RH+) — Terminal 3I (RH-) — Terminal 1X (RH-) • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the related wiring harnesses between the audio amplifier and the audio unit. Go to the next step.
6	• Inspect the connection of the audio amplifier connector (16-pin, 8-pin). • Is the connector connected securely?	Yes	Go to the next step.
		No	Connect the audio amplifier connector (16-pin, 8-pin) securely.
7	• Disconnect the audio amplifier (8-pin, 16-pin) and the speaker connector. • Inspect the continuity between the following terminals of the audio amplifier connector and the speaker connector. **For door speaker** — Terminal 1H (LH+)— Terminal B — Terminal 1G (LH-)— Terminal A — Terminal 1D (RH+)— Terminal B — Terminal 1C (RH-)— Terminal A **For door upper speaker** — Terminal 2D (LH+)— Terminal B — Terminal 2B (LH-)— Terminal A — Terminal 2M (RH+)— Terminal B — Terminal 2O (RH-)— Terminal A **For rear speakers** — Terminal 2E (+)— Terminal B — Terminal 2G (-)— Terminal A **For center speaker** — Terminal 2I (+)— Terminal B — Terminal 2K (-)— Terminal A • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the related wiring harnesses.

SYMPTOM TROUBLESHOOTING [ENTIRE AUDIO SYSTEM]

STEP	INSPECTION		ACTION
8	• Inspect the continuity between the following terminals of the audio amplifier wiring harness-side connector (8-pin, 16-pin) and ground. **For door speakers** — Terminal 1H (LH+) — GND — Terminal 1G (LH-) — GND — Terminal 1D (RH+) — GND — Terminal 1C (RH-) — GND **For door upper speakers** — Terminal 2D (LH+) — GND — Terminal 2B (LH-) — GND — Terminal 2M (RH+) — GND — Terminal 2O (RH-) — GND **For rear speakers** — Terminal 2E (+) — GND — Terminal 2G (-) — GND **For center speaker** — Terminal 2I (+) — GND — Terminal 2K (-) — GND • Is there continuity?	Yes	Repair or replace for a short circuit between the audio amplifier and speaker wiring harnesses or inside the speaker. **Note** • If there is a short circuit between the speaker wiring harnesses or the speaker lead wire and ground, the protector circuit inside the audio amplifier operates to cut the sound.
		No	Go to the next step.
9	• Inspect the suspect speaker. • Is the speaker normal? **Note** • If the speaker lead wire contacts to either ground or vehicle frame, replace the speaker.	Yes	Replace the audio amplifier. (See 09-20-6 AUDIO AMPLIFIER REMOVAL/ INSTALLATION.)
		No	Replace the speaker.

NO.5 SOUND BREAK-UP OR POOR SOUND QUALITY [ENTIRE AUDIO SYSTEM]

id0903e2818300

5	Sound break-up or poor sound quality
Possible DTC	09:Er21
POSSIBLE CAUSE	• Improper speaker installation • Door trim and/or package trim vibration • Audio unit malfunction • Audio amplifier malfunction (with Bose®) • Speaker malfunction (e.g., foreign material penetration, damage)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is there sound break-up or poor sound quality from all speakers?	Yes	Go to the next step.
		No	Go to the step 5.
2	• Inspect the sound while adjusting the sound volume. • Is there sound break-up or poor sound quality between “15” and “20”?	Yes	Go to the next step.
		No	The system is normal.
3	• Inspect the BASS/TREB. • Is there poor sound quality between “-3 — +3” of the “BASS/TREB”? **Note** • When the AUDIO CONT/TUNE switch is pressed for a few seconds, BASS/TREB is set to “0”.	Yes	Go to the next step.
		No	If there is sound break-up between “-6—+6” of the BASS/ TREB at the maximum volume, the system is normal.

SYMPTOM TROUBLESHOOTING [ENTIRE AUDIO SYSTEM]

STEP	INSPECTION		ACTION
4	• Attempt to duplicate the symptom on another vehicle. • Is the sound quality better than the customer's vehicle?	Yes	**Without Bose®** • Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.) **With Bose®** • Replace the audio amplifier if the following occurs: (See 09-20-6 AUDIO AMPLIFIER REMOVAL/ INSTALLATION.) — Noise occurs from a specific speaker. • Replace the audio unit if the following occurs: (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.) — Noise occurs from two or more speakers.
		No	The system is normal.
5	• Identify the speaker with sound break-up by adjusting BAL/FADE. • . Is the speaker installed properly?	Yes	Go to the next step.
		No	Install the speaker properly.
6	• Remove the speaker. • Is there any foreign material penetration or damage to the speaker?	Yes	Repair or replace the suspect speaker.
		No	Go to the next step.
7	• Inspect the sound again. • Is there sound break-up?	Yes	Go to the next step.
		No	Inspect for vibration from the door trim and/or other trim. Repair or replace the suspect trim if necessary.
8	• Replace with a speaker known to be operational. (e.g., swap right and left speakers) • Is the sound break-up heard at the same location?	Yes	**Without Bose®** • Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.) **With Bose®** • Replace the audio amplifier if the following occurs: (See 09-20-6 AUDIO AMPLIFIER REMOVAL/ INSTALLATION.) — Noise occurs from a specific speaker. • Replace the audio unit if the following occurs: (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.) — Noise occurs from two or more speakers.
		No	Replace the speaker.

SYMPTOM TROUBLESHOOTING [ENTIRE AUDIO SYSTEM]

NO.6 VOLUME INCREASES/DECREASES WHILE DRIVING THE VEHICLE [ENTIRE AUDIO SYSTEM]

id0903e2818500

6	Volume increases/decreases while driving the vehicle
Possible DTC	—
POSSIBLE CAUSE	• Audio unit malfunction (without Bose®) • Audio amplifier malfunction (with Bose®) **Note** • Inspect the ALC function (without Bose®) or AUDIOPILOT function (with Bose®) while driving the vehicle and playing a CD.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Does the ALC function or AUDIOPILOT function turn on?	Yes	Go to the next step.
		No	**Without Bose®** • Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.) **With Bose®** • Replace the audio amplifier if the following occurs: (See 09-20-6 AUDIO AMPLIFIER REMOVAL/ INSTALLATION.) — The volume changes suddenly.
2	• Turn the ALC function or AUDIOPILOT function off. • Does the sound change while driving the vehicle?	Yes	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.)
		No	The system is normal. Explain the ALC function to the customer.

NO.7 ALC FUNCTION IS INOPERATIVE [ENTIRE AUDIO SYSTEM]

id0903e2803600

7	ALC function is inoperative
Possible DTC	—
POSSIBLE CAUSE	• Audio unit malfunction • Open or short circuit in vehicle speed signal wiring harness (e. g., instrument cluster) **Note** • Inspect the ALC function while driving the vehicle and playing a CD.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Turn the ALC function on. • Inspect the ALC function operation while driving the vehicle. (ALC level 3) • Does the ALC system operate properly?.	Yes	The system is normal. Explain the ALC function to the customer.
		No	Go to the next step.
2	• Turn the ignition switch to LOCK position. • Remove the center panel unit. • Disconnect the audio unit connector (24-pin). • Inspect the audio unit connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion). • Are the terminals normal?	Yes	Go to the next step.
		No	Repair or replace the terminal.
3	• Turn the ignition switch to LOCK position. • Inspect for continuity between the following wiring harnesses. — 1I terminal-GND • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground.
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [ENTIRE AUDIO SYSTEM]

STEP	INSPECTION		ACTION
4	• Turn the ignition switch to LOCK position. • Remove the instrument cluster. • Inspect for continuity following the wiring harness between instrument cluster and center panel unit. — 2O terminal-1I terminal • Is there continuity?	Yes	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.)
		No	Repair or replace the wiring harness for possible open circuit between the instrument cluster and the audio unit.

NO.8 AudioPilot®2 FUNCTION IS INOPERATIVE [ENTIRE AUDIO SYSTEM]

id0903e2996400

8	AudioPilot®2 function is inoperative
Possible DTC	—
POSSIBLE CAUSE	• Audio amplifier malfunction • Open or short circuit in AudioPilot®2 signal wiring harness • Open or short circuit in AudioPilot®2 microphone signal wiring harness • Open or short circuit in vehicle speed signal wiring harness (e. g., instrument cluster) **Note** • Inspect the AudioPilot®2 function while driving the vehicle and playing a CD.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Turn the AudioPilot®2 function on. • Inspect the AudioPilot®2 function operation while driving the vehicle. • Does the AudioPilot®2 system operation properly?	Yes	The system is normal. Explain the AudioPilot®2 function to the customer.
		No	Go to the next step.
2	• Inspect the connection of the audio amplifier connector (AudioPilot®2 microphone signal). • Inspect both the audio amplifier wiring harness-side connector terminal 3O, 3P and 3B for a poor connection (such as damaged/ pulled-out pins, corrosion). • Are all the pins normal?	Yes	Repair or replace the pins and/or the connector.
		No	Go to the next step.
3	• Inspect the connection of the AudioPilot®2 microphone connector (2-pin). • Inspect the AudioPilot®2 microphone wiring harness-side connector terminal A and B (2-pin) for poor connection (such as damaged/ pulled-out pins, corrosion). • Are all pins normal?	Yes	Repair or replace the pins and/or the connector.
		No	Go to the next step.
4	• Inspect continuity between the following terminals of the audio amplifier connector and body ground. — Terminal 3O (AudioPilot®2 microphone+) — Terminal 3P (AudioPilot®2 microphone-) — Terminal 3B (vehicle speed signal) • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to ground.
		No	Go to the next step.
5	• Inspect continuity between the following terminals of the audio amplifier connector and AudioPilot®2 microphone/instrument cluster connector. — Terminal 3O—AudioPilot®2 microphone terminal B (+) — Terminal 3P—AudioPilot®2 microphone terminal A (-) — Terminal 3B—Instrument cluster terminal 2O (vehicle speed signal) • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace for open circuit.

SYMPTOM TROUBLESHOOTING [ENTIRE AUDIO SYSTEM]

STEP	INSPECTION		ACTION
6	• Retrieve the DTCs from all vehicle modules using the M-MDS. • Is there the following DTC displayed? — Vehicle speed signal — CAN communication	Yes	Go to the appropriate DTC inspection.
		No	Replace the audio amplifier. (See 09-20-6 AUDIO AMPLIFIER REMOVAL/ INSTALLATION.)

NO.9 NO AUDIO SYSTEM ILLUMINATION [ENTIRE AUDIO SYSTEM]

id0903e2826600

9	No audio system illumination
Possible DTC	09:Er20, 21:Er19
POSSIBLE CAUSE	• Center panel malfunction • Burnt fuse (TNS signal) • Poor connection of center panel unit connector, terminal damage • Open or short circuit in TNS signal wiring harness • Audio unit malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is all the illumination on the center panel unit turned off?	Yes	Go to the next step.
		No	Replace the center panel. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.)
2	• Turn the ignition switch to the LOCK position. • Inspect the fuse (ILLUMI). • Is the fuse normal?	Yes	Go to the step 4.
		No	Go to the next step.
3	• Turn the ignition switch to the LOCK position. • Disconnect the audio unit connector (24-pin) and inspect the continuity between the audio unit wiring harness-side connector terminal 1E (TNS) and the ground. • Is there continuity?	Yes	Repair or replace the short circuit in the suspect wiring harness. After repairing the wiring harness, replace with the appropriate standard fuse.
		No	Go to the next step.
4	• Inspect the connection of the audio unit connector (24-pin). • Inspect both the audio unit and wiring harness-side connector terminal 1E for a poor connection (such as damaged/pulled-out pins, corrosion). • Are all the pins normal?	Yes	Go to the next step.
		No	**If audio unit connector has a poor connection:** • Securely connect the audio unit connector. **If the audio unit side connector is malfunctioning:** • Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.) **If the wiring harness-side connector is malfunctioning:** • Repair or replace the pins and/or the connector.
5	• Connect the audio unit connector (24-pin). • Turn the ignition switch to the ACC position. • Inspect the voltage at the audio unit connector terminal 1E (TNS). • Is the voltage **B+** when the light switch is turned to the TNS position?	Yes	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.)
		No	Repair or replace the related wiring harness (TNS signal).

09-03F SYMPTOM TROUBLESHOOTING [RADIO]

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FOREWORD [RADIO]

id0903e3802700

Note

- In case location, time, and broadcasting station etc. can be specified through interview to customer, possibility that signal environment causes problem is high.
- Perform confirmation of symptom and evaluation under conditions that customer reported (location, time, broadcasting station etc.). If not possible, perform it under equivalent conditions.
- Before inspection or repair, record the broadcasting stations that customer preset and reset them accordingly after the inspection or repair. Adjust the clock too.

Troubleshooting Index

No.	Symptom	Possible DTC
1	09-03F-3 NO.1 NO RADIO RECEPTION (AM/FM)/NO OR LOW VOLUME [RADIO]	09:Er20, 09:Er22
2	09-03F-4 NO.2 NOISE FROM RADIO (AM ONLY) [RADIO]	09:Er22
3	09-03F-6 NO.3 NOISE FROM RADIO (FM ONLY) [RADIO]	09:Er22
4	09-03F-8 NO.4 CANNOT TUNE (SEEK DOES NOT STOP) [RADIO]	09:Er20, 09:Er22
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SYMPTOM TROUBLESHOOTING [RADIO]

Quick Diagnostic Chart (Radio)

X: Applicable

Possible factor \ Troubleshooting item	1 No radio reception (AM/FM)/No or low volume	2 Noise from radio (AM only)	3 Noise from radio (FM only)	4 Cannot tune (SEEK does not stop)	5 Cannot preset (preset function does not operate)	6 Reception frequency of radio slips
Jamming from aftermarket electronic equipment (two-way radio, navigation system, mobile phone, etc)	X	X	X			
Audio unit	X	X	X	X	X	X
Antenna plug poor connection	X	X	X	X		
Antenna feeder	X	X	X	X		
Electronic jamming from outside, or inferior condition of broadcasting station radio wave	X	X	X	X		X
Antenna rod not installed	X	X	X	X		
Noise from electrical system on vehicle (e.g. fuel pump)		X	X			
Battery		X	X			
Charging system		X	X			
Antenna installation loosened		X	X			
Center panel				X	X	

ar8uuw00000403

CONFIRMATION STEP 1: RECEPTION CONDITION SYMPTOM (EXAMPLE) [RADIO]

id0903e3804000

Symptom	Antenna signal condition	Source
Only a buzzing sound from the speakers	• There is no broadcasting wave. • Signals from antenna to audio unit are not transmitted.	• Electric noise caused by the operation of internal circuit from audio unit itself • Atmosphere noise
A buzzing or crunching sound and normal sound produced at the same time from the speakers	• Though signals are transmitted from antenna to audio unit, electric noise from other sources is larger.	• Electrical noise caused by operation of electrical component on vehicle • Electrical noise from high tension wire, transformer substation (factory), electrical feeder line (street car), or motorcycle.
A thumping sound and normal sound produced at the same time from the speakers (FM only)	• Noise occurs due to radio wave environment at specific places (e.g. in valleys between buildings). Noise varies when own vehicle or surrounding vehicles moves. (FM only)	• Interference between direct and reflected waves of FM signals causes noise (Multipass noise).

SYMPTOM TROUBLESHOOTING [RADIO]

CONFIRMATION STEP 2: ANTENNA SYSTEM SYMPTOM (EXAMPLE) [RADIO]

id0903e3804100

Possible cause	AM reception condition	FM reception condition
• Antenna feeder axis, open circuit • Antenna feeder plug not attached	NG: No reception	YES: Reception possible. (Sensitivity decreases, but reception is possible under strong electric field.)
• Antenna feeder axis (+) to ground (-), open circuit	NG: No reception	NG: No reception
• Antenna feeder and antenna, poor ground	YES: Reception possible (Noise may occur)	YES: Reception possible (Sensitivity decreases, but reception is possible under strong electric field.)
• Antenna feeder, jack and plug poor connection	NG: No reception (Depending on connection conditions)	YES: Reception possible (Depending on connection conditions)

CONFIRMATION STEP 3: ANTENNA SYSTEM SIMPLE INSPECTION [RADIO]

id0903e3804200

- Because the antenna system is equipped with a capacitor, the continuity cannot be checked. Therefore proceed the following simple inspection.
  1. Turn the AM radio on.
  2. Tune to the frequency that there is no broadcast and you will hear a buzzing sound.
  3. Turn a work light on and shake it around the antenna rod (around 10—20 mm)

Note
- Use a fluorescent light type for the inspection. Accurate diagnostic cannot be done with a different type of light.

4. If a whirring sound from the speaker synchronized to the work light movement is confirmed, the antenna system is normal.

amxzzw0000110

NO.1 NO RADIO RECEPTION (AM/FM)/NO OR LOW VOLUME [RADIO]

id0903e3804300

1	No radio reception (AM/FM)/no or low volume
Possible DTC	09:Er20, 09:Er22
POSSIBLE CAUSE	• Low vehicle battery voltage • Electronic jamming from outside, or inferior condition of broadcasting station radio wave • Jamming from aftermarket electronic equipment (two-way radio, navigation system, mobile phone, etc.) • Antenna plug poor connection • Antenna feeder malfunction • Audio unit malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Turn the center panel unit power to ON. • Is the LCD indicated correctly?	Yes	Go to the step 3.
		No	Go to the next step.
2	• Measure voltage at B+ and ACC terminals. • Is voltage okay? **Specification** **With ignition switch ON: 11.5 V or more** **At idling: 12.5 V or more**	Yes	Go to the next step.
		No	Follow diagnostic procedure for symptom No. 2 (ENTIRE AUDIO SYSTEM).
3	• Set volume to 10 to 15. • Is buzzing sound or voice confirmed?	Yes	Go to the next step.
		No	Follow diagnostic procedure for symptom No. 3 (ENTIRE AUDIO SYSTEM) or No. 4 (ENTIRE AUDIO SYSTEM).
4	• Tune to local broadcasting station and check reception condition. • Is reception okay?	Yes	Go to the next step.
		No	Go to the step 6.

SYMPTOM TROUBLESHOOTING [RADIO]

STEP	INSPECTION		ACTION
5	• Push PRESET switches and check preset conditions. • Has preset been stored?	Yes	The system is normal.
		No	Preset broadcasting stations.
6	• Is aftermarket electronic equipment (two-way radio, navigation system, mobile phone, etc.) installed? **Note** • TV antenna located closely to audio antenna can be cause of noise. Relocate TV antenna.	Yes	Go to the next step.
		No	Go to the step 8.
7	• Remove aftermarket electronic equipment. • Turn audio unit ON and check reception condition. • Is reception improved?	Yes	The system is normal. (Explain to customers that aftermarket electronic equipment is cause of noise)
		No	Go to the next step.
8	• Refer to confirmation step 3, and inspect antenna system. • Is a whirring sound present?	Yes	Replace audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.)
		No	Go to the next step.
9	• Inspect antenna plug connection condition. • Is connection okay?	Yes	Go to the next step.
		No	Insert antenna plug securely.
10	• Turn ignition switch to LOCK position. • Measure continuity between antenna feeder axis and ground. • Is there any continuity?	Yes	Replace antenna feeder.
		No	Go to the next step.
11	• Compare reception with other audio unit on same model (model/unit) under same problem conditions. • Is reception equivalent between customer's unit and compared unit? **Note** • Due to following differences, you may feel difference in reception efficiency. **(Vehicle side factor)** — Antenna installation location, height, feeder wiring routing, optional electrical equipment **(Audio unit factor)** — Volume concern type: It decreases change of volume when signals become weak. (Noise is easy to be conspicuous) — Noise decrease type: It decreases volume when signals become weak, so that noise is not conspicuous.	Yes	The system is normal. (It is caused by electronic jamming from outside, or inferior broadcasting station signal condition.)
		No	Replace audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.)

NO.2 NOISE FROM RADIO (AM ONLY) [RADIO]

id0903e3804400

2	Noise from radio (AM only)
Possible DTC	09:Er22
POSSIBLE CAUSE	• Antenna rod not installed • Jamming from aftermarket electronic equipment (two-way radio, navigation system, mobile phone, etc.) • Battery malfunction • Noise from electrical system on vehicle (e.g. fuel pump) • Charging system malfunction • Electronic jamming from outside, or inferior condition of broadcasting station radio wave • Antenna plug poor connection • Antenna feeder malfunction • Antenna installation loosened • Audio unit malfunction

SYMPTOM TROUBLESHOOTING [RADIO]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Tune to local broadcasting station and check reception condition. • Is reception okay?	Yes	Tune to correct frequency of broadcasting station. If not preset, preset it.
		No	Go to the next step.
2	• Is aftermarket electronic equipment (two-way radio, navigation system, mobile phone, etc.) installed? **Note** • TV antenna located closely to audio antenna can be cause of noise. Relocate TV antenna.	Yes	Go to the next step.
		No	Go to the step 4.
3	• Remove aftermarket electronic equipment. • Turn audio unit ON and check reception condition. • Is reception improved?	Yes	The system is normal. (Explain to customers that aftermarket electronic equipment is cause of noise)
		No	Go to the next step.
4	• Measure battery voltage. • Is battery voltage okay? **Specification:** **With ignition switch ON: 11.5 V or more** **At idling: 12.5 V or more** **Note** • Inspect that battery cables are connected to terminals securely.	Yes	Go to the next step.
		No	Charge battery. Inspect charging system, and repair or replace if necessary.
5	• Is noise occurring only when vehicle electrical system (e.g. fuel pump) operates? **Note** • Identify subject electrical component by disconnecting fuse, turning switch ON & OFF, or disconnecting & connecting connector. • It will be easy when simulation function on M-MDS is used.	Yes	Go to the next step.
		No	Go to the step 7.
6	• Inspect power supply, ground condition, and noise prevention capacitor for electrical component. • Is noise present after inspection? **Note** • Inspect following: — Power supply to electrical component for voltage drop (compare with battery voltage) — Resistance between ground of electrical component and body. (Should be close to 0 ohm) — Installation condition of noise prevention capacitor for fuel pump etc.	Yes	Go to the next step.
		No	Troubleshooting completed. **Note** • The audio unit supplies 12 V battery power to the antenna amplifier for the AM radio reception in the radio mode. The audio unit cannot receive the AM signals without the 12 V battery power to the antenna amplifier. If the AM signals become strong, the audio unit may receive the signal with noises.
7	• Inspect antenna plug connection condition. • Is connection okay?	Yes	Go to the next step.
		No	Insert antenna plug securely.
8	• Turn ignition switch to LOCK position. • Measure continuity between antenna feeder axis and ground. • Is there any continuity?	Yes	Replace antenna feeder.
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [RADIO]

STEP	INSPECTION		ACTION
9	Compare reception with other audio unit on same model (model/unit) under same problem conditions. • Is reception equivalent between customer's unit and compared unit? **Note** • Due to following differences, you may feel difference in reception efficiency. **(Vehicle side factor)** — Antenna installation location, height, feeder wiring routing, optional electrical equipment **(Audio unit factor)** — Volume concern type: It decreases change of volume when signals become weak. (Noise is easy to be conspicuous) — Noise decrease type: It decreases volume when signals become weak, so that noise is not conspicuous.	Yes	The system is normal (It is caused by electronic jamming from outside, or inferior broadcasting station signal condition).
		No	Go to the next step.
10	• Retighten ground fixation for antenna installation part and antenna amplifier. • Is noise present, after retightening?	Yes	Replace audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.)
		No	Troubleshooting completed.

NO.3 NOISE FROM RADIO (FM ONLY) [RADIO]

id0903e3804500

3	Noise from radio (FM only)
Possible DTC	09:Er22
POSSIBLE CAUSE	• Antenna rod not installed • Jamming from aftermarket electronic equipment (two-way radio, navigation system, mobile phone, etc.) • Battery malfunction • Noise from electrical system on vehicle (e.g. fuel pump) • Charging system malfunction • Electronic jamming from outside, or inferior condition of broadcasting station radio wave • Antenna plug poor connection • Antenna feeder malfunction • Antenna installation loosened • Audio unit malfunction **Note** • FM broadcast has feature "sound quality is good" and "resistant to noise", but FM broadcast has particular noises. Though audio unit is designed to reduce noise, there are times noise occurs due to conditions.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Tune to local broadcasting station and check reception condition. • Is reception okay?	Yes	Tune to correct frequency of broadcasting station. If not preset, preset it.
		No	Go to the next step.
2	• Is aftermarket electronic equipment (two-way radio, navigation system, mobile phone, etc.) installed?	Yes	Go to the next step.
		No	Go to the step 4.
3	• Remove aftermarket electronic equipment. • Turn audio unit ON and check reception condition. • Is reception improved?	Yes	The system is normal. (Explain to customers that aftermarket electronic equipment is cause of noise)
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [RADIO]

STEP	INSPECTION		ACTION
4	• Measure battery voltage. • Is battery voltage okay? **Specification:** **With ignition switch ON: 11.5 V or more** **At idling: 12.5 V or more** **Note** • Inspect that battery cables are connected to terminals securely.	Yes	Go to the next step.
		No	Charge battery. Inspect charging system, and repair or replace if necessary.
5	• Is noise occurring only when vehicle electrical system (e.g. fuel pump) operates? **Note** • Identify subject electrical component by disconnecting fuse, turning switch ON & OFF, or disconnecting & connecting connector. • It will be easy when simulation function on M-MDS is used.	Yes	Go to the next step.
		No	Go to the step 7.
6	• Inspect power supply, ground condition, and noise prevention capacitor for electrical component. • Is noise present after inspection? **Note** • Inspect following: — Power supply to electrical component for voltage drop (compare with battery voltage) — Resistance between ground of electrical component and body. (Should be close to 0 ohm) — Installation condition of noise prevention capacitor for fuel pump etc.	Yes	Go to the next step.
		No	Troubleshooting completed.
7	• Inspect antenna plug connection condition. • Is connection okay?	Yes	Go to the next step.
		No	Insert antenna plug securely.
8	• Turn ignition switch to LOCK position. • Measure continuity between antenna feeder axis and ground. • Is there any continuity?	Yes	Replace antenna feeder.
		No	Go to the next step.
9	• Compare reception with other audio unit on same model (model/unit) under same problem conditions. • Is reception equivalent between customer's unit and compared unit?	Yes	The system is normal (It is caused by electronic jamming from outside, or inferior broadcasting station signal condition).
		No	Go to the next step.
10	• Retighten ground fixation for antenna installation part and antenna amplifier. • Is noise present, after retightening? **Note** • When antenna is not grounded perfectly, FM particular noise is likely to be conspicuous.	Yes	Replace audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.)
		No	Troubleshooting completed.

SYMPTOM TROUBLESHOOTING [RADIO]

NO.4 CANNOT TUNE (SEEK DOES NOT STOP) [RADIO]

id0903e3804600

4	Cannot tune (seek does not stop)
Possible DTC	09:Er20, 09:Er22
POSSIBLE CAUSE	• Center panel malfunction • Electronic jamming from outside, or inferior condition of broadcasting station radio wave • Antenna plug poor connection • Antenna feeder malfunction • Audio unit malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Inspect if feel of SEEK switch is normal when switch is pushed and released. • Is it okay?	Yes	Go to the next step.
		No	Perform confirmation step 1: audio panel switch confirmation. Replace center panel if necessary.
2	• Inspect indication of LCD. • Is frequency indication increased or decreased when SEEK switch is pushed?	Yes	Go to the next step.
		No	Perform confirmation step 1: audio panel switch confirmation. Replace center panel if necessary.
3	• Manually tune to local broadcasting station and check reception condition. • Is reception okay?	Yes	Go to the step 6.
		No	Go to the next step.
4	• Inspect antenna plug connection condition. • Is connection okay?	Yes	Go to the next step.
		No	Insert antenna plug securely.
5	• Turn ignition switch to LOCK position. • Measure continuity between antenna feeder axis and ground. • Is there any continuity?	Yes	Replace antenna feeder.
		No	Go to the next step.
6	• Check if number of broadcasting stations changes depending on time and place. • Does it change?	Yes	The system is normal. (Explain to customer that SEEK sometimes does not stop depending on signal reception condition) **Note** • Signals tend to reach longer distances in the night. It is conspicuous in AM signals, several audio functions may stop due to foreign broadcasting station or noise. Though the audio system restrains sensitivity of SEEK and SCAN functions in the night, the audio system may select other than desired broadcasting station when signals are considerably strong. This function is linked to the parking light. When the parking light or headlight is turned on, SEEK and SCAN may not function for weak signals.
		No	Replace audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.)

SYMPTOM TROUBLESHOOTING [RADIO]

NO.5 CANNOT PRESET (PRESET FUNCTION DOES NOT OPERATE) [RADIO]

id0903e3804700

5	Cannot preset (preset function does not operate)
Possible DTC	21:Er19
POSSIBLE CAUSE	• Audio unit malfunction • Center panel malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Tune to desired station and push channel preset button 1 for about 2 seconds to store it. • Repeat above for other stations using PRESET switch 2 to 6. • Push channel preset switch 1 to 6 one by one. • Are stored stations present?	Yes	Go to the next step.
		No	Go to the step 3.
2	• Turn ignition switch to LOCK and then to ACC. • Check if preset stations are stored by pushing PRESET switches. • Are stations stored?	Yes	The system is normal. (Explain preset procedure to customer using Owner's Manual)
		No	Replace audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.)
3	• Remove center panel from audio unit, and reinstall center panel to audio unit. • Turn the ignition switch to the ACC or ON position. • Turn the center panel unit power to ON. • While pressing the POWER/VOLUME switch, simultaneously press the PRESET switch 3 for **approx. 0.2 s**. • Push all switches and check if buzzer sounds. • Is all switches okay?	Yes	Replace audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.)
		No	Replace center panel. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.)

NO.6 RECEPTION FREQUENCY OF RADIO SLIPS [RADIO]

id0903e3804800

6	Reception frequency of radio slip
Possible DTC	09:Er22
POSSIBLE CAUSE	• Electronic jamming from outside, or inferior condition of broadcasting station radio wave • Audio unit malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Push SEEK switch and check if desired broadcasting station is tuned. • Is it okay?	Yes	Go to the step 3.
		No	Go to the next step.
2	• Check if other broadcasting station is received at certain place when indication of reception frequency stays. • Is other station received? **Note** • When you receive weak signal from one broadcasting station and come close to broadcasting antenna which emits strong signal, broadcasting with strong signal is sometimes received.	Yes	Go to the next step.
		No	Replace audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.)

SYMPTOM TROUBLESHOOTING [RADIO]

STEP	INSPECTION		ACTION
3	• Compare reception with other audio unit on same model (model/unit) under same problem conditions. • Is reception equivalent between customer's unit and compared unit?	Yes	Troubleshooting completed (Audio unit normal).
		No	Replace audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY.)

REFERENCE [RADIO]

id0903e3830000

1. Multipath Noise

- Signals from an FM transmitter are a high frequency and similar to beams of light because they do not bend around corners, but they do reflect. Since FM signals can be reflected by obstructions, it is possible to receive both the direct signal and the reflected signal at the same time. This causes a slight delay in reception and may be heard as a broken sound or a distortion.

atraaw00001761

2. Flutter/Skip Noise

- Signals become weak in valleys between mountains, tall building, and other obstacles. When the vehicle passes through such an area, the reception conditions may change suddenly, resulting in annoying noise.

atraaw00001762

3. Stereo and Monaural Receptions

- As signals become weak, noise may appear more in stereo reception. Comparing to stereo reception, noise in monaural receptions is relatively less striking.

Measures in Audio System

Separation control

- Utilizing the characteristic of monaural reception that noise is relatively less striking than stereo reception, the audio system automatically changes the reception from stereo to monaural and lessens annoying noise when signals become weak or a multipath phenomenon occurs.

High tone control

- When signals become weak or a multipath phenomenon occurs, the audio system restrains volume level in high frequency band and lessens annoying noise.

SYMPTOM TROUBLESHOOTING [RADIO]

Effect Setting of Separation Control and High Tone Control

- The separation and high tone controls influence sound quality, Therefore they are specifically tuned for individual model. (Comparison of characteristic must be done on the same models)

High tone setting	⇨	Less effective range	⇨	Noise is conspicuous
Noise restraint setting	⇨	Wider effective range	⇨	Noise is less conspicuous

acxuuw00001936

Remarks

- Signals tend to reach longer distances at night. It is conspicuous in AM signals, several audio functions may stop due to foreign broadcasting station or noise. Though the audio system restrains sensitivity of SEEK and SCAN functions at night, the audio system may select other than desired broadcasting station when signals are considerably strong. This function is linked to the parking light. When the parking light or headlight is turned on, SEEK and SCAN may not function for weak signals.

acxuuw00001937

09-03G SYMPTOM TROUBLESHOOTING [CD PLAYER/ CHANGER]

FOREWORD [CD PLAYER/CHANGER] 09-03G–1
Troubleshooting Index 09-03G–1
NO.1 CD PLAYER/CHANGER DOES NOT LOAD THE CD OR EJECTS THE CD IMMEDIATELY [CD PLAYER/CHANGER] 09-03G–3
NO.2 CD PLAYER/CHANGER DOES NOT EJECT THE CD [CD PLAYER/CHANGER] 09-03G–3
NO.3 CD PLAYER/CHANGER DOES NOT PLAY THE CD/NO SOUND [CD PLAYER/CHANGER] 09-03G–4
NO.4 SOUND JUMPS [CD PLAYER/CHANGER] 09-03G–5
NO.5 CD PLAYER/CHANGER SCRATCHES ON THE CD [CD PLAYER/CHANGER] 09-03G–6
NO.6 DISC CHANGE IS INOPERATIVE [CD PLAYER/CHANGER] 09-03G–6
NO.7 CD PLAYER DOES NOT PLAY THE MP3/WMA-FORMATTED FILE [CD PLAYER/CHANGER] 09-03G–6
NO.8 MP3/WMA-FORMATTED FILE FOLDER SELECTION IS INOPERATIVE/TRACK SEARCH IS INOPERATIVE [CD PLAYER/CHANGER] 09-03G–7
NO.9 CD PLAYER DOES NOT INDICATE THE MP3/WMA TITLE TEXT [CD PLAYER/CHANGER] 09-03G–8
NO.10 CD PLAYER DOES NOT PLAY THE AUDIO DATA (CDDA) [CD PLAYER/CHANGER] 09-03G–9
NO.11 TRACK CHANGE IS INOPERATIVE [CD PLAYER/CHANGER] 09-03G–10
AUDIO CD [CD PLAYER/CHANGER] . . . 09-03G–10
MP3/WMA-Formatted File. 09-03G–11

SYMPTOM TROUBLESHOOTING [CD PLAYER/CHANGER]

FOREWORD [CD PLAYER/CHANGER]

id0903e5803900

Troubleshooting Index

No.	Items	Symptom	Possible DTC
1	CD player/changer	09-03G-3 NO.1 CD PLAYER/CHANGER DOES NOT LOAD THE CD OR EJECTS THE CD IMMEDIATELY [CD PLAYER/CHANGER]	10:Er01, 22:Er01
2		09-03G-3 NO.2 CD PLAYER/CHANGER DOES NOT EJECT THE CD [CD PLAYER/CHANGER]	10:Er01, 22:Er01
3		09-03G-4 NO.3 CD PLAYER/CHANGER DOES NOT PLAY THE CD/NO SOUND [CD PLAYER/CHANGER]	10:Er07, 22:Er07
4		09-03G-5 NO.4 SOUND JUMPS [CD PLAYER/CHANGER]	10:Er02, 22:Er02
5		09-03G-6 NO.5 CD PLAYER/CHANGER SCRATCHES ON THE CD [CD PLAYER/CHANGER]	10:Er02, 22:Er02
6	CD changer	09-03G-6 NO.6 DISC CHANGE IS INOPERATIVE [CD PLAYER/CHANGER]	22:Er01
7	MP3/WMA (Windows media audio) applicable CD player/changer	09-03G-6 NO.7 CD PLAYER DOES NOT PLAY THE MP3/WMA-FORMATTED FILE [CD PLAYER/CHANGER]	10:Er07, 22:Er07
8		09-03G-7 NO.8 MP3/WMA-FORMATTED FILE FOLDER SELECTION IS INOPERATIVE/TRACK SEARCH IS INOPERATIVE [CD PLAYER/CHANGER]	10:Er02, 22:Er02
9		09-03G-8 NO.9 CD PLAYER DOES NOT INDICATE THE MP3/WMA TITLE TEXT [CD PLAYER/CHANGER]	10:Er02, 22:Er02
10		09-03G-9 NO.10 CD PLAYER DOES NOT PLAY THE AUDIO DATA (CDDA) [CD PLAYER/CHANGER]	10:Er02, 22:Er02
11	CD player/changer	09-03G-10 NO.11 TRACK CHANGE IS INOPERATIVE [CD PLAYER/CHANGER]	10:Er02, 22:Er02

SYMPTOM TROUBLESHOOTING [CD PLAYER/CHANGER]

X: Applicable

Troubleshooting Item / Possible factor	CD player/changer					CD player	MP3/WMA (Windows media audio) applicable CD player				CD player/changer
	1	2	3	4	5	6	7	8	9	10	11
	CD player/changer dose not load the CD or ejects the CD immediately	CD player/changer dose not eject the CD	CD player/changer dose not play the CD/No sound	Sound jumps	CD player/changer scratches on the CD	Disc change is inoperative	CD player dose not play the MP3/WMA-formatted file	MP3/WMA-formatted file folder selection is inoperative/ Track search is inoperative	CD player dose not indicate the MP3/WMA title text	CD player dose not play the audio data (CODA)	Track change is inoperative
CD is inserted upside down	X		X								
Audio unit is malfunctioning	X	X	X	X	X	X					X
Defective CD (egg., cracked, badly bent, rough edges, scratch, dirty CD, condensation)	X	X	X	X							X
Non-conventional discs (e.g., 8 cm (3 in) CD, 8 cm (3 in) disc adapter, heart-shaped disc, octagonal disc)	X	X	X								X
Poor connection of audio unit connector or terminal (e.g., damaged, bent, pull-out pin, corrosion)	X	X									
Improper center panel installation		X				X					
Improper CD cover installation		X									
Improper audio unit installation (e.g., rattle, loose)				X							
Inadequate tire pressure				X							
Deformed disc is used (e.g., out of specification (thickness), bent disc)	X	X			X						
Multiple CDs are inserted into the CD player at the same time		X			X						
Center panel is malfunctioning						X					X
CD-R/RW written format is out of specification							X			X	
MP3 and other format data are in the CD-R/RW							X				
File extension for MP3/WMA-formatted file is incorrect (Correct: ".mp3"/".wma", Incorrect: e.g., RIFF)							X				
Defective CD-R/RW (e.g., dirty, scratch)							X	X	X	X	
CD-R/RW (MP3 files are all written to RIFF format)							X				
Conflict of ID tag version for CD-R/RW								X	X		
Improper folder and/or music title in CD-R/RW								X			
The number of characters of folder/music file name in CD-R/RW exceeds the maximum number of characters								X	X		
Improper encode in CD-R/RW								X	X		
MP3/WMA (Windows media audio) applicable CD player/changer is malfunctioning							X	X	X	X	X
No title input in CD-R/RW									X		
Input title text by 2-bytes characters									X		
Data other than the audio data is in CD-R/RW										X	

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SYMPTOM TROUBLESHOOTING [CD PLAYER/CHANGER]

NO.1 CD PLAYER/CHANGER DOES NOT LOAD THE CD OR EJECTS THE CD IMMEDIATELY [CD PLAYER/CHANGER]

id0903e5826100

1	CD player/changer does not load the CD or ejects the CD immediately
Possible DTC	10:Er01, 22:Er01
POSSIBLE CAUSE	• CD is inserted upside down • Defective CD (e.g., cracked, badly bent, rough edges, scratch, dirty CD, condensation) • Non-conventional discs (e.g., 8 cm (3 in) CD, 8 cm (3 in) disc adapter, heart-shaped disc, octagonal disc) • Deformed disc is used (e.g., out of specification (thickness), bent disc) • Poor connection of center panel unit connector or terminal (e.g., damaged, bent, pulled-out pin, corrosion) • Audio unit malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is CD inserted properly, label-side up?	Yes	Go to the next step.
		No	Explain to the customer that CD should be inserted into the slot, label-side up.
2	• Replace with a CD known to be good. • Does the CD player/changer load the CD?	Yes	Go to the next step.
		No	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ASSEMBLY).
3	Visually inspect the CD. — Is there any dirt, scratch or deformation on the CD? — Is the CD a non-conventional disc?	Yes	Explain to the customer that the defective CD or non-conventional disc cannot be use.
		No	Go to the next step.
4	• Turn the ignition switch to the LOCK position. • Inspect the connection of the audio unit connector (24-pin). • Inspect both audio unit connector and wiring harness-side connector for poor connection. (such as damaged/bent/pulled-out pins, corrosion) • All the pins and connector normal?	Yes	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ASSEMBLY).
		No	**If the audio unit connector/pin is wrong:** • Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ASSEMBLY). **If the wiring harness-side connector/pin is wrong:** • Repair or replace the pins and/or the connector.

NO.2 CD PLAYER/CHANGER DOES NOT EJECT THE CD [CD PLAYER/CHANGER]

id0903e5826200

2	CD player/changer does not eject the CD
Possible DTC	10:Er01, 22:Er01
POSSIBLE CAUSE	• Defective CD. (e.g., cracked, badly bent, rough edges, scratch, dirty CD, condensation) • Non-conventional discs (e.g., 8 cm (3 in) CD, 8 cm (3 in) disc adapter, heart-shaped disc, octagonal disc) • Deformed disc is used (e.g., out of specification (thickness), bent disc). • Multiple CDs are inserted into the CD player at the same time • Poor connection of center panel unit connector or terminal (e.g., damaged, bent, pulled-out pin, corrosion) • Improper CD cover installation • Improper center panel installation • Audio unit malfunction **Note** • The CD may be malfunctioning if the CD player/changer does not eject the certain CD only. Inspect the CD player/changer operation using the CD known to be good.

SYMPTOM TROUBLESHOOTING [CD PLAYER/CHANGER]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Inspect the operation of the audio system other than CD player/changer (e.g. Radio). • Does other audio system operate?	Yes	Go to the step 3.
		No	Go to the next step.
2	• Turn the ignition switch to the LOCK position. • Inspect the connection of the audio unit connector (24-pin). • Inspect both audio unit connector and wiring harness-side connector for poor connection. (such as damaged/bent/pulled-out pins, corrosion) • All the pins and connector normal?	Yes	Go to the next step.
		No	**If the audio unit connector/pin is wrong:** • Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY). **If the wiring harness-side connector/pin is wrong:** • Repair or replace the pins and/or the connector.
3	• Eject the CD. • Is the CD ejected from the CD player/ changer?	Yes	Go to the next step.
		No	Inspect the center panel and CD cover installation. Securely install the center panel and/or CD cover as necessary.
4	• Insert the CD into the CD player/changer. • Does the CD insert into the CD player/ changer smoothly?	Yes	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY).
		No	Install the center panel and/or CD cover properly, then go to the next step.
5	• Is the CD ejected from the CD player/ changer?	Yes	Troubleshooting completed. Explain repairs to the customers.
		No	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY).

NO.3 CD PLAYER/CHANGER DOES NOT PLAY THE CD/NO SOUND [CD PLAYER/CHANGER]

id0903e5806100

3	CD player/changer does not play the CD/No sound
Possible DTC	10:Er07, 22:Er07
POSSIBLE CAUSE	• CD is inserted upside down • Defective CD (e.g., cracked, badly bent, rough edges, scratch, dirty CD, condensation) • Non-conventional discs (e.g., 8 cm (3 in) CD, 8 cm (3 in) disc adapter, heart-shaped disc, octagonal disc) • Audio unit malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Turn the radio ON and inspect that there is a sound. • Is there a sound? **Note** • Check for the volume dial position.	Yes	Go to the next step.
		No	Go to the symptom troubleshooting No.3 (ENTIRE AUDIO SYSTEM).
2	• Was CD inserted properly, label-side up?	Yes	Go to the next step.
		No	Explain to the customer that CD should be inserted into the slot, label-side up.
3	• Replace the CD known to be good. • Does the CD player/changer load the CD?	Yes	Go to the next step.
		No	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY).

SYMPTOM TROUBLESHOOTING [CD PLAYER/CHANGER]

STEP	INSPECTION		ACTION
4	• Visually inspect the CD. — Is there any dirt, scratch or deformation on the CD? — Is the CD a non-conventional disc? — Is there a CD in MP3 recording?	Yes	Explain to the customer that the defective CD or non-conventional disc cannot be use.
		No	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY).

NO.4 SOUND JUMPS [CD PLAYER/CHANGER]

id0903e5806200

4	Sound jumps
Possible DTC	10:Er02, 22:Er02
POSSIBLE CAUSE	• Defective CD (e.g., cracked, badly bent, rough edges, scratch, dirty CD, condensation) • Improper center panel unit installation (e.g., rattle, loose) • Inadequate tire pressure • Audio unit malfunction **Note** • The CD may be malfunctioning if the sound jumps on the certain CD only. Inspect the CD player/ changer operation using the CD known to be good.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Does the sound jump when the vehicle is stopped?	Yes	Go to the step 6.
		No	Go to the next step.
2	• Drive the vehicle. • Does the sound jump when driving over uneven surfaces?	Yes	Go to the next step.
		No	Go to the step 6.
3	• Is the center panel unit installed securely?	Yes	Go to the next step.
		No	Install the center panel unit securely.
4	• Inspect the tire pressure. • Is the tire pressure normal?	Yes	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY).
		No	Go to the next step.
5	• Adjust the tire pressure within specification. • Does the sound jump when driving the vehicle?	Yes	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY).
		No	Audio system is normal. Explain repairs to the customers.
6	• Replace the CD known to be good. • Does the sound jump when driving the vehicle?	Yes	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY).
		No	Audio system is normal. Explain to the customer that the CD is malfunctioning.

SYMPTOM TROUBLESHOOTING [CD PLAYER/CHANGER]

NO.5 CD PLAYER/CHANGER SCRATCHES ON THE CD [CD PLAYER/CHANGER]

id0903e5806300

5	CD player/changer scratches on the CD
Possible DTC	10:Er02, 22:Er02
POSSIBLE CAUSE	• Deformed disc is used (e.g., out of specification (thickness), bent disc) • Multiple CDs are inserted into the CD player at the same time • Audio unit malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Were the multiple CDs inserted into the CD player at the same time?	Yes	Explain to the customer to insert a CD one by one.
		No	Go to the next step.
2	• Visually inspect the CD. • Is the CD a deformed disc (e.g., out of specification (thickness), bent disc)?	Yes	Audio system is normal. Explain to the customer that the CD is malfunctioning.
		No	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY).

NO.6 DISC CHANGE IS INOPERATIVE [CD PLAYER/CHANGER]

id0903e5806400

6	Disc change is inoperative
Possible DTC	22:Er01
POSSIBLE CAUSE	• Improper center panel installation • Audio unit malfunctioning • Center panel malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Inspect the CD changer operation. • Does the CD changer operate properly?	Yes	Go to the next step.
		No	Go to the symptom troubleshooting “No.3 CD player/ changer does not play the CD/No sound”.
2	• Inspect the followings: — Is the display shown properly when operating the disc change button? — Does the radio band selection operate properly?	Yes	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY).
		No	Go to the next step.
3	• Inspect the center panel installation. • Does the CD changer change the disc properly after re-installing the center panel?	Yes	Install the center panel securely and properly.
		No	Go to the “No.1 center panel switch inspection” in this section. Replace the center panel as necessary.

NO.7 CD PLAYER DOES NOT PLAY THE MP3/WMA-FORMATTED FILE [CD PLAYER/CHANGER]

id0903e5888100

7	CD player does not play the MP3/WMA-formatted file
Possible DTC	10:Er07, 22:Er07
POSSIBLE CAUSE	• CD-R/RW written format is out of specification • MP3/WMA and other format data are in the CD-R/RW • File extension for MP3-formatted file is incorrect (Correct. “.mp3”/“.wma”, incorrect: e.g., RIFF) • Defective CD-R/RW (e.g. dirty CD, scratch) • Audio unit malfunction **Note** • The free-software for the MP3-formatted file in the field may cause the deterioration of sound quality, noise, or defective play, so that the CD player won’t play the customer made MP3-formatted file. • The CD player may not play the CD-R/RW properly due to the disc condition. • If there are MP3/WMA-formatted file and other file in the same disc, the CD player may not play the disc. • If there are MP3/WMA-formatted file and audio data in the same disc, the CD player loads and plays the first session of the data only.

SYMPTOM TROUBLESHOOTING [CD PLAYER/CHANGER]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Inspect the written format of the recorded data on the CD-R/RW. • Is the written format correct?	Yes	Go to the next step.
		No	Write the CD-R/RW with the correct specification.
2	• Inspect the recorded data in the CD-R/RW. • Is there MP3/WMA and other format data in the CD-R/RW.	Yes	Replace with the CD-R/RW known to be good (MP3/WMA-formatted file data only), then inspect the CD player operation. **If the CD player plays the MP3/WMA-formatted file:** • Audio system is normal. Explain to the customer that the CD player does not operate properly if the MP3/WMA and other format data are in the CD-R/RW. **If the CD player does not play the MP3/WMA-formatted file:** • Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ASSEMBLY).
		No	Go to the next step.
3	• Inspect the CD-R/RW written format. • Is the written format within the specification (".mp3" /".wma" is the correct file extension)?	Yes	Replace with the CD-R/RW using the ".mp3" /".wma" file extension, then inspect the CD player operation. **If the CD player plays the MP3/WMA-formatted file:** • Audio system is normal. Explain to the customer that the CD player does not operate properly if the correct file extension is not used. **If the CD player does not play the MP3/WMA-formatted file:** • Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ASSEMBLY).
		No	Go to the next step.
4	• Visually inspect the CD-R/RW. • Is there any dirt or scratch on the CD-R/RW?	Yes	Clean the disc or replace with the CD-R/RW known to be good.
		No	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ASSEMBLY).

NO.8 MP3/WMA-FORMATTED FILE FOLDER SELECTION IS INOPERATIVE/TRACK SEARCH IS INOPERATIVE [CD PLAYER/CHANGER]

id0903e5889100

8	MP3/WMA-formatted file folder selection is inoperative/Track search is inoperative
Possible DTC	10:Er02, 22:Er02
POSSIBLE CAUSE	• Defective CD-R/RW (e.g. dirty CD, scratch) • Conflict of ID tag version for CD-R/RW (MP-3) • Improper folder and/or music title in CD-R/RW • The number of characters of folder/audio file name in CD-R/RW exceeds the maximum number of characters • Improper encode in CD-R/RW • Audio unit malfunction

Note

- ID3 is a tagging format for MP3-formatted file. ID3 allows metadata (e.g., title, artist, track number, etc.) to be added to the MP3-formatted file.
- There are two versions in the ID tag.
  — ID3v1: This is the most widespread standard tag formats and most software is compatible with this version. There is a limitation on the maximum number of characters for the text data.
  — ID3v2: There are a variety of version in V2, but there is no interchangeability among the versions.

SYMPTOM TROUBLESHOOTING [CD PLAYER/CHANGER]

Limitation on the maximum number of characters for the text data (ID3v1)

Item	Maximum number of characters	Description
Title	30	Music title
Artist	30	Artist name
Album	30	Album title
Year	4	Album produced year/CD wholesale year
Genre	—	Music category selection
Comment	30	Free comment
Track	3	Track number

- In a WMA file, the track name, artist name and album name are recorded with data called “WMA-Tag”, and the information can be displayed.
- WMA files which do not comply with the specific standard may not be played correctly or its file and folder name may not be displayed correctly.
- The file extension may not be provided depending on the computer operating system, version, software, or setting. In this case, add the file extension “.wma” to the end of the file name, and then write the disc.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Visually inspect the CD-R/RW. • Is there any dirt or scratch on the CD/R/RW?	Yes	Clean the disc or replace with the CD-R/RW known to be good.
		No	Go to the next step. (MP-3)/Go to the step 3.(WMA)
2	• Inspect the ID tag version. • Is ID tag correct?	Yes	Go to the next step.
		No	Write the CD-R/RW with the correct ID tag version.
3	• Inspect folder and audio file name. • Are all file name input correctly?	Yes	Go to the next step.
		No	Use the CD-R/RW that a folder and audio file name is input correctly.
4	• Inspect the encode for the folder and audio file name in the CD-R/RW. • Is the encode correct? **Note** • Unreadable characters may be displayed if incorrect encode is used.	Yes	Go to the next step.
		No	Use the correct encode.
5	• Inspect the number of characters for the folder and audio file name. • Is the number of characters within the maximum number of characters?	Yes	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY).
		No	Input the folder and audio file name within the maximum number of characters.

NO.9 CD PLAYER DOES NOT INDICATE THE MP3/WMA TITLE TEXT [CD PLAYER/CHANGER]

id0903e5889500

9	CD player does not indicate the MP3/WMA title text
Possible DTC	**10:Er02, 22:Er02**
POSSIBLE CAUSE	• Defective CD-R/RW (e.g. dirty CD, scratch) • Conflict of ID tag version for CD-R/RW (MP-3) • The number of characters of folder/audio file name in CD-R/RW exceeds the maximum number of characters • Improper encode in CD-R/RW • No title input in CD-R/RW • Input title text by 2-bytes characters • Audio unit malfunction

SYMPTOM TROUBLESHOOTING [CD PLAYER/CHANGER]

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Visually inspect the CD-R/RW. • Is there any dirt or scratch on the CD/R/RW?	Yes	Clean the disc or replace with the CD-R/RW known to be good.
		No	Go to the next step.
2	• Inspect the display the LCD. • Is the CD (other than MP3/WMA compatible) displayed on the LCD?	Yes	Go to the next step. (MP-3)/Go to the step 4. (WMA)
		No	Replace the center panel. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY).
3	• Inspect the ID tag version. • Is the ID tag correct?	Yes	Go to the next step.
		No	Write the CD-R/RW with the correct ID tag version.
4	• Is the title text input into the CD-R/RW?	Yes	Go to the next step.
		No	Input the title text. **Note** • Do not input the title text by two-bytes character.
5	• Inspect the encode for the folder and audio file name in the CD-R/RW. • Is the encode correct?	Yes	Go to the next step.
		No	Use the correct encode.
6	• Inspect the number of characters for the folder and audio file name. • Is the number of characters within the maximum number of characters?	Yes	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY).
		No	Input the folder and audio file name within the maximum number of characters.

NO.10 CD PLAYER DOES NOT PLAY THE AUDIO DATA (CDDA) [CD PLAYER/CHANGER]

id0903e5806800

10	CD player does not play the audio data (CDDA)
Possible DTC	10:Er02, 22:Er02
POSSIBLE CAUSE	• CD-R/RW written format is out of specification • Defective CD-R/RW (e.g., dirty CD, scratch) • Data other than the audio data is in CD-R/RW • Audio unit malfunction **Note** • The CD player may not play the CD-R/RW properly due to the disc condition. • If there are MP-3-formatted file and audio data in the same disc, the CD player loads and plays the first session of the data only.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Replace with the audio-CD known to be good. • Does the CD player play the audio-CD properly?	Yes	Go to the next step.
		No	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY).
2	• Inspect the written format of the recorded data on the CD-R/RW. • Is the written format correct?	Yes	Go to the next step.
		No	Write the CD-R/RW with the correct specification.

SYMPTOM TROUBLESHOOTING [CD PLAYER/CHANGER]

STEP	INSPECTION		ACTION
3	• Inspect the recorded data in the CD-R/RW. • Is any data other than the audio data recorded in the CD-R/RW?	Yes	Replace with the CD-R/RW known to be good (record audio data only), then inspect the CD player operation. **If the CD-R/RW plays:** • Audio system is normal. Explain to the customer that the CD player does not operate properly if the audio data and other data are recorded in the CD-R/RW. **If the CD-R/RW does not play:** • Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY).
		No	Go to the next step.
4	• Visually inspect the CD-R/RW. • Is there any dirt or scratch on the CD-R/RW?	Yes	Clean the disc or replace with the CD-R/RW known to be good.
		No	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY).

NO.11 TRACK CHANGE IS INOPERATIVE [CD PLAYER/CHANGER]

id0903e5806900

11	Track change is inoperative
Possible DTC	10:Er02, 22:Er02
POSSIBLE CAUSE	• Defective CD (e.g., cracked, badly bent, rough edges, scratch, dirty CD, condensation) • Non-conventional discs (e.g., 8 cm (3 in) CD, 8 cm (3 in) disc adapter, heart-shaped disc, octagonal disc) • Center panel malfunction • Audio unit malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Replace the CD known to be good. • Does the CD player change the track?	Yes	Explain to the customer that the defective CD or non-conventional disc cannot be used.
		No	Go to the next step.
2	• Inspect the center panel installation. • Does the CD player change the track number on the display when pressing the track up or down button?	Yes	Replace the audio unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/ INSTALLATION). (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ ASSEMBLY).
		No	Go to the “No.1 center panel switch inspection” in this section. Replace the center panel as necessary.

AUDIO CD [CD PLAYER/CHANGER]

id0903e5807100

- The CD player/changer has been designed to play CDs bearing the identification logo, COMPACT DISC DIGITAL AUDIO, as shown. No other discs can be played on the CD player/ changer other than MP3/WMA applicable one.
- The CD player/changer may not play the following CD:
  — Defective CD (e.g., cracked, badly bent, rough edges, scratch, dirty CD condensation)
  — 8 cm (3 in) CDs accessories (e.g., 8 cm (3 in) disc adapter, sticker, label)
  — Nonstandard CD (e.g., Diameter/thickness is out of specification)
  Specification: 119.7—120.3 mm (4.668—4.692 in) of diameter, 1.2+0.3 or -0.1 mm (0.047+0.012 or 0.004 in) of thickness
- Do not use non-conventional discs. The CD player/changer could be damaged.

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SYMPTOM TROUBLESHOOTING [CD PLAYER/CHANGER]

Examples:

- Although the same physical size as the compact disc, SACD uses a different kind of digital audio signal, Direct Stream Digital.
- The CD player/changer may not play the CD-R/RW properly due to the disc condition (excluding the MP3/WMA).

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MP3/WMA-Formatted File
Outline of CD-R and CD-RW

- Definition
  - — CD-R: The CD-R is a non-rewritable version. Once a section of a CD-R is written, it cannot be erased or rewritten.
  - — CD-RW: The CD-RW is a re-writable version of CD-ROM and can be written the data an unlimited number of times.
  - — Since a reflected laser beam amount of the CD-R/RW is less than the reflected laser beam amount of the conventional CD media, the CD player/changer may not play the CD-R/RW or have the sound jumped.
  - — Since the recording quality of the CD-R/RW vary widely, some CD-R/RW may not be played.

Recording method

- There are two methods for recording.
- Classification by recorder
  - — Record the audio data in the audio-CD by audio recorder
    - The price of the audio recorder and original audio-CD includes the copyright fee.
  - — Recorded the audio data in the conventional data-CD by the personal computer
    - The data-CD is cheaper than the audio-CD. But, there is a CD with the low quality.
- Classification by audio data uncompression/compression
  - — Uncompressed audio data
    - The CD-R/RW player can play the uncompressed audio data.
  - — Compressed audio data
    - It is possible to record the large quantity of music in a disc. The sound quality varies depends on the audio data compression format. The compressed audio data can be played on the applicable player only.
  - — Type of compression format:
    - MP3: MPEG Audio Layer 3 — Mazda genie MP3 applicable CD player is available.
    - WMA: Windows Media Audio
    - ATRAG: Adaptive TRansform Acoustic Coding

MP3

- The following condition should be met in order to record the MP3-formatted data on the MP3 applicable CD player:

Media	Applicable to the CD-R/RW
Logical format	ISO 9660 level 1&2 / Joliet / Romeo
Number of directly	8 directly
Number of files	Maximum 255 as a total number of file and folder Maximum 155 for folder
ID3 TAG	Applicable to Ver1.1, 2.3 and 2.4
File extension	MP3
Packet writing	Not applicable
Bit rate	8 kbps—320 kbps/VBR
Sampling rate	11.025 kHz—48 kHz

SYMPTOM TROUBLESHOOTING [CD PLAYER/CHANGER]

WMA (Windows media audio)

- CD-R and CD-RW including WMA files can be played with this unit. Discs which conform to the following formats can be played.
  Playable WMA files are as follows:

Item	Item	Content
Specification		Windows Media Audio Version 7.0, 8.0, 9.0
Sampling frequency	Bit rate	32kHz — 32, 40, 48 kbps
		44.1kHz — 32, 48, 64, 80, 96, 128, 160, 192, 256, 320 kbps
		48kHz — 64, 96, 128, 160, 192 kbps
VBR (Variable Bit Rate)		Supported
Channel mode		Stereo/Monaural
WMA tag		Title, artist name, album name

09-03H SYMPTOM TROUBLESHOOTING [IMMOBILIZER SYSTEM]

TROUBLESHOOTING INDEX [IMMOBILIZER SYSTEM] 09-03H–1

NO.1 SECURITY LIGHT DISPLAY IS NOT NORMAL [IMMOBILIZER SYSTEM] 09-03H–1

SYMPTOM TROUBLESHOOTING [IMMOBILIZER SYSTEM]

TROUBLESHOOTING INDEX [IMMOBILIZER SYSTEM]

id0903f5990200

No.	TROUBLESHOOTING ITEM	DESCRIPTION
1	The security light display is not normal.	• The security light remains illuminated **2 min or more** after the ignition switch is turned to the ON position • The security light does not illuminate when the ignition switch is turned to the ON position. • The security light remains illuminated while the ignition switch is at the LOCK position. • The security light does not flash or the flashing interval is abnormal while the ignition switch is at the LOCK position.

NO.1 SECURITY LIGHT DISPLAY IS NOT NORMAL [IMMOBILIZER SYSTEM]

id0903f5800200

1	**The security light display is not normal.**
DESCRIPTION	• The security light remains illuminated **2 min or more** after the ignition switch is turned to the ON position • The security light does not illuminate when the ignition switch is turned to the ON position. • The security light remains illuminated while the ignition switch is at the LOCK position. • The security light does not flash or the flashing interval is abnormal while the ignition switch is at the LOCK position.
POSSIBLE CAUSE	• Keyless control module malfunction • Instrument cluster malfunction • Open or short circuit in the wiring harness between the instrument cluster and keyless control module **Note** • If the security light remains illuminated for **approx. 1 min** after the ignition switch is turned to the ON position and then displays a DTC, perform immobilizer system malfunction diagnosis according to that DTC. (See 09-02A-4 DTC TABLE [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].) • While performing immobilizer system security access using the M-MDS, the security light does not illuminate even if the ignition switch is turned to the ON position. Verify the illumination condition of the security light by disconnecting the DLC-2 to release security access. NOTE: SECURITY LIGHT FLASHING SEQUENCE WHEN IGNITION SWITCH IS TURNED TO LOCK POSITION (IMMOBILIZER SYSTEM IS NORMAL)

Note

- Normal operation of the security light is as follows. The light starts flashing every 2 s when the ignition switch is turned from ON to ACC position and the immobilizer system is armed. The light stops flashing when the ignition switch is turned to the ON position with the correct ignition key. At this time, the immobilizer system is disarmed and the security light illuminates for about 3 s and then goes out.

SYMPTOM TROUBLESHOOTING [IMMOBILIZER SYSTEM]

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	• Turn the ignition switch to the ON position. • Do other warning lights in the instrument cluster illuminate normally?	Yes	Go to the next step.
		No	Inspect the instrument cluster. (See 09-22-4 INSTRUMENT CLUSTER INSPECTION.)
2	• Turn the ignition switch to the LOCK position. • Disconnect the negative battery cable. • Disconnect the instrument cluster connector (24-pin). • Connect the negative battery cable. • Does the security light illuminate?	Yes	Replace the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
		No	Go to the next step.
3	• Disconnect the negative battery cable. • Ground instrument cluster terminal 2F using a jumper wire. • Connect the negative battery cable. • Does the security light illuminate?	Yes	Go to the next step.
		No	Replace the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
4	• Disconnect the negative battery cable. • Disconnect the instrument cluster connector. • Connect the keyless control module connector. • Connect the negative battery cable. • Turn the ignition switch to the ON position. • Does the security light illuminate?	Yes	Replace the keyless control module. (See 09-14-14 KEYLESS CONTROL MODULE REMOVAL/INSTALLATION.)
		No	Repair the wiring harness.

09-03I SYMPTOM TROUBLESHOOTING [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM]

FOREWORD [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM] 09-03I–1
Troubleshooting Index **09-03I–1**
No.1 HANDS-FREE TELEPHONE SYSTEM DOES NOT RECEIVE/TRANSMIT CALLS, DOES NOT CONNECT [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM] 09-03I–1
Diagnostic procedure **09-03I–2**
No.2 CALLER'S VOICE VOLUME TOO LOW, OR NOISE INTERRUPTS CALL [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM] 09-03I–3
Diagnostic procedure **09-03I–3**
No.3 ADDRESSEE'S VOICE VOLUME TOO LOW, OR NOISE INTERRUPTS CALL [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM] 09-03I–4
Diagnostic procedure **09-03I–4**

SYMPTOM TROUBLESHOOTING [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM]

FOREWORD [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM]

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Troubleshooting Index

No.	Items	Possible DTC
1	09-03I-1 No.1 HANDS-FREE TELEPHONE SYSTEM DOES NOT RECEIVE/TRANSMIT CALLS, DOES NOT CONNECT [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM]	26:Er81, 26:Er82, 26:Er83, 26:Er84, 26:Er85, 26:Er86
2	09-03I-3 No.2 CALLER'S VOICE VOLUME TOO LOW, OR NOISE INTERRUPTS CALL [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM]	26:Er81, 26:Er82, 26:Er83, 26:Er84, 26:Er86
3	09-03I-4 No.3 ADDRESSEE'S VOICE VOLUME TOO LOW, OR NOISE INTERRUPTS CALL [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM]	26:Er81, 26:Er86

No.1 HANDS-FREE TELEPHONE SYSTEM DOES NOT RECEIVE/TRANSMIT CALLS, DOES NOT CONNECT [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM]

id0903h4844000

1	**Hands-free telephone system does not receive/transmit calls, does not connect**
Possible DTC	26:Er81, 26:Er82, 26:Er83, 26:Er84, 26:Er85, 26:Er86
Possible cause	• Malfunction in voice recognition/hands-free switch related parts — Voice recognition/hands-free switch malfunction — Poor connection in the connector • Malfunction in microphone related parts — Microphone malfunction — Poor connection in the connector • Malfunction in audio system — Open or short circuit in the wiring harness between the HF/TEL unit and the speaker through the audio unit — Poor connection in the connector • HF/TEL unit does not respond — HF/TEL unit malfunction — Open or short circuit in the wiring harness between the HF/TEL unit and the audio unit — Open or short circuit in the wiring harness of the HF/TEL unit power supply or ground circuit — Poor connection in the connector • Problem in cellular phone — Cellular phone does not set up to HF/TEL system — Cellular phone does not operate (low battery voltage, power off) — Cellular phone is outside of the signal transmission area — Bluetooth does not operate

SYMPTOM TROUBLESHOOTING [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM]

Diagnostic procedure

- When performing an asterisked (*) troubleshooting inspection, slightly shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunction. If there is a problem, verify that the connectors, terminals and wiring harness are connected correctly and undamaged.

STEP	INSPECTION		ACTION
1	• Inspect the cellular phone condition while the hands free phone does not operate. • Can the following conditions be verified? — Low battery voltage — Power is off — Out of signal transmission area	Yes	Enter a cellular phone signal transmission area and reinspect the HF/TEL system operation.
		No	Go to the next step.
2	• Does the cellular phone set up to the HF/TEL unit?	Yes	Set up the cellular phone to the HF/TEL unit.
		No	Go to the next step.
3	• Is the audio system sound output normal?	Yes	Go to the next step.
		No	Perform the audio system troubleshooting procedure.
4	• Perform the audio system on-board diagnostic. • Are the following DTC displayed? — 26:Er82 — 26:Er83 — 26:Er84	Yes	Go to the next step.
		No	Go to the step 6.
5*	• Inspect for open or short circuits in the following wiring harnesses and connectors, and inspect the connector connections. — Between microphone terminal A and HF/TEL unit terminal B — Between microphone terminal B and HF/TEL unit terminal D — Between microphone terminal C and HF/TEL unit terminal U — Between microphone terminal E and HF/TEL unit terminal J • Are the harnesses and connector connections normal?	Yes	Replace the microphone. (See 09-20-23 MICROPHONE REMOVAL/INSTALLATION.)
		No	Repair or replace malfunctioning parts.
6	• Perform the HF/TEL system on-board diagnostic. (See 09-02D-1 STARTING PROCEDURE FOR ON-BOARD DIAGNOSTIC TEST MODE [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM].) • Is 26:Er81 displayed?	Yes	Inspect and repair the audio system CAN communication.
		No	Go to the next step.
7	• Inspect the voice recognition/hands-free switch. • Is the voice recognition/hands-free switch normal? (See 09-20-21 AUDIO CONTROL SWITCH INSPECTION.)	Yes	Go to the next step.
		No	Replace the audio control switch. (See 09-20-21 AUDIO CONTROL SWITCH REMOVAL/INSTALLATION.)
8	• Call the hands free cell phone using another cellular phone. • Do the same symptoms appear?	Yes	Replace the HF/TEL unit. (See 09-20-22 HANDS-FREE TELEPHONE (HF/TEL) UNIT REMOVAL/INSTALLATION.)
		No	The cellular phone Bluetooth system is malfunctioning.

SYMPTOM TROUBLESHOOTING [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM]

No.2 CALLER'S VOICE VOLUME TOO LOW, OR NOISE INTERRUPTS CALL [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM]

id0903h4844100

2	Caller's voice volume too low, or noise interrupts call
Possible DTC	26:Er81, 26:Er82, 26:Er83, 26:Er84, 26:Er86
Possible cause	• Malfunction in the microphone related parts — Open or short circuit in the wiring harness between the microphone and the HF/TEL unit — Microphone malfunction — Poor connection in the connector • Malfunction in the audio control switch — Voice recognition/hands-free switch malfunction — Open or short circuit in the wiring harness between the voice recognition/hands-free switch and the audio unit — Poor connection in the connector • HF/TEL unit does not receive the vehicle speed signal — CAN communication error • Malfunction in the audio system — Audio control switch and/or related circuit malfunction • Influence due to vehicle driving conditions — Noise while driving is loud (engine, tire noise, blower fan noise) — Windows and/or Convertible top/Power retractable hardtop are open • HF/TEL unit malfunction • Problem in the cellular phone — Vehicle is in a place where signal transmission is weak — Bluetooth does not operate

Diagnostic procedure

- When performing an asterisked (*) troubleshooting inspection, slightly shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunction. If there is a problem, verify that the connectors, terminals and wiring harness are connected correctly and undamaged.

STEP	INSPECTION		ACTION
1*	• Can the audio volume be controlled using audio control switch?	Yes	Go to the next step.
		No	Inspect and repair the audio control switch and related wiring harness.
2	• Does the symptom appear under following conditions? — Windows and/or Convertible top/Power retractable hardtop are open — Noise while driving is loud (engine, tire noise, blower fan noise)	Yes	The system is normal. (Influence due to vehicle driving conditions)
		No	Go to the next step.
3	• Perform the audio system on-board diagnostic. • Is 26:Er81 displayed?	Yes	Inspect and repair the audio system CAN communication.
		No	Go to the next step.
4*	• Inspect for open or short circuits in the following wiring harnesses and connectors, and inspect the connector connections. — Between microphone terminal A and HF/TEL unit terminal B — Between microphone terminal B and HF/TEL unit terminal D — Between microphone terminal C and HF/TEL unit terminal U — Between microphone terminal D and GND — Between microphone terminal E and HF/TEL unit terminal J • Are the harnesses and connector connections normal?		Go to the next step.
		No	Repair or replace malfunctioning parts.
5	• Inspect the following switches. (See 09-20-21 AUDIO CONTROL SWITCH INSPECTION.) — Voice recognition/hands-free switch • Are the switches normal?	Yes	Go to the next step.
		No	Replace the audio control switch. (See 09-20-21 AUDIO CONTROL SWITCH REMOVAL/INSTALLATION.)

SYMPTOM TROUBLESHOOTING [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM]

STEP	INSPECTION		ACTION
6*	• Inspect for open or short circuits in the following wiring harnesses and connectors, and inspect the connector connections. — Between audio unit (24-pin) terminal 1N and audio control switch terminal G • Are the harnesses and connector connections normal?	Yes	Go to the next step.
		No	Repair or replace malfunctioning parts.
7	• Make a call with the cellular phone without using HF/TEL system. • Does the same symptom appear?	Yes	Cellular phone related problem.
		No	Go to the next step.
8	• Call the hands-free cell phone using another cellular phone. • Does the same symptom appear?	Yes	Go to the next step.
		No	The cellular phone Bluetooth system is malfunctioning.
9	• Replace the microphone. (See 09-20-23 MICROPHONE REMOVAL/INSTALLATION.) • Does the same symptom appear?	Yes	Replace the HF/TEL unit. (See 09-20-22 HANDS-FREE TELEPHONE (HF/TEL) UNIT REMOVAL/INSTALLATION.)
		No	Troubleshooting is completed. (Microphone malfunction)

No.3 ADDRESSEE'S VOICE VOLUME TOO LOW, OR NOISE INTERRUPTS CALL [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM]

id0903h4844200

3	Addressee's voice volume too low, or noise interrupts call
Possible DTC	26:Er81, 26:Er86
Possible cause	• Malfunction in the audio system — Open or short circuit in the wiring harness between the HF/TEL unit and the speaker through the audio unit — Audio control switch and/or related circuit malfunction — Poor connection in the connector • HF/TEL unit does not receive the vehicle speed signal — CAN communication error • HF/TEL unit malfunction • Problem in the cellular phone — Vehicle is in a place where signal transmission is weak — Bluetooth does not operate

Diagnostic procedure

- When performing an asterisked (*) troubleshooting inspection, slightly shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunction. If there is a problem, verify that the connectors, terminals and wiring harness are connected correctly and undamaged.

STEP	INSPECTION		ACTION
1	• Is the audio system sound output normal?	Yes	Go to the next step.
		No	Perform the audio system troubleshooting procedure.
2	• Can the audio volume be controlled using audio control switch?	Yes	Go to the next step.
		No	Inspect and repair the audio control switch and related wiring harness.
3	• Perform the audio system on-board diagnostic. • Is 26:Er81 displayed?	Yes	Inspect and repair the audio system CAN communication.
		No	Go to the next step.
4*	• Inspect for open or short circuits in the following wiring harnesses and connectors, and inspect the connector connections. — Between HF/TEL unit (24-pin) terminal G and audio unit (16-pin) terminal 2B — Between HF/TEL unit (24-pin) terminal H and audio unit (16-pin) terminal 2J — Between HF/TEL unit (24-pin) terminal L and shield wire • Are the harnesses and connector connections normal?	Yes	Go to the next step.
		No	Repair or replace malfunctioning parts.
5	• Make a call with the cellular phone without using HF/TEL system. • Does the same symptom appear?	Yes	Cellular phone related problem.
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [HANDS-FREE TELEPHONE (HF/TEL) SYSTEM]

STEP	INSPECTION		ACTION
6	• Call the hands-free cell phone using another cellular phone. • Does the same symptom appear?	Yes	Replace the HF/TEL unit. (See 09-20-22 HANDS-FREE TELEPHONE (HF/TEL) UNIT REMOVAL/INSTALLATION.)
		No	The cellular phone Bluetooth system is malfunctioning.

09-03J SYMPTOM TROUBLESHOOTING [POWER RETRACTABLE HARDTOP]

SYMPTOM TROUBLESHOOTING INDEX [POWER RETRACTABLE HARDTOP] 09-03J–1
NO. 1 POWER RETRACTABLE HARDTOP WARNING BUZZER SOUNDS CONTINUOUSLY [POWER RETRACTABLE HARDTOP] 09-03J–1
NO. 2 POWER RETRACTABLE HARDTOP INDICATOR LIGHT FLASHING [POWER RETRACTABLE HARDTOP]. 09-03J–3
NO. 3 POWER RETRACTABLE HARDTOP DOES NOT START TO OPEN [POWER RETRACTABLE HARDTOP] 09-03J–4
NO. 4 POWER RETRACTABLE HARDTOP DOES NOT START TO CLOSE [POWER RETRACTABLE HARDTOP] 09-03J–7
NO. 5 POWER RETRACTABLE HARDTOP STOPS WHILE OPERATING [POWER RETRACTABLE HARDTOP] 09-03J–9

SYMPTOM TROUBLESHOOTING [POWER RETRACTABLE HARDTOP]

SYMPTOM TROUBLESHOOTING INDEX [POWER RETRACTABLE HARDTOP]

id0903j2850000

No.	TROUBLESHOOTING ITEM	DESCRIPTION
1	Power retractable hardtop warning buzzer sounds continuously	Power retractable hardtop warning buzzer sounds continuously while power retractable hardtop is stopped
2	Power retractable hardtop indicator light flashing	Power retractable hardtop indicator light flashes when power retractable hardtop is stopped
3	Power retractable hardtop does not start to open	Power retractable hardtop does not start to open when power retractable hardtop (open) switch is pressed
4	Power retractable hardtop does not start to close	Power retractable hardtop does not start to close when power retractable hardtop (close) switch is pressed
5	Power retractable hardtop stops while operating	Power retractable hardtop stops while power retractable hardtop is opening/closing

NO. 1 POWER RETRACTABLE HARDTOP WARNING BUZZER SOUNDS CONTINUOUSLY [POWER RETRACTABLE HARDTOP]

id0903j2851000

1	**Power retractable hardtop warning buzzer sounds continuously**
DESCRIPTION	• Power retractable hardtop warning buzzer sounding continuously while the power retractable hardtop is stopped.

POSSIBLE CAUSE	• Power retractable hardtop control module sends an improper buzzer operation signal to the instrument cluster.
	— Power retractable hardtop control module malfunction
	— Power retractable hardtop control module cannot detect the power retractable hardtop permission condition signal.
	  • Improper vehicle speed detected
	  • Improper transmission position detected (except for transmission neutral (MT)/N or P position (AT) detected)
	• Power retractable hardtop control module detects a system malfunction.
	• Instrument cluster malfunction. (Buzzer sounds regardless of the instruction from the power retractable hardtop control module)

SYMPTOM TROUBLESHOOTING [POWER RETRACTABLE HARDTOP]

Diagnostic Procedure

- When performing the asterisked (*) troubleshooting inspection, slightly shake the wiring harness and connectors while performing the inspection to determine whether poor contact points are the cause of any intermittent malfunction. If there is a problem, verify that the connectors, terminals and wiring harness are connected correctly and undamaged.

STEP	INSPECTION		ACTION
1	**VERIFY THAT PRESENT DTC IS STORED** • Stop the vehicle. • Shift to P or N position (AT)/neutral position (MT). • Turn the ignition switch to the ON position. • Verify that power retractable hardtop indicator light status. • Is the power retractable hardtop indicator light flashing?	Yes	Retrieve the DTC for the power retractable hardtop control module using the M-MDS. If the DTC is displayed, perform the appropriate troubleshooting procedure. Then go to the next step.
		No	Go to the next step.
2	**VERIFY THAT POWER RETRACTABLE HARDTOP INDICATOR LIGHT ILLUMINATES** • Turn the ignition switch to ON position. • Verify the power retractable hardtop indicator light status. • Does the power retractable hardtop indicator light illuminate?	Yes	Fully open/close the roof and lock the top lock (if the roof is fully closed). Verify the power retractable hardtop indicator light status again. If the indicator light illuminates with the power retractable hardtop fully open, return to Step 1. If the indicator light illuminates with the power retractable hardtop fully closed, inspect the top lock switch. If the indicator light does not illuminate go to the next step.
		No	Go to the next step.
3	**INSPECT TO SEE WHETHER MALFUNCTION IS IN OPERATION PERMISSION CONDITION SIGNAL OR ELSEWHERE** • Connect the M-MDS to the DLC-2. • Monitor the following PIDs. (See 01-40-9 PCM INSPECTION [L8, LF].) (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].) (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE INSPECTION.) **PCM** — VSS — PNP/CPP (MT) — CPP (MT) **TCM (AT)** — TR **Power Retractable Hardtop Control Module** — VSS • Are these monitor values normal?	Yes	Go to the next step.
		No	Inspect and repair the suspected signal related wiring harness and component.
4*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN INSTRUMENT CLUSTER (BUZZER) OR POWER RETRACTABLE HARDTOP CONTROL MODULE** • Perform the INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE. (See 09-22-6 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.) • Does the buzzer sound with check code 14?	Yes	Replace the power retractable hardtop control module. (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE REMOVAL/INSTALLATION.)
		No	Replace the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.) (See 09-22-3 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY.)

SYMPTOM TROUBLESHOOTING [POWER RETRACTABLE HARDTOP]

NO. 2 POWER RETRACTABLE HARDTOP INDICATOR LIGHT FLASHING [POWER RETRACTABLE HARDTOP]

id0903j2851100

2	Power retractable hardtop indicator light flashing
DESCRIPTION	• Power retractable hardtop indicator light flashes when the power retractable hardtop is stopped.
POSSIBLE CAUSE	• Power retractable hardtop control module does recognize that the top lock is locked when the power retractable hardtop fully closed. — Top lock switch malfunction — Open or short circuit in the wiring harness between the top lock switch and the power retractable hardtop control module • Power retractable hardtop control module cannot control the power retractable hardtop indicator light operation. — Power retractable hardtop control module malfunction — Short to ground in the wiring harness between power retractable hardtop control module and the power retractable hardtop indicator light • Power retractable hardtop control module detects a system malfunction.

Diagnostic Procedure

- When performing the asterisked (*) troubleshooting inspection, slightly shake the wiring harness and connectors while performing the inspection to determine whether poor contact points are the cause of any intermittent malfunction. If there is a problem, verify that the connectors, terminals and the wiring harness are connected correctly and undamaged.

STEP	INSPECTION		ACTION
1	**VERIFY THAT PRESENT DTC IS STORED** • Connect the M-MDS to DLC-2. • Retrieve the DTC for the power retractable hardtop control module. • Is there a DTC present?	Yes	Go to the appropriate DTC inspection. (See 09-02E-2 DTC TABLE [POWER RETRACTABLE HARDTOP].)
		No	Go to the next step.
2	**INSPECT TO SEE WHETHER MALFUNCTION IS IN TOP LOCK SWITCH OR ELSEWHERE** • Verify the roof status. • Is the roof fully closed?	Yes	Go to the next step.
		No	Go to Step 4.
3	**INSPECT TOP LOCK SWITCH** • Inspect the top lock switch. (See 09-14-14 TOP LOCK SWITCH INSPECTION.) • Is the top lock switch normal?	Yes	Inspect and repair for an open or short circuit in the wiring harness between the top lock switch and power retractable hardtop control module.
		No	Replace the striker switch. (See 09-16-10 CONVERTIBLE TOP REMOVAL/INSTALLATION.)
4*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN POWER RETRACTABLE HARDTOP INDICATOR LIGHT CONTROL CIRCUIT OR ELSEWHERE** • Turn the ignition switch to the LOCK position. • Disconnect the power retractable hardtop control module (6-pin) and power retractable hardtop switch connectors. • Verify the continuity between the power retractable hardtop control module terminal 2C and ground. • Is there continuity?	Yes	Replace for a short to the ground circuit.
		No	Replace the power retractable hardtop switch, then go to the next step. (See 09-16-26 POWER RETRACTABLE HARDTOP SWITCH REMOVAL/INSTALLATION.)
5	**INSPECT TO SEE WHETHER MALFUNCTION IS IN POWER RETRACTABLE HARDTOP INDICATOR LIGHT OR POWER RETRACTABLE HARDTOP CONTROL MODULE** • Reinspect malfunction condition. Does the power retractable hardtop indicator light flash?	Yes	Replace the power retractable hardtop control module. (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE REMOVAL/INSTALLATION.)
		No	Replace the power retractable hardtop switch. (See 09-16-26 POWER RETRACTABLE HARDTOP SWITCH REMOVAL/INSTALLATION.)

SYMPTOM TROUBLESHOOTING [POWER RETRACTABLE HARDTOP]

NO. 3 POWER RETRACTABLE HARDTOP DOES NOT START TO OPEN [POWER RETRACTABLE HARDTOP]

id0903j2851200

3	Power retractable hardtop does not to start open
DESCRIPTION	• Power retractable hardtop does not start to open when the power retractable hardtop (open) switch is pressed.
POSSIBLE CAUSE	• Power retractable hardtop control module cannot detect the power retractable hardtop permission condition signal. — Improper vehicle speed detected — Improper transmission position detected (except for transmission neutral (MT)/N or P position (AT) detected) • Power retractable hardtop control module cannot detect the proper power retractable hardtop switch signal. — Power retractable hardtop (open) switch malfunction (stuck off) — Power retractable hardtop (close) switch malfunction (stuck on) — Open or short circuit in the wiring harness between the power retractable hardtop control module and the power retractable hardtop switch • Power retractable hardtop control module detect an improper top lock status. — Top lock switch malfunction — Open or short circuit in the wiring harness between the top lock switch and the power retractable hardtop control module • Power retractable hardtop control module cannot detect proper deck panel and roof positions. — Deck panel open position switch signal improper • Deck panel open position switch malfunction • Deck panel open position switch improper installation — Deck panel close position switch signal malfunction • Deck panel close position switch malfunction • Deck panel close position switch improper installation — Power retractable hardtop open position switch signal malfunction • Power retractable hardtop open position switch malfunction • Power retractable hardtop open position switch improper installation — Power retractable hardtop close position switch signal malfunction • Power retractable hardtop close position switch malfunction • Power retractable hardtop close position switch improper installation • Power retractable hardtop link mechanics malfunction. — Excessive restriction or hesitation • Power retractable hardtop control module detects a system malfunction. **Note** • If the following conditions are recognized, the power retractable hardtop control module invalidates the operation of the power retractable hardtop (open) switch. — Top lock is locked with the power retractable hardtop fully closed — Power retractable hardtop the fully open

SYMPTOM TROUBLESHOOTING [POWER RETRACTABLE HARDTOP]

Diagnostic Procedure

- When performing the asterisked (*) troubleshooting inspection, slightly shake the wiring harness and connectors while performing the inspection to determine whether poor contact points are the cause of any intermittent malfunction. If there is a problem, verify that the connectors, terminals and the wiring harness are connected correctly and undamaged.

STEP	INSPECTION		ACTION
1	**INSPECT TO SEE WHETHER MALFUNCTION IS IN OPERATION PERMISSION CONDITION SIGNAL OR ELSEWHERE** • Connect the M-MDS to the DLC-2. • Monitor the following PIDs. (See 01-40-9 PCM INSPECTION [L8, LF].) (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].) (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE INSPECTION.) **PCM** — VSS — PNP/CPP (MT) — CPP (MT) **TCM (AT)** — TR **Power Retractable Hardtop Control Module** — VSS • Are these monitor values normal?	Yes	Go to the next step.
		No	Inspect and repair the suspected signal related wiring harness and component.
2*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN POWER RETRACTABLE HARDTOP (CLOSE) SWITCH SIGNAL OR ELSEWHERE** • Monitor the power retractable hardtop control module PID SW_CL (power retractable hardtop (close) switch) using the M-MDS without the power retractable hardtop (close) switch pressed. • Is the monitor value OFF?	Yes	Go to Step 4.
		No	Go to the next step.
3	**INSPECT POWER RETRACTABLE HARDTOP (CLOSE) SWITCH** • Turn the ignition switch to the LOCK position. • Remove the power retractable hardtop switch. • Measure the resistance between power retractable hardtop switch component side connector terminals A and F without the power retractable hardtop (close) switch pressed. • Is the resistance **2.1—2.3 kilohms**?	Yes	Replace the power retractable hardtop switch. (See 09-16-26 POWER RETRACTABLE HARDTOP SWITCH REMOVAL/INSTALLATION.)
		No	Inspect and repair the wiring harness between power retractable hardtop control module terminal 1H and power retractable hardtop switch terminal F at wiring harness side connectors.
4	**VERIFY THAT POWER RETRACTABLE HARDTOP INDICATOR LIGHT ILLUMINATION** • Turn the ignition switch to the ON position. • Verify the power retractable hardtop indicator light status. • Does the power retractable hardtop indicator light flash or illuminate?	Yes	**If the indicator light is flashing:** Go to the next step. **If the indicator light is illuminated:** Go to Step 6.
		No	Go to Step 9.
5	**VERIFY THAT PRESENT MALFUNCTION DTC IS STORED** • Connect the M-MDS to DLC-2. • Retrieve the DTC for the power retractable hardtop control module. (See 09-02E-1 DTC INSPECTION [POWER RETRACTABLE HARDTOP].) • Is there any present malfunction DTC?	Yes	Go to the appropriate DTC inspection. (See 09-02E-2 DTC TABLE [POWER RETRACTABLE HARDTOP].)
		No	Go to symptom troubleshooting “No.2 POWER RETRACTABLE HARDTOP INDICATOR LIGHT IS FLASHING” procedure.

SYMPTOM TROUBLESHOOTING [POWER RETRACTABLE HARDTOP]

STEP	INSPECTION		ACTION
6*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN TOP LOCK SWITCH OR ELSEWHERE** • Monitor the power retractable hardtop control module PID SW_STRIKER using the M-MDS while the top lock switch is released. (See 09-02E-1 DTC INSPECTION [POWER RETRACTABLE HARDTOP].) • Is the monitor value off?	Yes	Go to Step 8.
		No	Go to the next step.
7	**INSPECT TOP LOCK SWITCH** • Inspect the top lock switch. (See 09-14-14 TOP LOCK SWITCH INSPECTION.) • Is the top lock switch normal?	Yes	Inspect and repair for an open or short circuit between the top lock switch and power retractable hardtop control module.
		No	Replace the striker switch. (See 09-16-10 CONVERTIBLE TOP REMOVAL/INSTALLATION.)
8*	**INSPECT POWER RETRACTABLE HARDTOP LIMIT SWITCH AND DECK PANEL LIMIT SWITCH** • Monitor the power retractable hardtop control module PID RHT_OP, RHT_CL, DECK_OP and DECK_CL using the M-MDS. • Do the monitoring values indicate the roof and deck panel positions properly?	Yes	Verify that the malfunction symptom appears without the roof and deck panel in the fully open position. If the same symptom appears, replace the power retractable hardtop control module. (See 09-16-21 POWER RETRACTABLE HARDTOP REMOVAL/INSTALLATION.)
		No	Inspect and repair suspected position sensor. (See 09-16-26 POWER RETRACTABLE HARDTOP SWITCH INSPECTION.) (See 09-16-40 DECK PANEL LIMIT SWITCH INSPECTION.)
9*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN POWER RETRACTABLE HARDTOP (OPEN) SWITCH SIGNAL OR ELSEWHERE** • Monitor the power retractable hardtop control module PID SW_OP using the M-MDS while the power retractable hardtop (open) switch is pressed. • Is the monitor value on?	Yes	Go to Step 10.
		No	Go to the next step.
10	**INSPECT POWER RETRACTABLE HARDTOP (OPEN) SWITCH** • Remove the power retractable hardtop switch. • Measure the resistance between power retractable hardtop switch connector (component side) terminal A and F while the power retractable hardtop (open) switch is pressed. • Is the resistance **0.95—1.05 kilohms**?	Yes	Inspect and repair the wiring harness between power retractable hardtop control module terminal 1H and power retractable hardtop switch terminal F at the wiring harness side connectors.
		No	Replace the power retractable hardtop switch.
11	**INSPECT POWER RETRACTABLE HARDTOP LINK MECHANICS** • Inspect the roof and deck panel link mechanics. • Is there any restriction or hesitation with roof and deck panel operation?	Yes	Repair or replace the malfunctioning part.
		No	Replace the power retractable hardtop control module. (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE REMOVAL/INSTALLATION.)

SYMPTOM TROUBLESHOOTING [POWER RETRACTABLE HARDTOP]

NO. 4 POWER RETRACTABLE HARDTOP DOES NOT START TO CLOSE [POWER RETRACTABLE HARDTOP]

id0903j2851300

4	Power retractable hardtop does not start to close
DESCRIPTION	• Power retractable hardtop does not start to close when the power retractable hardtop (close) switch is pressed.
POSSIBLE CAUSE	• Power retractable hardtop control module cannot detect the power retractable hardtop permission condition signal. — Improper vehicle speed detected — Improper transmission position detected (except for transmission neutral (MT)/N or P position (AT) detected) • Power retractable hardtop control module cannot detect the proper power retractable hardtop switch signal. — Power retractable hardtop (open) switch malfunction (stuck on) — Power retractable hardtop (close) switch malfunction (stuck off) — Open or short circuit in the wiring between the power retractable hardtop control module and the power retractable hardtop switch • Power retractable hardtop control module cannot detect proper deck panel and roof positions. — Deck panel open position switch signal improper • Deck panel open position switch malfunction • Deck panel open position switch improper installation — Deck panel close position switch signal improper • Deck panel close position switch malfunction • Deck panel close position switch improper installation — Power retractable hardtop open position switch signal improper • Power retractable hardtop open position switch malfunction • Power retractable hardtop open position switch improper installation — Power retractable hardtop close position switch signal improper • Power retractable hardtop close position switch malfunction • Power retractable hardtop close position switch improper installation • Power retractable hardtop link mechanics malfunction. — Excessive restriction or hesitation • Power retractable hardtop control module detects a system malfunction.

Diagnostic Procedure

- When performing the asterisked (*) troubleshooting inspection, slightly shake the wiring harness and connectors while performing the inspection to determine whether poor contact points are the cause of any intermittent malfunction. If there is a problem, verify that the connectors, terminals and the wiring harness are connected correctly and undamaged.

STEP	INSPECTION		ACTION
1	**INSPECT TO SEE WHETHER MALFUNCTION IS IN OPERATION PERMISSION CONDITION SIGNAL OR ELSEWHERE** • Connect the M-MDS to the DLC-2. • Monitor the following PIDs. (See 01-40-9 PCM INSPECTION [L8, LF].) (See 05-02-97 PID/DATA MONITOR INSPECTION [SJ6A-EL].) (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE INSPECTION.) **PCM** — VSS — PNP/CPP (MT) — CPP (MT) **TCM (AT)** — TR **Power Retractable Hardtop Control Module** — VSS • Are these monitor values normal?	Yes	Go to the next step.
		No	Inspect and repair the suspected signal related wiring harness and component.

SYMPTOM TROUBLESHOOTING [POWER RETRACTABLE HARDTOP]

STEP	INSPECTION		ACTION
2*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN POWER RETRACTABLE HARDTOP (OPEN) SWITCH SIGNAL OR ELSEWHERE** • Monitor the power retractable hardtop control module PID SW_OP using the M-MDS without the power retractable hardtop (open) switch pressed. • Is the monitor value off?	Yes	Go to Step 4.
		No	Go to the next step.
3	**INSPECT POWER RETRACTABLE HARDTOP (OPEN) SWITCH** • Turn the ignition switch to the LOCK position. • Remove the power retractable hardtop switch. • Measure the resistance between power retractable hardtop switch component side connector terminals A and F without the power retractable hardtop (open) switch pressed. • Is the resistance **0.95—1.05 kohms**?	Yes	Replace the power retractable hardtop switch. (See 09-16-26 POWER RETRACTABLE HARDTOP SWITCH REMOVAL/INSTALLATION.)
		No	Inspect and repair the wiring harness between power retractable hardtop control module terminal 1H and power retractable hardtop switch terminal F at wiring harness side connectors.
4	**VERIFY THAT POWER RETRACTABLE HARDTOP INDICATOR LIGHT ILLUMINATES** • Turn the ignition switch to the ON position. • Verify the power retractable hardtop indicator light status. • Does the power retractable hardtop indicator light flash or illuminate?	Yes	**If the indicator light is flashing:** Go to the next step. **If the indicator light is illuminated:** Go to Step 6.
		No	Go to Step 7.
5	**VERIFY THAT PRESENT MALFUNCTION DTC IS STORED** • Connect the M-MDS to DLC-2. • Retrieve the DTC for the power retractable hardtop control module. (See 09-02E-1 DTC INSPECTION [POWER RETRACTABLE HARDTOP].) • Is there any present malfunction DTC?	Yes	Go to the appropriate DTC inspection. (See 09-02E-2 DTC TABLE [POWER RETRACTABLE HARDTOP].)
		No	Go to symptom troubleshooting “No.2 POWER RETRACTABLE HARDTOP INDICATOR LIGHT IS FLASHING” procedure.
6*	**INSPECT POWER RETRACTABLE HARDTOP LIMIT SWITCH AND DECK PANEL LIMIT SWITCH** • Monitor the power retractable hardtop control module PID RHT_OP, RHT_CL, DECK_OP and DECK_CL using the M-MDS. • Do the monitoring values indicate the roof and deck panel positions properly?	Yes	Verify that the malfunction symptom appears without the roof and deck panel in the fully open position. If the same symptom appears, replace the power retractable hardtop control module. (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE REMOVAL/INSTALLATION.)
		No	Inspect and repair the suspected position sensor. (See 09-16-26 POWER RETRACTABLE HARDTOP SWITCH INSPECTION.) (See 09-16-40 DECK PANEL LIMIT SWITCH INSPECTION.)
7*	**INSPECT TO SEE WHETHER MALFUNCTION IS IN POWER RETRACTABLE HARDTOP (CLOSE) SWITCH SIGNAL OR ELSEWHERE** • Monitor the power retractable hardtop control module PID SW_CL using the M-MDS while the power retractable hardtop (close) switch is pressed. • Is the monitor value ON?	Yes	Go to Step 9.
		No	Go to the next step.
8	**INSPECT POWER RETRACTABLE HARDTOP (CLOSE) SWITCH** • Remove the power retractable hardtop switch. • Measure the resistance between the power retractable hardtop switch connector (component side) terminal A and F while the open is switch pressed. • Is the resistance **2.1—2.3 kilohms**?	Yes	Inspect and repair the wiring harness between power retractable hardtop control module terminal 1H and power retractable hardtop switch terminal F at wiring harness side connectors.
		No	Replace the power retractable hardtop switch. (See 09-16-26 POWER RETRACTABLE HARDTOP SWITCH REMOVAL/INSTALLATION.)

SYMPTOM TROUBLESHOOTING [POWER RETRACTABLE HARDTOP]

STEP	INSPECTION		ACTION
9	**INSPECT POWER RETRACTABLE HARDTOP LINK MECHANICS** • Inspect the roof and deck panel link mechanics. • Is there any restriction or hesitation with roof and deck panel operation?	Yes	Repair or replace malfunctioning part.
		No	Replace the power retractable hardtop control module. (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE REMOVAL/INSTALLATION.)

NO. 5 POWER RETRACTABLE HARDTOP STOPS WHILE OPERATING [POWER RETRACTABLE HARDTOP]

id0903j2851400

5	Power retractable hardtop stops while operating
DESCRIPTION	• Power retractable hardtop stops while the power retractable hardtop is opening/closing.
POSSIBLE CAUSE	• Deck panel does not operate while power retractable hardtop is operating. — Deck panel cannot move • Open or short circuit or poor connection in the wiring harness between the left/right deck panel motor and power retractable hardtop control module • Left/right deck panel motor malfunction • Deck panel link mechanics malfunction (excessive restriction or hesitation) — Deck panel position cannot be detected • Deck panel open position switch malfunction • Deck panel close position switch malfunction • Open or short circuit or poor connection in the wiring harness between the deck panel open position switch and the power retractable hardtop control module • Open or short circuit or poor connection in the wiring harness between deck panel close position switch and power retractable hardtop control module • Roof does not operate while the power retractable hardtop is operating. — Roof cannot move • Open or short circuit or poor connection in the wiring harness between the left/right roof motor and the power retractable hardtop control module • Left/right roof motor malfunction • Roof link mechanics malfunction (excessive restriction or hesitation) — Roof position cannot be detected — Power retractable hardtop open position switch malfunction — Power retractable hardtop close position switch malfunction — Open or short circuit or poor connection in the wiring harness between the power retractable hardtop open position switch and the power retractable hardtop control module — Open or short circuit or poor connection in the wiring harness between the power retractable hardtop close position switch and the power retractable hardtop control module • Power retractable hardtop switch signal is interrupted while the power retractable hardtop is operating. — Power retractable hardtop (open) switch malfunction (Contact point defective) — Power retractable hardtop (close) switch malfunction (Contact point defective) — Open or short circuit or poor connection in the wiring harness between the power retractable hardtop control module and the power retractable hardtop switch • Power retractable hardtop control module detects a system malfunction.

Diagnostic Procedure

- When performing the asterisked (*) troubleshooting inspection, slightly shake the wiring harness and connectors while performing the inspection to determine whether poor contact points are the cause of any intermittent malfunction. If there is a problem, verify that the connectors, terminals and the wiring harness are connected correctly and undamaged.

STEP	INSPECTION		ACTION
1	**VERIFY THAT POWER RETRACTABLE HARDTOP INDICATOR LIGHT ILLUMINATES** • Turn the ignition switch to the ON position. • Verify the power retractable hardtop indicator light status. • Does the power retractable hardtop indicator light flash?	Yes	Go to the next step.
		No	Go to Step 3.
2	**VERIFY THAT PRESENT MALFUNCTION DTC STORED** • Connect the M-MDS to DLC-2. • Retrieve DTC for power retractable hardtop control module. (See 09-02E-1 DTC INSPECTION [POWER RETRACTABLE HARDTOP].) • Is there a DTC present?	Yes	Go to the appropriate DTC inspection. (See 09-02E-2 DTC TABLE [POWER RETRACTABLE HARDTOP].)
		No	Go to symptom troubleshooting “No.2 POWER RETRACTABLE HARDTOP INDICATOR LIGHT IS FLASHING” procedure.

SYMPTOM TROUBLESHOOTING [POWER RETRACTABLE HARDTOP]

STEP	INSPECTION		ACTION
3	**INSPECT TO SEE WHETHER MALFUNCTION IS IN DECK PANEL OR ELSEWHERE** • Verify the malfunction symptom. • Does the deck panel operation stop during the open or close operation?	Yes	**Stops during the deck panel open operation:** Go to the next step. **Stops during the deck panel close operation:** Go to Step 7.
		No	Go to Step 14.
4	**INSPECT TO SEE WHETHER MALFUNCTION IS IN DECK PANEL OPEN POSITION SWITCH OR ELSEWHERE** • Monitor the power retractable hardtop control module PID DECK_OP using the M-MDS at the position where the deck panel does not operate. • Is the monitor value on (deck panel fully open)?	Yes	Go to the next step.
		No	Go to Step 10.
5	**INSPECT DECK PANEL OPEN POSITION SWITCH** • Inspect the deck panel open position switch. (See 09-16-40 DECK PANEL LIMIT SWITCH INSPECTION.) • Is the deck panel open position switch normal?	Yes	Go to the next step.
		No	Replace the deck panel link. (See 09-16-37 DECK PANEL DISASSEMBLY/ASSEMBLY.)
6*	**INSPECT DECK PANEL OPEN POSITION SWITCH WIRING HARNESS** • Turn the ignition switch to the LOCK position. • Disconnect the power retractable hardtop control module (16-pin) and the deck panel open position switch connectors. • Verify the continuity between power retractable hardtop control module terminal 3F and ground. • Is there continuity?	Yes	Adjust the deck panel open position switch installation.
		No	Repair for a short to the ground circuit.
7	**INSPECT TO SEE WHETHER MALFUNCTION IS IN DECK PANEL CLOSE POSITION SWITCH OR ELSEWHERE** • Monitor the power retractable hardtop control module PID DECK_CL using the M-MDS when the position where the deck panel could not operate. • Is the monitor value ON (deck panel fully closed)?	Yes	Go to the next step.
		No	Go to Step 10.
8	**INSPECT DECK PANEL CLOSE POSITION SWITCH** • Inspect the deck panel close position switch. (See 09-16-40 DECK PANEL LIMIT SWITCH INSPECTION.) • Is the deck panel close position switch normal?	Yes	Go to the next step.
		No	Replace the deck panel link. (See 09-16-37 DECK PANEL DISASSEMBLY/ASSEMBLY.)
9*	**INSPECT DECK PANEL CLOSE POSITION SWITCH WIRING HARNESS** • Turn the ignition switch to the LOCK position. • Disconnect the power retractable hardtop control module (16-pin) and the deck panel close position switch connectors. • Verify that the continuity between the power retractable hardtop control module terminal 3F and ground. • Is there any continuity?	Yes	Adjust the deck panel close position switch installation.
		No	Repair for a short to the ground circuit.

SYMPTOM TROUBLESHOOTING [POWER RETRACTABLE HARDTOP]

STEP	INSPECTION		ACTION
10*	**INSPECT DECK PANEL MOTOR WIRING HARNESS** • Turn the ignition switch to the LOCK position. • Disconnect the power retractable hardtop control module (16-pin, 24-pin), and deck panel motor (6-pin) connectors on both sides. • Inspect for an open or short circuit and poor connection at the following terminals: — Power retractable hardtop control module terminal 3M—deck panel motor (right) terminal A — Power retractable hardtop control module terminal 3E—deck panel motor (right) terminal E — Power retractable hardtop control module terminal 1K—deck panel motor (right) terminal F — Power retractable hardtop control module terminal 3H—deck panel motor (left) terminal A — Power retractable hardtop control module terminal 3P—deck panel motor (left) terminal E — Power retractable hardtop control module terminal 1O—deck panel motor (left) terminal F • Is there an open or short circuit, or a poor connection?	Yes	Repair or replace malfunctioning part.
		No	Go to the next step.
11	**INSPECT DECK PANEL MOTOR** • Inspect the deck panel motors on both sides. (See 09-16-39 DECK PANEL MOTOR INSPECTION.) • Are both deck panel motors normal?	Yes	Go to the next step.
		No	Replace suspected deck panel motor. (See 09-16-38 DECK PANEL MOTOR REMOVAL/ INSTALLATION.)
12	**INSPECT DECK PANEL MOTOR HALL SENSOR** • Measure the pulse profiles for the following power retractable hardtop control module (24-pin) while the deck panel is operating using the oscilloscope. — Terminal 1K (right deck panel hall sensor) — Terminal 1O (left deck panel motor hall sensor) • Is the pulse profile normal? (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE INSPECTION.)	Yes	Go to the next step.
		No	Replace the suspected deck panel motor. (See 09-16-38 DECK PANEL MOTOR REMOVAL/ INSTALLATION.)
13	**INSPECT POWER RETRACTABLE HARDTOP LINK MECHANICS** • Inspect the deck panel link mechanics. • Is there any restriction or hesitation for the deck panel operation?	Yes	Repair or replace the malfunctioning part.
		No	Go to Step 25.
14	**INSPECT TO SEE WHETHER MALFUNCTION IS IN ROOF OR ELSEWHERE** • Verify that malfunction symptom. • Does the roof operation stop during the open or close operation?	Yes	**Stops during the roof open operation:** Go to the next step. **Stops during the roof close operation:** Go to Step 18.
		No	Go to Step 25.
15	**INSPECT TO SEE WHETHER MALFUNCTION IS IN POWER RETRACTABLE HARDTOP OPEN POSITION SWITCH OR ELSEWHERE** • Monitor the power retractable hardtop control module PID RHT_OP using the M-MDS at the position where the roof does operate. • Is the monitor value on (roof fully open)?	Yes	Go to the next step.
		No	Go to Step 22.

SYMPTOM TROUBLESHOOTING [POWER RETRACTABLE HARDTOP]

STEP	INSPECTION		ACTION
16	**INSPECT POWER RETRACTABLE HARDTOP OPEN POSITION SWITCH** • Inspect the power retractable hardtop open position switch. (See 09-16-35 POWER RETRACTABLE HARDTOP LIMIT SWITCH INSPECTION.) • Is the power retractable hardtop open position switch normal?	Yes	Go to the next step.
		No	Replace the power retractable hardtop limit switch. (See 09-16-33 POWER RETRACTABLE HARDTOP LIMIT SWITCH REMOVAL/INSTALLATION.)
17*	**INSPECT POWER RETRACTABLE HARDTOP OPEN POSITION SWITCH WIRING HARNESS** • Turn the ignition switch to the LOCK position. • Disconnect the power retractable hardtop control module (24-pin) and the power retractable hardtop open position switch connectors. • Verify that continuity between power retractable hardtop control module terminal 1T—ground. • Is there continuity?	Yes	Adjust the power retractable hardtop open position switch installation.
		No	Repair for a short to the ground circuit.
18	**INSPECT TO SEE WHETHER MALFUNCTION IS IN POWER RETRACTABLE HARDTOP CLOSE POSITION SWITCH OR ELSEWHERE** • Monitor the power retractable hardtop control module PID RHT_CL using the M-MDS at the position where the roof could not operate. • Is the monitor value on (roof fully closed)?	Yes	Go to the next step.
		No	Go to Step 20.
19	**INSPECT POWER RETRACTABLE HARDTOP CLOSE POSITION SWITCH** • Inspect the power retractable hardtop close position switch. (See 09-16-35 POWER RETRACTABLE HARDTOP LIMIT SWITCH INSPECTION.) • Is the power retractable hardtop close position switch normal?	Yes	Go to the next step.
		No	Replace the power retractable hardtop limit switch. (See 09-16-33 POWER RETRACTABLE HARDTOP LIMIT SWITCH REMOVAL/INSTALLATION.)
20*	**INSPECT POWER RETRACTABLE HARDTOP CLOSE POSITION SWITCH WIRING HARNESS** • Turn the ignition switch to the LOCK position. • Disconnect the power retractable hardtop control module (24-pin) and the deck panel close position switch connectors. • Verify that continuity between power retractable hardtop control module terminal 1F—ground. • Is there any continuity?	Yes	Adjust the power retractable hardtop close position switch installation position.
		No	Repair for a short to the ground circuit.
21*	**INSPECT ROOF MOTOR WIRING HARNESS** • Turn the ignition switch to the LOCK position. • Disconnect the power retractable hardtop control module (16-pin, 24-pin), and the roof motor (6-pin) connector on both sides. • Inspect for the open or short circuit and poor connection at the following terminals: — Power retractable hardtop control module terminal 3I—roof motor (right) terminal A — Power retractable hardtop control module terminal 3A—roof motor (right) terminal E — Power retractable hardtop control module terminal 1I—roof motor (right) terminal D — Power retractable hardtop control module terminal 3C—roof motor (left) terminal A — Power retractable hardtop control module terminal 3L—roof motor (left) terminal E — Power retractable hardtop control module terminal 1M—roof motor (left) terminal D • Is there an open or short circuit, or a poor connection?	Yes	Repair or replace the malfunctioning part.
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [POWER RETRACTABLE HARDTOP]

STEP	INSPECTION		ACTION
22	**INSPECT ROOF MOTOR** • Inspect the both side roof motor hall sensors on both side. (See 09-16-32 ROOF MOTOR INSPECTION.) • Are both roof motors normal?	Yes	Go to the next step.
		No	Replace the suspected roof motor. (See 09-16-33 ROOF MOTOR REMOVAL/INSTALLATION.)
23	**INSPECT ROOF MOTOR HALL SENSOR** • Measure the pulse profiles for the following power retractable hardtop control module (24-pin) while the roof is operating using the oscilloscope. — Terminal 1I (right side roof motor hall sensor) — Terminal 1M (left side roof motor hall sensor) • Is the pulse profile normal? (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE INSPECTION.)	Yes	Go to the next step.
		No	Replace the suspected roof motor. (See 09-16-33 ROOF MOTOR REMOVAL/INSTALLATION.)
24	**INSPECT POWER RETRACTABLE HARDTOP LINK MECHANICS** • Inspect the roof link mechanics. • Does the roof operation stop during open or close operation?	Yes	Repair or replace the malfunctioning part.
		No	Go to the next step.
25	**INSPECT POWER RETRACTABLE HARDTOP SWITCH** • Remove the power retractable hardtop switch. • Measure the resistance between power retractable hardtop switch connector (component side) terminals A and F. • Is the resistance normal? — **Power retractable hardtop (open) switch pressed: 0.95—1.05 kilohms** — **Power retractable hardtop (close) switch pressed: 2.1—2.3 kilohms**	Yes	Go to the next step.
		No	Replace the power retractable hardtop switch. (See 09-16-26 POWER RETRACTABLE HARDTOP SWITCH REMOVAL/INSTALLATION.)
26*	**INSPECT POWER RETRACTABLE HARDTOP SWITCH WIRING HARNESS** • Turn the ignition switch to the ON position. • Disconnect the power retractable hardtop control module (24-pin) and power retractable hardtop switch connectors. • Inspect for an open or short circuit and poor connection between the power retractable hardtop control module terminal 1H and the power retractable hardtop switch terminal F. • Is there any open or short circuit, or poor connection?	Yes	Repair or replace the malfunctioning part.
		No	Replace the power retractable hardtop control module. (See 09-16-27 POWER RETRACTABLE HARDTOP CONTROL MODULE REMOVAL/INSTALLATION.)

09-10 BODY PANELS

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BODY PANELS

1	Bonnet (See 09-10-2 BONNET REMOVAL/INSTALLATION.) (See 09-10-3 BONNET ADJUSTMENT.)
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3	Front bumper (See 09-10-7 FRONT BUMPER REMOVAL/INSTALLATION.) (See 09-10-8 FRONT BUMPER DISASSEMBLY/ASSEMBLY.)
4	Front fender panel (See 09-10-10 FRONT FENDER PANEL REMOVAL/INSTALLATION.)
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9	Seat back crossmember assembly (See 09-10-13 SEAT BACK CROSSMEMBER ASSEMBLY REMOVAL/INSTALLATION.)

BONNET REMOVAL/INSTALLATION

id091000407200

Warning

- **Removing the bonnet without proper support can be dangerous. The bonnet may fall and injure you. Always perform the following procedure with at least another person.**

1. Disconnect the negative battery cable. (See01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. To remove the bonnet hinge, remove the following parts:
   (1) Front bumper (See 09-10-7 FRONT BUMPER REMOVAL/INSTALLATION.)
   (2) Front combination lights (See 09-18-5 FRONT COMBINATION LIGHT REMOVAL/INSTALLATION.)
   (3) Side step molding (See09-16-6 SIDE STEP MOLDING REMOVAL.) (See09-16-6 SIDE STEP MOLDING INSTALLATION.)
   (4) Front fender panel (See 09-10-10 FRONT FENDER PANEL REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Bonnet insulator
2	Shroud seal weatherstrip
3	Cushion rubber
4	Bonnet
5	Bonnet hinge
6	Bonnet striker
7	Bonnet stay

4. Install in the reverse order of removal.
5. Adjust the bonnet. (See 09-10-3 BONNET ADJUSTMENT.)

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BODY PANELS

BONNET ADJUSTMENT

id091000407300

Gap Adjustment

1. Disconnect the negative battery cable. (See01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the following parts:
   (1) Front bumper (See 09-10-7 FRONT BUMPER REMOVAL/INSTALLATION.)
   (2) Front combination lights (See 09-18-5 FRONT COMBINATION LIGHT REMOVAL/INSTALLATION.)
   (3) Side step molding (See09-16-6 SIDE STEP MOLDING REMOVAL.)
   (4) Front fender panel (See 09-10-10 FRONT FENDER PANEL REMOVAL/INSTALLATION.)
3. Loosen the bonnet hinge installation bolts and adjust the bonnet.
4. Tighten the bolts. (See 09-10-2 BONNET REMOVAL/INSTALLATION)

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5. Verify that the gap between the bonnet and the body is within the specification.

   Standard clearance
   a: 3.6—6.6 mm {0.15—0.25 in}
   b: 3.0—5.0 mm {0.12—0.19 in}

6. Install the following parts:
   (1) Front fender panel (See 09-10-10 FRONT FENDER PANEL REMOVAL/INSTALLATION.)
   (2) Side step molding (See09-16-6 SIDE STEP MOLDING INSTALLATION.)
   (3) Front combination lights (See 09-18-5 FRONT COMBINATION LIGHT REMOVAL/INSTALLATION.)
   (4) Front bumper (See 09-10-7 FRONT BUMPER REMOVAL/INSTALLATION.)

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Height Difference Adjustment

1. Turn the stop rubber to adjust the height of the bonnet.

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BODY PANELS

2. Verify that the height difference between the bonnet and the body is within the specification.

   Standard clearance
   a: –1.0—2.0 mm {–0.04—0.07 in}
   b: –0.5—1.5 mm {–0.02—0.05 in}

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TRUNK LID REMOVAL/INSTALLATION

id091000801600

Warning
- **Removing the stay damper without supporting the trunk lid can be dangerous. The trunk lid may fall and injure you. Be sure to open the trunk lid completely and support it securely before removing the stay damper.**

1. Disconnect the negative battery cable. (See01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the trunk lid wiring harness connector, then take the trunk lid wiring harness out from the vehicle.

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3. Remove the clip that secure the trunk lid wiring harness.

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BODY PANELS

4. Pry off the stay damper band using a flathead screwdriver.
5. Pry out the connecting part of the stay damper and the trunk lid hinge with a flathead screwdriver to disconnect them, then remove the stay damper.

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6. Remove nuts A, then remove the trunk lid.
7. Remove nuts B, then remove the trunk lid hinge.
8. Install in the reverse order of removal.
9. Adjust the trunk lid. (See09-10-5 TRUNK LID ADJUSTMENT)

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TRUNK LID ADJUSTMENT

id091000801700

1. Measure the gap and height difference between the trunk lid and the body.
2. Loosen the trunk lid hinge installation nuts or the trunk lid lock striker installation screws, and adjust the trunk lid.

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BODY PANELS

Standard clearance
- **a: 4.5—7.5 mm {0.18—0.29 in} (Except Power Retractable Hardtop)**
- **a: 5.5—8.5 mm {0.22—0.33 in} (Power Retractable Hardtop)**
- **b: 5.0—9.0 mm {0.20—0.35 in}**
- **c: 3.0—6.0 mm {0.12—0.23 in} (Except Power Retractable Hardtop)**
- **c: 4.0—8.0 mm {0.16—0.31 in} (Power Retractable Hardtop)**
- **d: 3.0—5.0 mm {0.12—0.19 in}**

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3. Tighten the nuts. (See 09-10-4 TRUNK LID REMOVAL/INSTALLATION)

STAY DAMPER DISPOSAL

id091000801800

Note
- The gas in the stay damper is colorless, odorless, and non-toxic.

1. Wear protective eye wear.
2. Lay the stay damper flat.
3. Saw **2—3 mm {0.08—0.11 in}** into the stay damper using a hacksaw, and allow the gas to escape from the stay damper.
4. Verify that the gas has escaped from the stay damper.
5. Discard the stay damper.

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FUEL-FILLER LID REMOVAL/INSTALLATION

id091000404800

1. Remove the bolts.
2. Remove the fuel-filler lid.
3. Install in the reverse order of removal.
4. Adjust the fuel-filler lid. (See 09-10-7 FUEL-FILLER LID ADJUSTMENT.)

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BODY PANELS

FUEL-FILLER LID ADJUSTMENT

id091000800200

1. Measure the gap and height difference between the fuel-filler lid and the body.
2. Loosen the fuel-filler lid installation bolts, and adjust the fuel-filler lid.

   Standard clearance
   a: 1.7—3.7 mm {0.07—0.14 in}
   b: -0.05—1.5 mm {0.02—0.05 in}
   c: -1.0—1.0 mm {0.04—0.03 in}
   d: -0.75—1.25 mm {-0.03—0.04 in}

3. Tighten the bolts. (See 09-10-6 FUEL-FILLER LID REMOVAL/INSTALLATION)

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FRONT BUMPER REMOVAL/INSTALLATION

id091000800300

1. Disconnect the negative battery cable. (See01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Disconnect the front fog light connectors. (Vehicles with front fog light)
3. Remove in the order indicated in the table.

1	Screw A
2	Fastener A
3	Cover
4	Bolt A
5	Nut
6	Bolt B
7	Bolt C
8	Front bumper

4. Install in the reverse order of removal.
5. Adjust the front fog light aiming. (Vehicles with front fog light) (See 09-18-15 FRONT FOG LIGHT AIMING.)

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BODY PANELS

FRONT BUMPER DISASSEMBLY/ASSEMBLY

id091000405200

Vehicles With Power Retractable Hardtop

1. To disassemble the front bumper, remove the following parts:
   (1) Front fog lights (Vehicles with front fog light) (See 09-18-15 FRONT FOG LIGHT REMOVAL/ INSTALLATION.)
2. Disassemble in the order indicated in the table.

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1	Fastener A
2	Set plate RH
3	Set plate CTR
4	Set plate LH
5	Fastener B
6	Energy absorbing form
7	Front bumper mesh

8	Front fog light bezel
9	Front fog light hole cover (Vehicles without front fog light)
10	Ornament
11	License plate holder
12	Front bumper fascia

3. Assemble in the reverse order of disassembly.

BODY PANELS

Vehicles Without Power Retractable Hardtop

1. To disassemble the front bumper, remove the following parts:
   (1) Front fog lights (Vehicles with front fog light) (See 09-18-15 FRONT FOG LIGHT REMOVAL/ INSTALLATION.)
2. Disassemble in the order indicated in the table.

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1	Fastener A
2	Set plate RH
3	Set plate CTR
4	Set plate LH
5	Fastener B
6	Energy absorbing form
7	Front bumper mesh

8	Front fog light bezel
9	Front fog light hole cover (Vehicles without front fog light)
10	Ornament
11	License plate holder
12	Front bumper fascia

3. Assemble in the reverse order of disassembly.

BODY PANELS

FRONT BUMPER REINFORCEMENT REMOVAL/INSTALLATION

id091000800600

1. Disconnect the negative battery cable. (See01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the following parts:
   (1) Front bumper (See 09-10-7 FRONT BUMPER REMOVAL/INSTALLATION.)
   (2) Front combination light (See 09-18-5 FRONT COMBINATION LIGHT REMOVAL/INSTALLATION.)
   (3) Fresh air duct (See 01-13-7 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L8, LF].)
   (4) Horn (See 09-22-5 HORN REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Clip
2	Shroud seal plate
3	Harness clip
4	Front bumper reinforcement

4. Install in the reverse order of removal.

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FRONT FENDER PANEL REMOVAL/INSTALLATION

id091000405900

1. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the front bumper. (See 09-10-7 FRONT BUMPER REMOVAL/INSTALLATION.)
3. Remove the front combination light. (See 09-18-5 FRONT COMBINATION LIGHT REMOVAL/INSTALLATION.)
4. Remove the side step molding. (See09-16-6 SIDE STEP MOLDING REMOVAL.) (See09-16-6 SIDE STEP MOLDING INSTALLATION.)
5. Remove in the order indicated in the table.

1	Fastener
2	Bolt A
3	Bolt B
4	Bolt C
5	Bolt D
6	Front fender panel

6. Install in the reverse order of removal.

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BODY PANELS

REAR BUMPER REMOVAL/INSTALLATION

id091000800700

1. Disconnect the negative battery cable. (See01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the following parts:
   (1) Trunk end trim (See 09-17-12 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (2) Partition board (See 09-17-23 PARTITION BOARD REMOVAL/INSTALLATION.)
   (3) Trunk side trim (See 09-17-11 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
   (4) Rear combination lights (See 09-18-19 REAR COMBINATION LIGHT REMOVAL/INSTALLATION.)
3. Remove the screws.
4. Splash shield, detach tabs A, and then remove the splash shield.

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5. Remove in the order indicated in the table.

1	Screw A
2	Screw B
3	Screw C
4	Fastener A
5	Energy absorbing form
6	Rear bumper (See 09-10-12 Rear Bumper Removal Note.) (See 09-10-12 Rear bumper Installation Note.)

6. Install in the reverse order of removal.

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BODY PANELS

Rear Bumper Removal Note

1. Affix the protective tape to the position shown in the figure.

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2. Pull the rear bumper ends (wheel arch) outward to detach from the bumper slider.

Caution

- **When detaching the rear bumper from the bumper slider, the rear bumper could fall and be damaged. Secure the rear bumper so that it does not fall.**

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Rear bumper Installation Note

1. Spread the rear bumper ends (wheel arches) apart.
2. Attach the rear bumper to the body.
3. Press the rear bumper connecting area into the body to engage with the bumper slider.

REAR BUMPER REINFORCEMENT REMOVAL/INSTALLATION

id091000800900

1. Disconnect the negative battery cable. (See01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the following parts:
   (1) Trunk end trim (See 09-17-12 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (2) Partition board (See 09-17-23 PARTITION BOARD REMOVAL/INSTALLATION.)
   (3) Trunk side trim (See 09-17-11 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
   (4) Rear combination lights (See 09-18-19 REAR COMBINATION LIGHT REMOVAL/INSTALLATION.)
   (5) Rear bumper (See 09-10-11 REAR BUMPER REMOVAL/INSTALLATION.)

3. Remove the nuts, then remove the rear bumper reinforcement.
4. Install in the reverse order of removal.

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SEAT BACK CROSSMEMBER ASSEMBLY REMOVAL/INSTALLATION

id091000802800

1. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Open hook lever (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (8) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (9) Open hook (See 09-14-7 OPEN HOOK REMOVAL/INSTALLATION.)
   (10) Rear speaker (See 09-20-10 REAR SPEAKER REMOVAL/INSTALLATION.)
   (11) Seat belt set plate (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
   (12) Seat belt upper anchor installation bolt (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
   (13) Power retractable hardtop link bracket. (Vehicle with power retractable hardtop) (See 09-16-44 POWER RETRACTABLE HARDTOP LINK BRACKET REMOVAL/INSTALLATION.)
3. Half open the power retractable hardtop. (Vehicle with power retractable hardtop)

Caution

- **If the seat back crossmember component is removed with the power retractable hardtop fully opened, it may contact the middle roof and damage the roof. Half open the power retractable hardtop before removing the seat back crossmember component.**

4. Remove the clips, then remove the speaker wiring harness.

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BODY PANELS

5. Remove in the order indicated in the table.

1	Bolt A
2	Bolt B
3	Junction
4	Bolt C (Except power retractable hardtop)
5	Bolt D (Except power retractable hardtop)
6	Bolt E
7	Nut
8	Seat Back Crossmember Assembly (See 09-10-14 Seat Back Crossmember Assembly Installation Note.)

6. Install in the reverse order of removal.

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Seat Back Crossmember Assembly Installation Note

1. After temporarily tightening all of the bolts and nuts, tighten them to the specified torque.

Tightening torque
20.0—28.0 N·m {2.04—2.85 kgf·m, 14.7—20.6 ft·lbf}

09-11 DOORS AND LIFTGATE

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DOORS AND LIFTGATE

DOOR AND LIFTGATE LOCATION INDEX

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1	Door checker (See 09-11-4 DOOR CHECKER REMOVAL/ INSTALLATION.)
2	Door hinge (See 09-11-5 DOOR HINGE REMOVAL/ INSTALLATION.)
3	Door pad (See 09-11-3 DOOR PAD REMOVAL/ INSTALLATION.)

4	Door (See 09-11-2 DOOR REMOVAL/INSTALLATION.) (See 09-11-5 DOOR ADJUSTMENT.)
5	Door module panel (See 09-11-3 DOOR MODULE PANEL REMOVAL/ INSTALLATION.)

DOORS AND LIFTGATE

DOOR REMOVAL/INSTALLATION

id091100620500

1. Disconnect the negative battery cable.(See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove in the order indicated in the table.

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1	Connector (See 09-11-2 Connector Removal Note.)
2	Bolt A

3	Bolt B
4	Door

3. Install in the reverse order of removal.
4. Adjust the door. (See 09-11-5 DOOR ADJUSTMENT.)

Connector Removal Note

1. Pull down the lever in the direction indicated by the arrow and disconnect the connector.

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DOORS AND LIFTGATE

DOOR MODULE PANEL REMOVAL/INSTALLATION

id091100602600

1. Disconnect the negative battery cable.(See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the following parts:
   (1) Door trim (See 09-17-16 DOOR TRIM REMOVAL/INSTALLATION.)
   (2) Door speaker (See 09-20-8 DOOR SPEAKER REMOVAL/INSTALLATION.)
3. Disconnect the power outer mirror harness connector.
4. Disconnect the door lock actuator connector.
5. Disconnect the power window motor connector.
6. Remove screws A and B.
7. pull the door module panel outward and detach clips C.
8. Remove the door module panel.
9. Install in the reverse order of removal.

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DOOR PAD REMOVAL/INSTALLATION

id091100620700

1. Disconnect the negative battery cable.(See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the following parts:
   (1) Door trim (See 09-17-16 DOOR TRIM REMOVAL/INSTALLATION.)
   (2) Door speaker (See 09-20-8 DOOR SPEAKER REMOVAL/INSTALLATION.)
   (3) Door module panel (See 09-11-3 DOOR MODULE PANEL REMOVAL/INSTALLATION.)
3. Remove the fasteners.
4. Remove the door pad.
5. Install in the reverse order of removal.

amxzzw0000021

DOORS AND LIFTGATE

DOOR CHECKER REMOVAL/INSTALLATION

id091100602800

1. Disconnect the negative battery cable.(See01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the following parts:
   (1) Door trim (See 09-17-16 DOOR TRIM REMOVAL/INSTALLATION.)
   (2) Door speaker (See 09-20-8 DOOR SPEAKER REMOVAL/INSTALLATION.)
3. Remove the bolt.

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4. Remove the nut.
5. Pull out the door checker from the door speaker installation hole.
6. Install in the reverse order of removal.

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DOORS AND LIFTGATE

DOOR HINGE REMOVAL/INSTALLATION

id091100620900

1. Disconnect the negative battery cable.(See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the following parts:
   (1) Front bumper (See 09-10-7 FRONT BUMPER REMOVAL/INSTALLATION.)
   (2) Front combination lights (See 09-18-5 FRONT COMBINATION LIGHT REMOVAL/INSTALLATION.)
   (3) Side step molding (See 09-16-6 SIDE STEP MOLDING REMOVAL.) (See 09-16-6 SIDE STEP MOLDING INSTALLATION.)
   (4) Front fender panel (See 09-10-10 FRONT FENDER PANEL REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Bolt
2	Door hinge

4. Install in the reverse order of removal.
5. Adjust the door. (See 09-11-5 DOOR ADJUSTMENT.)

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DOOR ADJUSTMENT

id091100521100

1. Measure the gap and height difference between the door and the body.
2. Loosen the door hinge installation bolts or the door lock striker installation screws, and adjust the door.
3. Tighten the bolts or screws.

amxzzw0000016

Standard clearance

A—A top and bottom (a): 3.1—5.0 mm {0.13—0.19 in}
A—A middle (a): 3.3—5.2 mm {0.13—0.20 in}
B—B top (b): -1.0—1.0 mm {-0.040—0.039 in}
B—B bottom (b): -0.5—1.5 mm {-0.020—0.059 in}
C—C top and bottom (c): 3.0—5.0 mm {0.12—0.19 in}
C—C top (c): -1.0—1.0 mm {-0.040—0.039 in}
C—C bottom (d): -0.5—1.5 mm {-0.020—0.059 in}

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DOOR GLASS REMOVAL/INSTALLATION

1. Position the door glass so that the distance between the top of the front door glass and top of the front beltline molding is **110 mm {4.33 in}**.
2. Remove the battery cover.
3. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Remove the door trim. (See 09-17-16 DOOR TRIM REMOVAL/INSTALLATION.)
5. Remove the door module panel. (See 09-11-3 DOOR MODULE PANEL REMOVAL/INSTALLATION.)

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6. Remove the glass stopper.

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7. Remove the nuts attaching door glass to regulator.
8. Lift the door glass up, then remove it while tilting it in the direction of the arrow.
9. Install in the reverse order of removal.
10. Adjust the door glass. (See 09-12-5 DOOR GLASS ADJUSTMENT.)

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GLASS/WINDOWS/MIRRORS

DOOR QUARTER GLASS REMOVAL/INSTALLATION

id091200813200

1. Position the door glass so that the distance between the top of the front door glass and top of the front beltline molding is **110 mm {4.33 in}**.
2. Remove the battery cover.
3. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Remove the door trim. (See 09-17-16 DOOR TRIM REMOVAL/INSTALLATION.)
5. Remove the door module panel. (See 09-11-3 DOOR MODULE PANEL REMOVAL/INSTALLATION.)
6. Remove the door glass. (See 09-12-3 DOOR GLASS REMOVAL/INSTALLATION.)
7. Remove the power window regulator.(See 09-12-6 POWER WINDOW REGULATOR REMOVAL/INSTALLATION.)
8. Remove the nut and bolt, then remove the door glass guide. (See 09-12-4 Door Glass Guide Installation Note.)

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e5u912zw5043

9. Remove the nuts, then remove the door quarter glass.
10. Install in the reverse order of removal.

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Door Glass Guide Installation Note

1. Adjust the adjustment bolt as shown in the figure.

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GLASS/WINDOWS/MIRRORS

DOOR GLASS ADJUSTMENT

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1. Fully close the door glass.
2. Remove the door trim.(See 09-17-16 DOOR TRIM REMOVAL/INSTALLATION.)
3. Remove the door module panel. (See 09-11-3 DOOR MODULE PANEL REMOVAL/INSTALLATION.)
4. Connect the power window regulator connector.
5. Loosen the glass stopper installation bolts.
6. Loosen the power window regulator and door glass tightening nuts.
7. Align the door glass with the rear edge of the front beltline molding lip.

Note

- The standard position for the rear edge of the cap is 1 mm from the rear edge of the door panel. If the standard position for the rear edge of the front beltline molding has deviated, align the rear edge of the door glass to the standard position for the rear edge position of the front beltline molding lip.

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8. Lightly tighten the power window regulator and door glass tightening nuts.

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9. Adjust the clearance between the upper edge of the door glass and the door glass guide.

mm {in}

Clearance	Standard	Minimum	Maximum
a	1.0 {0.04}	0 {0}	1.5 {0.06}

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10. Adjust the door glass position.

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GLASS/WINDOWS/MIRRORS

11. Tighten the power window regulator and door glass tightening nuts.

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12. Tighten the bolts while pressing the glass stopper in the direction of the arrows.
13. Verify that the door glass opens and closes smoothly.
14. Install the door module panel. (See 09-11-3 DOOR MODULE PANEL REMOVAL/INSTALLATION.)
15. Install the door trim.(See 09-17-16 DOOR TRIM REMOVAL/INSTALLATION.)
16. Close the door with the soft top closed and verify that the door glass opens and closes smoothly.

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POWER WINDOW REGULATOR REMOVAL/INSTALLATION

id091200812700

1. Remove the battery cover.
2. Disconnect the negative battery cable.(See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the door trim.(See 09-17-16 DOOR TRIM REMOVAL/INSTALLATION.)
4. Remove the door module panel. (See 09-11-3 DOOR MODULE PANEL REMOVAL/INSTALLATION.)
5. Remove the door glass.(See 09-12-3 DOOR GLASS REMOVAL/INSTALLATION.)
6. Remove the nuts.

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7. Remove the power window regulator.
8. Install in the reverse order of removal.

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GLASS/WINDOWS/MIRRORS

POWER WINDOW REGULATOR DISASSEMBLY/ASSEMBLY

id091200812900

1. Remove in the order indicated in the table.

1	Cover (See 09-12-7 Cover Disassembly Note.)
2	Power window motor
3	Frame

2. Assemble in the reverse order of disassembly.

Note
- When installing the power window motor, be careful that the cable does not become unwounded from the drum.

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Cover Disassembly Note

1. Carefully bend away the crimp of the cover using long nose pliers.

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POWER WINDOW MOTOR INSPECTION

id091200417000

1. Apply battery positive voltage to the power window motor terminals, and inspect the power window motor operation.
   - If the power window motor does not operate as indicated in the table, replace it.

Operation	Terminal	
	G	A
Open	Ground	B+
Close	B+	Ground

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GLASS/WINDOWS/MIRRORS

POWER WINDOW MAIN SWITCH REMOVAL/INSTALLATION

id091200418900

1. Remove the battery cover.
2. Disconnect the negative battery cable.(See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the console.(See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
4. Depress the tab and remove the power window main switch.
5. Install in the reverse order of removal.

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POWER WINDOW MAIN SWITCH INSPECTION

id091200419000

1. Measure the voltage at each terminal (other than terminal A and H).
   - If the voltage is not as specified in the terminal voltage table, inspect the parts under “Inspection item (s)” and related wiring harnesses.
2. Remove the battery cover.
3. Disconnect the negative battery cable.(See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Inspect the power window main switch connector for continuity at terminal A and H.

- If the system does not work properly even though the inspection items or related wiring harnesses do not have any malfunction, replace the power window main switch.

Terminal	Signal name	Connected to	Measured condition	Voltage (V)/ Continuity	Inspection item (s)
A	Communication	Power retractable hardtop control module	Under any condition: Inspect for continuity to power retractable hardtop control module terminal	Continuity detected	• Power retractable hardtop control module • Related wiring harnesses
B	IG 1	P.WIND 20 A fuse	Switch the ignition to ON	B+	• P.WIND 20 A fuse • Related wiring harnesses
			Switch the ignition to LOCK	1.0 or less	
D	Close output	Power window motor (RH)	While door glass is opening	1.0 or less	• Power window motor (See 09-12-7 POWER WINDOW MOTOR INSPECTION.) • Related wiring harnesses
			While door glass is closing	B+	
F	Open output	Power window motor (RH)	While door glass is opening	B+	• Power window motor (See 09-12-7 POWER WINDOW MOTOR INSPECTION.) • Related wiring harnesses
			While door glass is closing	1.0 or less	
G	GND	Body ground	Under any condition	1.0 or less	• GND
H	Communication	Power retractable hardtop control module	Under any condition: Inspect for continuity to power retractable hardtop control module terminal	Continuity detected	• Power retractable hardtop control module • Related wiring harnesses
I	Close output	Power window motor (LH)	While door glass is opening	1.0 or less	• Power window motor (See 09-12-7 POWER WINDOW MOTOR INSPECTION.) • Related wiring harnesses
			While door glass is closing	B+	
J	Open output	Power window motor (LH)	While door glass is opening	B+	• Power window motor (See 09-12-7 POWER WINDOW MOTOR INSPECTION.) • Related wiring harnesses
			While door glass is closing	1.0 or less	

GLASS/WINDOWS/MIRRORS

L.H.D.

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GLASS/WINDOWS/MIRRORS

R.H.D.

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WINDSHIELD REMOVAL

id091200417800

1. Remove the battery cover.
2. Disconnect the negative battery cable.(See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the following parts:
   (1) Wiper arm and blade (See 09-19-3 WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
   (2) Cowl grille (See 09-16-5 COWL GRILLE REMOVAL/INSTALLATION.)
   (3) Side cowl grille (See 09-16-5 SIDE COWL GRILLE REMOVAL/INSTALLATION.)
   (4) Windshield garnish (See 09-16-8 WINDSHIELD GARNISH REMOVAL.)
   (5) Rearview mirror (See 09-12-23 REARVIEW MIRROR REMOVAL/INSTALLATION.)
   (6) Remove the female wedge. (See 09-16-12 CONVERTIBLE TOP DISASSEMBLY/ASSEMBLY.)
   (7) Remove the map light. (See 09-18-32 MAP LIGHT REMOVAL/INSTALLATION.)
   (8) Remove the A-pillar trim. (See 09-17-11 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (9) Front header trim (See 09-17-14 FRONT HEADER TRIM REMOVAL/INSTALLATION.)
4. Apply protective tape along the edge of the body.

   Note
   - Overlap and adhere the protective tape to the corners to prevent damage.

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5. Remove the windshield molding by pulling it outward.

   Note
   - If the windshield molding is difficult to remove, warm the windshield molding using a hot air blower.
   - The windshield molding is a replacement part.

GLASS/WINDOWS/MIRRORS

Not Reusing Windshield

Note
- For the areas of the sealant that are difficult to cut, use the piano wire and follow the procedure under “Reusing Windshield”.

Warning
- **Using the piano wire with bare hands can cause injury. Always wear gloves when using the piano wire.**

1. Cut out the sealant all around the glass using a sealant remover.
2. Remove the windshield.

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Reusing Windshield

Warning
- **Using the piano wire with bare hands can cause injury. Always wear gloves when using the piano wire.**

Note
- Before removing the windshield from the body, mark the position of the windshield by affixing tape to the windshield and body panel.

1. Avoiding the pin on the inside of the vehicle, insert the piano wire which has been cut to sufficient length.

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2. Wind each end of the piano wire around a bar.

Note
- Use a long sawing action to spread the work over the whole length of the piano wire to prevent it from breaking due to localized heating.

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GLASS/WINDOWS/MIRRORS

3. Secure one end of the piano wire, and while pulling the other end, cut the sealant around the windshield.
4. Pinch the pin from the inside of the vehicle and detach it.
5. Remove the windshield.
6. If the pin is damaged, remove the pin.

Note
- Before removing the pin from the windshield glass, place an alignment mark on the windshield.

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WINDSHIELD INSTALLATION

id091200417900

Warning
- **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**

Caution
- **If a door is opened or closed when all the window glass is closed, the resulting change in air pressure could cause the sealant to crack preventing the proper installation of the glass. Keep the door glass opened until the windshield installation is completed.**

1. Remove the sealant along the perimeter of the glass using a cutting a razor. (When reusing the glass)
2. Clean and degrease an **approx. 50 mm {2.0 in}** wide strip along the perimeter of the windshield.
3. Inspect the glass for cracks. If it is cracked, chamfer it using sandpaper.
4. Align the marks made before removal and install the pin to the windshield referring to the figure. (when reusing the glass, and the pin was removed)

e5u912zw5033

5. Install the windshield molding.
6. Use glass primer on the glass, then allow it to dry for **approx. 30 min**.

Caution
- **To prevent weakening of the primer adhesion, keep the bonding surface free of dirt, moisture, and grease. Do not touch the surface with your hand.**

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GLASS/WINDOWS/MIRRORS

Note
- Make sure to apply primer to the hollowed marks in the ceramic coating.

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7. Cut away the old sealant using a razor or scraper so that **1—2 mm {0.04—0.07 in}** thickness of sealant remains along the perimeter of the frame.
8. If the sealant has come off completely in any one place, apply some primer after degreasing, and allow it **approx. 30 min** to dry. Then apply **2 mm {0.07 in}** thickness of new sealant.

   Caution
   - **To prevent weakening of the primer adhesion, keep the bonding surface free of dirt, moisture, and grease. Do not touch the surface with your hand.**

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9. Clean and degrease along the perimeter of the bonding area on the body.

GLASS/WINDOWS/MIRRORS

10. Apply body primer on the body as shown in the figure, then allow it to dry for **approx. 30 min**.

Caution
- **To prevent weakening of the primer adhesion, keep the bonding surface free of dirt, moisture, and grease. Do not touch the surface with your hand.**

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11. Apply sealant to the area of the glass surface as shown in the figure.
12. Insert the windshield locator pins to the body and install the windshield.

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13. Verify that the clearance of the A-pillar is within the range shown in the figure, and press along the perimeter of the glass.
14. Install the following parts:
    (1) Front header trim (See 09-17-14 FRONT HEADER TRIM REMOVAL/INSTALLATION.)
    (2) A-pillar trim. (See 09-17-11 A-PILLAR TRIM REMOVAL/INSTALLATION.)
    (3) Map light. (See 09-18-32 MAP LIGHT REMOVAL/INSTALLATION.)
    (4) Female wedge. (See 09-16-10 CONVERTIBLE TOP REMOVAL/ INSTALLATION.)
    (5) Rearview mirror (See 09-12-23 REARVIEW MIRROR REMOVAL/INSTALLATION.)
    (6) Windshield garnish (See 09-16-9 WINDSHIELD GARNISH INSTALLATION.)
    (7) Cowl grille (See 09-16-5 COWL GRILLE REMOVAL/INSTALLATION.)
    (8) Side cowl grille (See 09-16-5 SIDE COWL GRILLE REMOVAL/INSTALLATION.)
    (9) Wiper arm and blade (See 09-19-3 WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
15. Allow the sealant to harden completely.

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Sealant hardening time: 24 h

GLASS/WINDOWS/MIRRORS

REAR WINDOW GLASS REMOVAL/INSTALLATION [POWER RETRACTABLE HARDTOP]

id0912008081i8

1. Unlock the top lock.
2. Fully open the deck panel.
3. Cover both sides of the rear window glass with thick cloth to protect the window.
4. Remove the battery cover.
5. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
6. Remove the following parts:
   (1) Console (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Front seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (8) Seat belt upper anchor installation bolt (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
   (9) Power retractable hardtop link bracket (See 09-16-44 POWER RETRACTABLE HARDTOP LINK BRACKET REMOVAL/INSTALLATION.)
   (10) Rear side trim (See 09-17-21 REAR SIDE TRIM REMOVAL/INSTALLATION.)
   (11) Cab-side weatherstrip (See 09-16-12 CONVERTIBLE TOP DISASSEMBLY/ASSEMBLY.)
   (12) Power retractable hardtop (See 09-16-21 POWER RETRACTABLE HARDTOP REMOVAL/INSTALLATION.)

Note
- The number of shims varies depending on the location of the rear window glass installation nut. Adjustment will be easier by verifying the number of shims to be used before removing the rear window glass.

7. Disconnect the filament connector.
8. If the rear window glass or the middle roof panel is to be reused, remove it using the following procedure.

Note
- If the rear window glass or middle roof panel is to be used, positioning and adjustment during installation will be easier by placing marks for the installation before removal.
- Placing marks is not necessary if the rear window glass or middle roof panel is to be replaced with a new one because there will be no marked positions.

(1) Affix masking tape to the position shown in the figure.

Note
- Mark the roof link and rear window glass at 4 locations as shown in the figure.

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GLASS/WINDOWS/MIRRORS

(2) Apply positioning marks to the masking tape.
(3) Apply a positioning mark to the exterior circumference of the nuts.

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9. Move the power retractable hardtop in the open direction as shown in the figure until it is separated from the middle roof panel.

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10. Remove the cap.
11. Remove the nuts and washers.
12. Remove the shims.
13. Remove the rear window glass.
14. Remove the rear window defroster.
15. Install in the reverse order of removal.

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Rear Window Defroster Installation Note

1. Remove the connector from the roof motor bracket.
2. Remove the wiring harness from clip A.
3. Remove clip B, then remove clip C while pulling it in the direction shown by the arrow avoiding the tab.

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4. Remove the wiring harness from the roof link lock groove.

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5. Remove clip D while pulling it in the direction shown by the arrow avoiding the tab.

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Rear Window Glass Installation Note

Rear window glass or middle roof panel is newly replaced

1. Adjust the rear window glass and middle roof panel gap and height difference so that it is within the specification. (See 09-16-24 POWER RETRACTABLE HARDTOP ADJUSTMENT.)

Rear window glass or middle roof panel is reused

1. Install the shim according to the number verified prior to removal.
2. Align the alignment marks applied before the rear window glass removal, install the rear window glass, and then remove the masking tape.
3. Refer to POWER RETRACTABLE HARDTOP ADJUSTMENT and verify that the gap and height difference between the rear window glass and middle roof panel are within the specifications. Adjust the power retractable hardtop if necessary. (See 09-16-24 POWER RETRACTABLE HARDTOP ADJUSTMENT.)

GLASS/WINDOWS/MIRRORS

FILAMENT INSPECTION

id091200801000

1. Switch the ignition to ON.
2. Turn the rear window defroster switch on.

   Caution
   - **Directly touching the rear window defroster filament with the lead of the voltmeter could damage it. Wrap aluminum foil around the end of the lead and test the rear window defroster filament by touching it with the foil.**

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3. Connect the positive lead of the tester to the positive side of each rear window defroster filament and the negative lead to ground.
4. Gradually slide the positive lead from the positive side to the negative side and verify that the voltage decreases accordingly.
   - If the voltage changes rapidly, the rear window defroster filament has a malfunction. Repair the rear window defroster filament.

Measured part	Voltage (Reference)
(1) to (2)	Approx. 12 V to 0 V

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FILAMENT REPAIR

id091200801100

1. Clean the rear window defroster filament using isopropyl alcohol.
2. Attach tape to both sides of the rear window defroster filament.
3. Using a small brush or marking pen, apply silver paint.
4. After **2—3 min**, carefully remove the tape without damaging the applied area.

   Caution
   - **Do not operate the rear window defroster until the paint is completely dry. It may be cause other malfunctions if it is used before paint is dry.**

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5. Dry the repaired part using the following procedure.
   - When the room temperature is **25 °C {77 °F}**, leave as it is for **24 h**.
   - When a hot air blower is used, dry with the temperature of **150 °C {302 °F}** for **30 min**.

GLASS/WINDOWS/MIRRORS

POWER OUTER MIRROR REMOVAL/INSTALLATION

id091200420800

1. Remove the battery cover.
2. Disconnect the negative battery cable.(See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the door trim.(See 09-17-16 DOOR TRIM REMOVAL/INSTALLATION.)
4. Remove the door speaker.(See 09-20-8 DOOR SPEAKER REMOVAL/INSTALLATION.)
5. Remove the door module panel.
6. Remove clips.

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7. Rotate the power outer mirror in the direction shown by the arrow.

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8. Remove the bolt.

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9. Rotate the power outer mirror in the direction shown by the arrow.

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GLASS/WINDOWS/MIRRORS

10. Remove the bolt and the power outer mirror.
11. Install in the reverse order of removal.

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POWER OUTER MIRROR SWITCH REMOVAL/INSTALLATION

id091200420400

1. Remove the battery cover.
2. Disconnect the negative battery cable.(See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the handle pull.(See 09-17-17 DOOR TRIM DISASSEMBLY/ASSEMBLY.)
4. Remove the armrest.(See 09-17-17 DOOR TRIM DISASSEMBLY/ASSEMBLY.)
5. Remove the door trim.(See 09-17-16 DOOR TRIM REMOVAL/INSTALLATION.)
6. Remove the switch panel from the door trim by depressing the tab.
7. Remove the screws and the power outer mirror switch.
8. Install in the reverse order of removal.

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POWER OUTER MIRROR SWITCH INSPECTION

id091200420500

1. Inspect for continuity between the power outer mirror switch terminals using an ohmmeter.
   - If not as specified, replace the power outer mirror switch.

○—○ : Continuity

Operation		D	C	E	B	H	G	F
LH	Up	○				○	○	○
	Down	○				○	○	○
	Left			○		○	○	○
	Right			○		○	○	○
RH	Up		○			○	○	○
	Down		○			○	○	○
	Left				○	○	○	○
	Right				○	○	○	○

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GLASS/WINDOWS/MIRRORS

POWER OUTER MIRROR DISASSEMBLY/ASSEMBLY

1. Remove the outer mirror glass.(See 09-12-21 Outer Mirror Glass Disassembly Note.)(See 09-12-22 Outer Mirror Glass Assembly Note.)
2. Assemble in the reverse order of disassembly.

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Outer Mirror Glass Disassembly Note

1. Press area A of the outer mirror glass so that area B moves outward.

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2. Detach pin A while lifting up the inside of the outer mirror glass holder.
3. Pull out the outer mirror glass holder and detach pins B.
4. Disconnect the connector. (vehicles with heated outer mirrors)
5. Remove the outer mirror glass holder and the outer mirror glass as a single unit.

amxzzw0000072

GLASS/WINDOWS/MIRRORS

Outer Mirror Glass Assembly Note

1. Connect the connector. (vehicles with heated outer mirrors)
2. Press area A of the mirror glass into the base to attach pin A.
3. Press areas B of the outer mirror glass into the base to attach pins B.

amxzzw0000072

POWER OUTER MIRROR INSPECTION

id091200803000

1. Apply battery positive voltage and connect the ground to the corresponding power outer mirror terminals, and then inspect the operation of the power outer mirror.
   - If not as specified, replace the power outer mirror.

Operation	Terminal	
	B+	GND
Up	B	D
Down	D	B
Left	F	D
Right	D	F

amxzzw0000071

2. Inspect for continuity between the power outer mirror heater terminals.
   - If not as specified, replace the power outer mirror.

○——○ : Continuity

Mirror operation	Terminal	
	A	G
Heater	○	○

amxzzw00000719

amxzzw0000071

GLASS/WINDOWS/MIRRORS

REARVIEW MIRROR REMOVAL/INSTALLATION

id091200803100

Type A

1. Remove the cover.

e5u912zw5028

2. Depress the clip, and then remove the rearview mirror by pulling upward.
3. Install in the reverse order of removal.

e5u912zw5029

Type B

1. Insert a flathead screwdriver between the mirror and the base.
2. Push the base pin down to remove the rearview mirror.

amxzzw0000072

3. Install the rearview mirror onto the base.

amxzzw0000072

GLASS/WINDOWS/MIRRORS

BASE REMOVAL

id091200423300

1. Remove the rearview mirror.
2. Wind each end of a wire around a bar.

Warning
- **Using the piano wire with bare hands can cause injury. Always wear gloves when using the piano wire.**

Note
- Use a long sawing action to spread the work over the whole length of the piano wire to prevent it from breaking. Do not pull too hard to prevent damage to windshield.

acxuuw00001981

3. Saw through the sealant to remove the base.

BASE INSTALLATION

id091200803300

1. Cut away all of the original sealant using a razor.

Warning
- **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**

2. Clean and degrease the ceramic coating on the glass and the base.

Caution
- **Keep the area free of dirt and grease, and do not touch the surface. Otherwise, the primer may not properly bond to the surface of the glass.**

3. Apply primer to the bonding area of the glass and the base.
4. Use only glass primer on the glass, and body primer on the base. Allow the primer to dry for **approx. 30 min**.
5. Apply **3.0 mm {0.12 in}** layer of sealant to the base.

a6e7734w004

6. Center the base in the ceramic coating and press it onto the glass.
7. Use isopropyl alcohol to remove any excess repair sealant.

Hardening time of sealant

Temperature	Surface hardening time	Time required until vehicle can be put into service
5 °C {41 °F}	Approx. 1.5 h	Approx. 12 h
20 °C {68 °F}	Approx. 1 h	Approx. 4 h
35 °C {95 °F}	Approx. 10 min.	Approx. 2 h

A6E7734W005

8. Install the rearview mirror.

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SEATS

SEAT LOCATION INDEX

id091300424300

L.H.D.

STANDARD TYPE

SPORTS TYPE

amxzzw0000157

1	Seat (See 09-13-4 SEAT REMOVAL/INSTALLATION.) (See 09-13-5 SEAT BACK COMPONENT [DRIVER-SIDE] REMOVAL/INSTALLATION.) (See 09-13-7 SEAT BACK TRIM REMOVAL/INSTALLATION)
2	Seat cushion trim (See 09-13-10 SEAT CUSHION TRIM REMOVAL/INSTALLATION)

3	Seat warmer unit (See 09-13-33 SEAT WARMER UNIT INSPECTION.)
4	Seat side cover (See 09-13-23 SEAT SIDE COVER REMOVAL/INSTALLATION)
5	Seat warmer switch (See 09-13-32 SEAT WARMER SWITCH REMOVAL/INSTALLATION.) (See 09-13-32 SEAT WARMER SWITCH INSPECTION.)

SEATS

R.H.D.

amxzzw0000157

1	Seat (See 09-13-4 SEAT REMOVAL/INSTALLATION.) (See 09-13-5 SEAT BACK COMPONENT [DRIVER-SIDE] REMOVAL/INSTALLATION.) (See 09-13-7 SEAT BACK TRIM REMOVAL/INSTALLATION)
2	Seat cushion trim (See 09-13-10 SEAT CUSHION TRIM REMOVAL/INSTALLATION)

3	Seat warmer unit (See 09-13-33 SEAT WARMER UNIT INSPECTION.)
4	Seat side cover (See 09-13-23 SEAT SIDE COVER REMOVAL/INSTALLATION)
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SEATS

SEAT REMOVAL/INSTALLATION

id091300804100

Warning

- **Handling a seat (with built-in side air bag) improperly can accidentally operate (deploy) the air bag, which may seriously injure you. Read the service warnings before handling a seat (with built-in side air bag). (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.)**

Caution

- **After removing a seat, do not operate the slider lever. If the slider lever is operated, the left and right slide positions will deviate, and the slide adjuster may be damaged after the seat is installed.**
- **Verify that there are no malfunctions in the sliding mechanism after installing a seat.**
- **When performing the procedure with a seat removed from the vehicle, perform the procedure on a clean rag so as not to damage or soil the seat.**

1. Turn the ignition switch to the LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait **1 min or more**. (See 01-17-2 BATTERY REMOVAL/ INSTALLATION [L8, LF].)
4. Press connector tab A in the direction of arrow.

amxzzw0000150

5. Pull out the connector lock in the direction of arrow and disconnect the connector.

amxzzw0000087

6. Remove the bolts, then remove the seat.
7. Install in the reverse order of removal.

amxzzw0000150

SEATS

SEAT BACK COMPONENT [DRIVER-SIDE] REMOVAL/INSTALLATION

id091300988800

Warning

- **Handling a seat (with built-in side air bag) improperly can accidentally operate (deploy) the air bag, which may seriously injure you. Read the service warnings before handling a seat (with built-in side air bag). (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.)**

Caution

- **After removing a seat, do not operate the slider lever. If the slider lever is operated, the left and right slide positions will deviate, and the slide adjuster may be damaged after the seat is installed.**
- **Verify that there are no malfunctions in the sliding mechanism after installing a seat.**
- **When performing the procedure with a seat removed from the vehicle, perform the procedure on a clean rag so as not to damage or soil the seat.**

L.H.D.
Removal

1. Turn the ignition switch to LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait **1 min or more**. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Remove the seat. (See 09-13-4 SEAT REMOVAL/INSTALLATION.)
5. Remove the seat side cover. (See 09-13-23 SEAT SIDE COVER REMOVAL/INSTALLATION.)
6. Disconnect the side air bag module connector, then remove the side air bag wiring harness. (See 09-13-7 Side Air Bag Connector Disconnect Note)

amxzzw0000157

7. Disconnect the seat warmer connector.

SEATS

8. Lift up the cover of both sides in the direction of arrow shown in the figure.
9. Remove the nuts, then remove the seat back component.
10. Install in the reverse order of removal.

amxzzw0000157

R.H.D.
Removal

1. Turn the ignition switch to LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait **1 min or more**. (See 01-17-2 BATTERY REMOVAL/ INSTALLATION [L8, LF].)
4. Remove the seat. (See 09-13-4 SEAT REMOVAL/INSTALLATION.)
5. Remove the seat side cover. (See 09-13-23 SEAT SIDE COVER REMOVAL/INSTALLATION.)
6. Disconnect the side air bag module connector, then remove the side air bag wiring harness. (See 09-13-7 Side Air Bag Connector Disconnect Note)

amxzzw0000158

7. Disconnect the seat warmer connector.

SEATS

8. Lift up the cover of both sides in the direction of arrow shown in the figure.
9. Remove the nuts, then remove the seat back component.
10. Install in the reverse order of removal.

amxzzw0000158

Side Air Bag Connector Disconnect Note

1. Detach the tab as shown in the figure and remove the connector from the seat connector.

amxzzw0000191

SEAT BACK TRIM REMOVAL/INSTALLATION

id091300987100

L.H.D.

1. Turn the ignition switch to LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Remove the screw, then remove the belt guide.

amxzzw0000160

SEATS

5. Slide hook A in the direction of arrow (1), (2), (3) shown in the figure to detach it from hook B.

amxzzw0000159

6. Open the fastener.

amxzzw0000159

7. Remove ring C, then remove the holder bracket C in the direction of arrow.

amxzzw0000159

8. Pull out part A shown in the figure to the front.
9. Disconnect the seat warmer connector.

amxzzw0000160

10. Remove the seat back trim and the seat back pad as a single unit from the seat frame by pulling them in the direction of arrow.

amxzzw0000160

SEATS

11. Partially peal back the seat back trim from the seat back pad, remove rings C in the order of (4), (5), (6) and (7) shown in the figure, then remove the seat back trim.
12. Install in the reverse order of removal.

amxzzw0000217

R.H.D.

1. Turn the ignition switch to LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Remove the screw, then remove the belt guide.

amxzzw0000159

5. Slide hook A in the direction of arrow (1), (2), (3) shown in the figure to detach it from hook B.

amxzzw0000160

6. Open the fastener.

amxzzw0000160

SEATS

7. Remove ring C, then remove the holder bracket C in the direction of arrow.

amxzzw0000160

8. Pull out part A shown in the figure to the front.
9. Disconnect the seat warmer connector.

amxzzw0000187

10. Remove the seat back trim and the seat back pad as a single unit from the seat frame by pulling them in the direction of arrow.

amxzzw0000187

11. Partially peal back the seat back trim from the seat back pad, remove rings C in the order of (4), (5), (6) and (7) shown in the figure, then remove the seat back trim.
12. Install in the reverse order of removal.

amxzzw0000217

SEAT CUSHION TRIM REMOVAL/INSTALLATION

id091300987200

Warning

- **Handling a seat (with built-in side air bag) improperly can accidentally operate (deploy) the air bag, which may seriously injure you. Read the service warnings before handling a seat (with built-in side air bag). (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.)**

Caution

- **After removing a seat, do not operate the slider lever. If the slider lever is operated, the left and right slide positions will deviate, and the slide adjuster may be damaged after the seat is installed.**
- **Verify that there are no malfunctions in the sliding mechanism after installing a seat.**
- **When performing the procedure with a seat removed from the vehicle, perform the procedure on a clean rag so as not to damage or soil the seat.**

SEATS

L.H.D.
Driver-side

1. Turn the ignition switch to LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait **1 min or more**. (See 01-17-2 BATTERY REMOVAL/ INSTALLATION [L8, LF].)
4. Remove the seat. (See 09-13-4 SEAT REMOVAL/INSTALLATION.)
5. Disconnect the connectors, then remove the side air bag wiring harness. (See 09-13-23 Side Air Bag Connector Disconnect Note)

amxzzw0000161

6. Remove the bolts, then remove the seat cushion.

amxzzw0000217

SEATS

7. Detach hook A as shown in the figure in the direction of arrow (1) shown in the figure.

amxzzw0000187

8. Detach hook B in the direction of arrow (2) shown in the figure.

amxzzw0000187

SEATS

9. Detach hook C in the direction of arrow (3) shown in the figure.

amxzzw0000187

10. Detach hook D in the direction of arrow (4) shown in the figure.
11. Remove the seat cushion trim and the seat cushion pad from the seat cushion frame as a single unit.

amxzzw0000161

SEATS

12. Remove rings C in the order of (5), (6), (7), (8) and (9) as shown in the figure, then remove the seat cushion trim from the seat cushion pad in the direction of arrow shown in the figure.

amxzzw0000217

13. Install in the reverse order of removal.

Passenger-side

1. Turn the ignition switch to LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait **1 min or more**. (See 01-17-2 BATTERY REMOVAL/ INSTALLATION [L8, LF].)
4. Remove the seat. (See 09-13-4 SEAT REMOVAL/INSTALLATION.)
5. Remove the seat side cover. (See 09-13-23 SEAT SIDE COVER REMOVAL/INSTALLATION.)
6. Cut the bands securing the wiring harness.

amxzzw0000161

SEATS

7. Disconnect the connectors, then remove the side air bag wiring harness. (See 09-13-23 Side Air Bag Connector Disconnect Note)

amxzzw0000161

8. Remove rings C.

amxzzw0000162

9. Detach hook A in the direction of arrow (1) shown in the figure.

amxzzw0000162

SEATS

10. Detach hook B in the direction of arrow (2) shown in the figure.
11. Detach hook C from hook D in the direction of arrow (3) shown in the figure.

amxzzw0000162

amxzzw0000162

12. Remove the seat cushion trim and the seat cushion pad from the seat frame as a single unit.

SEATS

13. Remove rings C in the order of (4), (5), (6), (7) and (8) as shown in the figure, then remove the seat cushion trim from the seat cushion pad in the direction of arrow shown in the figure.

amxzzw0000217

14. Install in the reverse order of removal.

R.H.D.
Driver-side

1. Turn the ignition switch to LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait **1 min or more**. (See 01-17-2 BATTERY REMOVAL/ INSTALLATION [L8, LF].)
4. Remove the seat. (See 09-13-4 SEAT REMOVAL/INSTALLATION.)
5. Disconnect the connectors, then remove the side air bag wiring harness. (See 09-13-23 Side Air Bag Connector Disconnect Note)

amxzzw0000162

SEATS

6. Remove the bolts, then remove the seat cushion.

amxzzw0000218

7. Detach hook A as shown in the figure in the direction of arrow (1) shown in the figure.

amxzzw0000187

SEATS

8. Detach hook B in the direction of arrow (2) shown in the figure.
9. Detach hook C in the direction of arrow (3) shown in the figure.

amxzzw0000187

amxzzw0000187

10. Detach hook D in the direction of arrow (4) shown in the figure.
11. Remove the seat cushion trim and the seat cushion pad from the seat cushion frame as a single unit.

amxzzw0000163

SEATS

12. Remove rings C in the order of (5), (6), (7), (8) and (9) as shown in the figure, then remove the seat cushion trim from the seat cushion pad in the direction of arrow shown in the figure.

amxzzw0000217

13. Install in the reverse order of removal.

Passenger-side

1. Turn the ignition switch to LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait **1 min or more**. (See 01-17-2 BATTERY REMOVAL/ INSTALLATION [L8, LF].)
4. Remove the seat. (See 09-13-4 SEAT REMOVAL/INSTALLATION.)
5. Remove the seat side cover. (See 09-13-23 SEAT SIDE COVER REMOVAL/INSTALLATION.)
6. Cut the bands securing the wiring harness.

amxzzw0000161

SEATS

7. Disconnect the connectors, then remove the side air bag wiring harness. (See 09-13-23 Side Air Bag Connector Disconnect Note)

amxzzw0000163

8. Remove rings C.

amxzzw0000163

9. Detach hook A in the direction of arrow (1) shown in the figure.

amxzzw0000163

SEATS

10. Detach hook B in the direction of arrow (2) shown in the figure.
11. Detach hook C from hook D in the direction of arrow (3) shown in the figure.

amxzzw0000163

amxzzw0000187

12. Remove the seat cushion trim and the seat cushion pad from the seat frame as a single unit.

13. Remove rings C in the order of (4), (5), (6), (7) and (8) as shown in the figure, then remove the seat cushion trim from the seat cushion pad in the direction of arrow shown in the figure.

amxzzw0000217

14. Install in the reverse order of removal.

Side Air Bag Connector Disconnect Note

1. Detach the tab as shown in the figure and remove the connector from the seat connector.

amxzzw0000191

SEAT SIDE COVER REMOVAL/INSTALLATION

id091300987300

Warning

- **Handling a seat (with built-in side air bag) improperly can accidentally operate (deploy) the air bag, which may seriously injure you. Read the service warnings before handling a seat (with built-in side air bag). (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.)**

Caution

- **After removing a seat, do not operate the slider lever. If the slider lever is operated, the left and right slide positions will deviate, and the slide adjuster may be damaged after the seat is installed.**
- **Verify that there are no malfunctions in the sliding mechanism after installing a seat.**
- **When performing the procedure with a seat removed from the vehicle, perform the procedure on a clean rag so as not to damage or soil the seat.**

SEATS

L.H.D.
Driver's seat

1. Turn the ignition switch to LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait **1 min or more**. (See 01-17-2 BATTERY REMOVAL/ INSTALLATION [L8, LF].)
4. Remove the seat. (See 09-13-4 SEAT REMOVAL/INSTALLATION.)
5. Remove the outer lift lever cover in the direction of arrow (1), (2) shown in the figure to disengage the tab A and hook B.

amxzzw0000163

6. Remove the snap ring.

amxzzw0000164

SEATS

7. Operate the lift lever in the direction of arrow (3) shown in the figure.

amxzzw0000164

8. Using a flathead screwdriver, hold the spring and return the lift lever a bit to pull it up in the order of (4), (5) shown in the figure.

SEATS

9. After operating the recliner knob in the upward direction (6), cut the area indicated in the figure, then remove the recliner knob in the direction of arrow (7).

   Caution
   - **The seat back folds forward when the recliner knob is operated. Be careful when operating the recliner knob.**

amxzzw0000164

10. Remove the screw C.
11. Remove the screw D and pull the seat side cover in the direction of arrow (8) shown in the figure to disengage the hook E.

amxzzw0000164

amxzzw0000164

SEATS

Passenger's seat

1. Turn the ignition switch to LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait **1 min or more**. (See 01-17-2 BATTERY REMOVAL/ INSTALLATION [L8, LF].)
4. Remove the seat. (See 09-13-4 SEAT REMOVAL/INSTALLATION.)
5. After operating the recliner knob in the upward direction (1), cut the area indicated in the figure, then remove the recliner knob in the direction of arrow (2).

   Caution
   - **The seat back folds forward when the recliner knob is operated. Be careful when operating the recliner knob.**

amxzzw0000164

6. Remove the screw A.
7. Pull the seat side cover in the direction of arrow (3) shown in the figure to disengage the tab B.

amxzzw0000164

amxzzw0000164

8. Pull the seat side cover in the direction of arrow (4) shown in the figure to disengage the tab C.
9. Install in the reverse order of removal.

SEATS

R.H.D.
Driver's seat

1. Turn the ignition switch to LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait **1 min or more**. (See 01-17-2 BATTERY REMOVAL/ INSTALLATION [L8, LF].)
4. Remove the seat. (See 09-13-4 SEAT REMOVAL/INSTALLATION.)
5. Remove the outer lift lever cover in the direction of arrow (1), (2) shown in the figure to disengage the tab A and hook B.

amxzzw0000164

6. Remove the snap ring.

amxzzw0000164

SEATS

7. Operate the lift lever in the direction of arrow (3) shown in the figure.

amxzzw0000165

8. Using a flathead screwdriver, hold the spring and return the lift lever a bit to pull it up in the order of (4), (5) shown in the figure.

SEATS

9. After operating the recliner knob in the upward direction (6), cut the area indicated in the figure, then remove the recliner knob in the direction of arrow (7).

   Caution
   - **The seat back folds forward when the recliner knob is operated. Be careful when operating the recliner knob.**

amxzzw0000165

10. Remove the screw C.
11. Remove the screw D and pull the seat side cover in the direction of arrow (8) shown in the figure to disengage the hook E.

amxzzw0000165

amxzzw0000165

SEATS

Passenger's seat

1. Turn the ignition switch to LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait **1 min or more**. (See 01-17-2 BATTERY REMOVAL/ INSTALLATION [L8, LF].)
4. Remove the seat. (See 09-13-4 SEAT REMOVAL/INSTALLATION.)
5. After operating the recliner knob in the upward direction (1), cut the area indicated in the figure, then remove the recliner knob in the direction of arrow (2).

   Caution
   - **The seat back folds forward when the recliner knob is operated. Be careful when operating the recliner knob.**

amxzzw0000165

6. Remove the screw A.
7. Pull the seat side cover in the direction of arrow (3) shown in the figure to disengage the tab B.

amxzzw0000165

amxzzw0000165

8. Pull the seat side cover in the direction of arrow (4) shown in the figure to disengage the tab C.
9. Install in the reverse order of removal.

SEATS

SEAT WARMER SWITCH REMOVAL/INSTALLATION

id091300716000

1. Turn the ignition switch to LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Remove the console. (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
5. Remove the side wall. (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
6. Remove the console panel. (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.)
7. Squeeze the tabs of seat warmer switch in the direction of arrow shown in the figure, and pull it outward to remove it.
8. Install in the reverse order of removal.

amxzzw0000150

SEAT WARMER SWITCH INSPECTION

id091300716100

1. Inspect for resistance and continuity between the seat warmer switch terminals using a tester.

SEAT WARMER SWITCH LH

SEAT WARMER SWITCH RH

O-W-O : RESISTANCE

SWITCH POSITION	TERMINAL	
	B	F
0		
1	O—W—O	R_1
2	O—W—O	R_2
3	O—W—O	R_3
4	O—W—O	R_4
5	O—W—O	R_5

R_1: 1213 Ω
R_2: 791 Ω
R_3: 426 Ω
R_4: 110 Ω
R_5: 10 Ω

amxzzw0000150

- If not as specified, replace the seat warmer switch.

SEATS

SEAT WARMER UNIT INSPECTION

id091300716200

1. Remove the seat. (See 09-13-4 SEAT REMOVAL/INSTALLATION.)
2. While inspecting for continuity between the terminals A and B of the connector, use a dryer to warm the thermostat of the seat warmer unit on seat cushion.

amxzzw0000150

3. Verify that the continuity between the seat warmer terminals is as indicated in the table.
   - If not as indicated in the table, replace the seat warmer unit.

○—○ : Continuity

Thermostat temperature	Terminal	
	A	B
More than approx. 37—43 °C {99—109 °F}		
Less than approx. 27—33 °C {81—91 °F}	○	○

e5u913zw5004

amxzzw0000150

09-14 SECURITY AND LOCKS

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SECURITY AND LOCKS

SECURITY AND LOCKS LOCATION INDEX

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Locks and Openers

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SECURITY AND LOCKS

Keyless Entry System and Immobilizer System

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1	Key (transponder) (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING)
2	Transmitter (See 09-14-22 TRANSMITTER BATTERY REPLACEMENT) (See 09-14-24 TRANSMITTER ID CODE REGISTRATION)
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SECURITY AND LOCKS

Theft-deterrent System

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1	Intruder sensor (See 09-14-35 INTRUDER SENSOR REMOVAL/INSTALLATION)
2	Theft-deterrent siren (See 09-14-20 THEFT-DETERRENT SIREN REMOVAL/INSTALLATION)

OUTER HANDLE REMOVAL/INSTALLATION

id091400817700

1. Remove the following parts:
   (1) Door trim (See 09-17-16 DOOR TRIM REMOVAL/INSTALLATION.)
   (2) Door module panel (See 09-11-3 DOOR MODULE PANEL REMOVAL/INSTALLATION.)
2. Detach the rod from the outer handle.
3. Remove the cover.
4. Remove the bolts.

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SECURITY AND LOCKS

5. Secure the rear part of the front outer handle and, with the front outer handle lever pulled outward (1), remove the rear part of the front outer handle from the front door.
6. Pull out the front part of the front outer handle from the front door.
7. Install in the reverse order of removal.

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INNER HANDLE REMOVAL/INSTALLATION

id091400432700

1. Remove the door trim. (See 09-17-16 DOOR TRIM REMOVAL/INSTALLATION.)
2. Remove the screws, then remove the inner handle.
3. Detach the cables from the inner handle and door lock knob.
4. Install in the reverse order of removal.

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BONNET LATCH AND RELEASE LEVER REMOVAL/INSTALLATION

id091400436800

1. Disconnect the negative battery cable. (See01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the front bumper. (See 09-10-7 FRONT BUMPER REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

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1	Connector (with theft-deterrent system)
2	Bonnet latch

3	Bonnet release lever (See 09-14-6 Bonnet Release Lever Removal Note.)
4	Bonnet release cable

4. Install in the reverse order of removal.
5. Adjust the bonnet. (See 09-10-3 BONNET ADJUSTMENT.)

SECURITY AND LOCKS

Bonnet Release Lever Removal Note

1. Pull the bonnet release lever.
2. While maintaining the condition in procedure 1, insert a tape-wrapped flathead screwdriver as shown in the figure, press the ends of the tabs with the screwdriver in the direction of the arrows (1), pull the bonnet release lever in the direction of arrow (2), and then disconnect the lower panel.

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Caution

- **Remove the bonnet release lever while being careful not to damage the bonnet release cable with the flathead screwdriver.**

3. Pull the latch release lever outward, remove it from the lower panel, and then disconnect the bonnet release cable.
4. Install in the reverse order of removal.

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SECURITY AND LOCKS

BONNET LATCH SWITCH INSPECTION

id091400810500

1. Open the bonnet.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the bonnet latch switch connector.
4. Inspect for continuity between the bonnet latch switch terminals A and B.
   - If there is no continuity, replace the bonnet latch switch.

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5. Lock the bonnet latch using a flathead screwdriver or equivalent as shown.
6. Inspect for continuity between the bonnet latch switch terminals A and B
   - If there is continuity, replace the bonnet latch.

Caution

- **After the inspection, unlock the bonnet latch. If closing the bonnet with the bonnet latch locked, the bonnet latch and/or bonnet striker may be broken.**

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OPEN HOOK REMOVAL/INSTALLATION

id091400817800

1. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (8) Seat back bar lower garnish (See 09-17-20 SEAT BACK BAR LOWER GARNISH REMOVAL/INSTALLATION

SECURITY AND LOCKS

2. Remove the bolts.
3. Remove the open hook.
4. Install in the reverse order of removal.

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FUEL-FILLER LID OPENER REMOVAL/INSTALLATION

id091400804800

1. Remove the following parts:
   (1) Trunk end trim (See 09-17-12 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (2) Partition board (See 09-17-23 PARTITION BOARD REMOVAL/INSTALLATION.)
   (3) Trunk side trim (See 09-17-11 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.

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1	Lift spring	2	Fuel-filler lid opener

3. Install in the reverse order of removal.
4. Adjust the fuel-filler lid. (See 09-10-7 FUEL-FILLER LID ADJUSTMENT.)

DOOR KEY CYLINDER REMOVAL/INSTALLATION

id091400817200

1. Position the door glass so that the distance between the top of the front door glass and top of the front beltline molding is 110 mm {4.33 in}.
2. Disconnect the negative battery cable.(See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the following parts:
   (1) Door trim (See 09-17-16 DOOR TRIM REMOVAL/INSTALLATION.)
   (2) Door speaker (See 09-20-8 DOOR SPEAKER REMOVAL/INSTALLATION.)
   (3) Door module panel (See 09-11-3 DOOR MODULE PANEL REMOVAL/INSTALLATION.)
   (4) Door glass (See 09-12-3 DOOR GLASS REMOVAL/INSTALLATION.)
   (5) Outer handle (See 09-14-4 OUTER HANDLE REMOVAL/INSTALLATION.)

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SECURITY AND LOCKS

4. Detach the door key cylinder rod.

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5. Turn the front door key cylinder so that the tab is aligned with the notch.
6. Remove the front door key cylinder by pulling it out from the front door.
7. Install in the reverse order of removal.

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BONNET STRIKER REMOVAL/INSTALLATION

id091400800300

1. Remove the bolt, then remove the bonnet striker.
2. Install in the reverse order of removal.

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SECURITY AND LOCKS

DOOR LATCH AND LOCK ACTUATOR REMOVAL/INSTALLATION

id091400817300

1. Position the door glass so that the distance between the top of the front door glass and top of the front beltline molding is 110 mm {4.33 in}.
2. Disconnect the negative battery cable.(See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the following parts:
   (1) Door trim (See 09-17-16 DOOR TRIM REMOVAL/INSTALLATION.)
   (2) Door speaker (See 09-20-8 DOOR SPEAKER REMOVAL/INSTALLATION.)
   (3) Inner handle (See 09-14-5 INNER HANDLE REMOVAL/INSTALLATION.)
   (4) Door module panel (See 09-11-3 DOOR MODULE PANEL REMOVAL/INSTALLATION.)
   (5) Door glass (See 09-12-3 DOOR GLASS REMOVAL/INSTALLATION.)
4. Detach the rods from the key cylinder and the outer handle.
5. Remove the screws, then remove the door latch and lock actuator.
6. Install in the reverse order of removal.

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DOOR LOCK ACTUATOR INSPECTION

id091400817400

Door Lock Actuator

1. Position the door glass so that the distance between the top of the front door glass and top of the front beltline molding is 110 mm {4.33 in}.
2. Disconnect the negative battery cable.(See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the following parts:
   (1) Door trim (See 09-17-16 DOOR TRIM REMOVAL/INSTALLATION.)
   (2) Door speaker (See 09-20-8 DOOR SPEAKER REMOVAL/INSTALLATION.)
   (3) Inner handle (See 09-14-5 INNER HANDLE REMOVAL/INSTALLATION.)
   (4) Door module panel (See 09-11-3 DOOR MODULE PANEL REMOVAL/INSTALLATION.)
   (5) Door glass (See 09-12-3 DOOR GLASS REMOVAL/INSTALLATION.)
4. Apply battery positive voltage to the front door lock actuator terminals and inspect the operation of the front door lock actuator.

- If not as specified, replace the front door lock actuator.

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Actuator operation	Connection	
	B+	GND
Lock	A (F)	C (D)
Double lock	A (F)	B (E)
Unlock	C and B (D and E)	A (F)

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( ) : RH

SECURITY AND LOCKS

Door Lock-link Switch

1. Position the door glass so that the distance between the top of the front door glass and top of the front beltline molding is 110 mm {4.33 in}.
2. Disconnect the negative battery cable.(See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the following parts:
   (1) Door trim (See 09-17-16 DOOR TRIM REMOVAL/INSTALLATION.)
   (2) Door speaker (See 09-20-8 DOOR SPEAKER REMOVAL/INSTALLATION.)
   (3) Inner handle (See 09-14-5 INNER HANDLE REMOVAL/INSTALLATION.)
   (4) Door module panel (See 09-11-3 DOOR MODULE PANEL REMOVAL/INSTALLATION.)
   (5) Door glass (See 09-12-3 DOOR GLASS REMOVAL/INSTALLATION.)
4. Inspect for continuity between the door lock-link switch terminals.
   - If not as specified, replace the door lock actuator.

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○—○ : Continuity

Lock knob position	Terminal		
	E (B)	F (A)	D (C)
Lock		○	○
Unlock	○	○	

( ): RH

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Door Key Cylinder Switch

1. Position the door glass so that the distance between the top of the front door glass and top of the front beltline molding is 110 mm {4.33 in}.
2. Disconnect the negative battery cable.(See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the following parts:
   (1) Door trim (See 09-17-16 DOOR TRIM REMOVAL/INSTALLATION.)
   (2) Door speaker (See 09-20-8 DOOR SPEAKER REMOVAL/INSTALLATION.)
   (3) Inner handle (See 09-14-5 INNER HANDLE REMOVAL/INSTALLATION.)
   (4) Door module panel (See 09-11-3 DOOR MODULE PANEL REMOVAL/INSTALLATION.)
   (5) Door glass (See 09-12-3 DOOR GLASS REMOVAL/INSTALLATION.)
4. Inspect for continuity between the door lock-link switch terminals.
   - If not as specified, replace the front door lock actuator.

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○—○ : Continuity ○-ᴡᴡ-○ : Resistance

Key cylinder position	Terminal	
	A	B
Neutral		
Lock	○	R ○
Unlock	○	○

R: 950—1050 ohms

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SECURITY AND LOCKS

DOOR LOCK STRIKER REMOVAL/INSTALLATION

id091400430300

1. Remove the screws, and then remove the door lock striker.
2. Install in the reverse order of removal.
3. Adjust the door. (See 09-11-5 DOOR ADJUSTMENT.)

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TRUNK LID OPENER REMOVAL/INSTALLATION

id091400812100

1. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the trunk end trim. (See 09-17-12 TRUNK END TRIM REMOVAL/INSTALLATION.)
3. Detach the rod.
4. Disconnect the trunk lid opener connector and the trunk compartment light connector.
5. Remove the bolts, then remove the trunk lid opener.
6. Install in the reverse order of removal.

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TRUNK LID STRIKER REMOVAL/INSTALLATION

id091400817600

1. Remove the trunk end trim. (See 09-17-12 TRUNK END TRIM REMOVAL/INSTALLATION.)
2. Remove the bolts, then remove the trunk lid striker.
3. Install in the reverse order of removal.

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SECURITY AND LOCKS

TRUNK LID OPENER INSPECTION

id091400811400

1. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the trunk end trim. (See 09-17-12 TRUNK END TRIM REMOVAL/INSTALLATION.)
3. Remove the trunk lid opener. (See 09-14-12 TRUNK LID OPENER REMOVAL/INSTALLATION.)
4. Apply battery positive voltage and connect the ground to the corresponding the trunk lid opener terminals, and inspect the trunk lid opener operation.
   - If the trunk lid opener does not operate as indicated in the table, replace the trunk lid opener.

Operation	Terminal	
	A	B
Unlocks	B+	Ground

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TRUNK LID OPENER SWITCH REMOVAL/INSTALLATION

id091400812200

1. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Using a small flathead screwdriver, detach the tabs of the trunk lid opener switch from the dashboard.
3. Push the trunk lid opener switch into the dashboard and remove.
4. Disconnect the trunk lid opener switch connector.
5. Install in the reverse order of removal.

e5u914aw4011

TRUNK LID OPENER SWITCH INSPECTION

id091400817500

1. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the trunk lid open switch. (See 09-14-13 TRUNK LID OPENER SWITCH REMOVAL/INSTALLATION.)
3. Inspect for continuity between the trunk lid open switch terminals.
   - If not as specified, replace the trunk lid open switch.

○—○ : Continuity

Operation	Terminal	
	A	B
On	○	○

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SECURITY AND LOCKS

TOP LOCK SWITCH INSPECTION

id091400820000

1. Inspect for continuity between the top lock switch terminals.
   - If not as specified, replace the striker. (See 09-16-12 CONVERTIBLE TOP DISASSEMBLY/ASSEMBLY.)

○—○ : Continuity

Operation	Terminal	
	A	B
Convertible top open		
Convertible top close	○	○

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D5E914AW6011

KEYLESS CONTROL MODULE REMOVAL/INSTALLATION

id091400438400

Note
- If the keyless control module is replaced, always perform the following procedure.
  — Immobilizer system resetting (with immobilizer system) (See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.)

L.H.D.
1. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the side panel. (See 09-17-10 SIDE PANEL REMOVAL/INSTALLATION.)
3. Remove the bolt and nut.

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4. While inclining the keyless control module along the body panel in the direction indicated by the arrow, disengage the bracket tab from the hole in the body panel.
5. Disconnect the keyless control module connector.
6. Remove the keyless control module.

SECURITY AND LOCKS

7. Remove the screw, then remove the bracket.

Note
- The screw which fixes the keyless control module and bracket is for a body ground connection. Be sure to secure the screw when installing.

8. Install in the reverse order of removal.

e6u914zw1006

R.H.D.

Note
- Disconnect the fuse block and the vehicle wiring harnesses, and then remove them to secure a work space.

1. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)

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SECURITY AND LOCKS

2. Remove the keyless control module installation bolt and nut.

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3. Remove the side panel. (See 09-17-10 SIDE PANEL REMOVAL/INSTALLATION.)
4. Insert a flathead screwdriver between the bracket and the body from the installation hole of the side cover and move it in the direction shown by the arrow to remove the keyless control module.

Note
- If the bracket is deformed, repair it.

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SECURITY AND LOCKS

- Bend the tab straight as shown in the figure for easier installation access.

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5. Remove the keyless control module.
6. Remove the screw, then remove the bracket.

Note

- The screw which fixes the keyless control module and bracket is for a body ground connection. Be sure to secure the screw when installing.

7. Install in the reverse order of removal.

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KEYLESS CONTROL MODULE INSPECTION

id091400806400

1. Measure the voltage or inspect for continuity according to the Terminal Voltage Table (Reference).
   - If the voltage is not as specified in the Terminal Voltage Table (Reference), inspect the parts under “Inspection item(s)” and related wiring harnesses.

Terminal Voltage Table (Reference)

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Terminal	Signal name	Connected to	Measured condition	Voltage (V)/ Continuity	Inspection item(s)
1A	Door lock control	Door lock actuator (driver-side)	Door lock actuator locking	1.0 or less → B+ → 1.0 or less	• Door lock actuator (driver-side) • Related wiring harnesses
			Other	1.0 or less	
1B	GND	GND	Under any condition: Inspect for continuity to GND.	Continuity detected	• Related wiring harnesses
1C	Door unlock control	Door lock actuator	Door lock actuator unlocking	1.0 or less → B+ → 1.0 or less	• Door lock actuator • Related wiring harnesses
			Other	1.0 or less	
1D	Door lock control	Door lock actuator	Door lock actuator locking	1.0 or less → B+ → 1.0 or less	• Door lock actuator • Related wiring harnesses
			Other	1.0 or less	
1E	Power supply	D.LOCK 20 A fuse	Under any condition	B+	• D.LOCK 20 A fuse • Battery

SECURITY AND LOCKS

Terminal	Signal name	Connected to	Measured condition	Voltage (V)/ Continuity	Inspection item(s)
1F	Power supply	ROOM 15 A fuse	Under any condition	B+	• ROOM 15 A fuse • Battery
3B	IG1	METER 15 A fuse	Ignition switch is at ON position	B+	METER 15 A fuse
			Ignition switch is at LOCK or ACC position	1.0 or less	
3C	GND	Body ground	Under any condition: Inspect for continuity to ground.	Continuity detected	GND
3F	Security light	Instrument cluster	Under any condition: Inspect for continuity to instrument cluster.	Continuity detected	Instrument cluster
3O	Key reminder switch	Steering lock unit	Key reminder switch is ON	B+	Steering lock unit
			Other	1.0 or less	
3R	Theft-deterrent siren signal*1	Theft-deterrent siren	Theft-deterrent system arming (See 09-14-19 Inspection Using an Oscilloscope (Reference).)	—	• Theft-deterrent siren • Related wiring harnesses
	Instrument cluster signal*2	Instrument cluster	Under any condition: Inspect for continuity to instrument cluster.	Continuity detected	• Instrument cluster • Related wiring harnesses
3S	Power supply (keyless receiver)	Keyless receiver	Under any condition	B+	Keyless receiver
3U	Communication (keyless receiver)	Keyless receiver	Under any condition: Inspect for continuity to keyless receiver.	Continuity detected	Keyless receiver
3Z	Trunk open signal	Trunk compartment light switch	Trunk lid open (trunk compartment light switch on)	1.0 or less	• Trunk compartment light switch • Related wiring harnesses
			Trunk lid closed (trunk compartment light switch off)	B+	
3AB	Power supply (With intruder sensor)	Intruder sensor	Under any condition	B+	Intruder sensor
3AD	Communication (With intruder sensor)	Intruder sensor	Under any condition: Inspect for continuity to steering lock unit.	Continuity detected	Intruder sensor
4E	Lock signal input	Door lock-link switch (driver-side)	Driver-side door is locked: Inspect for continuity to ground.	Continuity detected	Door lock-link switch (driver-side)
			Driver-side door is unlocked: Inspect for continuity to ground.	No continuity	
4G	Lock/unlock input	Driver-side door key cylinder switch	At the moment key cylinder is locked	2.5	• Driver-side door key cylinder switch • Related wiring harnesses
			At the moment key cylinder is unlocked	1.0 or less	
			At the moment key cylinder is neutral position	5	
4I	Unlock signal input	Door lock-link switch (driver-side)	Driver-side door is unlocked: Inspect for continuity to ground.	Continuity detected	Door lock-link switch (driver-side)
			Driver-side door is locked: Inspect for continuity to ground.	No continuity	
4N	Hazard output	Hazard warning switch	Hazard warning switch is on.	1.0 or less	• Hazard warning switch • Related wiring harnesses
			Hazard warning switch is off.	B+	

SECURITY AND LOCKS

Terminal	Signal name	Connected to	Measured condition	Voltage (V)/ Continuity	Inspection item(s)
4O	Trunk lid opener switch input	Trunk lid opener switch	Trunk lid opener switch on	B+	• Trunk lid opener switch • Related wiring harnesses
			Trunk lid opener switch off	1.0 or less	
4P	Trunk lid opener output	Trunk lid opener relay	Press the trunk open switch	1.0 or less	• Trunk lid opener relay • Related wiring harnesses
			Other	B+	
4Q	Door switch signal (RH) output	Door switch	Door open (RH) (Door switch on)	1.0 or less	• Door switch (RH) • Related wiring harnesses
			Door closed (RH) (Door switch off)	B+	
4R	Unlock signal input	Door lock-link switch (passenger-side)	Passenger-side door is unlocked: Inspect for continuity to ground.	Continuity detected	Door lock-link switch (passenger-side)
			Passenger-side door is locked: Inspect for continuity to ground.	No continuity	
4S*1	Theft-deterrent siren signal	Theft-deterrent siren	Theft-deterrent system arming (See 09-14-19 Inspection Using an Oscilloscope (Reference).)	—	• Theft-deterrent siren • Related wiring harnesses
4T	Door switch signal (LH) output	Door switch	Door open (LH) (Door switch on)	1.0 or less	• Door switch (LH) • Related wiring harnesses
			Door closed (LH) (Door switch off)	B+	
4V	Bonnet latch switch signal	Bonnet latch switch	Bonnet open (Bonnet latch switch off)	B+	• Bonnet latch switch • Related wiring harnesses
			Bonnet closed (Bonnet latch switch on)	1.0 or less	
4W	Top lock switch signal	Top lock switch	Convertible top open (Top lock switch on)	1.0 or less	• Top lock switch • Related wiring harnesses
			Convertible top closed (Top lock switch off)	B+	
4Z	HS-CAN-	—	Terminal used for communication therefore determination based on terminal voltage inspection not possible.		
4AA	HS-CAN+	—	Terminal used for communication therefore determination based on terminal voltage inspection not possible.		

*1 : With TPMS
*2 : Without TPMS

Inspection Using an Oscilloscope (Reference)
Intruder sensor signal

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- Terminal connected: 5F (+)—Negative battery terminal
- Oscilloscope setting: 2 V/DIV (Y): 100 ms/DIV (X), DC range
- Measurement condition: Theft-deterrent system arming.

SECURITY AND LOCKS

THEFT-DETERRENT SIREN REMOVAL/INSTALLATION

id091400809500

1. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the following parts:
   (1) Trunk end trim (See 09-17-12 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (2) Partition board (See 09-17-23 PARTITION BOARD REMOVAL/INSTALLATION.)
   (3) Trunk side trim (See 09-17-11 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
3. Remove the nuts, then remove the theft-deterrent siren.
4. Install in the reverse order of removal.

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KEYLESS RECEIVER REMOVAL/INSTALLATION

id091400438300

L.H.D.

1. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the glove compartment lid. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
3. Disconnect the keyless receiver module connector.
4. Remove the nut, then remove the keyless receiver (front).
5. Install in the reverse order of removal.

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SECURITY AND LOCKS

R.H.D.

1. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the lower panel. (See 09-17-8 LOWER PANEL REMOVAL/INSTALLATION.)
3. Remove the nut, then pull the keyless receiver.
4. Disconnect the keyless receiver module connector.
5. Install in the reverse order of removal.

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KEYLESS RECEIVER INSPECTION

id091400437800

1. Measure the voltage or inspect for continuity according to the Terminal Voltage Table (Reference).
   - If the voltage is not as specified in the Terminal Voltage Table (Reference), inspect the parts under “Inspection item(s)” and related wiring harnesses.

Terminal Voltage Table (Reference)

KEYLESS RECEIVER
WIRING HARNESS-SIDE CONNECTOR

E6U914ZW1007

Terminal	Signal name	Connected to	Measured condition	Voltage (V)/ Continuity	Inspection item(s)
A	Power supply	Keyless control module	Under any condition	B+	• Keyless control module • Related wiring harnesses
C	Data	Keyless control module	Under any condition: Inspect the wiring harness between the keyless receiver and keyless control module terminal 3U for continuity.	Continuity detected	• Keyless control module • Related wiring harnesses
E	GND	Body ground	Under any condition: Inspect for continuity to ground.	Continuity detected	GND

SECURITY AND LOCKS

TRANSMITTER BATTERY REPLACEMENT

id091400437400

1. Insert a flathead screwdriver into the transmitter notch and remove the key from the transmitter by pressing the tab.

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2. Insert a flathead screwdriver into the transmitter notch and open the transmitter.

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3. Press the hook in the direction of the arrow and remove the battery using the flathead screwdriver.

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4. Install the new battery (CR1620) with the positive (+) pole facing up.
5. Align the upper and lower covers and close the transmitter.

Battery type
Lithium battery CR1620

Battery life
Approx. 2 years (when used approx. 10 times/day)

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SECURITY AND LOCKS

6. Install the key to the transmitter.

Note
- When attaching the key to the transmitter, squeeze them together until a click sound is heard.
- If the key is not securely attached it will separate from the transmitter.

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SECURITY AND LOCKS

TRANSMITTER ID CODE REGISTRATION

id091400437600

Caution

- **Always program three ID codes because the programming mode terminates if three ID codes are programmed. At this time, the same transmitter (programmed transmitter) can be programmed two or three times.**

Note

- Always program three ID codes because all the programmed ID codes prior to activation are cleared when the programming mode is activated.
- A maximum of three ID codes can be programmed.
- When programming the ID code into a keyless control module, verify that other transmitters are not being operated in the vicinity.
- After ID code programming, remove the key from the steering lock and verify that all doors lock/unlock normally using the transmitter.

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SECURITY AND LOCKS

IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING

id091400441900

Foreword

- When replacing immobilizer system-related parts or programming an additional key, program the immobilizer system-related parts so that the system operates normally. For immobilizer system-related parts programming, select the programming procedures according to the service. (See 09-14-25 Selection of Procedure for Immobilizer System-Related Parts Programming.)

Caution

- **If any metallic or magnetic object is near the key, communication between the key and the vehicle may be obstructed, resulting in a failure to program the immobilizer system-related parts. Remove any metallic or magnetic objects, such as key holders, from the key when programming immobilizer system-related parts.**
- **If any of the following devices are inside the vehicle, programming of immobilizer system-related parts may fail. Do not bring any of the following devices or similar products inside the vehicle when programming immobilizer system-related parts.**
  —M-MDS
  —Personal computer
  —Devices that can send/receive radio waves
- **If the engine is started during immobilizer system-related parts programming, the programming mode cancels. Therefore, do not start the engine unless indicated in the procedure. Repeat the procedure from the beginning if the engine is started during the immobilizer system-related parts programming.**

Note

- The “Valid key” referred to in this manual indicates the key that can start the engine.
- Two or more key ID numbers must be programmed for the engine to start.
- A maximum of eight key ID numbers can be programmed for one vehicle.
- The number of programmed key ID numbers can be verified using the M-MDS.
- Do not select any screen menu other than the ones indicated in the procedure during M-MDS operation.

Selection of Procedure for Immobilizer System-Related Parts Programming

1. Verify that the room fuse is equipped.
2. Select the applicable programming procedure from the service content of the immobilizer system-related parts.

Immobilizer System-Related Parts Service and Programming Procedure Table

No.	Service		Programming procedure
1	Additional key programming	Have two or more valid keys	(See 09-14-26 No.1 Additional Key Programming Procedure (Using Two Valid Keys).)
2		Have one valid key or none	(See 09-14-27 No. 2 Additional Key Programming Procedure (Using the M-MDS).)
3	Additional key programming procedure setting	Disable programming using valid keys	(See 09-14-29 No.3 Additional Key Programming Procedure Changing.)
		Enable programming using valid keys	
4	Programming due to PCM replacement		(See 09-14-29 No.4 Programming Procedure Due to PCM Replacement.)
5	Programming due to keyless control module replacement		(See 09-14-30 No.5 Programming Procedure Due to Keyless Control Module Replacement.)
6	Programming due to simultaneous replacement of immobilizer system-related parts • PCM • Keyless control module		(See 09-14-32 No.6 Programming Procedure Due to Simultaneous Replacement of Immobilizer System-related Parts (PCM and Keyless Control Module).)
7	Programming due to coil antenna replacement		Programming of immobilizer system-related parts is not necessary

SECURITY AND LOCKS

M-MDS Connecting Procedure

Note
- Do not place the M-MDS in the vehicle while programming the immobilizer system.

1. Fully lower the door glass.
2. Connect the M-MDS to the DLC-2.
3. Place the M-MDS outside the vehicle.

Caution
- **Cover the vehicle body with a clean rag so as not to damage the vehicle body with the cable.**

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No.1 Additional Key Programming Procedure (Using Two Valid Keys)

Conditions
- Have two or more valid keys.

Note
- If a key ID number cannot be programmed and DTC 15 is displayed, the maximum number of programmed keys may have been reached. Verify the number of programmed keys using the M-MDS.
- If eight keys have already been programmed and it is necessary to program other keys, the previously programmed key ID numbers must first be cleared.
- If “Customer spare key programming disable” is selected, perform additional key programming using the M-MDS. (See 09-14-27 No. 2 Additional Key Programming Procedure (Using the M-MDS).)

Procedure

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Step	Procedure	Action after procedure
1	**LAUNCH PROGRAMMING MODE** 1. Turn the ignition switch to the ON position using key 1. 2. After verifying that the security light illuminates for **approx. 3 s** and turns off, turn the ignition switch to the LOCK position within **approx. 4 s** using key 1. 3. Remove key 1. 4. Turn the ignition switch to the ON position using key 2. 5. After verifying that the security light illuminates for **approx. 3 s** and turns off, turn the ignition switch to the LOCK position within **approx. 4 s** using key 2. 6. Remove key 2.	Go to the next step.

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Step	Procedure	Action after procedure	
2	**PERFORM ADDITIONAL KEY PROGRAMMING** 1. Turn the ignition switch to the ON position using key 3. 2. Verify that the security light illuminates for **approx. 3 s**, and then turns off. 3. Remove key 3. 4. Are there other keys to be programmed?	Yes	Go back to Step 1.
		No	Go to the next step.
3	**VERIFY KEY PROGRAMMING IS CORRECT** • Verify that the engine can start and run for approx. 5 s or more using all the programmed keys. **Note** • When verifying that the engine starts, wait at least **approx. 5 s or more** before starting the engine using the next key.	Procedure is completed	

No. 2 Additional Key Programming Procedure (Using the M-MDS)

Conditions

- There is only one valid key, or none.

Note

- If a key ID number cannot be programmed and DTC 15 is displayed, the maximum number of programmed keys may have been reached. Verify the number of programmed keys using the M-MDS.
- If eight keys have already been programmed and it is necessary to program other keys, the previously programmed key ID numbers must first be cleared.

Procedure

VALID KEY	 KEY 1
KEY FOR RESISTRATION	 KEY 1

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SECURITY AND LOCKS

Step	Procedure	Action after procedure	
1	**PERFORM ADDITIONAL KEY PROGRAMMING** 1. Connect the M-MDS to the DLC-2. (See 09-14-26 M-MDS Connecting Procedure) 2. Turn the ignition switch to the ON position using key 1. **Note** • Although the security light starts flashing and DTC 15 is displayed after **approx. 1 min**, this does not indicate an improper procedure. Continue to perform the procedure as indicated. 3. After vehicle identification, select the following from the M-MDS initial screen. — Using an IDS (laptop PC) 1. Select the “Body” 2. Select the “Security” 3. Select the “PATS Function” 4. Then, select an item from the screen menu. — Program additional ignition key 5. Perform the security access according to the directions on the M-MDS screen. **Note** • After executing the above menu, “This operation is successful” is displayed. This indicates that the programming of the key currently in the ignition switch ON position has been completed. 6. After verifying that the PATS function menu is displayed again on the M-MDS screen, turn the ignition switch to the LOCK position. 7. Remove key 1. 8. Are there other keys to be programmed?	Yes	Change the key and repeat Step 1. **Note** • Additional key programming can be performed using the procedure in No.1 Additional Key Programming Procedure (Using Two Valid Keys).
		No	Go to the next step.
2	**CLOSE THE M-MDS** 1. After verifying that the PATS function menu is displayed again on the M-MDS screen, select “Finish (this menu)”. 2. Turn the ignition switch to the LOCK position.	Go to the next step.	
3	**VERIFY KEY PROGRAMMING IS CORRECT** Verify that the engine can be started with the programmed key. **Note** • When verifying that the engine starts, wait at least **approx. 5 s or more** before starting the engine using the next key.	Procedure is completed	

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No.3 Additional Key Programming Procedure Changing

Note

- This procedure is performed for disabling the No.1 Additional Key Programming Procedure (Using Two Valid Keys).
- The setting is “Customer spare key programming enable” when the vehicle is new or the keyless control module is replaced with a new one.

Procedure

Step	Procedure	Action after procedure
1	**CHANGE CUSTOMER SPARE KEY PROGRAMMING PROCEDURE** 1. Connect the M-MDS to the DLC-2. (See 09-14-26 M-MDS Connecting Procedure.) 2. Turn the ignition switch to the ON position using a key (The key can be either the valid key or an unprogrammed key). **Note** • If an unprogrammed key is used, the security light starts flashing and DTC 15 is displayed after **approx. 1 min.** However, this does not indicate an improper procedure. Continue to perform the procedure as indicated. 3. After vehicle identification, select the following from the M-MDS initial screen. —Using an IDS (laptop PC) 1. Select the “Body” 2. Select the “Security” 3. Select the “PATS Function” 4. Select either of the following from the M-MDS menu to change the additional key programming procedure. —When “Customer Spare Key Programming Enable” is selected: The additional key programming procedure using valid keys is enabled. —When “Customer Spare Key Programming Disable” is selected: The additional key programming procedure using valid keys is disabled. 5. Perform the security access according to the directions on the M-MDS screen. 6. After verifying that the PATS function menu is displayed again on the M-MDS screen, select “Finish (this menu)”. 7. Turn the ignition switch to the LOCK position.	Procedure is completed

No.4 Programming Procedure Due to PCM Replacement

Conditions

- There is only one valid key.

Procedure

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Step	Procedure	Action after procedure
1	**REPLACE PCM** Refer to PCM REMOVAL/INSTALLATION to perform PCM replacement. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)	Go to the next step.

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Step	Procedure	Action after procedure	
2	**PERFORM PARAMETER RESET** 1. Connect the M-MDS to the DLC-2. (See 09-14-26 M-MDS Connecting Procedure.) 2. Turn the ignition switch to the ON position using a valid key. **Note** • Although the security light remains illuminated and DTC 23 is displayed after **approx. 1 min**, continue to perform the procedure as indicated. 3. Verify that the keyless warning light illuminates for **approx. 3 s**, and then turns off. 4. After vehicle identification, select the following from the M-MDS initial screen. —Using an IDS (laptop PC): 1. Select the “Body” 2. Select the “Security” 3. Select the “PATS Function” 5. Then, select an item from the screen menu. —Parameter Reset 6. Perform the security access according to the directions on the M-MDS screen. 7. Select the replaced parts “PCM” according to the directions on the M-MDS screen. **Caution** • **At this time, do not select the other parts from the M-MDS menu.** 8. After verifying that the PATS function menu is displayed again on the M-MDS screen, select “Finish (this menu)”. 9. Turn the ignition switch to the LOCK position. 10. Turn the ignition switch to the ON position. 11. Verify that the security light illuminates for **approx. 3 s**, and then turns off. 12. Turn the ignition switch to the LOCK position.	Go to the next step.	
3	**VERIFY PROGRAMMING IS PERFORMED CORRECTLY** 1. Verify that the engine can be started with all the keys. 2. Can the engine be started?	Yes	Procedure is completed
		No	Perform the corresponding DTC inspection to repair the malfunctioning part.

No.5 Programming Procedure Due to Keyless Control Module Replacement

Note
- Since two or more keys need to be programmed to start the engine, program two or more keys after the replacement.

Conditions
- Have two or more keys to be programmed after the replacement.

Procedure

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Step	Procedure	Action after procedure
1	**REPLACE KEYLESS CONTROL MODULE** Refer to KEYLESS CONTROL MODULE REMOVAL/INSTALLATION to perform keyless control module replacement. (See 09-14-14 KEYLESS CONTROL MODULE REMOVAL/INSTALLATION.)	Go to the next step.

SECURITY AND LOCKS

Step	Procedure	Action after procedure	
2	**PERFORM PARAMETER RESET** 1. Connect the M-MDS to the DLC-2. (See 09-14-26 M-MDS Connecting Procedure.) 2. Turn the ignition switch to the ON position using a valid key. **Note** • Although the security light remains illuminated and DTC 15 is displayed after **approx. 1 min**, continue to perform the procedure as indicated. 3. Verify that the keyless warning light illuminates for **approx. 3 s**, and then turns off. 4. After vehicle identification, select the following from the M-MDS initial screen. — Using an IDS (laptop PC): 1. Select the “Body” 2. Select the “Security” 3. Select the “PATS Function” 5. Then, select an item from the screen menu. — Parameter Reset 6. Perform the security access according to the directions on the M-MDS screen. 7. Select the replaced parts “RKE” according to the directions on the M-MDS screen. **Caution** • **At this time, do not select the other parts from the M-MDS menu.** 8. Verify that the PATS function menu is displayed again on the M-MDS screen.	Go to the next step.	
3	**CLEAR IGNITION KEY ID NUMBERS** 1. Select “Ignition Key Code Erase and Program” from the M-MDS screen menu. 2. Clear the ignition key ID number according to the directions on the M-MDS.	Go to the next step.	
4	**PERFORM IGNITION KEY ID NUMBER PROGRAMMING** 1. Program two keys according to the directions on the M-MDS. 2. After verifying that the PATS function menu is displayed again on the M-MDS screen, select “Finish (this menu)”. 3. Turn the ignition switch to the LOCK position. 4. Turn the ignition switch to the ON position. 5. Verify that the security light illuminates for **approx. 3 s**, and then turns off. 6. Turn the ignition switch to the LOCK position. 7. Disconnect the M-MDS from the DLC-2.	Go to the next step.	
5	**VERIFY PROGRAMMING IS PERFORMED CORRECTLY** 1. Verify that the engine can be started with all the keys. 2. Can the engine be started?	Yes	Procedure is completed
		No	Perform the corresponding DTC inspection to repair the malfunctioning part.

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No.6 Programming Procedure Due to Simultaneous Replacement of Immobilizer System-related Parts (PCM and Keyless Control Module)

Note

- Since two or more keys need to be programmed to start the engine, program two or more keys after the replacement.

Conditions

- Have two or more keys to be programmed after the replacement.

Procedure

ar8uuw00001123

Step	Procedure	Action after procedure
1	**REPLACE KEYLESS CONTROL MODULE.** Refer to KEYLESS CONTROL MODULE REMOVAL/INSTALLATION to perform keyless control module replacement. (See 09-14-14 KEYLESS CONTROL MODULE REMOVAL/INSTALLATION.)	Go to the next step.
2	**REPLACE PCM** Refer to PCM REMOVAL/INSTALLATION to perform PCM replacement. (See 01-40-6 PCM REMOVAL/INSTALLATION [L8, LF].)	Go to the next step.
3	**PERFORM PARAMETER RESET** 1. Connect the M-MDS to the DLC-2. (See 09-14-26 M-MDS Connecting Procedure.) 2. Turn the ignition switch to the ON position using a valid key. **Note** • Although the security light remains illuminated and DTC 15 is displayed after **approx. 1 min**, continue to perform the procedure as indicated. 3. Verify that the keyless warning light illuminates for **approx. 3 s**, and then turns off. 4. After vehicle identification, select the following from the M-MDS initial screen. — Using an IDS (laptop PC): 1. Select the “Body” 2. Select the “Security” 3. Select the “PATS Function” 5. Then, select an item from the screen menu. — Parameter Reset 6. Perform the security access according to the directions on the M-MDS screen. 7. Select the replaced parts according to the directions on the M-MDS screen. — If the keyless control module is replaced: Select “RKE”. — If the PCM is replaced: Select “PCM”. **Caution** • **At this time, do not select the other parts from the M-MDS menu.** 8. Verify that the PATS function menu is displayed again on the M-MDS screen.	Go to the next step.
4	**CLEAR IGNITION KEY ID NUMBERS** 1. Select “Ignition Key Code Erase and Program” from the M-MDS screen menu. 2. Clear the ignition key ID number according to the directions on the M-MDS.	Go to the next step.

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Step	Procedure	Action after procedure	
5	**PERFORM IGNITION KEY ID NUMBER PROGRAMMING** 1. Program two keys according to the directions on the M-MDS. 2. After verifying that the PATS function menu is displayed again on the M-MDS screen, select “Finish (this menu)”. 3. Turn the ignition switch to the LOCK position. 4. Turn the ignition switch to the ON position. 5. Verify that the security light illuminates for **approx. 3 s**, and then turns off. 6. Turn the ignition switch to the LOCK position. 7. Disconnect the M-MDS from the DLC-2.	Go to the next step.	
6	**VERIFY PROGRAMMING IS PERFORMED CORRECTLY** 1. Verify that the engine can be started with all the keys. 2. Can the engine be started?	Yes	Procedure is completed
		No	Perform the corresponding DTC inspection to repair the malfunctioning part.

COIL ANTENNA REMOVAL/INSTALLATION

id091400804900

Note
- Do not remove the coil antenna unless you are replacing it.

1. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.)
3. Disconnect the coil antenna connector.
4. Detach the steering lock tabs from the holes on the coil antenna.
5. Install in the reverse order of removal.

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FUEL-FILLER LID OPENER LEVER AND CABLE REMOVAL/INSTALLATION

id091400808800

Fuel-filler Lid Opener Lever

1. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the following parts:
   (1) Seats (See 09-13-4 SEAT REMOVAL/INSTALLATION.)
   (2) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (3) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (4) Scuff plate (09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (5) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (6) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (7) Seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (8) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (9) Seat back bar lower garnish (See 09-17-20 SEAT BACK BAR LOWER GARNISH REMOVAL/INSTALLATION.)

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3. Remove the nut.

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4. Remove the fuel-filler lid opener lever.
5. Install in the reverse order of removal.
6. Adjust the fuel-filler lid. (See 09-10-7 FUEL-FILLER LID ADJUSTMENT.)

Fuel-filler Lid Opener Cable

1. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the following parts:
   (1) Seats. (See 09-13-4 SEAT REMOVAL/INSTALLATION.)
   (2) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (3) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (4) Scuff plate (09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (5) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (6) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (7) Seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (8) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (9) Seat back bar lower garnish (See 09-17-20 SEAT BACK BAR LOWER GARNISH REMOVAL/INSTALLATION.)
   (10)Trunk end trim (See 09-17-12 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (11)Partition board (See 09-17-23 PARTITION BOARD REMOVAL/INSTALLATION.)
   (12)Trunk side trim (See 09-17-11 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
   (13)Fuel-filler lid opener (See 09-14-8 FUEL-FILLER LID OPENER REMOVAL/INSTALLATION.)
3. Remove the fuel-filler lid opener cable.
4. Install in the reverse order of removal.
5. Adjust the fuel-filler lid. (See 09-10-7 FUEL-FILLER LID ADJUSTMENT.)

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INTRUDER SENSOR REMOVAL/INSTALLATION

id091400809400

1. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
3. Remove the nuts.
4. Disconnect the connector, then remove the intruder sensor.
5. Install in the reverse order of removal.

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EXTERIOR TRIM

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EXTERIOR TRIM

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EXTERIOR TRIM

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EXTERIOR TRIM

COWL GRILLE REMOVAL/INSTALLATION

id091600444000

1. Remove the wiper arm and blade. (See 09-19-3 WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
2. Remove the covers.

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3. Remove the screws.
4. Remove windshield washer hose from cowl grille.
5. Remove the weatherstrip.
6. Pull the cowl grille in the direction of arrow (1) so that it is free from the pins, pull tabs A in the direction of arrow (2), and then remove the windshield.
7. Remove the cowl grille.
8. Install in the reverse order of removal.

SIDE COWL GRILLE REMOVAL/INSTALLATION

id091600807200

1. Remove the wiper arm and blade. (See 09-19-3 WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
2. Remove the cowl grille. (See 09-16-5 COWL GRILLE REMOVAL/INSTALLATION.)
3. Remove the fasteners.
4. Remove the side cowl grill.
5. Install in the reverse order of removal.

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EXTERIOR TRIM

SIDE STEP MOLDING REMOVAL

1. Remove the fasteners.
2. Pull the side step molding and remove clips A from the body.
3. Slide the side step molding to the vehicle rear and remove clips B and C from the side step molding.
4. Remove the side step molding.
5. Remove clips B and C from the body, then install it to the side step molding.
6. Install in the reverse order of removal.

id091600804400

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SIDE STEP MOLDING INSTALLATION

1. Install in order the clips A, C from body.
2. Install the clips B.
3. Install the side step molding.
4. install the fasteners.

id091600804300

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EXTERIOR TRIM

EXTRACTOR CHAMBER REMOVAL/INSTALLATION

id091600449500

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the rear combination light. (See 09-18-19 REAR COMBINATION LIGHT REMOVAL/INSTALLATION.)
4. Remove clip A using a fastener remover and then remove the extractor chamber from the body.
5. Install in the reverse order of removal.

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FRONT BELTLINE MOLDING REMOVAL/INSTALLATION

id091600447700

1. Fully open the door glass.
2. Remove clip A using a protective tape-wrapped flathead screwdriver.
3. Lift (partially peeling back) the front beltline molding in the direction of the arrow and remove it while detaching tab B.
4. Install in the reverse order of removal.

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BELTLINE MOLDING REMOVAL/INSTALLATION

id091600807300

1. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Front seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (8) Seat belt set plate (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
   (9) Seat back crossmember assembly (See 09-10-13 SEAT BACK CROSSMEMBER ASSEMBLY REMOVAL/INSTALLATION.)
   (10) Rear side trim (See 09-17-21 REAR SIDE TRIM REMOVAL/INSTALLATION.)
   (11) Rear package trim (See 09-17-21 REAR PACKAGE TRIM REMOVAL/INSTALLATION.)
   (12) Side shelf (See 09-17-22 SIDE SHELF REMOVAL/INSTALLATION.)
   (13) Seat belt upper anchor installation bolt (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
   (14) Convertible top (See 09-16-10 CONVERTIBLE TOP REMOVAL/INSTALLATION.)

EXTERIOR TRIM

2. Remove the fasteners.

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3. Remove the beltline protector.
4. Remove the nut and bolts.
5. Remove the beltline molding.
6. Install in the reverse order of removal.

DRIP MOLDING REMOVAL/INSTALLATION

id091600807400

1. Partially peel back the seaming welt.
2. Remove the screws.
3. Remove the drip molding.
4. Install in the reverse order of removal.

e5u916zw5007

WINDSHIELD GARNISH REMOVAL

id091600807500

1. Cut the double-sided adhesive tape on the windshield garnish using a flathead screwdriver or razor while warming it using a hot air blower.

   Warning
   - **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**

2. Remove the windshield garnish.

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EXTERIOR TRIM

WINDSHIELD GARNISH INSTALLATION

id091600807600

Warning
- **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**

Note
- Double-sided adhesive tape has already been attached to the new windshield garnish.

1. When installing a new windshield garnish, follow the procedure below:
   (1) Remove the adhesive remaining on the body using razor.
   (2) Remove any grease or dirt from the adhesion surface of the body.
2. When reusing the windshield garnish, follow the procedure below:
   (1) Remove the adhesive remaining on the windshield garnish and the body using a razor.
   (2) Remove any grease or dirt from the adhesion surface of the windshield garnish and body.
   (3) Apply primer to the bonding area of the windshield garnish.
   (4) Attach double-sided adhesive tape to the windshield garnish as shown in the figure.

Clearance
a: 16 mm {0.62 in}
b: 2.0 mm {0.07 in}
c: 1.5 mm {0.05 in}
d: 2.0 mm {0.07 in}
e: 16 mm {0.62 in}

Note
- Use 3M GT7116, GT7116FR and GT7104 double-sided adhesive tape or equivalent.

3. Peel off the end of the double-sided adhesive tape (1), (2), and (3), and attach the windshield garnish side to the position shown in the figure.

Clearance
a: 0.3—1.7 mm {0.012—0.066 in}

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4. Peel off the tape backing from the double-sided adhesive tape (1), (2), and (3), and attach it to the vehicle.
5. Peel off the end of the double-sided adhesive tape (4) and (5), and attach it to the position shown in the figure.
6. Peel off the tape backing from the double-sided adhesive tape (4) and (5), and then adhere the windshield garnish side.
7. Peel off the end of the double-sided adhesive tape (6) and attach the windshield garnish center to the position shown in the figure.

Clearance
a: 0.3—1.7 mm {0.012—0.06 in}
b: –0.3—2.3 mm {–0.012—0.090 in}
c: 0.0—0.7 mm {0.00—0.027 in}

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EXTERIOR TRIM

8. Peel off the end of the double-sided adhesive tape (7) and attach it to the position shown in the figure.
9. Peel off the tape backing from the double-sided adhesive tape (6) and (7), and then attach the windshield garnish center by applying pressure.
10. Peel off the tape backing from the double-sided adhesive tape (8) and (9), and then adhere the windshield garnish center.

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CONVERTIBLE TOP REMOVAL/INSTALLATION

id091600807700

1. Cover both sides of the rear window glass with thick cloth to protect the window.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF])
3. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Front seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (8) Seat belt set plate (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
   (9) Seat back crossmember assembly (See 09-10-13 SEAT BACK CROSSMEMBER ASSEMBLY REMOVAL/INSTALLATION.)
   (10) Rear side trim (See 09-17-21 REAR SIDE TRIM REMOVAL/INSTALLATION.)
   (11) Rear package trim (See 09-17-21 REAR PACKAGE TRIM REMOVAL/INSTALLATION.)
   (12) Side shelf (See 09-17-22 SIDE SHELF REMOVAL/INSTALLATION.)
   (13) Seat belt upper anchor installation bolt (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
4. Disconnect the rear window defroster connector.
5. Remove in the order indicated in the table.

EXTERIOR TRIM

6. Install in the reverse order of removal.

e5u916zw5012

1	Bolt A
2	Nut A
3	Nut B
4	Set plate

5	Band
6	Convertible top (See 09-16-11 Convertible Top Removal Note) (See 09-16-11 Convertible Top Installation Note)

Convertible Top Removal Note

1. Unlock the top lock.

Convertible Top Installation Note

1. Insert the rain rail into the beltline molding lip, and install it over the studs.

e5u916zw5013

EXTERIOR TRIM

2. Install the link bracket to the stud bolts with no gaps (a) on the mating surfaces, then tighten the bolts and nut.

   Tightening torque
   19—25 N·m {1.9—2.6 kgf·m, 14—18 ft·lbf}

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CONVERTIBLE TOP DISASSEMBLY/ASSEMBLY

id091600807800

1. Disassemble in the order indicated in the table.
2. To remove the striker, remove the following parts:
   (1) Map light (See 09-18-32 MAP LIGHT REMOVAL/INSTALLATION.)
   (2) A-pillar trim (See 09-17-11 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (3) Front header trim (See 09-17-14 FRONT HEADER TRIM REMOVAL/INSTALLATION.)
3. Assemble in the reverse order of disassembly.

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1	Top lock lever cover
2	Top lock cover
3	Top lock
4	Male wedge cover
5	Male wedge
6	Set plate

7	Slider
8	Weatherstrip
9	Retainer (See 09-16-13 Retainer Disassembly Note.) (See 09-16-17 Retainer Assembly Note.)

EXTERIOR TRIM

10	Top fabric (See 09-16-13 Top Fabric Disassembly Note.) (See 09-16-15 Top Fabric Assembly Note.)
11	Rain rail (See 09-16-14 Rain Rail Disassembly Note.) (See 09-16-15 Rain Rail Assembly Note.)
12	Spring A (See 09-16-15 Spring A Disassembly Note.)
13	Spring B (See 09-16-15 Spring B Disassembly Note.)
14	Female wedge
15	Striker
16	Connector
17	Cab-side weatherstrip

Retainer Disassembly Note

1. Mark around the retainer installation screws with paint before removing them.

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Top Fabric Disassembly Note

1. Remove the top fabric from the front bow retainer.

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2. Pull out the top fabric from the front header.

e5u916zw5017

EXTERIOR TRIM

3. Remove the covers.

e5u916zw5018

4. Remove the cable installation rivet using a drill.
5. Remove the cables from the cable guide.

e5u916zw5019

6. Remove the band installation rivet using a drill.

e5u916zw5020

7. Remove the nut, then remove the cable end bracket.

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Rain Rail Disassembly Note

1. Remove the rivets from the top fabric using a drill.

EXTERIOR TRIM

Spring A Disassembly Note

1. Remove the bolt.
2. Remove the spacers, spring and collars from the link.

e5u916zw5022

Spring B Disassembly Note

1. Remove the bolt.
2. Pull the link in the direction of the arrow to remove the spacer and spring.

e5u916zw5023

Rain Rail Assembly Note

1. Degrease the rain rail using white gasoline.
2. Install the insulation tape to the rivet installation hole of the rain rail.
3. Secure the top fabric and rain rail with the rivet.
4. Flatten the stem using hammer.

amxzzw0000206

Top Fabric Assembly Note

1. Place the link onto the top fabric.
2. Align the link with the set plate installation hole of the top fabric, and install the top fabric to the front header.

e5u916zw5037

EXTERIOR TRIM

3. Thread the cable into the cable guide.
4. Set the aluminum rivet to the riveter, and then secure the cable to the link with the rivet.

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5. Install the covers.

e5u916zw5018

6. Install the top fabric to the front bow.

e5u916zw5027

7. Secure the top fabric to the front bow retainer using a rubber hammer.

e5u916zw5028

8. Set the aluminum rivet to the riveter, and then secure the band to the link with the rivet.

e5u916zw5020

EXTERIOR TRIM

9. Install the cable end bracket.

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Retainer Assembly Note

1. Install the retainers to the link, aligning the retainer marks with the retainer installation screws.

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CONVERTIBLE TOP ADJUSTMENT

id091600807900

1. Remove the spring.
2. Remove the snap ring. (See 09-16-18 Snap Ring Removal Note.) (See 09-16-18 Snap Ring Installation Note.)
3. Remove the pin.
4. Remove the screws.
5. Remove the cover.
6. Adjust the clearance of part A by rotating the adjustment nut.

Note

- Turn the adjustment nut to the right to narrow the part A clearance, left to widen it.

E5U916ZW8000

Clearance
A: 4—8 mm {0.16—0.31 in}

7. Install in the reverse order of removal.

E5U916ZW8008

EXTERIOR TRIM

Snap Ring Removal Note

Caution
- **Remove the snap ring such that the dimension is maintained as indicated in the figure.**
- **Because the snap ring is to be reused, remove it carefully so that the ring is not expanded.**

E5U916ZW8002

1. Insert a tape-wrapped flathead screwdriver between the cover and snap ring, and remove the snap ring by prying along the perimeter so as not to damage the snap ring.

E5U916ZW8001

Snap Ring Installation Note
1. Insert the snap ring to the pin while slightly expanding the snap ring end using snap ring pliers.
2. After securing the snap ring, verify that there is no excessive play between the snap ring and pin.

E5U916ZW8003

DRAIN COVER REMOVAL/INSTALLATION

id091600808200

Except Power Retractable Hardtop
1. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Front seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (8) Seat belt set plate (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
   (9) Seat back crossmember assembly (See 09-10-13 SEAT BACK CROSSMEMBER ASSEMBLY REMOVAL/INSTALLATION.)
   (10)Rear side trim (See 09-17-21 REAR SIDE TRIM REMOVAL/INSTALLATION.)
   (11)Rear package trim (See 09-17-21 REAR PACKAGE TRIM REMOVAL/INSTALLATION.)
   (12)Side shelf (See 09-17-22 SIDE SHELF REMOVAL/INSTALLATION.)
   (13)Seat belt upper anchor installation bolt (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
   (14)Convertible top (See 09-16-10 CONVERTIBLE TOP REMOVAL/INSTALLATION.)
   (15)Beltline protector (See 09-16-7 BELTLINE MOLDING REMOVAL/INSTALLATION.)
   (16)Retractor screen (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)

EXTERIOR TRIM

2. Remove the fasteners.
3. Pull the drain cover upward and detach from the drain valve.
4. Remove the drain cover.
5. Detach the tabs of the drain valve from below the body.
6. Remove the drain valve.
7. Install in the reverse order of removal.

e5u916zw5036

Power Retractable Hardtop

1. Fully open the deck panel.
2. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Front seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (8) Seat belt upper anchor installation bolt (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
   (9) Seat belt set plate (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
   (10) Rear side trim (See 09-17-21 REAR SIDE TRIM REMOVAL/INSTALLATION.)
   (11) Side shelf (See 09-17-22 SIDE SHELF REMOVAL/INSTALLATION.)
   (12) Power retractable hardtop link bracket (See 09-16-44 POWER RETRACTABLE HARDTOP LINK BRACKET REMOVAL/INSTALLATION.)
   (13) Cab-side weatherstrip (See 09-16-10 CONVERTIBLE TOP REMOVAL/INSTALLATION.)
   (14) Power retractable hardtop (See 09-16-21 POWER RETRACTABLE HARDTOP REMOVAL/INSTALLATION.)
3. Remove the fastener and clip A.
4. Pull the drain cover upward and detach from the drain valve.
5. Remove the upper drain cover and lower drain cover.
6. Detach the tabs of the drain valve from below the body.
7. Remove the drain valve.
8. Install in the reverse order of removal.

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EXTERIOR TRIM

FRONT UNDER COVER REMOVAL/INSTALLATION

id091600819400

1. Remove the splash shield A. (See 09-16-20 SPLASH SHIELD REMOVAL/INSTALLATION.)
2. Remove the bolts A at section A shown in the figure.
3. Remove the bolts B at section B shown in the figure.
4. Remove the fasteners C at section C shown in the figure.
5. Remove the front under cover.
6. Install in the reverse order of removal.

amxzzw0000097

SPLASH SHIELD REMOVAL/INSTALLATION

id091600808400

Splash Shield A

1. Remove the bolts.
2. Remove the fasteners at section A shown in the figure.
3. Remove the splash shield A.
4. Install in the reverse order of removal.

amxzzw0000097

EXTERIOR TRIM

Splash Shield B

1. Remove the front suspension tower bar.
2. Remove the splash shield A.
3. Remove the front shock absorber and coil spring.
4. Remove the fasteners at section A shown in the figure.
5. Remove the splash shield B.
6. Install in the reverse order of removal.

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POWER RETRACTABLE HARDTOP REMOVAL/INSTALLATION

id091600809000

Caution

- **If the deck panel does not operate electrically, see "DECK PANEL MANUAL OPEN/CLOSE PROCEDURE" to open/close the deck panel. (See 09-16-52 DECK PANEL MANUAL OPEN/CLOSE PROCEDURE.)**

1. Unlock the top lock.
2. Fully open the deck panel.
3. Cover both sides of the rear window glass with thick cloth to protect the window.
4. Remove the battery cover.
5. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF])
6. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Front seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (8) Seat belt upper anchor installation bolt (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
   (9) Power retractable hardtop link bracket (See 09-16-44 POWER RETRACTABLE HARDTOP LINK BRACKET REMOVAL/INSTALLATION.)
   (10)Cab-side weatherstrip (See 09-16-12 CONVERTIBLE TOP DISASSEMBLY/ASSEMBLY.)
7. Disconnect the roof motor connectors.
8. Disconnect the rear window defroster connector.
9. Disconnect the roof motor limit switch connector.
10. Disconnect the power retractable hardtop drain hose.(See 09-16-59 POWER RETRACTABLE HARDTOP DRAIN HOSE REMOVAL/INSTALLATION.)
11. Remove in the order indicated in the table.

EXTERIOR TRIM

12. Install in the reverse order of removal.

amxuuw0000063

1	Bolt A
2	Bolt B (See 09-16-23 Bolt B Removal/Installation Note)

3	Nut
4	Power retractable hardtop (See 09-16-23 Power Retractable hardtop Installation Note.)

EXTERIOR TRIM

Bolt B Removal/Installation Note

1. Remove or install bolt B shown in the figure by inserting a hand from the deck panel opening.

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Power Retractable hardtop Installation Note

1. Place the main bracket on the stud bolt so that the power retractable hardtop top lock is locked.
2. Install the power retractable hardtop without any gap (a) between the positioning surface of the main bracket and stud bolt, and tighten the bolt and nut.

Tightening torque
19—25 N·m {1.9—2.6 kgf·m, 14—18 ft·lbf}

amxuuw0000056

EXTERIOR TRIM

POWER RETRACTABLE HARDTOP ADJUSTMENT

id091600809300

Top Lock

1. Remove the spring.
2. Remove the snap ring. (See 09-16-17 CONVERTIBLE TOP ADJUSTMENT.)
3. Remove the pin.
4. Remove the screws.
5. Remove the cover.
6. Adjust the clearance of part A by rotating the adjustment nut.

Note

- Turn the adjustment nut to the right to narrow the part A clearance, left to widen it.

amxzzw0000089

Clearance

A: 4—8 mm {0.16—0.31 in}

amxzzw0000089

7. Install in the reverse order of removal.

Snap ring removal note

Caution

- **Remove the snap ring such that the dimension is maintained as indicated in the figure.**
- **Because the snap ring is to be reused, remove it carefully so that the ring is not expanded.**

amxzzw0000089

EXTERIOR TRIM

1. Insert a tape-wrapped flathead screwdriver between the cover and snap ring, and remove the snap ring by prying along the perimeter so as not to damage the snap ring.

amxzzw0000089

Snap ring installation note

1. Insert the snap ring to the pin while slightly expanding the snap ring end using snap ring pliers.
2. After securing the snap ring, verify that there is no excessive play between the snap ring and pin.

amxzzw0000089

Power Retractable Hardtop

1. Loosen the installation bolts and nut for each link.

amxzzw0000089

EXTERIOR TRIM

2. Adjust the gap and height difference between the front roof panel, middle roof panel and rear window glass within the specification by moving them back and forth, left and right, and by adjusting the number of shims if necessary.

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Clearance
a:5.0—9.0 mm {0.20—0.35 in}
b:-2.0—2.0 mm {-0.07—0.07 in}
c:5.0—9.0 mm {0.20—0.35 in}
d:-2.0—2.0 mm {-0.07—0.07 in}

3. Tighten the bolts and nuts.

POWER RETRACTABLE HARDTOP SWITCH REMOVAL/INSTALLATION

id091600809400

Note
- The power retractable hardtop switch is integrated with the hazard warning switch. (See 09-18-26 HAZARD WARNING SWITCH REMOVAL/INSTALLATION)

POWER RETRACTABLE HARDTOP SWITCH INSPECTION

id091600811700

1. Verify that the continuity between the power retractable hardtop switch terminals is as indicated in the table.

○-W-○ : Resistance

Test condition		Terminal	
		F	A
OPEN SWITCH	ON	○——W——○ R1	
	OFF		
CLOSE SWITCH	ON	○——W——○ R2	
	OFF		

R1 : 990—1010 ohms
R2 : 2178—2222 ohms

E5E916ZW6011

- If not as indicated in the table, replace the hazard warning switch.

EXTERIOR TRIM

2. Apply battery voltage to power retractable hardtop switch terminal L, and connect terminal C to ground.
3. Verify that the LED illuminates.
   - If there is any malfunction, replace the hazard warning switch.

E5E916ZW6012

POWER RETRACTABLE HARDTOP CONTROL MODULE REMOVAL/INSTALLATION

id091600821700

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF])
3. Remove the service hole cover (LH) of the back trim.
4. Partially peel back the power retractable hardtop cover.
5. Remove the roof hook cable case.

amxzzw0000091

6. Remove in the order indicated in the table.

1	Nut
2	Connector
3	Power retractable hardtop control module

7. Install in the reverse order of removal.

amxzzw0000091

POWER RETRACTABLE HARDTOP CONTROL MODULE INSPECTION

id091600809600

1. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Front seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
2. Attach the tester lead to the power retractable hardtop control module wiring harness-side connector and inspect voltage, continuity, or resistance according to the standard (reference) on the table.

EXTERIOR TRIM

Standard (Reference)

amxzzw0000207

Terminal	Signal	Connected to	Test condition		Standard	Inspection item
1A	Trunk lid opener relay output signal	Trunk lid opener relay	The deck panel is in the fully closed position.		B+	• Deck panel limit switch • Trunk lid opener relay • Related wiring harness
			The deck panel is not in the fully closed position.		1.0 or less	
1B	—	—	—		—	—
1C	Power window input signal	Power window main switch	Under any condition: Inspect for continuity to power window main switch.		Continuity detected	• Power window main switch • Related wiring harness
1D	Top lock input signal	Top lock switch	Ignition switch is turned to the ON position	When the top lock is locked.	1.0 or less	• Top lock switch • Related wiring harness
				When the top lock is unlocked.	B+	
1E	Power window full-open request signal (Output)	Power window main switch	Under any condition: Inspect for continuity to power window main switch.		Continuity detected	• Power window main switch • Related wiring harness
1F	Trunk lid latch switch signal	Trunk lid latch switch	When the trunk lid is open.		1.0 or less	• Trunk lid latch switch • Related wiring harness
			When the trunk lid is closed.		B+	
1G	Hall effect sensor power supply	• Roof Motor • Deck panel motor	Ignition switch is turned to the ON position	When the roof panel or deck panel is not moving.	1.0 or less	• Roof Motor • Deck panel Motor • Related wiring harness
				When the roof panel or deck panel is moving.	B+	
1H	Input signal of the roof panel open/ close switch	Power retractable hardtop switch (hazard warning switch)	Ignition switch is turned to the ON position	Opening switch on	approx. 2.5	• Power retractable hardtop switch • Related wiring harness
				Closing switch on	approx. 3.4	
				Other	approx. 5.0	
1I	Roof motor hall sensor input signal (RH)	Roof motor (RH)	When the roof panel is moving.	Pulse is output. (See 09-16-31 Inspection using an oscilloscope (reference).)		• Roof motor (RH) • Related wiring harness
1J	Power supply	ROOM 15 A fuse	Under any condition		B+	• ROOM 15 A fuse • Related wiring harness
1K	Deck panel motor hall sensor input signal (RH)	Deck panel motor (RH)	When the deck panel is moving.	Pulse is output. (See 09-16-31 Inspection using an oscilloscope (reference).)		• Deck panel motor (RH) • Related wiring harness
1L	—	—	—		—	—

EXTERIOR TRIM

Terminal	Signal	Connected to	Test condition		Standard	Inspection item
1M	Roof motor hall sensor input signal (LH)	Roof motor (LH)	When the roof panel is moving.	Pulse is output. (See 09-16-31 Inspection using an oscilloscope (reference).)		• Roof motor (LH) • Related wiring harness
1N	—	—	—		—	—
1O	Deck panel motor hall sensor input signal (LH)	Deck panel motor (LH)	When the deck panel is moving.	Pulse is output. (See 09-16-31 Inspection using an oscilloscope (reference).)		• Deck panel motor (LH) • Related wiring harness
1P	—	—	—		—	—
1Q	Hall effect sensor GND	GND	Under any condition: Inspect for continuity to GND.		Continuity detected	• Related wiring harness
1R	Roof close position switch input signal	Power retractable hardtop limit switch	Ignition switch is turned to the ON position	When the roof panel is fully closed.	1.0 or less	• Power retractable hardtop limit switch • Related wiring harness
				When the roof panel is not fully closed.	B+	
1S	CAN-H	—	Because this terminal is for communication, good/no good judgment by terminal voltage is not possible.		—	• Related wiring harnesses
1T	Roof open position switch input signal	Power retractable hardtop limit switch	Ignition switch is turned to the ON position	When the roof panel is fully open.	1.0 or less	• Power retractable hardtop limit switch • Related wiring harness
				When the roof panel is not fully open.	B+	
1U	CAN-L	—	Because this terminal is for communication, good/no good judgment by terminal voltage is not possible.		—	• Related wiring harnesses
1V	Signal GND	Power retractable hardtop limit switch/ deck panel limit switch	Ignition switch is turned to the ON position	Under any condition	1.0 or less	• Related wiring harness
1W	Signal GND	GND	Under any condition: Inspect for continuity to GND.		Continuity detected	• Related wiring harness
1X	IG1	ENGINE 15 A fuse	Ignition switch is turned to the ON position		B+	• Related wiring harness
			When the ignition switch is not in the ON position.		1.0 or less	
2A	Power supply	Main fuse block	Under any condition		B+	• Related wiring harness
2B	Power supply	Main fuse block	Under any condition		B+	• Related wiring harness
2C	Indicator light output signal	Power retractable hardtop Indicator light (hazard warning switch)	Ignition switch is turned to the ON position	Illuminated	1.0 or less	• Hazard switch • Related wiring harness
				Not illuminated	B+	
2D	—	—	—		—	—
2E	Power GND	GND	Under any condition: Inspect for continuity to GND.		Continuity detected	• Related wiring harness
2F	Power GND	GND	Under any condition: Inspect for continuity to GND.		Continuity detected	• Related wiring harness
3A	Roof motor control (open)	Roof motor (RH)	Ignition switch is turned to the ON position	Roof panel open operation	B+	• Roof motor (RH) • Related wiring harness
				Roof panel close operation	1.0 or less*1	
				Other	approx. 2	—
3B	—	—	—		—	—
3C	—	—	—		—	—

EXTERIOR TRIM

Terminal	Signal	Connected to	Test condition		Standard	Inspection item
3D	Roof motor control (close)	Roof motor (LH)	Ignition switch is turned to the ON position	Roof panel open operation	1.0 or less*1	• Roof motor (LH) • Related wiring harness
				Roof panel close operation	B+	
				Other	approx. 2	—
3E	Deck panel motor control (close)	Deck panel motor (RH)	Ignition switch is turned to the ON position	Deck panel open operation	1.0 or less*1	• Deck panel motor (RH) • Related wiring harness
				Deck panel close operation	B+	
				Other	approx. 2	
3F	Deck panel open position sensor input signal	Deck panel limit switch	Ignition switch is turned to the ON position	When the deck panel is fully open.	1.0 or less	• Deck panel limit switch • Related wiring harness
				When the deck panel is not fully open.	B+	
3G	—	—	—		—	—
3H	Deck panel motor control (open)	Deck panel motor (LH)	Ignition switch is turned to the ON position	Deck panel open operation	B+	• Deck panel motor (LH) • Related wiring harness
				Deck panel close operation	1.0 or less*1	
				Other	approx. 2	
3I	Roof motor control (close)	Roof motor (RH)	Ignition switch is turned to the ON position	Roof panel open operation	1.0 or less*1	• Roof motor (RH) • Related wiring harness
				Roof panel close operation	B+	
				Other	approx. 2	
3J	—	—	—		—	—
3K	—	—	—		—	—
3L	Roof motor control (open)	Roof motor (LH)	Ignition switch is turned to the ON position	Roof panel open operation	B+	• Roof motor (LH) • Related wiring harness
				Roof panel close operation	1.0 or less*1	
				Other	approx. 2	
3M	Deck panel motor control (open)	Deck panel motor (RH)	Ignition switch is turned to the ON position	Deck panel open operation	B+	• Deck panel motor (RH) • Related wiring harness
				Deck panel close operation	1.0 or less*1	
				Other	approx. 2	
3N	—	—	—		—	—
3O	Deck panel close position sensor input signal	Deck panel limit switch	Ignition switch is turned to the ON position	Except closed position	1.0 or less	• Deck panel limit switch • Related wiring harness
				Closed position	B+	
3P	Deck panel motor control (close)	Deck panel motor (LH)	Ignition switch is turned to the ON position	Deck panel open operation	1.0 or less*1	• Deck panel motor (LH) • Related wiring harness
				Deck panel close operation	B+	
				Other	approx. 2	

*1 : The voltage increases during operation speed control of the roof and deck panel.

EXTERIOR TRIM

Inspection using an oscilloscope (reference)
Roof motor hall sensor

- Terminal connected: power retractable hardtop control module 1I (RH), 1M (LH)—Negative battery terminal
- Oscilloscope setting: 2 V/DIV (Y): 5 ms/DIV (X), DC range
- Measurement condition: When the roof is moving.

Note
- Pulse interval varies with the roof panel operation speed.

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Deck panel motor hall sensor

- Terminal connected: power retractable hardtop control module 1K (RH), 1O (LH)—Negative battery terminal
- Oscilloscope setting: 2 V/DIV (Y): 5 ms/DIV (X), DC range
- Measurement condition: When the deck panel is moving.

Note
- Pulse interval varies with the deck panel operation speed.

amxzzw0000207

POWER RETRACTABLE HARDTOP CONTROL MODULE BRACKET REMOVAL/INSTALLATION

id091600809500

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Front seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
4. Remove the roof hook cable case.

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EXTERIOR TRIM

5. Remove in the order indicated in the table.

1	Connector
2	Nut
3	Bolt
4	Power retractable hardtop control module assembly

amxzzw0000207

6. Remove the nuts.
7. Remove the power retractable hardtop control module from the power retractable hardtop control module bracket.
8. Install in the reverse order of removal.

amxzzw0000207

ROOF MOTOR INSPECTION

id091600809800

1. Apply battery positive voltage and connect the ground to roof motor terminals A and E, and then inspect the roof motor operation.
   - If the roof motor does not operate as indicated in the table, replace it.

   Caution
   - **If the roof motor temperature is high, the motor may not rotate due to the motor internal PTC function. Leave it untouched for about 3 min to cool it down, then reinspect.**

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Operation	Terminal	
	E	A
Open	B+	Ground
Close	Ground	B+

2. Connect the battery positive voltage to roof motor terminal B and connect terminal F to ground.
3. Operate the roof motor and measure the voltage at terminal D.
   - If there is any malfunction, replace the roof motor.

   Voltage
   - **Pulse: max. 13 V/min. 0 V**

EXTERIOR TRIM

ROOF MOTOR REMOVAL/INSTALLATION

id091600809700

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Front seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (8) Seat belt upper anchor installation bolt (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
   (9) Power retractable hardtop link bracket (See 09-16-44 POWER RETRACTABLE HARDTOP LINK BRACKET REMOVAL/INSTALLATION.)
4. Disconnect the roof motor connector.
5. Remove the bolts A and washers.
6. Remove the roof motor bracket.
7. Remove the bolts B and C.
8. Remove the roof motor.
9. Install in the reverse order of removal.

amxzzw0000209

POWER RETRACTABLE HARDTOP LIMIT SWITCH REMOVAL/INSTALLATION

id091600821000

Note
- The power retractable hardtop limit switch is installed on the RH side.

1. Fully open the deck panel.
2. Cover both sides of the rear window glass with thick cloth to protect the window.
3. Remove the battery cover.
4. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
5. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Front seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (8) Seat belt upper anchor installation bolt (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
   (9) Power retractable hardtop link bracket (See 09-16-44 POWER RETRACTABLE HARDTOP LINK BRACKET REMOVAL/INSTALLATION.)
   (10)Cab-side weatherstrip (See 09-16-12 CONVERTIBLE TOP DISASSEMBLY/ASSEMBLY.)
6. Disconnect the roof motor limit switch connector.
7. Disconnect the power retractable hardtop drain hose. (See 09-16-59 POWER RETRACTABLE HARDTOP DRAIN HOSE REMOVAL/INSTALLATION.)

EXTERIOR TRIM

8. Remove the power retractable hardtop. (See 09-16-21 POWER RETRACTABLE HARDTOP REMOVAL/ INSTALLATION.)
9. Remove in the order indicated in the table.

1	Screw A
2	Cover (See 09-16-34 Cover Installation Note.)
3	Screw B
4	Power retractable hardtop limit switch

10. Install in the reverse order of removal.

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Cover Installation Note

1. Install the power retractable hardtop limit switch wiring harness to the cover hook and groove shown in the figure.

amxzzw0000207

EXTERIOR TRIM

POWER RETRACTABLE HARDTOP LIMIT SWITCH INSPECTION

id091600810300

1. Verify that the continuity between the power retractable hardtop limit switch terminals is as indicated in the table.
- If not as indicated in the table, replace the roof motor link (RH). (The power retractable hardtop limit switch is integrated with the roof motor link (RH).)

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○—○ : Continuity

Switch position		Terminal			
		A	B	C	D
POWER RETRACTABLE HARDTOP CLOSE POSITION SWITCH	ROD PUSHED	○	—○		
	NORMAL CONDITUION				
POWER RETRACTABLE HARDTOP OPEN POSITION SWITCH	ROD PUSHED			○	—○
	NORMAL CONDITUION				

E5E916ZW6023

DECK PANEL REMOVAL/INSTALLATION

id091600809900

Caution
- **If the deck panel does not operate electrically, see "DECK PANEL MANUAL OPEN/CLOSE PROCEDURE" to open/close the deck panel. (See 09-16-52 DECK PANEL MANUAL OPEN/CLOSE PROCEDURE)**

1. Fully open the deck panel.
2. Remove the battery cover.
3. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Set the side shelf out of the way. (See 09-17-22 SIDE SHELF REMOVAL/INSTALLATION.)
5. Insert a phillips screwdriver with no wear securely into each screw groove and remove the screws.

Caution
- **The screws are engaged firmly because thread-locking compound has been applied to them. When removing the screws, be careful not to deform the screw groove.**

6. Remove the rod from the wire guide.

amxuuw0000071

7. Remove tabs A using a tape-wrapped flathead screwdriver, and then remove the wire guide plate.
8. Loosen the nut, then pull the roof hook cable in the direction shown by the arrow and remove it.

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EXTERIOR TRIM

9. Remove the bolts.

amxzzw0000207

10. Disconnect the deck panel motor connectors.
11. Disconnect the high-mount brake light connector.
12. Disconnect the deck panel limit switch connector.
13. Remove the deck panel.
14. Install in the reverse order of removal.

EXTERIOR TRIM

DECK PANEL DISASSEMBLY/ASSEMBLY

id091600810000

1. Remove the deck panel motors. (See 09-16-38 DECK PANEL MOTOR REMOVAL/INSTALLATION.)
2. Remove the high-mount brake light. (See 09-18-19 HIGH-MOUNT BRAKE LIGHT REMOVAL/INSTALLATION.)

Note
- Verify the number of shims because it differs depending on the installation position.

3. Disassemble in the order indicated in the table.
4. Assemble in the reverse order of disassembly.

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1	Deck panel link
2	Deck panel link upper bracket
3	Deck panel link lower bracket

4	Deck panel (See 09-16-37 Deck Panel Link Removal Note.) (See 09-16-37 Deck Panel Link Installation Note.)

Deck Panel Link Removal Note

1. When removing the deck panel link, place the positioning mark by affixing masking tape on the deck panel link and deck panel.

Deck Panel Link Installation Note

1. Install the shim according to the number verified prior to removal.
2. Align the alignment marks placed before the deck panel link removal and install the deck panel link.
3. Refer to DECK PANEL ADJUSTMENT and verify that the gap and height difference between the deck panel, trunk lid, and back window glass are within the specifications. Adjust the power retractable hardtop if necessary. (See 09-16-38 DECK PANEL ADJUSTMENT)

EXTERIOR TRIM

DECK PANEL ADJUSTMENT

id091600810100

1. Loosen the installation nuts for deck panel.
2. Adjust the gap and height difference between the deck panel and trunk lid within the specification by moving the deck panel back and forth, left and right, and by adjusting the number of shims if necessary.

E5E916ZW6032

E5E916ZW6031

Clearance
a:4—6 mm {0.16—0.23 in}
b:-2—2 mm {-0.07—0.07 in}

3. Tighten the nuts.

DECK PANEL MOTOR REMOVAL/INSTALLATION

id091600811300

Caution
- **If the deck panel does not operate electrically, see "DECK PANEL MANUAL OPEN/CLOSE PROCEDURE" to open/close the deck panel. (See 09-16-52 DECK PANEL MANUAL OPEN/CLOSE PROCEDURE)**

1. Fully open the deck panel.
2. Remove the battery cover.
3. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Set the side shelf out of the way. (See 09-17-22 SIDE SHELF REMOVAL/INSTALLATION.)
5. Remove the deck panel. (See 09-16-35 DECK PANEL REMOVAL/INSTALLATION.)

EXTERIOR TRIM

6. Remove the screws indicated in the figure.
7. Disconnect the deck panel motor connector.
8. Remove the deck panel motor.
9. Install in the reverse order of removal.

amxzzw0000091

DECK PANEL MOTOR INSPECTION

1. Apply battery positive voltage and connect the ground to deck panel motor terminals A and E, and then inspect the deck panel motor operation.
   - If the deck panel motor does not operate as indicated in the table, replace it.

   Caution
   - **If the deck panel motor temperature is high, the motor may not rotate due to the motor internal PTC function. Leave it untouched for about 3 min to cool it down, then reinspect.**

id091600810200

E5E916ZW6030

Operation	Terminal	
	E	A
Open	Ground	B+
Close	B+	Ground

2. Connect the battery positive voltage to deck panel motor terminal D and connect terminal F to ground.
3. Operate the deck panel motor and measure the voltage at terminal B.
   - If there is any malfunction, replace the deck panel motor.

   Note
   - Terminal C is not used for the system control.

   Voltage
   - **Pulse:max. 13 V/min. 0 V**

EXTERIOR TRIM

DECK PANEL LIMIT SWITCH REMOVAL/INSTALLATION

id091600821100

Caution

- **If the deck panel does not operate electrically, see “DECK PANEL MANUAL OPEN/CLOSE PROCEDURE” to open/close the deck panel. (See 09-16-52 DECK PANEL MANUAL OPEN/CLOSE PROCEDURE.)**

1. Fully open the deck panel.
2. Remove the battery cover.
3. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
4. Set the side shelf out of the way. (See 09-17-22 SIDE SHELF REMOVAL/INSTALLATION.)
5. Remove the deck panel. (See 09-16-35 DECK PANEL REMOVAL/INSTALLATION.)
6. Remove the deck panel motor. (RH) (See 09-16-38 DECK PANEL MOTOR REMOVAL/INSTALLATION.)
7. Remove the screws A and B.
8. Remove the deck panel limit switch prate.
9. Remove the screws C.
10. Remove the deck panel limit switch.
11. Install in the reverse order of removal.

amxuuw0000062

DECK PANEL LIMIT SWITCH INSPECTION

id091600811500

1. Verify that the continuity between the deck panel limit switch terminals is as indicated in the table.
   - If not as indicated in the table, replace the deck panel link (RH).

○—○ : Continuity

Switch position		Terminal			
		A	B	C	D
DECK PANEL CLOSE POSITION SWITCH	ROD PUSHED				
	NORMAL CONDITUION	○	○		
DECK PANEL OPEN POSITION SWITCH	ROD PUSHED			○	○
	NORMAL CONDITUION				

E5E916ZW6035

E5E916ZW6034

EXTERIOR TRIM

REAR DECK WEATHERSTRIP REMOVAL

id091600810400

1. Fully open the deck panel.
2. Remove the quarter trim. (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
3. Remove the cab-side weatherstrip. (See 09-16-12 CONVERTIBLE TOP DISASSEMBLY/ASSEMBLY.)
4. Remove the fasteners.
5. Remove the rear deck weatherstrip.

amxzzw0000091

REAR DECK WEATHERSTRIP INSTALLATION

id091600811200

1. Align the deck flange with the weatherstrip marking, and insert. (1)
2. Peel off the tape backing of the butylene tape, align it to the molded part at the tip of the rear deck weatherstrip and press, then attach the fasteners. (2)
3. Install the rear deck weatherstrip. (3)
4. Install the cab-side weatherstrip. (See 09-16-12 CONVERTIBLE TOP DISASSEMBLY/ ASSEMBLY.)
5. Install the quarter trim. (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)

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ROOF HOOK REMOVAL/INSTALLATION

id091600810500

1. Fully close the power retractable hardtop.
2. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Front seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
3. Open the cable case cover and disconnect the cable while pressing the cable in the direction of the arrow. (See 09-16-42 Roof Hook Install Note)

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EXTERIOR TRIM

4. Remove the bolts.
5. Remove the screw.
6. Remove the roof hook.

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7. Remove the screws.
8. Pull up the cover and remove the hook.
9. Remove the cover.
10. Install in the reverse order of removal.

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Roof Hook Install Note

1. Securely fix the 3 cable-side grooves to the cable case.

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ROOF HOOK CABLE REMOVAL/INSTALLATION

id091600821400

1. Fully open the deck panel.
2. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Front seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
3. Open the cable case cover and disconnect the cable while pressing the cable in the direction of the arrow. (See 09-16-44 Roof Hook Install Note)
4. Set the side shelf out of the way. (See 09-17-22 SIDE SHELF REMOVAL/INSTALLATION.)
5. Insert a Phillips screwdriver with no wear securely into each screw groove and remove the screws.

   Caution
   - **The screws are engaged firmly because thread-locking compound has been applied to them. When removing the screws, be careful not to deform the screw groove.**

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EXTERIOR TRIM

6. Remove the rod from the wire guide.

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7. Remove tabs A using a tape-wrapped flathead screwdriver, and then remove the wire guide plate.
8. Loosen the nut, then pull the roof hook cable in the direction shown by the arrow and remove it.

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9. Remove the nut.
10. Remove the roof hook cable case.

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11. Remove the roof hook cable from the hook and clip shown in the figure.
12. Install in the reverse order of removal.

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EXTERIOR TRIM

Caution

- **If the roof hook cable is installed to the installation groove on the drain cover, it may become a source of noise during deck panel operation. Do not install it even if there is an installation groove on the drain cover.**

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Roof Hook Install Note

1. Securely fix the 3 cable-side grooves to the cable case.

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POWER RETRACTABLE HARDTOP LINK BRACKET REMOVAL/INSTALLATION

id091600810600

1. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Front seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (8) Seat belt upper anchor installation bolt (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
2. Remove the bolts A, B and C. (See 09-16-45 Bolt B, C Install Note.)
3. Remove the junction. (See 09-10-13 SEAT BACK CROSSMEMBER ASSEMBLY REMOVAL/INSTALLATION.)
4. Loosen the installation bolts and nuts of the seat back crossmember component, and tilt the seat back crossmember component towards the vehicle front. (See 09-10-13 SEAT BACK CROSSMEMBER ASSEMBLY REMOVAL/INSTALLATION.)

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EXTERIOR TRIM

5. Rotate the power retractable hardtop link bracket in the direction shown by the arrow at the pivot fulcrum of pin A and set the hook out of the way.
6. Remove the power retractable hardtop link bracket.
7. Install in the reverse order of removal.

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Bolt B, C Install Note

1. Temporarily tighten all the bolts, then tighten the bolts in the order indicated in the figure.

   Tightening torque
   19—25 N·m {1.9—2.6 kgf·m, 14—18 ft—lbf}

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FRONT ROOF PANEL REMOVAL/INSTALLATION

id091600810700

1. Fully open the deck panel.
2. Cover both sides of the rear window glass with thick cloth to protect the window.
3. Remove the battery cover.
4. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
5. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Front seat back bar garnish (See09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (8) Seat belt upper anchor installation bolt (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
   (9) Power retractable hardtop link bracket (See 09-16-44 POWER RETRACTABLE HARDTOP LINK BRACKET REMOVAL/INSTALLATION.)
   (10) Cab-side weatherstrip (See 09-16-12 CONVERTIBLE TOP DISASSEMBLY/ASSEMBLY.)
   (11) Power retractable hardtop (See 09-16-21 POWER RETRACTABLE HARDTOP REMOVAL/INSTALLATION.)

   Note
   - Verify the number of shims because it differs depending on the installation position.

EXTERIOR TRIM

6. When removing the front roof panel, place the positioning mark by affixing masking tape on the roof link and front roof panel.

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7. Remove the tabs A and hook B.
8. Remove the cover.
9. Remove the bolts and washers.
10. Remove the shims.
11. Remove the front roof panel.
12. Install in the reverse order of removal.

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Front Roof Panel Installation Note

1. Install the shim according to the number verified prior to removal.
2. Align the alignment marks placed before the front roof panel removal and install the front roof panel.
3. Refer to POWER RETRACTABLE HARDTOP ADJUSTMENT and verify that the gap and height difference between the front roof panel and middle roof panel are within the specifications. Adjust the power retractable hardtop if necessary. (See 09-16-24 POWER RETRACTABLE HARDTOP ADJUSTMENT.)

EXTERIOR TRIM

FRONT ROOF PANEL DISASSEMBLY/ASSEMBLY

id091600810800

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

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1	Top lock lever cover
2	Top lock cover
3	Roof hook wedge
4	Top lock
5	Male wedge cover

6	Male wedge
7	Weatherstrip
8	Retainer (See 09-16-47 Retainer Disassembly Note.) (See 09-16-47 Retainer Assembly Note.)
9	Front roof panel

Retainer Disassembly Note

1. Mark around the retainer installation screws with paint before removing them.

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Retainer Assembly Note

1. Install the retainers to the link, aligning the retainer marks with the retainer installation screws.

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EXTERIOR TRIM

MIDDLE ROOF PANEL REMOVAL/INSTALLATION

id091600810900

1. Fully open the deck panel.
2. Cover both sides of the rear window glass with thick cloth to protect the window.
3. Remove the battery cover.
4. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
5. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Front seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (8) Seat belt upper anchor installation bolt (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
   (9) Power retractable hardtop link bracket (See 09-16-44 POWER RETRACTABLE HARDTOP LINK BRACKET REMOVAL/INSTALLATION.)
   (10) Cab-side weatherstrip (See 09-16-12 CONVERTIBLE TOP DISASSEMBLY/ASSEMBLY.)
   (11) Power retractable hardtop (See 09-16-21 POWER RETRACTABLE HARDTOP REMOVAL/INSTALLATION.)
6. Remove the front roof panel from the middle roof panel. (See 09-16-45 FRONT ROOF PANEL REMOVAL/INSTALLATION.)
7. Remove the rear window glass from the middle roof panel. (See 09-12-15 REAR WINDOW GLASS REMOVAL/INSTALLATION [POWER RETRACTABLE HARDTOP].)
8. Remove the roof motor from the middle roof panel. (See 09-16-33 ROOF MOTOR REMOVAL/INSTALLATION.)
9. Install in the reverse order of removal.

MIDDLE ROOF PANEL DISASSEMBLY/ASSEMBLY

id091600811000

1. Remove the middle roof panel weatherstrip. (See 09-16-49 MIDDLE ROOF PANEL WEATHERSTRIP REMOVAL/INSTALLATION.)
2. Disassemble in the order indicated in the table.
3. Assemble in the reverse order of disassembly.

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1	Retainer (See 09-16-49 Retainer Disassembly Note.) (See 09-16-49 Retainer Assembly Note.)
2	Middle roof panel

EXTERIOR TRIM

Retainer Disassembly Note

1. Mark around the retainer installation screws with paint before removing them.

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Retainer Assembly Note

1. Install the retainers to the link, aligning the retainer marks with the retainer installation screws.

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MIDDLE ROOF PANEL WEATHERSTRIP REMOVAL/INSTALLATION

id091600821200

Removal

1. Remove the fasteners.

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2. Peel off the double-sided adhesive tape.
3. Remove the middle roof panel weatherstrip.

Installation

Warning

- **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**

Note

- Double-sided adhesive tape has already been attached to the new middle roof panel weatherstrip.

1. Remove the double-sided adhesive tape on the middle roof panel using a utility knife.
2. Remove any grease or dirt from the adhesion surface of the middle roof panel.

EXTERIOR TRIM

3. Install the fasteners.

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4. Peel off the tape backings and attach the middle roof panel weatherstrip by applying pressure.

ROOF LINK LOCK REMOVAL/INSTALLATION

id091600721700

1. Fully open the deck panel.
2. Remove the rear defroster harness from the roof link lock (LH). (See 09-12-15 REAR WINDOW GLASS REMOVAL/INSTALLATION [POWER RETRACTABLE HARDTOP])
3. Remove the bolt.
4. Remove the pin A.
5. Remove the roof link lock.
6. Install in the reverse order of removal.

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BLACK-OUT FILM REMOVAL

id091600821500

Front

1. Partially peel back the middle roof weatherstrip.
2. Peel off the black-out film by pulling it outward from one end.

Note

- Slowly remove the black-out film since it may tear easily.

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EXTERIOR TRIM

Rear

1. Move the power retractable hardtop in the open direction as shown in the figure until it is separated from the middle roof panel.

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2. Peel off the black-out film by pulling it outward from one end.

   Note
   - Slowly remove the black-out film since it may tear easily.

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BLACK-OUT FILM INSTALLATION

id091600821600

Front

1. Remove any grease or dirt from the affixing surface of the middle roof panel.
2. Peel off the tape backing from the upper area **50-100 mm**, and adhere the black-out film to the positioning point shown in the figure.

   Clearance
   a:0—2.0 mm {0—0.079 in}

3. Peel off the tape backing, and after verifying that the bottom edge is positioned within **2 mm** from the line shown in the figure, adhere the surface of the black-out film.
4. Peel off the transparent protective film on the black-out film.
5. Apply pressure to the black-out film in the order of side and back side.
6. Grasp edges b, c and pull in the direction shown by the arrow making sure there are no wrinkles in the corner area, and adhere.
7. Install the middle roof panel weatherstrip. (See 09-16-49 MIDDLE ROOF PANEL WEATHERSTRIP REMOVAL/INSTALLATION.)

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Rear

1. Remove any grease or dirt from the affixing surface of the middle roof panel.

EXTERIOR TRIM

2. Peel off the tape backing from the upper area **50-100 mm**, and adhere the black-out film to the positioning point shown in the figure.

   Clearance
   a:0—2.0 mm {0—0.079 in}
   b:0—3.0 mm {0—0.12 in}

3. Peel off the tape backing and adhere the black-out film surface.
4. Peel off the transparent protective film on the black-out film.
5. Apply pressure to the black-out film in the order of side and back side.

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6. Fold in the edges in the order shown in the figure.
7. Attach the black-out film (RH) and black-out film (LH) using the same procedure as the black-out film (center).

   Caution
   - **Adhere so that the center edge of the black-out film (RH) and black-out film (LH) are underneath the edge of the black-out film (center) in the alignment area, with no deviation.**

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DECK PANEL MANUAL OPEN/CLOSE PROCEDURE

id091600812000

Caution
- **Because the pinion gear (deck panel motor) and sector gear are disengaged when the manual open/close procedure is performed, the deck panel does not operate electrically after a repair. It is necessary to perform the recovery procedure to engage the pinion gear (deck panel motor) and sector gear. (See 09-16-56 Recovery Procedure.)**

Deck Panel Manual Open/Close Procedure And Temporary Measure Procedure

Note
- The temporary measure is for releasing the lock using a rope if the deck panel needs to be opened/closed again or to drive the vehicle after the deck panel manual open/close procedure has been performed. To open/close the deck panel manually on the vehicle where the temporary measure has already been performed, open/close the deck panel manually referring to “Deck panel manual open/close procedure after temporary measure”. (See 09-16-54 Close the deck panel (Temporary measure).)

EXTERIOR TRIM

- To perform the following procedure, use the tools that comes with the vehicle.
- To free the deck panel, both the motors need to be unlocked.
- The following procedure is only for the left side. Perform the same procedure on the right side to free the deck panel.

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Open the deck panel

1. Remove the bolts.

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2. Insert the eye bolt into the thread hole above the removed bolt.
3. Rotate the eye bolt in the tightening direction seven times to press the deck panel motor bracket.

Note

- When the deck panel motor bracket is pressed, the deck panel motor bracket rotates, and the pinion gear (deck panel motor) and sector gear are disengaged.

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4. Remove the eye bolt.

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EXTERIOR TRIM

5. Insert the eye bolt into the guide pipe shown in the figure.

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6. Press the eye bolt towards the vehicle rear and disengage the sector gear and the lock pin of the deck panel base link.
7. Lift up the deck panel from the both the left and right sides of the vehicle, one person on each side, to open the deck panel.

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Close the deck panel (Temporary measure)

Note
- If the deck panel needs to be opened/closed again or to drive the vehicle, perform the following temporary measure procedure.

1. Double tie the rope to the deck panel link screw as shown in the figure.

Caution
- **Tie the rope securely around the knob so that it does not loosen.**

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2. Route the rope on the vehicle's front side to the inside of the vehicle, passing it through the gap in the side shelf.

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EXTERIOR TRIM

3. Route the rope on the vehicle's rear side to the outside of the vehicle, passing it between the deck panel links.
4. After doing the same procedure on the right side, close the deck panel from both the left and right sides of the vehicle, one person on each side.

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5. Pull the rope on the vehicle's rear (rope is outside of vehicle) along the trunk lid to engage and lock the sector gear and the lock pin of the deck panel base link.

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6. Double tie the rope on the vehicle's rear side (rope is outside of vehicle) to the trunk lid hinge as shown in the figure.

Caution
- **Tie the rope on the trunk lid hinge to prevent the lock from releasing while driving. Tie the rope securely on the trunk lid hinge so that it does not loosen.**

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Deck Panel Manual Open/Close Procedure After Temporarily Measure

Note
- The temporary measure is for releasing the lock using a rope if the deck panel needs to be opened/closed again or to drive the vehicle after the deck panel manual open/close procedure has been performed. To open/close the deck panel manually on a vehicle where the temporary measure has already been performed, perform the following procedure and open/close the deck panel manually.

Open the deck panel

1. Untie the rope knot tied to the trunk rid hinge.
2. Pull the rope on the vehicle's front (rope is inside of vehicle) to disengage the sector gear and the lock pin of the deck panel base link.
3. Lift up the deck panel from the both the left and right sides of the vehicle, one person on each side, to open the deck panel.

amxzzw0000094

EXTERIOR TRIM

Close the deck panel

Note
- If the deck panel needs to be opened/closed again or to drive the vehicle, perform the following procedure to close the deck panel.

1. Close the deck panel from both the left and right sides of the vehicle, one person on each side.
2. Pull the rope on the vehicle's rear (rope is outside of vehicle) along the trunk lid to engage and lock the sector gear and the lock pin of the deck panel base link.

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3. Double tie the rope on the vehicle's rear side (rope is outside of vehicle) to the trunk lid hinge as shown in the figure.

Caution
- **Tie the rope on the trunk lid hinge to prevent the lock from releasing while driving. Tie the rope securely on the trunk lid hinge so that it does not loosen.**

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Recovery Procedure

1. Fully open the deck panel.
2. Rotate the deck panel motor bracket in the direction of the arrow to engage the pinion gear (deck panel motor) and the sector gear.

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EXTERIOR TRIM

3. Install the bolt.

Note
- If the temporary measure is performed, remove the ropes.

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Deck Panel Manual Open/Close Procedure With The Roof Panel Fully Closed

1. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
2. Remove the aeroboard. (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
3. Peering from the space where the wind blocker was removed, remove both sides of the nuts shown in the figure.

Note
- The number of shims varies depending on the location of the deck panel installation nuts. Adjustment will be easier by verifying the number of shims to be used before removing the deck panel.

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4. Lift up the deck panel with one other person.

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EXTERIOR TRIM

5. Disconnect the high-mount brake light connector on the left side by pulling it in the direction of (2) while pressing it in the direction of (1).
6. Remove the deck panel.

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Nut Removal Note

1. Insert a spanner into the clearance between the deck panel and side shelf, and remove the nuts.

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Deck Panel Recovery Procedure

1. Connect the negative battery cable.
2. Fully open the deck panel.
3. Install the deck panel. (See 09-16-35 DECK PANEL REMOVAL/INSTALLATION.)
4. Verify the deck panel clearance. (See 09-16-24 POWER RETRACTABLE HARDTOP ADJUSTMENT.)

EXTERIOR TRIM

POWER RETRACTABLE HARDTOP DRAIN HOSE REMOVAL/INSTALLATION

id091600821300

1. Fully close the power retractable hardtop.
2. Fully open the deck panel.
3. Remove clip A, and remove the power retractable hardtop drain hose from the rear window glass.
4. Insert your hand from the fully opened deck panel and remove clip B, and remove the power retractable hardtop drain hose from the rear side trim.
5. Install in the reverse order of removal.

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POWER RETRACTABLE HARDTOP OPEN/CLOSE WARNING BEEP ON/OFF SWITCHING

id091600812100

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (laptop PC)
     1.Select"Module Programming".
   - When using the PDS (Pocket PC)
     1.Select "Programming".
     2.Select "Module programming".
3. Then, select items from the screen menu in the following order.
   (1) Select "Programmable Parameters".
   (2) Select "Warning Lamps/Chimes".
4. Select the "following item" on the M-MDS to set Enabled/Disabled.

   Item
   - **RHT Buzzer - (IC)**

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INTERIOR TRIM

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INTERIOR TRIM

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1	Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
2	Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
3	Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
4	Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
5	Seat back bar lower garnish (See 09-17-20 SEAT BACK BAR LOWER GARNISH REMOVAL/INSTALLATION.)

6	Seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
7	Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
8	Rear package trim (See 09-17-21 REAR PACKAGE TRIM REMOVAL/INSTALLATION.)
9	Rear side trim (See 09-17-21 REAR SIDE TRIM REMOVAL/INSTALLATION.)
10	Side shelf (See 09-17-22 SIDE SHELF REMOVAL/INSTALLATION.)

INTERIOR TRIM

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1	Trunk end trim (See 09-17-12 TRUNK END TRIM REMOVAL/INSTALLATION.)	3	Trunk mat (See 09-17-23 TRUNK MAT REMOVAL/INSTALLATION.)
2	Partition board (See 09-17-23 PARTITION BOARD REMOVAL/INSTALLATION.)	4	Trunk side trim (See 09-17-11 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)

DASHBOARD REMOVAL/INSTALLATION

id091700800300

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Glove compartment (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
   (3) Side wall (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
   (4) Console panel (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (5) Center panel unit (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.)
   (6) Lower panel (See 09-17-8 LOWER PANEL REMOVAL/INSTALLATION.)
   (7) Column cover (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.)
   (8) Driver-side air bag module (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
   (9) Steering wheel (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (10)Combination switch (See 09-18-21 COMBINATION SWITCH REMOVAL/INSTALLATION.)
   (11)Steering shaft (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (12)Meter hood (See 09-17-7 METER HOOD REMOVAL/INSTALLATION.)
   (13)Instrument cluster (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
   (14)Side panel (See 09-17-10 SIDE PANEL REMOVAL/INSTALLATION.)
   (15)Bonnet release lever (See 09-14-5 BONNET LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (16)Female wedge (See 09-16-12 CONVERTIBLE TOP DISASSEMBLY/ASSEMBLY.)
   (17)A-pillar trim (See 09-17-11 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (18)Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (19)Front side trim (See 09-17-11 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (20)Fuse box No.1
4. Disconnect the dashboard wiring harness connectors.
5. Remove in the order indicated in the figure.
6. Install in the reverse order of removal.

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INTERIOR TRIM

amxzzw0000188

1	Evaporator temperature sensor connector
2	Short code connector
3	Power MOS FET connector
4	Blower motor connector
5	Airflow mode actuator connector
6	Nut
7	Cover

8	Bolt A
9	Bolt B
10	Bolt C
11	Bolt D
12	Bolt E
13	Dashboard

DASHBOARD DISASSEMBLY/ASSEMBLY

id091700453600

1. Remove the following parts:
   (1) Decoration panel (See 09-17-13 DECORATION PANEL REMOVAL/INSTALLATION.)
   (2) Hazard warning switch (See 09-18-26 HAZARD WARNING SWITCH REMOVAL/INSTALLATION.)
   (3) Center speaker cover (See 09-20-9 CENTER SPEAKER REMOVAL/INSTALLATION.)
   (4) Center speaker (vehicles with Bose®) (See 09-20-9 CENTER SPEAKER REMOVAL/INSTALLATION.)
   (5) Passenger-side air bag module (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
2. Disassemble in the order indicated in the table.
3. Assemble in the reverse order of disassembly.

INTERIOR TRIM

amxuuw0000071

1	Dashboard wiring harness
2	Pin
3	Defroster duct
4	Center duct
5	Striker
6	Dashboard member

7	Dashboard panel
8	Dashboard lower panel
9	Shower duct
10	Lower ventilator grille
11	Side demister nozzle
12	Switch panel

INTERIOR TRIM

COLUMN COVER REMOVAL/INSTALLATION

1. Remove the tab A, then remove the upper column cover.
2. Remove the ignition key illumination. (See 09-18-34 IGNITION KEY ILLUMINATION BULB REMOVAL/INSTALLATION.)
3. Remove the screws, then remove the lower column cover.
4. Install in the reverse order of removal.

id091700453700

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METER HOOD REMOVAL/INSTALLATION

id091700454300

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Pull the meter hood upward and detach clips A.

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4. Disconnect the microphone connector. (See 09-20-23 MICROPHONE REMOVAL/INSTALLATION.)
5. Remove the meter hood.
6. Install in the reverse order of removal.

INTERIOR TRIM

GLOVE COMPARTMENT REMOVAL/INSTALLATION

1. Remove the dumper clip.
2. Bend the stoppers inward, then remove.
3. Turn the glove compartment downward and pull the pins.
4. Remove the glove compartment.
5. Install in the reverse order of removal.

id091700453800

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LOWER PANEL REMOVAL/INSTALLATION

id091700453900

L.H.D.

1. Pull the lower panel outward and detach clips A and tab B.
2. Turn the lower panel downward and remove the tabs C.
3. Remove the lower panel.
4. Install in the reverse order of removal.

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R.H.D.

1. Pull the lower panel outward and detach clips A.
2. Turn the lower panel downward and remove the tabs B.
3. Remove the lower panel.
4. Install in the reverse order of removal.

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INTERIOR TRIM

VENTILATOR GRILLE REMOVAL/INSTALLATION

id091700454100

Driver's Side

1. Remove the decoration panel. (driver's side) (See 09-17-13 DECORATION PANEL REMOVAL/INSTALLATION.)
2. Remove the screws.
3. Remove the ventilator grille.
4. Install in the reverse order of removal.

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Passenger's Side

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Side wall (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
   (3) Center panel unit (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.)
   (4) Glove compartment (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
   (5) Decoration panel (passenger's side) (See 09-17-13 DECORATION PANEL REMOVAL/INSTALLATION.)
4. Remove the screws.
5. Remove the ventilator grille.
6. Install in the reverse order of removal.

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Center

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Side wall (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
   (3) Center panel unit (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.)
   (4) Glove compartment (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
   (5) Decoration panel (passenger's side) (See 09-17-13 DECORATION PANEL REMOVAL/INSTALLATION.)
4. Remove the screws.
5. Remove the ventilator grille.
6. Install in the reverse order of removal.

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INTERIOR TRIM

SIDE WALL REMOVAL/INSTALLATION

id091700454400

Caution
- **Do not pull the side wall ends outward to remove the side wall. The side wall and clips could be damaged.**

Note
- The removal procedure is the same for the driver's side.

1. Remove the console. (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
2. Remove the screws.

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3. Detach hook A, tab B, D and clip C while pulling the side wall.
4. Remove the side wall.
5. Install in the reverse order of removal.

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SIDE PANEL REMOVAL/INSTALLATION

id091700454000

1. Pull the side panel outward and detach clips A.
2. Pull the side panel rearward and detach tab B from the dashboard.
3. Remove the side panel.
4. Install in the reverse order of removal.

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INTERIOR TRIM

FRONT SIDE TRIM REMOVAL/INSTALLATION

id091700459600

1. Remove the scuff plate. (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
2. Remove the seaming welt.
3. Remove the fastener.
4. Pull the front side trim toward you, then disengage clip A and pin B from the body.
5. Remove the front side trim.
6. Install in the reverse order of removal.

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A-PILLAR TRIM REMOVAL/INSTALLATION

id091700458700

1. Remove the female wedge. (See 09-16-12 CONVERTIBLE TOP DISASSEMBLY/ASSEMBLY.)
2. Pull the A-pillar trim, then disengage clip A, B and tab C.
3. Pull the A-pillar trim upward, then disengage tabs D from the body.
4. Remove the A-pillar trim.
5. Install in the reverse order of removal.

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TRUNK SIDE TRIM REMOVAL/INSTALLATION

id091700462300

1. Remove the trunk end trim. (See 09-17-12 TRUNK END TRIM REMOVAL/INSTALLATION.)
2. Remove the partition board. (See 09-17-23 PARTITION BOARD REMOVAL/INSTALLATION.)
3. Remove the fasteners.
4. Remove the trunk side trim.
5. Install in the reverse order of removal.

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INTERIOR TRIM

TRUNK END TRIM REMOVAL/INSTALLATION

id091700462400

1. Remove the fasteners.
2. Pull the trunk end trim upward, then disengage pin A.
3. Disconnect the trunk compartment light connector.
4. Disconnect the trunk rid cancel switch connector.
5. Remove the trunk end trim.
6. Install in the reverse order of removal.

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CONSOLE REMOVAL/INSTALLATION

id091700801200

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the selector lever knob (AT), shift lever knob (MT).
4. Remove in the order indicated in the table.

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1	Parking brake lever boot
2	Parking brake lever boot plate
3	Rubber mat
4	Rear cover
5	Cup holder guide

6	Box mat
7	Power window main switch connector
8	Indicator compartment connector (AT)
9	Console

5. Install in the reverse order of removal.

INTERIOR TRIM

CONSOLE DISASSEMBLY/ASSEMBLY

id091700801300

1. Disassemble in the order indicated in the table.

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1	Boot (MT)
2	Indicator compartment (AT)
3	Cup holder

4	Stopper
5	Cover lid

2. Assemble in the reverse order of disassembly.

CONSOLE PANEL REMOVAL/INSTALLATION

id091700718200

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the console. (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
4. Remove the side wall. (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
5. Remove the screws.
6. Pull the console panel outward and detach tabs A and pins B.
7. Disconnect the seat warmer switch connector. (Vehicles with seat warmer)
8. Disconnect the accessory socket connector.
9. Disconnect the auxiliary jack connector.
10. Remove the console panel.
11. Install in the reverse order of removal.

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DECORATION PANEL REMOVAL/INSTALLATION

id091700788200

Driver's Side

1. Pull the decoration panel outward and detach clips A.
2. Remove the decoration panel.
3. Install in the reverse order of removal.

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INTERIOR TRIM

Passenger's Side

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Side wall (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
   (3) Center panel unit (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.)
   (4) Glove compartment (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
4. Remove the three screws.
5. Pull the decoration panel outward and detach clips A and B.
6. Remove the decoration panel.
7. Install in the reverse order of removal.

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FRONT HEADER TRIM REMOVAL/INSTALLATION

id091700807300

Removal

Caution
- **Do not twist or drop the front header trim, otherwise the vanity mirror could be damaged.**

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the female wedge. (See 09-16-12 CONVERTIBLE TOP DISASSEMBLY/ASSEMBLY.)
4. Remove the map light. (See 09-18-32 MAP LIGHT REMOVAL/INSTALLATION.)
5. Remove the A-pillar trim. (See 09-17-11 A-PILLAR TRIM REMOVAL/INSTALLATION.)
6. Remove the screws.
7. Pull the front header trim toward you, then disengage the clips A and pin B from the body.
8. Remove the front header trim.

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Installation

Caution
- **Do not twist or drop the front header trim, otherwise the vanity mirror could be damaged.**
- **If the front header trim is installed with the sunvisor pulled up, the vanity mirror could be damaged. Always install the front header trim with the sunvisor pulled down.**

INTERIOR TRIM

1. Install the pin A and clip B.
2. Pull down the sunvisor on the right, then install pin C and clips D.
3. Pull down the sunvisor on the left, then install pin E and clips F.
4. Install the screw.
5. Install the A-pillar trim. (See 09-17-11 A-PILLAR TRIM REMOVAL/INSTALLATION.)
6. Install the map light. (See 09-18-32 MAP LIGHT REMOVAL/INSTALLATION.)
7. Install the female wedge. (See 09-16-12 CONVERTIBLE TOP DISASSEMBLY/ ASSEMBLY.)
8. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
9. Install the battery cover.

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SCUFF PLATE REMOVAL/INSTALLATION

id091700808100

Caution
- **Pull up the scuff plate from the vehicle rear and remove it.**

1. Pull the scuff plate upward while detaching tabs C, and then detach clips A and D, and pins B, E from the body, and remove the scuff plate.
2. Install in the reverse order of removal.

e5u917zw5023

TIRE HOUSE TRIM REMOVAL/INSTALLATION

id091700802700

1. Remove the quarter trim. (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
2. Remove the scuff plate. (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
3. Remove the fasteners.
4. Pull the tire house trim outward and detach clips A.
5. Remove the tire house trim.
6. Install in the reverse order of removal.

e5u917zw5024

INTERIOR TRIM

QUARTER TRIM REMOVAL/INSTALLATION

id091700807400

1. Remove the fastener.
2. Remove the tabs A.
3. Pull the quarter trim upward and clips B.
4. Remove the seat belt from the quarter trim through the slit in the quarter trim and remove the quarter trim.
5. Install in the reverse order of removal.

e5u917zw5025

DOOR TRIM REMOVAL/INSTALLATION

id091700807500

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Affix protective tape to the location in the figure.
4. Move the hook A in the direction of arrow shown in the figure using a tape-laped flathead screwdriver and detach it from the door trim.
5. Remove the assist handle cover.

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INTERIOR TRIM

6. Remove the cover.
7. Remove the screws.
8. Detach clips B from the door trim using fastener remover.
9. Pull the door trim upward and detach tabs C from the door.
10. Disconnect the tweeter connector.
11. Disconnect the power outer mirror switch connector. (driver's side)

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12. Remove the inner handle cover.
13. Remove the door trim.
14. Install in the reverse order of removal.

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DOOR TRIM DISASSEMBLY/ASSEMBLY

id091700807600

1. Disassemble in the order indicated in the table.

1	Handle pull
2	Armrest
3	Cup holder
4	Door trim

2. Assemble in the reverse order of disassembly.

amxzzw0000210

INTERIOR TRIM

AEROBOARD REMOVAL/INSTALLATION

1. Insert a tape-wrapped flathead screwdriver into the service hole.
2. Twist the flathead screwdriver as indicated by the arrow to remove the clips A and tab B.
3. Remove the aeroboard.
4. Install in the reverse order of removal.

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SEAT BACK BAR GARNISH REMOVAL/INSTALLATION

1. Pull the front seat back bar garnish outward and detach tabs A and pins B.
2. Remove the front seat back bar garnish.

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3. Remove the screws.
4. Pull the rear seat back bar garnish upward and detach clips A.
5. Remove the rear seat back bar garnish.
6. Install in the reverse order of removal.

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INTERIOR TRIM

BACK TRIM REMOVAL/INSTALLATION

id091700807900

1. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Front seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
2. Pull the open hook lever outward and remove it while pinching the tabs as shown in the figure.
3. Remove the fasteners.

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4. Pull the back trim outward and detach clips A and B.
5. Remove the back trim.
6. Install in the reverse order of removal.

INTERIOR TRIM

SEAT BACK BAR LOWER GARNISH REMOVAL/INSTALLATION

id091700807800

Except Power Retractable Hardtop

1. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
2. Remove the fasteners.
3. Slide the seat back bar lower garnish to the vehicle rear and detach clips A and pin B.
4. Remove the seat back bar lower garnish.
5. Install in the reverse order of removal.

e5u917zw5030

Power Retractable hardtop

1. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (8) Roof hook (See 09-16-41 ROOF HOOK REMOVAL/INSTALLATION.)
2. Remove the clip A.
3. Remove the roof stopper.

amxzzw0000141

4. Remove the fasteners.
5. Slide the seat back bar lower garnish to the vehicle rear and detach clips B and pin C.
6. Remove the seat back bar lower garnish.
7. Install in the reverse order of removal.

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INTERIOR TRIM

REAR PACKAGE TRIM REMOVAL/INSTALLATION

id091700802800

1. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Front seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (8) Seat belt set plate (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
   (9) Seat back crossmember assembly (See 09-10-13 SEAT BACK CROSSMEMBER ASSEMBLY REMOVAL/INSTALLATION.)
   (10) Rear side trim (See 09-17-21 REAR SIDE TRIM REMOVAL/INSTALLATION.)
2. Remove the fasteners.
3. Remove the pins A and B.
4. Remove the rear package trim.
5. Install in the reverse order of removal.

e5u917zw5031

REAR SIDE TRIM REMOVAL/INSTALLATION

id091700806000

Except Power Retractable Hardtop

1. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Front seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (8) Seat belt set plate (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
   (9) Seat back crossmember assembly (See 09-10-13 SEAT BACK CROSSMEMBER ASSEMBLY REMOVAL/INSTALLATION.)
2. Remove the fasteners.
3. Pull the rear side trim outward and detach pin A, B and tab C.
4. Remove the rear side trim.
5. Install in the reverse order of removal.

e5u917zw5032

INTERIOR TRIM

Power Retractable Hardtop

1. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Front seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
2. Disconnect the power retractable hardtop drain hose. (See 09-16-59 POWER RETRACTABLE HARDTOP DRAIN HOSE REMOVAL/INSTALLATION.)
3. Remove the fasteners.
4. Remove the clip A and pin.
5. Remove the rear side trim.
6. Install the reverse order of removal.

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SIDE SHELF REMOVAL/INSTALLATION

id091700808200

Except Power Retractable Hardtop

1. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Front seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (8) Seat belt set plate (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
   (9) Seat back crossmember assembly (See 09-10-13 SEAT BACK CROSSMEMBER ASSEMBLY REMOVAL/INSTALLATION.)
   (10) Rear side trim (See 09-17-21 REAR SIDE TRIM REMOVAL/INSTALLATION.)
   (11) Rear package trim (See 09-17-21 REAR PACKAGE TRIM REMOVAL/INSTALLATION.)
2. Remove the fasteners.
3. Pull the side shelf outward and detach clip A.
4. Remove the side shelf.
5. Install in the reverse order of removal.

e5u917zw5033

INTERIOR TRIM

Power Retractable Hardtop

1. Fully open the deck panel.
2. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Front seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (8) Rear side trim (See 09-17-21 REAR SIDE TRIM REMOVAL/INSTALLATION.)
3. Remove the fasteners.
4. Pull the side shelf outward and detach clip A.
5. Remove the side shelf.
6. Install in the reverse order of removal.

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PARTITION BOARD REMOVAL/INSTALLATION

id091700803300

1. Remove the fasteners.
2. Remove the partition board.
3. Install in the reverse order of removal.

e5u917zw5036

TRUNK MAT REMOVAL/INSTALLATION

id091700808700

1. Remove the fasteners.
2. Remove the trunk mat.
3. Remove the seal fasteners.
4. Install in the reverse order of removal.

e5u917zw5037

INTERIOR TRIM

FLOOR COVERING REMOVAL/INSTALLATION

id091700803000

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the following parts:
   (1) Seat (See 09-13-4 SEAT REMOVAL/INSTALLATION.)
   (2) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (3) Side wall (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
   (4) Console panel (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (5) Foot rest
   (6) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (7) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (8) Front side trim (See 09-17-11 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (9) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (10)Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (11)Front seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (12)Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
4. Cut away the floor covering as shown in the figure.

Note
- The cut part needs to match up when installing the floor covering.

e5u917zw5042

5. Remove the fasteners A and B.
6. Remove the floor covering.
7. Install in the reverse order of removal.

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Rear Floor covering (Power Retractable Hardtop)

1. Fully open the deck panel.
2. Remove the side shelf. (See 09-17-22 SIDE SHELF REMOVAL/INSTALLATION.)
3. Remove the stoppers.
4. Remove the fasteners.
5. Remove the rear floor covering.
6. Install in the reverse order of removal.

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LIGHTING SYSTEMS

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DISCHARGE HEADLIGHT SERVICE WARNINGS

id091800463400

Discharge Headlight Service Warnings

- **To prevent electrical shock when replacing the discharge headlight, dry hands thoroughly, and carry out work in an area out of rain.**
- **When the light switch is on, approx. 25,000 V of high voltage passes through the discharge headlight. Because of the danger of electrical shock, do not insert fingers or a tester.**
- **When the headlights are on, high voltage flows around the socket and discharge headlight. When turning on the discharge headlights while working, always leave the headlights in the vehicle-installed condition to prevent electrical shock.**

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LIGHTING SYSTEMS

Discharge Headlight Control Module Service Warnings

- **Because of the danger of electrical shock, when inspecting with a tester, do not inspect the discharge headlight control module as a single module or disassemble it.**

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Discharge Headlight Control Module Reuse

- **If the discharge headlight control module is dented or damaged in any way, replace the unit with a new one to prevent electrical shock and improper operation.**
- **Although the module may temporarily operate normally even though it has received an impact, it is possible that the interior may have been damaged. When reusing the module, inspect the following items regarding discharge headlight illumination to verify that there are no malfunctions.**
  - **Verify that the discharge headlights illuminate normally by testing them several times under cold illumination (headlights off for approx. 10 min or more and then turned on) and hot illumination (headlights on for approx. 15 min or more, turned off for approx. 1 min, and then turned on again) conditions.**
  - **Inspect the headlight illumination in the period from directly after cold illumination until they are uniformly illuminated (approx. 5 min) and verify that there is no flickering or inconsistent brightness.**
  - **Turn on the headlights for approx. 30 min with normal condition discharge headlights and verify that there is no brightness difference between the right and left, and that illumination is consistent.**

LIGHTING SYSTEMS

FRONT COMBINATION LIGHT REMOVAL/INSTALLATION

id091800464400

Warning

- **Incorrect servicing of the discharge headlights could result in electrical shock. Before servicing the discharge headlights, always refer to the discharge headlight service warnings. (See 09-18-3 DISCHARGE HEADLIGHT SERVICE WARNINGS.)**

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the front bumper. (See 09-10-7 FRONT BUMPER REMOVAL/INSTALLATION.)
4. Remove the bolt and fastener shown in the figure.

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5. Remove the bolt shown in the figure.

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LIGHTING SYSTEMS

6. Remove the bolt shown in the figure.

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7. Disconnect the connectors shown in the figure.
8. Remove the front combination light.
9. Install in the reverse order of removal.
10. Adjust the headlight aiming. (See 09-18-6 HEADLIGHT AIMING.)

amxzzw0000101

HEADLIGHT AIMING

id091800464000

1. Point the headlight beams to a wall and verify that the headlight beams are as shown in the figure.

amxzzw0000103

2. Make a screen as shown in the figure using double-weight, white paper.
3. Adjust the tire pressure to the specification.
4. Position the unloaded vehicle on a flat, level surface.
5. Seat one person in the driver's seat.

amxzzw0000103

LIGHTING SYSTEMS

6. Line up the vehicle with the wall so that the center of the headlight is **3 m {9.8 ft}** away from the wall.

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7. Measure the height at the center of the headlight.

Note
- Since the height of the vehicle varies depending on the vehicle situation, measure the height of the center of the headlight using the actual vehicle.

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LIGHTING SYSTEMS

8. Align the center of the headlight with the center of the screen.

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9. Block the light of the other headlight using a partition.
10. Start the engine and charge the battery.
11. Turn on the headlight low beams.
12. Set the headlight leveling switch to the 0 position. (vehicles with headlight leveling switch)
13. Verify that the elbow point of the headlight is in the position indicated on the screen.
    - If the elbow point is not in the position indicated on the screen, perform the following adjustment:
      1. Insert a phillips driver into the position shown in the figure and adjust the headlights.

amxzzw0000103

LIGHTING SYSTEMS

HEADLIGHT BULB REMOVAL/INSTALLATION

id091800464100

Low-beam

Halogen type

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the fasteners, then slightly bend back the mudguard.
4. Disconnect the connector.

Caution

- **A halogen bulb generates extremely high heat when it is illuminated. If the surface of the bulb is soiled, excessive heat will build up and the life of the bulb will be shortened. When replacing the bulb, hold the metal flange, not the glass.**

amxzzw0000188

5. Remove the cover.
6. Remove the socket, then remove the headlight bulb.
7. Install in the reverse order of removal.

Discharge type

Warning

- **Incorrect servicing of the discharge headlights could result in electrical shock. Before servicing the discharge headlights, always refer to the discharge headlight service warnings. (See 09-18-3 DISCHARGE HEADLIGHT SERVICE WARNINGS.)**

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the fasteners, then slightly bend back the mudguard.
4. Remove the cover.

Caution

- **The discharge headlight generates extremely high heat when it is illuminated. If the surface of the discharge headlight is soiled, excessive heat will build up and the life of the discharge headlight will be shortened. When replacing the bulb, hold the metal flange, not the glass.**

amxzzw0000188

5. Remove the discharge connector. (See 09-18-9 Discharge connector removal note.)
6. Remove the discharge headlight (See 09-18-10 Discharge headlight removal note.)
7. Install in the reverse order of removal.

Discharge connector removal note

1. Rotate the discharge connector in the direction of the arrow shown in the figure to remove it.

amxzzw0000188

LIGHTING SYSTEMS

Discharge headlight removal note

1. Press sections A to release the bulb retaining wire and remove the discharge headlight.

amxzzw0000104

High-beam

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the connector.

Caution

- **A halogen bulb generates extremely high heat when it is illuminated. If the surface of the bulb is soiled, excessive heat will build up and the life of the bulb will be shortened. When replacing the bulb, hold the metal flange, not the glass.**

4. Remove the socket, then remove the headlight bulb.
5. Install in the reverse order of removal.

amxzzw0000103

DISCHARGE HEADLIGHT CONTROL MODULE REMOVAL/INSTALLATION

id091800464500

Warning

- **Incorrect servicing of the discharge headlights could result in electrical shock. Before servicing the discharge headlights, always refer to the discharge headlight service warnings. (See 09-18-3 DISCHARGE HEADLIGHT SERVICE WARNINGS.)**

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the front bumper. (See 09-10-7 FRONT BUMPER REMOVAL/INSTALLATION.)
4. Remove the front combination light. (See 09-18-5 FRONT COMBINATION LIGHT REMOVAL/INSTALLATION.)
5. Remove screws.
6. Disconnect the discharge headlight control module connector. (See 09-18-11 Discharge headlight control module connector removal note.)
7. Remove the discharge headlight control module.
8. Install in the reverse order of removal.

amxzzw0000101

LIGHTING SYSTEMS

Discharge headlight control module connector removal note

1. Remove the screw shown in the figure.
2. Disconnect the discharge headlight control module connector.

amxzzw0000101

DISCHARGE HEADLIGHT SYSTEM INSPECTION

id091800805400

Discharge headlight inoperative

Warning

- **Incorrect servicing of the discharge headlights could result in electrical shock. Before servicing the discharge headlights, always refer to the discharge headlight service warnings. (See 09-18-3 DISCHARGE HEADLIGHT SERVICE WARNINGS.)**

Terminal layout

amxzzw0000108

LIGHTING SYSTEMS

Inspection procedure

STEP	INSPECTION		ACTION
1	**INSPECT POWER SUPPLY CIRCUIT OF DISCHARGE HEADLIGHT CONTROL MODULE** • Disconnect the discharge headlight control module connector. • Turn the headlight switch to the HEADLIGHT (LO) position. • Measure the voltage at discharge headlight control module terminal C (wiring harness-side). • Is the voltage **approx. 12 V**?	Yes	Go to Step 6.
		No	Go to the next step.
2	**INSPECT FUSE** • Turn the headlight switch to the OFF position. • Remove the HEAD LOW R 15 A fuse (RH) or HEAD LOW L 15 A fuse (LH). • Inspect the fuses. • Are the fuses normal?	Yes	Go to the next step.
		No	Replace the fuse.
3	**INSPECT HEADLIGHT RELAY** • Remove the headlight relay. (See 09-21-5 RELAY LOCATION.) • Inspect the headlight relay. (See 09-21-6 RELAY INSPECTION.) • Is the headlight relay normal?	Yes	Go to the next step.
		No	Replace the headlight relay. (See 09-21-5 RELAY LOCATION.)
4	**INSPECT LIGHT SWITCH** • Inspect the light switch. (See 09-18-23 LIGHT SWITCH INSPECTION.) • Is the light switch normal?	Yes	Go to the next step.
		No	Replace the light switch. (See 09-18-23 LIGHT SWITCH REMOVAL/INSTALLATION.)
5	**INSPECT WIRING HARNESS BETWEEN BATTERY AND DISCHARGE HEADLIGHT CONTROL MODULE** • Remove the battery cover. • Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/ INSTALLATION [L8, LF].) • Inspect for continuity between the following terminals: — Battery (positive terminal) and headlight relay (main fuse block terminal A) — Headlight relay terminal 2C and HEAD LOW R 15 A fuse (RH) terminal U — Headlight relay terminal 2C and HEAD LOW L 15 A fuse (LH) terminal U — HEAD LOW R 15 A fuse (RH) terminal T and discharge headlight control module terminal C — HEAD LOW L 15 A fuse (LH) terminal R and discharge headlight control module terminal C • Are the wiring harnesses normal?	Yes	Go to the next step.
		No	Replace the related wiring harness.
6	**INSPECT WIRING HARNESS BETWEEN DISCHARGE HEADLIGHT CONTROL MODULE AND GROUND** • Inspect wiring harness between discharge headlight control module terminal F and ground for following: — Short to power supply — Open circuit • Inspect the headlight relay. (See 09-21-6 RELAY INSPECTION.) • Is the wiring harness normal?	Yes	Go to the next step.
		No	Replace the related wiring harness.

LIGHTING SYSTEMS

STEP	INSPECTION		ACTION
7	**VERIFY WHETHER MALFUNCTION IS IN DISCHARGE HEADLIGHT BULB OR DISCHARGE HEADLIGHT CONTROL UNIT** • Install any other discharge headlight (previously verified as illumination normally). (See 09-18-9 HEADLIGHT BULB REMOVAL/INSTALLATION.) • Connect the discharge headlight control module connector. • Turn the headlight switch to the HEADLIGHT (LO) position. • Does the headlight (low-beam) illuminate?	Yes	Replace the discharge headlight. (See 09-18-9 HEADLIGHT BULB REMOVAL/INSTALLATION.)
		No	Replace the discharge headlight control module. (See 09-18-10 DISCHARGE HEADLIGHT CONTROL MODULE REMOVAL/INSTALLATION.)

PARKING LIGHT BULB REMOVAL/INSTALLATION

id091800464900

LH

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the clip shown in the position in the figure.
4. Set the wiring harness out of the way to ensure an operation space for the parking light removal.

amxzzw0000146

5. Remove the socket, then remove the parking light bulb.
6. Install in the reverse order of removal.

amxzzw0000202

RH

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the nuts shown in the position in the figure.

amxzzw0000188

LIGHTING SYSTEMS

4. Set the coolant reserve tank out of the way to ensure an operation space for the parking light removal.

amxzzw0000146

5. Remove the socket, then remove the parking light bulb.
6. Install in the reverse order of removal.

amxzzw0000203

FRONT TURN LIGHT BULB REMOVAL/INSTALLATION

id091800464600

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the fasteners, then slightly bend back the mudguard.
4. Disconnect the connector.
5. Remove the socket, then remove the front turn light bulb.
6. Install in the reverse order of removal.

amxzzw0000104

LIGHTING SYSTEMS

FRONT FOG LIGHT REMOVAL/INSTALLATION

id091800468500

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the fasteners, then slightly bent back the mudguard.
4. Disconnect the front fog light connector.
5. Remove the screw and bolt, then remove the front fog light.
6. Install in the reverse order of removal.
7. Adjust the front fog light aiming. (See 09-18-15 FRONT FOG LIGHT AIMING.)

amxzzw0000189

FRONT FOG LIGHT BULB REMOVAL/INSTALLATION

id091800468600

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the fasteners, then slightly bend back the mudguard.
4. Disconnect the front fog light connector.

Caution

- **A halogen bulb generates extremely high heat when it is illuminated. If the surface of the bulb is soiled, excessive heat will build up and the life of the bulb will be shortened. When handling the bulb, hold the flange, not the glass.**

5. Remove the front fog light bulb.
6. Install in the reverse order of removal.

amxzzw0000104

FRONT FOG LIGHT AIMING

id091800468700

1. Make a screen as shown in the figure using double-weight, white paper.
2. Adjust the tire pressure to the specification.
3. Position the unloaded vehicle on a flat, level surface.
4. Seat one person in the driver's seat.

amxzzw0000104

LIGHTING SYSTEMS

5. Line up the vehicle with the wall so that the center of the front fog light is **3 m {9.8 ft}** away from the wall.

amxzzw0000105

6. Measure the height at the center of the front fog light.

Note
- Since the height of the vehicle varies depending on the vehicle situation, measure the height of the center of the front fog light using the actual vehicle.

amxzzw0000105

LIGHTING SYSTEMS

7. Align the center of the front fog light with the center of the screen.

amxzzw0000105

8. Block the light of the other front fog light using a partition.
9. Start the engine so that the battery remains charged.
10. Turn the front fog lights on.
11. Verify that the brightness border line of the front fog light is at the position indicated on the adjustment screen.
    - If the brightness border line is not at the position indicated on the adjustment screen, perform the following adjustment.
      1. Remove the adjustment bolt and cut the front fog light hole cover at the position shown in the figure.

amxzzw0000214

LIGHTING SYSTEMS

2. Loosen the screw.
3. Move the front fog light in the direction of the arrow shown in the figure to adjust the brightness border line to the position indicated on the adjustment screen.
4. Install the adjustment bolt and tighten the screw.

amxzzw0000232

SIDE TURN LIGHT REMOVAL/INSTALLATION

id091800811500

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Move the side turn light in the direction of the arrow (1) and detach the tab.
4. Pull area A of the side turn light in the direction of the arrow (2) and remove the front side turn light.

amxzzw0000102

5. Disconnect the side turn light connector.
6. Remove the side turn light
7. Remove the socket.
8. Remove the side turn light bulb.
9. Install in the reverse order of removal.

amxzzw0000102

LIGHTING SYSTEMS

REAR COMBINATION LIGHT REMOVAL/INSTALLATION

id091800465500

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the trunk end trim. (See 09-17-12 TRUNK END TRIM REMOVAL/INSTALLATION.)
4. Remove the trunk side trim. (See 09-17-11 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
5. Remove in the order indicated in the table.

1	Nut
2	Connector
3	Rear combination light
4	Socket
5	Brake light/taillight bulb
6	Rear turn light bulb
7	Back-up light bulb (passenger-side only) Rear fog light bulb (driver-side only) (with rear fog light)

amxzzw0000105

6. Install in the reverse order of removal.

HIGH-MOUNT BRAKE LIGHT REMOVAL/INSTALLATION

id091800802000

Except Power Retractable Hardtop

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the partition board. (See 09-17-23 PARTITION BOARD REMOVAL/INSTALLATION.)
4. Disconnect the high-mount brake light connector.
5. Press the tabs and remove the clips.
6. Install in the reverse order of removal.

amxzzw0000109

Power Retractable Hardtop

1. Fully open the deck panel.
2. Partially peel back the seal cover.
3. Disconnect the high-mount brake light connector.
4. Remove the wiring harness and connector of the high-mount brake light from the deck panel.

amxzzw0000214

LIGHTING SYSTEMS

5. Remove the nuts.
6. Remove the high-mount brake light.
7. Install in the reverse order of removal.

amxzzw0000202

LICENSE PLATE LIGHT REMOVAL/INSTALLATION

id091800465800

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Move the license plate light in the direction of the arrow (1) and detach the tab.
4. Pull area A of the license plate light in the direction of the arrow (2) and remove the license plate light.

amxzzw0000102

5. Disconnect the connector.
6. Remove the socket by rotating it in the direction of the arrow shown in the figure.

amxzzw0000102

LIGHTING SYSTEMS

7. Remove the license plate light bulb.
8. Install in the reverse order of removal.

amxzzw0000214

BACK-UP LIGHT SWITCH INSPECTION

id091800463900

1. Verify that the continuity between the back-up light switch terminals is as indicated in the table.
   - If not as indicated in the table, replace the back-up light switch.

○—○ : Continuity

Shift lever position	Terminal	
	A	B
Reverse	○	○
Other		

amxzzw00001057

amxzzw0000105

COMBINATION SWITCH REMOVAL/INSTALLATION

id091800469200

Warning

- **For vehicles with DSC, if the negative battery cable or the steering angle sensor connector or ROOM 15 A fuse is disconnected, the stored initial position of the steering angle sensor will be cleared and the DSC will not operate properly, making the vehicle unsafe to drive. Perform the steering angle sensor initialization procedure after connecting the negative battery cable.**

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the following parts:
   (1) Driver-side air bag module (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
   (2) Steering wheel (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (3) Column cover (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.)
   (4) Clock spring (See 08-10-10 CLOCK SPRING REMOVAL/INSTALLATION.)

LIGHTING SYSTEMS

4. Disconnect the connector.
5. Disconnect the steering angle sensor connector. (Vehicles with DSC)
6. Remove the screws and then remove the combination switch.
7. Install in the reverse order of removal.
8. Perform the steering angle sensor initialization procedure. (Vehicles with DSC) (See 04-15-15 STEERING ANGLE SENSOR INITIALIZATION PROCEDURE.)

amxzzw0000105

COMBINATION SWITCH DISASSEMBLY/ASSEMBLY

id091800469300

Caution

- **For vehicles with DSC: If the disc on the combination switch is deformed or has foreign material adhering to it, performance of the steering angle sensor may be reduced, causing abnormal operation. When handling the combination switch, be careful not to deform the disc and make sure there is no foreign material on it.**

1. Disassemble in the order indicated in the table.

1	Screw
2	Wiper and washer switch (Light switch)
3	Light switch (Wiper and washer switch)
4	Body

2. Assemble in the reverse order of disassembly.

amxzzw0000105

LIGHTING SYSTEMS

LIGHT SWITCH REMOVAL/INSTALLATION

id091800469700

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.)
4. Disconnect the connector.
5. Remove the screws and then remove the light switch.
6. Install in the reverse order of removal.

amxzzw0000106

LIGHT SWITCH INSPECTION

id091800469800

Left Side Of The Steering Column

1. Verify that the continuity between the light switch terminals is as indicated in the table.

Headlight Switch

- If not as indicated in the table, replace the light switch.

○—○ : Continuity

Switch position			Terminal				
Light	Dimmer	Flash-to-pass	J	L	P	O	Q
OFF	-	OFF					
		ON			○	○	○
TNS	-	OFF		○	○		
		ON		○	○	○	○
Headlight	LO	OFF	○	○	○		
		ON	○	○	○	○	○
	HI	-	○	○	○	○	

amxzzw00001062

amxzzw0000106

LIGHTING SYSTEMS

Turn Switch

○—○ : Continuity

Switch position	Terminal		
	A	C	E
Left	○	○	
OFF			
Right		○	○

amxzzw00001074

amxzzw0000107

Right Side Of The Steering Column

1. Verify that the continuity between the light switch terminals is as indicated in the table.

Headlight Switch

- If not as indicated in the table, replace the light switch.

○—○ : Continuity

Switch position			Terminal				
Light	Dimmer	Flash-to-pass	L	N	B	C	A
OFF	-	OFF					
		ON			○	○	○
TNS	-	OFF		○	○		
		ON		○	○	○	○
Headlight	LO	OFF	○	○	○		
		ON	○	○	○	○	○
	HI	-	○	○	○	○	

amxzzw00001064

amxzzw0000106

LIGHTING SYSTEMS

Turn Switch

○—○ : Continuity

Switch position	Terminal		
	M	O	Q
Left	○	○	
OFF			
Right		○	○

amxzzw00001066

amxzzw0000106

FRONT FOG LIGHT SWITCH INSPECTION

id091800469900

Left Side Of The Steering Column (Vehicle Without Rear Fog Light)

1. Verify that the continuity between the light switch terminals is as indicated in the table.
   - If not as indicated in the table, replace the light switch.

○—○ : Continuity

Switch position		Terminal	
Light	Front fog light switch	D	P
OFF	OFF		
	ON	○	○
TNS	ON	○	○
Head light	ON	○	○

amxzzw00001068

amxzzw0000106

Left Side Of The Steering Column (Vehicle With Rear Fog Light)

1. Verify that the continuity between the light switch terminals is as indicated in the table.
   - If not as indicated in the table, replace the light switch.

○—○ : Continuity

Switch position			Terminal		
Light	Front fog light switch	Rear fog light switch	P	D	F
OFF	OFF	—			
	ON	—	○	○	
	ON	ON	○	○	○
TNS	ON	OFF	○	○	
	ON	ON	○	○	○
Head light	ON	OFF	○	○	
	ON	ON	○	○	○

amxzzw00001070

amxzzw0000106

LIGHTING SYSTEMS

Right Side Of The Steering Column

1. Verify that the continuity between the light switch terminals is as indicated in the table.
   - If not as indicated in the table, replace the light switch.

○—○ : Continuity

Switch position		Terminal	
Light	Front fog light switch	P	B
OFF	OFF		
	ON	○—○	
TNS	ON	○—○	
Head light	ON	○—○	

amxzzw00001072

amxzzw0000107

REAR FOG LIGHT SWITCH INSPECTION

id091800804700

1. Verify that the continuity between the light switch terminals is as indicated in the table.
   - If not as indicated in the table, replace the light switch.

○—○ : Continuity

Switch position	Terminal	
	F	P
OFF		
ON	○—○	

amxzzw00001085

amxzzw0000108

HAZARD WARNING SWITCH REMOVAL/INSTALLATION

id091800470100

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the side wall. (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
4. Remove the center panel unit. (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.)
5. Remove the globe compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
6. Remove the decoration panel (passenger's side). (See 09-17-13 DECORATION PANEL REMOVAL/INSTALLATION.)
7. Remove in the order indicated in the table.

amxzzw0000109

1	Screw
2	Hazard warning switch connector
3	Hazard warning switch

8. Install in the reverse order of removal.

LIGHTING SYSTEMS

HAZARD WARNING SWITCH INSPECTION

id091800470000

1. Verify that the continuity between the hazard warning switch terminals is as indicated in the table.
   - If not as indicated in the table, replace the hazard warning switch.

○—○ : Continuity

Switch position	Terminal	
	J	A
OFF		
ON	○	○

amxzzw00001076

amxzzw0000107

HEADLIGHT LEVELING SWITCH REMOVAL/INSTALLATION

id091800464200

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the headlight leveling switch. (See 09-18-27 Headlight Leveling Switch Removal Note.)
4. Disconnect the connector.
5. Install in the reverse order of removal.

amxzzw0000109

Headlight Leveling Switch Removal Note

1. Reach into the dashboard through the underside of the lower panel and, while pushing on the tabs of the headlight leveling switch, pull it outward.

LIGHTING SYSTEMS

HEADLIGHT LEVELING SWITCH INSPECTION

id091800464300

1. Verify that continuity between the headlight leveling switch terminals is as indicated in the table.
   - If not as indicated in the table, replace the headlight leveling switch.

amxzzw0000191

: Resistance : Bulb

Switch position	Terminal				
	B	D	H	J	F
0			R1		R2
1			R3		R4
2			R5		R6
3			R7		R8

R1 : 249 ohms R2 : 2237 ohms R3 : 641 ohms
R4 : 1845 ohms R5 : 856 ohms R6 : 1630 ohms
R7 : 1050 ohms R8 : 1430 ohms

amxzzw00001880

AUTO LEVELING CONTROL MODULE REMOVAL/INSTALLATION

id091800473200

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
4. Disconnect the connector.
5. Remove the bolt and then remove the auto leveling control module.
6. Install in the reverse order of removal.

amxzzw0000109

LIGHTING SYSTEMS

FRONT AUTO LEVELING SENSOR REMOVAL/INSTALLATION

id091800719500

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Jack up the vehicle and remove the wheel and tire.
4. Disconnect the connector.
5. Remove the bolts and then remove the front auto leveling sensor.
6. Install in the reverse order of removal.

amxzzw0000107

FRONT AUTO LEVELING SENSOR INSPECTION

id091800474000

1. Connect three 1.5 V dry cell batteries in a series.
2. Connect the positive pole of the battery to front auto leveling sensor terminal A, and the negative pole to terminal D, then apply voltage of 4.5 V between terminals A and D.
3. Connect the tester as shown in the figure.
4. Measure the voltage while the link is moved up and down slowly.
   - If not as indicated in the table, replace the front auto leveling sensor.

Link angle (vehicle height)	Voltage (V)
+28° (High)	3.4
0°	2.3
-26° (Low)	1.2

amxzzw0000107

LIGHTING SYSTEMS

REAR AUTO LEVELING SENSOR REMOVAL/INSTALLATION

id091800719600

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Jack up the vehicle and remove the wheel and tire.
4. Disconnect the connector.
5. Remove the bolts and nut, then remove the rear auto leveling sensor.
6. Install in the reverse order of removal.

amxzzw0000109

REAR AUTO LEVELING SENSOR INSPECTION

id091800474100

1. Connect three 1.5 V dry cell batteries in a series.
2. Connect the positive pole of the battery to rear auto leveling sensor terminal A, and the negative pole to terminal B, then apply voltage of 4.5 V between terminals A and B.
3. Connect the tester as shown in the figure.
4. Measure the voltage while the link is moved up and down slowly.
   - If not as indicated in the table, replace the rear auto leveling sensor.

Link angle (vehicle height)	Voltage (V)
+37° (High)	3.8
0°	2.3
-26° (Low)	1.2

amxzzw0000107

LIGHTING SYSTEMS

FLASHER CONTROL MODULE REMOVAL/INSTALLATION

id091800850900

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the connector.
4. Remove the screw and then remove the flasher control module.
5. Install in the reverse order of removal.

amxzzw0000109

FLASHER CONTROL MODULE INSPECTION

id091800851000

1. Remove the flasher control module with the connector connected.(See 09-18-31 FLASHER CONTROL MODULE REMOVAL/INSTALLATION.)
2. Measure the voltage at each terminal is as indicated in the Terminal Voltage Tables.
3. Verify that continuity at terminal F is as indicated in the Terminal Voltage Table (Reference).
   - If the voltage or continuity is not as specified in the Terminal Voltage Table, inspect the parts under “Inspection item (s)”.
     — If the system does not work properly even though the parts or related wiring harnesses do not have any malfunction, replace the flasher control module.

Terminal Voltage Table (Reference)

amxzzw0000109

Terminal	Signal name	Connected to	Measured condition		Voltage (V)/ Continuity	Inspection item(s)
A	Power supply	HAZARD 10 A fuse	Under any condition		B+	• HAZARD 10 A fuse • Related wiring harnesses
D	Flasher control module output	Turn light (LH)	Turn light switch (LH) is on.	Turn light (LH) flashes.	Alternates between 1.0 or less and B+	• Turn light (LH) • Related wiring harnesses
			Hazard warning switch is on.			
			Except above		1.0 or less	
F	GND	Body ground	Under any condition		1.0 or less	• GND

LIGHTING SYSTEMS

Terminal	Signal name	Connected to	Measured condition		Voltage (V)/ Continuity	Inspection item(s)
G	Flasher control module output	Turn light (RH)	Turn light switch (RH) is on.	Turn light (RH) flashes.	Alternates between 1.0 or less and B+	• Turn light (RH) • Related wiring harnesses
			Hazard warning switch is on.			
			Except above		1.0 or less	
H	Hazard warning switch input	Hazard warning switch	Hazard warning switch is on.		1.0 or less	• Hazard warning switch (See09-18-27 HAZARD WARNING SWITCH INSPECTION.) • Related wiring harnesses
			Hazard warning switch is off.		B+	
I	Turn switch (RH) input	Turn switch	Turn the ignition switch to the ON position.	Turn switch (RH) is on.	B+	• Turn switch (See09-18-23 LIGHT SWITCH INSPECTION.) • Related wiring harnesses
			Except above		1.0 or less	
J	Turn switch (LH) input	Turn switch	Turn the ignition switch to the ON position.	Turn switch (LH) is on.	B+	• Turn switch (See09-18-23 LIGHT SWITCH INSPECTION.) • Related wiring harnesses
			Except above		1.0 or less	

MAP LIGHT REMOVAL/INSTALLATION

id091800801200

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Insert a tape-wrapped fastener remover into the service hole and pry with the fastener remover in the direction shown by the arrow to remove the lens.

amxzzw0000214

4. Remove the map light bulb
5. Remove the map light. (See 09-18-33 Map Light Removal Note.)
6. Disconnect the connector.
7. Install in the reverse order of removal.

amxzzw0000102

LIGHTING SYSTEMS

Map Light Removal Note

1. Insert a tape-wrapped fastener remover into the gap between the front header trim and the map light.
2. Press the tab, and remove the map light.

amxzzw0000102

MAP LIGHT INSPECTION

id091800801300

1. Verify that the continuity between the map light terminals is as indicated in the table.
   - If not as indicated in the table, replace the map light.

: Bulb

Switch position	Terminal		
	A	C	B
ON	○—⊗—○		
DOOR		○—⊗—○	
OFF			

amxzzw00001081

amxzzw0000108

TRUNK COMPARTMENT LIGHT BULB REMOVAL/INSTALLATION

id091800806200

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Slide the trunk component light in the direction of the arrow (1) in the figure, then pull it in the direction of the arrow (2).
4. Remove the trunk compartment light.
5. Disconnect the trunk compartment light connector.
6. Remove the trunk compartment light bulb.
7. Install in the reverse order of removal.

amxzzw0000108

LIGHTING SYSTEMS

TRUNK COMPARTMENT LIGHT INSPECTION

id091800850800

1. Verify that the continuity between the trunk compartment light terminals is as indicated in the table.
   - If not as indicated in the table, replace the trunk compartment light.

: Bulb

Switch position	Terminal	
	A	B
ON		
OFF		

amxzzw00001102

amxzzw0000110

IGNITION KEY ILLUMINATION BULB REMOVAL/INSTALLATION

id091800802400

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the upper column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.)
4. Remove the ignition key illumination bulb.
5. Install in the reverse order of removal.

amxzzw0000190

DOOR SWITCH REMOVAL/INSTALLATION

id091800803400

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the screw.
4. Disconnect the connector and remove the door switch.
5. Install in the reverse order of removal.

amxzzw0000108

DOOR SWITCH INSPECTION

id091800803500

1. Verify that the continuity between door switch terminal and the body ground is as indicated in the table.
   - If not as indicated in the table, replace the door switch.

: Continuity

Switch position	Terminal	
	A	Body ground
Door switch pressed		
Door switch released		

amxzzw00001092

amxzzw0000109

09-19 WIPER/WASHER SYSTEM

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WIPER/WASHER SYSTEM

WIPER/WASHER SYSTEM LOCATION INDEX

id091900800100

amxzzw0000118

1	Washer tank (See 09-19-5 WASHER TANK REMOVAL/INSTALLATION.)
2	Washer motor (See 09-19-7 WASHER MOTOR REMOVAL/INSTALLATION.) (See 09-19-7 WASHER MOTOR INSPECTION.)

3	Headlight cleaner motor (See 09-19-9 HEADLIGHT CLEANER MOTOR REMOVAL/INSTALLATION.) (See 09-19-9 HEADLIGHT CLEANER MOTOR INSPECTION.)
4	Washer hose (See 09-19-8 WASHER HOSE REMOVAL/INSTALLATION.)

WIPER/WASHER SYSTEM

5	Wiper arm and blade (See 09-19-3 WIPER ARM AND BLADE REMOVAL/INSTALLATION.) (See 09-19-4 WIPER ARM AND BLADE ADJUSTMENT.)
6	Wiper motor (See 09-19-6 WIPER MOTOR REMOVAL/INSTALLATION.) (See 09-19-5 WIPER MOTOR DISASSEMBLY/ASSEMBLY.) (See 09-19-4 WIPER MOTOR INSPECTION.)
7	Washer nozzle (See 09-19-7 WASHER NOZZLE REMOVAL/INSTALLATION.)
8	Headlight cleaner relay (See 09-19-11 HEADLIGHT CLEANER RELAY REMOVAL/INSTALLATION.) (See 09-19-12 HEADLIGHT CLEANER RELAY INSPECTION.)
9	Headlight cleaner actuator (See 09-19-10 HEADLIGHT CLEANER ACTUATOR REMOVAL/INSTALLATION.)
10	Headlight cleaner hose (See 09-19-11 HEADLIGHT CLEANER HOSE REMOVAL/INSTALLATION.)
11	Wiper and washer switch (See 09-19-8 WIPER AND WASHER SWITCH REMOVAL/INSTALLATION.) (See 09-19-9 WIPER AND WASHER SWITCH INSPECTION.)

WIPER ARM AND BLADE REMOVAL/INSTALLATION

1. Remove in the order indicated in the table.

1	Cap
2	Nut
3	Wiper arm (See 09-19-3 Wiper Arm Installation Note.)
4	Wiper blade
5	Rubber brush
6	Backing plate

2. Install in the reverse order of removal.
3. Adjust the windshield wiper arm and blade. (See 09-19-4 WIPER ARM AND BLADE ADJUSTMENT.)

id091900804300

amxzzw0000073

Wiper Arm Installation Note

1. Clean the wiper arm connector shafts using a wire brush before installing the wiper arms.

e5u919zw5012

WIPER/WASHER SYSTEM

WIPER ARM AND BLADE ADJUSTMENT

id091900804400

1. Operate the wipers, and turn off the wiper motor to set the wipers in the park position.
2. Adjust the wiper arm connector shafts to set the arm heights as shown.

amxzzw0000073

WIPER MOTOR INSPECTION

id091900804700

1. Disconnect the wiper motor connector.
2. Connect battery positive voltage to wiper motor terminal A or C, and ground to terminal F, then verify that the wipers operate as shown in the table.
   - If the wipers do not operate as indicated in the table, replace the wiper motor.

Terminal connected to battery positive voltage	Operation condition
C	HI
A	LO

amxzzw00000741

e5u919zw5109

3. Operate the wipers, disconnect battery positive voltage from terminal C, and then verify that the wipers stop.
4. Connect wiper motor terminals E and A, and apply battery positive voltage to terminal B.
5. Operate the wipers at low speed, and verify that they stop in the park position.
   - If there is any malfunction, replace the wiper motor.

WIPER/WASHER SYSTEM

WASHER TANK REMOVAL/INSTALLATION

id091900801700

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the washer hose from joint pipe A.
4. Remove the bolt and nut, then remove the washer tank.
5. Disconnect the washer motor connector.
6. Install in the reverse order of removal.

e5u919zw5005

WIPER MOTOR DISASSEMBLY/ASSEMBLY

id091900804600

1. Disassemble in the order indicated in the table.

1	Bolt
2	Wiper motor (See 09-19-6 Wiper Motor Assembly Note.)
3	Wiper link No.1 (See 09-19-5 Ball Joint Assembly Note.)
4	Wiper link No.2 (See 09-19-5 Ball Joint Assembly Note.)
5	Main link (See 09-19-5 Ball Joint Assembly Note.)

2. Assemble in the reverse order of disassembly.

e5u919zw5016

Ball Joint Assembly Note

1. Use a clean rag to protect the link, and squeeze using pliers.

amxzzw0000229

WIPER/WASHER SYSTEM

Wiper Motor Assembly Note

1. Connect the wiper motor to the vehicle wiring harness connector, operate the wipers, and then stop them at the auto-stop position.
2. Adjust the motor crank, wiper link No.1 and wiper link No.2 so that they are parallel as shown in the figure.
3. Assemble the wiper motor.

e5u919zw5018

WIPER MOTOR REMOVAL/INSTALLATION

id091900804500

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the wiper arm and blade. (See 09-19-3 WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
4. Remove the cowl grille. (See 09-16-5 COWL GRILLE REMOVAL/INSTALLATION.)
5. Disconnect the connector.
6. Remove the bolts.
7. Remove the nut.
8. Install in the reverse order of removal.

amxzzw0000074

WIPER/WASHER SYSTEM

WASHER MOTOR REMOVAL/INSTALLATION

id091900805000

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the washer tank. (See 09-19-5 WASHER TANK REMOVAL/INSTALLATION.)
4. Remove the washer motor, then remove the grommet.
5. Install in the reverse order of removal.

e5u919zw5006

WASHER MOTOR INSPECTION

id091900805100

1. Connect battery positive voltage to windshield washer motor terminal A and terminal B to ground.
2. Verify that the windshield washer motor operates normally.
   - If there is any malfunction, replace the windshield washer motor.

E5U919ZW5011

WASHER NOZZLE REMOVAL/INSTALLATION

id091900804800

1. Remove the cowl grille. (See 09-16-5 COWL GRILLE REMOVAL/INSTALLATION.)
2. Remove the washer hose from the washer nozzle. (See 09-19-8 WASHER HOSE REMOVAL/INSTALLATION.)
3. Squeeze the tabs of the washer nozzle.
4. Pull the washer nozzle out to remove it.
5. Install in the reverse order of removal.

e5u919zw5007

WIPER/WASHER SYSTEM

WASHER HOSE REMOVAL/INSTALLATION

id091900804900

1. Remove the wiper arm and blade. (See 09-19-3 WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
2. Disconnect joint pipe A, then remove washer hose A from clip A.
3. Remove the cowl grille. (See 09-16-5 COWL GRILLE REMOVAL/INSTALLATION.)
4. Remove clips.
5. Disconnect joint pipe B, then remove washer hose A.
6. Disconnect washer hose B from the washer nozzle, then remove washer hose B.
7. Disconnect joint pipe C, then remove washer hose C.
8. Remove washer hose D from clips C.
9. Disconnect washer hose D from the washer nozzle, then remove washer hose D.
10. Install in the reverse order of removal.

e5u919zw5013

WIPER AND WASHER SWITCH REMOVAL/INSTALLATION

id091900800200

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.)
4. Disconnect the wiper and washer switch connector.

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5. Remove the screws, then remove the wiper and washer switch.
6. Install in the reverse order of removal.

WIPER/WASHER SYSTEM

WIPER AND WASHER SWITCH INSPECTION

id091900802800

1. Verify that the continuity between the wiper and washer switch is as indicated in the table.
   - If not as indicated in the table, replace the wiper and washer switch.

○—○ : Continuity

Switch position		One -touch switch	Terminal				
			A (O)	C (M)	E (K)	K (E)	O (A)
Wiper switch	OFF	OFF		○	——	○	
		ON			○	○	
	INT	-		○	——	○	
	1	-			○	○	
	2	-			○	——	○
Washer switch	ON		○	——	○		

( ) : Wiper and washer switch (LH)

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amxzzw00000732

HEADLIGHT CLEANER MOTOR REMOVAL/INSTALLATION

id091900803300

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the washer tank. (See 09-19-5 WASHER TANK REMOVAL/INSTALLATION.)
4. Remove the bolt, then remove the bracket.
5. Remove the headlight cleaner motor, then remove the grommet.
6. Install in the reverse order of removal.

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HEADLIGHT CLEANER MOTOR INSPECTION

id091900803200

1. Connect battery positive voltage to headlight cleaner motor terminal A and terminal B to ground.
2. Verify that the headlight cleaner motor operates normally.
   - If there is any malfunction, replace the headlight cleaner motor.

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WIPER/WASHER SYSTEM

HEADLIGHT CLEANER ACTUATOR REMOVAL/INSTALLATION

id091900803000

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the front side turn light. (See 09-18-18 SIDE TURN LIGHT REMOVAL/INSTALLATION.)
4. Remove the front bumper. (See 09-10-7 FRONT BUMPER REMOVAL/INSTALLATION.)
5. Pull out the headlight cleaner cover.
6. While Pulling the headlight cleaner cover, push the tab with a tape-wrapped flathead screwdriver (1), remove the headlight cleaner cover (2).

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7. Squeeze the clip tabs and slide the clip in the direction of the arrow.
8. Disconnect headlight cleaner hose from the headlight cleaner actuator.

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9. Remove the clamp.
10. Remove the collar

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11. Push the tab in the direction shown by the arrow (1), remove the tab (2), then remove the headlight cleaner actuator (3).
12. Install in the reverse order of removal.

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WIPER/WASHER SYSTEM

HEADLIGHT CLEANER HOSE REMOVAL/INSTALLATION

id091900803100

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the front bumper. (See 09-10-7 FRONT BUMPER REMOVAL/INSTALLATION.)
4. Disconnect joint pipe.
5. Disconnect headlight cleaner hose from the headlight cleaner actuator.
6. Remove the headlight cleaner hose from the front bumper.
7. Install in the reverse order of removal.

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HEADLIGHT CLEANER RELAY REMOVAL/INSTALLATION

id091900805500

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the fasteners, then slightly bend back the mudguard.
4. Disconnect the connector.
5. Remove the bolt, then remove the headlight cleaner relay.
6. Install in the reverse order of removal.

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WIPER/WASHER SYSTEM

HEADLIGHT CLEANER RELAY INSPECTION

id091900805600

1. Remove the headlight cleaner relay with the connector still connected.
2. Measure the voltage at each terminal.
   - If the voltage is not as specified in the Terminal Voltage Table (Reference), inspect the parts under “Inspection item(s)”.
     — If the system does not work properly even though the parts or related wiring harnesses do not have any malfunction, replace the headlight cleaner relay.

Terminal Voltage Table (Reference)

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Terminal	Signal name	Connected to	Measured condition		Voltage (V)/ Continuity	Inspection item(s)
A	Headlight cleaner motor output	Headlight cleaner motor	Headlight cleaner activated (auto-operation or manual operation activated)		Alternates between 1.0 or less and B+	• Headlight relay (See 09-21-6 RELAY INSPECTION.) • Wiper and washer switch (See 09-19-9 WIPER AND WASHER SWITCH INSPECTION.) • Headlight cleaner motor (See 09-19-9 HEADLIGHT CLEANER MOTOR INSPECTION.) • Related wiring harnesses
			Except above		B+	
B	Washer motor output	Wiper and washer switch	Turn the ignition switch to the ON position.	Turn the washer switch to the OFF position.	1.0 or less	• Headlight relay (See 09-21-6 RELAY INSPECTION.) • Wiper and washer switch (See 09-19-9 WIPER AND WASHER SWITCH INSPECTION.) • Related wiring harnesses
				Turn the washer switch to the ON position.	B+	
C	GND	Body ground	Under any condition		1.0 or less	• GND • Related wiring harnesses
D	Headlight	Headlight relay	Light switch at ON position.		B+	• Headlight relay (See 09-21-6 RELAY INSPECTION.) • Related wiring harnesses
			Except above		1.0 or less	

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id092000800100

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2	Tweeter (With 6 speaker type) (See 09-20-11 TWEETER/DOOR UPPER SPEAKER REMOVAL/INSTALLATION.) (See 09-20-11 TWEETER INSPECTION.) Door upper speaker (With Bose®) (See 09-20-11 TWEETER/DOOR UPPER SPEAKER REMOVAL/INSTALLATION.) (See 09-20-11 DOOR UPPER SPEAKER INSPECTION.)
3	Microphone (With HF/TEL system) (See 09-20-23 MICROPHONE REMOVAL/INSTALLATION.)

4	AudioPilot® 2 microphone (With Bose®) (See 09-20-12 AudioPilot®2 MICROPHONE REMOVAL/INSTALLATION.)
5	Center panel unit (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.) (See 09-20-5 CENTER PANEL UNIT DISASSEMBLY/ASSEMBLY.)
6	Center speaker (With Bose®) (See 09-20-9 CENTER SPEAKER REMOVAL/INSTALLATION.) (See 09-20-9 CENTER SPEAKER INSPECTION.)

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7	Antenna feeder No.1 (See 09-20-14 ANTENNA FEEDER LOCATION.) (See 09-20-14 ANTENNA FEEDER NO.1 REMOVAL/INSTALLATION.) (See 09-20-16 ANTENNA FEEDER NO.1 INSPECTION.)
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9	Accessory socket (See 09-20-23 ACCESSORY SOCKET REMOVAL/INSTALLATION.) (See 09-20-24 ACCESSORY SOCKET INSPECTION.)
10	Door speaker (See 09-20-8 DOOR SPEAKER REMOVAL/INSTALLATION.) (See 09-20-7 DOOR SPEAKER INSPECTION.)

11	Antenna feeder No.2 (See 09-20-14 ANTENNA FEEDER LOCATION.) (See 09-20-16 ANTENNA FEEDER NO.2 REMOVAL/INSTALLATION.) (See 09-20-20 ANTENNA FEEDER NO.2 INSPECTION.)
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13	Audio amplifier (With Bose®) (See 09-20-6 AUDIO AMPLIFIER REMOVAL/INSTALLATION.)
14	Condenser (See 09-20-11 CONDENSER REMOVAL/INSTALLATION.)
15	HF/TEL unit (See 09-20-22 HANDS-FREE TELEPHONE (HF/TEL) UNIT REMOVAL/INSTALLATION.)
16	Rear speaker (See 09-20-10 REAR SPEAKER REMOVAL/INSTALLATION.) (See 09-20-10 REAR SPEAKER INSPECTION.)

CENTER PANEL UNIT REMOVAL/INSTALLATION

id092000800600

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the lower panel. (See 09-17-8 LOWER PANEL REMOVAL/INSTALLATION.)
4. Remove the side wall. (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
5. Remove the installation bolt.

L.H.D.

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ENTERTAINMENT

R.H.D.

amxzzw0000166

- If the installation bolt is equipped, remove it.

Caution
- **The center panel unit may be damaged if it is pulled out with the installation bolt installed. Verify that the installation bolt is removed before pulling out the center panel unit.**

6. Remove in the order indicated in the table

1	Screw
2	Center panel unit (See 09-20-5 Center Panel Unit Removal Note.)
3	Connector
4	Antenna feeder plug

7. Install in the reverse order of removal.

Caution
- **When installing the center panel unit, make sure that the wiring harness and antenna feeder are not caught between the unit and dashboard. If the wiring harness or the antenna feeder is caught between the unit and dashboard, it may cause malfunctions.**

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ENTERTAINMENT

Center Panel Unit Removal Note

1. Pull the center panel unit outward, detach clip A from the dashboard, and then remove the center panel unit.
2. When removing the center panel unit, disconnect the audio unit connector (24-pin) first to aid in disconnecting other connectors and the antenna plug.

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CENTER PANEL UNIT DISASSEMBLY/ASSEMBLY

id092000800700

Caution

- **Before disassembling the center panel unit, spread a cloth on the floor to put the disassembled parts on. This protects the surface of the panel from scratches or dirt.**

1. Disassemble in the order indicated in the table.

1	Screw A (See 09-20-5 Screw A Assemble Note.)
2	Audio unit
3	Screw B
4	Climate control unit
5	Center panel

2. Assemble in the reverse order of disassembly.

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Screw A Assemble Note

1. Tighten screws A at the position shown in the figure.

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ENTERTAINMENT

AUDIO AMPLIFIER REMOVAL/INSTALLATION

id092000801100

Except Power Retractable Hardtop

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (8) Seat belt set plate (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
   (9) Seat back crossmember assembly (See 09-10-13 SEAT BACK CROSSMEMBER ASSEMBLY REMOVAL/INSTALLATION.)
   (10) Rear side trim (See 09-17-21 REAR SIDE TRIM REMOVAL/INSTALLATION.)
   (11) Rear package trim (See 09-17-21 REAR PACKAGE TRIM REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

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1	Connector
2	Bolt
3	Audio amplifier

5. Install in the reverse order of removal.

Power Retractable Hardtop

Caution

- **When removing/installing or transporting the audio amplifier, hold it by its front waterproof cover. Otherwise the waterproof cover could deform and water penetration could cause the audio amplifier to malfunction.**
- **Always keep the front waterproof cover for the audio amplifier as the bottom surface when storing the audio amplifier. Otherwise the waterproof cover could deform and water penetration could cause the audio amplifier to malfunction.**

amxzzw0000186

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)

ENTERTAINMENT

3. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

1	Connector
2	Nut
3	Audio amplifier

5. Install in the reverse order of removal.

amxzzw0000218

DOOR SPEAKER INSPECTION

id092000806900

1. Verify the resistance between door speaker terminals.
   - If the resistance is not within the specification, replace the door speaker.

   Resistance
   Standard: 4 ohms
   Bose®: 1 ohm

2. Connect a **1.5 V** battery to the door speaker and verify that noise is heard from the door speaker.
   - If no noise is heard, replace the door speaker.

amxzzw0000167

ENTERTAINMENT

DOOR SPEAKER REMOVAL/INSTALLATION

id092000807200

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the door trim.(See 09-17-16 DOOR TRIM REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

1	Screw
2	Door speaker (See 09-20-8 Door Speaker Installation Note.)
3	Connector

5. Install in the reverse order of removal.

amxzzw0000230

Door Speaker Installation Note

Caution

- **If the speaker is installed with the wiring harness out of the groove, an open circuit in the wiring harness could occur.**

1. Remove the speaker with the wiring harness passing through the groove of the door module.

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ENTERTAINMENT

CENTER SPEAKER REMOVAL/INSTALLATION

id092000806000

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove in the order indicated in the table.

1	Center speaker cover (See 09-20-9 Center Speaker Cover Removal Note.)
2	Screw
3	Center speaker
4	Connector

4. Install in the reverse order of removal.

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Center Speaker Cover Removal Note

1. Insert a tape-wrapped fastener remover into the service hole.
2. Pry with the tape-wrapped fastener remover in the direction shown by the arrow to remove the center speaker cover.

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CENTER SPEAKER INSPECTION

id092000806100

1. Verify the resistance between center speaker terminals.
   - If the resistance is not within the specification, replace the center speaker.

   Resistance
   3.6 ohms

2. Connect a **1.5 V** battery to the center speaker and verify that noise is heard from the center speaker.
   - If no noise is heard, replace the center speaker.

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ENTERTAINMENT

REAR SPEAKER REMOVAL/INSTALLATION

id092000802400

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (8) Hands-free telephone (HF/TEL) unit (with HF/TEL system) (See 09-20-22 HANDS-FREE TELEPHONE (HF/TEL) UNIT REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

1	Connector
2	Nut
3	Bracket (with Bose®) Bracket and rear speaker (without Bose®)
4	Screw
5	Rear speaker (with Bose®)

amxzzw0000229

5. Install in the reverse order of removal.

REAR SPEAKER INSPECTION

id092000802500

1. Inspect for resistance between the rear speaker terminals using an ohmmeter.
   - If the resistance is not within the specification, replace the rear speaker.

Resistance
Standard: 8 ohms
Bose®: 3.6 ohms

amxzzw0000218

ENTERTAINMENT

TWEETER INSPECTION

id092000808100

1. Inspect for resistance between the tweeter terminals using an ohmmeter.
   - If the resistance is not within the specification, replace the tweeter.

   Resistance
   4 ohms

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TWEETER/DOOR UPPER SPEAKER REMOVAL/INSTALLATION

id092000810900

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the door trim. (See 09-17-16 DOOR TRIM REMOVAL/INSTALLATION.)
4. Disconnect the connector.
5. Remove the screws.
6. Remove the tweeter (with 6 speaker type)/door upper speaker (with Bose®).
7. Install in the reverse order of removal.

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DOOR UPPER SPEAKER INSPECTION

id092000808200

1. Inspect for resistance between the door upper speaker terminals using an ohmmeter.
   - If the resistance is not within the specification, replace the door upper speaker.

   Resistance
   3.6 ohms

amxzzw0000219

CONDENSER REMOVAL/INSTALLATION

id092000803000

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (8) Seat belt set plate (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
   (9) Seat back crossmember assembly (See 09-10-13 SEAT BACK CROSSMEMBER ASSEMBLY REMOVAL/INSTALLATION.)
   (10) Rear side trim (See 09-17-21 REAR SIDE TRIM REMOVAL/INSTALLATION.)
   (11) Rear package trim (See 09-17-21 REAR PACKAGE TRIM REMOVAL/INSTALLATION.)

ENTERTAINMENT

4. Remove in the order indicated in the table.

1	Connector
2	Bolt
3	Condenser

5. Install in the reverse order of removal.

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AudioPilot®2 MICROPHONE REMOVAL/INSTALLATION

id092000866300

Note

- AudioPilot® 2 is a registered trademark of Bose® Corporation.

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove in the order indicated in the table.

1	Connector
2	Screw
3	AudioPilot® 2 microphone

4. Install in the reverse order of removal.

amxzzw0000167

MANUAL ANTENNA REMOVAL/INSTALLATION

id092000807300

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove in the order indicated in the table.

1	Antenna rod
2	Mounting nut (See 09-20-13 Mounting Nut Removal Note.)
3	Spacer
4	Connector
5	Nut
6	Manual antenna

4. Install in the reverse order of removal.

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ENTERTAINMENT

Mounting Nut Removal Note

1. Use snap-ring pliers to remove the mounting nut.

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MANUAL ANTENNA INSPECTION

id092000807700

Note

- A amplifier is built into the manual antenna.

Antenna Amplifier

1. Turn on the audio unit and radio, and measure the voltage at manual antenna connector terminal C.
   - If the voltage is B+, inspect the antenna feeder.
   - If the voltage is not B+, inspect the audio unit or the antenna feeder.

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Manual Antenna

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Disconnect the manual antenna connector.
4. Inspect for continuity between the manual antenna terminals using an ohmmeter.
   - If not as specified, replace the manual antenna.

○—○ : Continuity

Step	Terminal			
	A	B	D	E
1	○		○	
2		○		○

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ENTERTAINMENT

ANTENNA FEEDER LOCATION

id092000801800

amxzzw0000167

1	Antenna feeder No.1
2	Antenna feeder No.2

ANTENNA FEEDER NO.1 REMOVAL/INSTALLATION

id092000812200

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Glove compartment (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
   (3) Side wall (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
   (4) Console panel (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (5) Center panel unit (See 09-20-3 CENTER PANEL UNIT REMOVAL/INSTALLATION.)
   (6) Lower panel (See 09-17-8 LOWER PANEL REMOVAL/INSTALLATION.)
   (7) Column cover (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.)
   (8) Driver-side air bag module (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
   (9) Steering wheel (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (10)Combination switch (See 09-18-21 COMBINATION SWITCH REMOVAL/INSTALLATION.)
   (11)Steering shaft (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (12)Meter hood (See 09-17-7 METER HOOD REMOVAL/INSTALLATION.)
   (13)Instrument cluster (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
   (14)Side panel (See 09-17-10 SIDE PANEL REMOVAL/INSTALLATION.)
   (15)Bonnet release lever (See 09-14-5 BONNET LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (16)Female wedge (See 09-16-12 CONVERTIBLE TOP DISASSEMBLY/ASSEMBLY.)
   (17)A-pillar trim (See 09-17-11 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (18)Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (19)Front side trim (See 09-17-11 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (20)Fuse box No.1
   (21)Dashboard (See 09-17-4 DASHBOARD REMOVAL/INSTALLATION.)
3. Remove clips A and B.
4. Disconnect the connector.
5. Remove the antenna feeder No.1.
6. Install in the reverse order of removal.

ENTERTAINMENT

L.H.D.

amxzzw0000168

R.H.D.

amxzzw0000168

ENTERTAINMENT

ANTENNA FEEDER NO.1 INSPECTION

id092000812400

1. Verify that the continuity is as indicated in the table.
   - If not as indicated in the table, replace the antenna feeder No.1.

○—○ : Continuity

Test condition	Terminal					
	A	B	C	D	E	F
Under any condition	○				○	
		○				○
			○	○		

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amxzzw0000168

ANTENNA FEEDER NO.2 REMOVAL/INSTALLATION

id092000812300

Except Power Retractable Hardtop

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Seat (RH) (See 09-13-4 SEAT REMOVAL/INSTALLATION.)
   (2) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (3) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (4) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (5) Front side trim (RH) (See 09-17-11 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (6) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (7) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (8) Seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (9) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (10)Seat belt set plate (See 08-11-1 SEAT BELT REMOVAL/INSTALLATION.)
   (11)Seat back crossmember assembly (See 09-10-13 SEAT BACK CROSSMEMBER ASSEMBLY REMOVAL/INSTALLATION.)
   (12)Rear side trim (See 09-17-21 REAR SIDE TRIM REMOVAL/INSTALLATION.)
   (13)Rear package trim (See 09-17-21 REAR PACKAGE TRIM REMOVAL/INSTALLATION.)
   (14)Side shelf (RH) (See 09-17-22 SIDE SHELF REMOVAL/INSTALLATION.)
   (15)Trunk end trim (See 09-17-12 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (16)Partition board (See 09-17-23 PARTITION BOARD REMOVAL/INSTALLATION.)
   (17)Trunk side trim (RH) (See 09-17-11 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
3. Disconnect the antenna feeder No.1.
4. Remove the clip A.
5. Partially peel back the floor covering.

amxzzw0000169

ENTERTAINMENT

6. Detach clips B.

amxzzw0000169

7. Detach clips C.

amxzzw0000169

ENTERTAINMENT

8. Disconnect the wiring harness from the clip D.
9. Disconnect the connector.
10. Detach clips D and E.
11. Remove the antenna feeder No.2.
12. Install in the reverse order of removal.

amxzzw0000169

Power Retractable Hardtop

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Seat (RH) (See 09-13-4 SEAT REMOVAL/INSTALLATION.)
   (2) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (3) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (4) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (5) Front side trim (RH) (See 09-17-11 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (6) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (7) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (8) Seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (9) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
   (10)Rear side trim (See 09-17-21 REAR SIDE TRIM REMOVAL/INSTALLATION.)
   (11)Side shelf (RH) (See 09-17-22 SIDE SHELF REMOVAL/INSTALLATION.)
   (12)Trunk end trim (See 09-17-12 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (13)Partition board (See 09-17-23 PARTITION BOARD REMOVAL/INSTALLATION.)
   (14)Trunk side trim (RH) (See 09-17-11 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)

ENTERTAINMENT

3. Disconnect the antenna feeder No.1.
4. Remove the clip A.
5. Partially peel back the floor covering.

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6. Detach clips B.

amxzzw0000169

ENTERTAINMENT

7. Detach clips C.

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8. Disconnect the wiring harness from the clip D.
9. Disconnect the connector.
10. Detach clips D and E.
11. Remove the antenna feeder No.2.
12. Install in the reverse order of removal.

amxzzw0000169

ANTENNA FEEDER NO.2 INSPECTION

id092000812500

1. Verify that the continuity is as indicated in the table.
   - If not as indicated in the table, replace the antenna feeder No.2.

○—○ : Continuity

Test condition	Terminal					
	A	B	C	D	E	F
Under any condition	○			○		
		○			○	
			○			○

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amxzzw0000168

ENTERTAINMENT

AUDIO CONTROL SWITCH REMOVAL/INSTALLATION

id092000800200

Note

- For vehicles with the cruise control system, the audio control switch harness and the cruise control switch harness are united, therefore they cannot be separated.

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the driver-side air bag module. (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
4. Remove the steering wheel. (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
5. Remove in the order indicated in the table.

amxzzw0000230

1	Screw A
2	Bracket
3	Steering shift switch (AT vehicles)
4	Screw B

5	Cover
6	Screw C
7	Audio control switch

6. Install in the reverse order of removal.

AUDIO CONTROL SWITCH INSPECTION

id092000800300

1. Verify the resistance and continuity between the audio control switch terminals.

amxzzw0000218

ENTERTAINMENT

- If the resistance and continuity are not as indicated in the tables, replace the audio control switch.

○—⩘—○ : Resistance

Button position	Terminal H	Terminal G	Resistance (ohm)
VOL Button(-) ON	○	○	50.92—56.28
VOL Button(+) ON	○	○	139.365—154.035
SEEK Button(UP) ON	○	○	285.665—315.735
SEEK Button(DOWN) ON	○	○	533.615—589.785
MODE Button ON	○	○	984.865—1,088.535
MUTE BUTTON (WITHOUT HF/TEL SYSTEM) VOICE RECOGNITION/ HANDS-FREE SWITCH (WITH HF/TEL SYSTEM)	○	○	1,934.865—2,138.535
OFF	○	○	4,794.365—5,299.035

amxzzw0000229

2. Verify that the LED illuminates.
   - If the LED does not illuminate, replace the audio control switch.

HANDS-FREE TELEPHONE (HF/TEL) UNIT REMOVAL/INSTALLATION

id092000807100

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Quarter trim (See 09-17-16 QUARTER TRIM REMOVAL/INSTALLATION.)
   (3) Scuff plate (See 09-17-15 SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Tire house trim (See 09-17-15 TIRE HOUSE TRIM REMOVAL/INSTALLATION.)
   (5) Aeroboard (See 09-17-18 AEROBOARD REMOVAL/INSTALLATION.)
   (6) Seat back bar garnish (See 09-17-18 SEAT BACK BAR GARNISH REMOVAL/INSTALLATION.)
   (7) Back trim (See 09-17-19 BACK TRIM REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

amxzzw0000218

1	Connector
2	Nut
3	Screw

4	Bracket
5	Cover
6	HF/TEL unit

4. Install in the reverse order of removal.

ENTERTAINMENT

MICROPHONE REMOVAL/INSTALLATION

id092000801400

1. Remove the battery cover.
2. Disconnect the negative battery cable.
3. Remove the meter hood. (See 09-17-7 METER HOOD REMOVAL/INSTALLATION.)
4. Remove the microphone in the direction of the arrow (2) shown in the figure while pressing the microphone tabs in the direction of the arrow (1).
5. Install in the reverse order of removal.

amxzzw0000230

ACCESSORY SOCKET REMOVAL/INSTALLATION

id092000800400

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the console. (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
4. Remove the side wall. (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
5. Remove the console panel. (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.)
6. Remove in the order indicated in the table.

1	Accessory socket (See 09-20-23 Accessory Socket Removal Note.)
2	Cap (See 09-20-24 Cap Removal Note.)

7. Install in the reverse order of removal.

amxzzw0000166

Accessory Socket Removal Note

1. While pressing a tape-wrapped fastener remover against the cap projection, pull the accessory socket outward.

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ENTERTAINMENT

Cap Removal Note

1. While pressing the tabs, pull the cap outwards.

amxzzw0000166

ACCESSORY SOCKET INSPECTION

id092000800500

1. Connect a tester as shown in the figure and verify that there is continuity.
   - If the continuity cannot be verified, replace the accessory socket.

amxzzw0000166

AUXILIARY JACK REMOVAL/INSTALLATION

id092000809900

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the console. (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
4. Remove the side wall. (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
5. Remove the console panel. (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.)
6. While pressing the tabs, pull the auxiliary jack.
7. Install in the reverse order of removal.

amxzzw0000168

ENTERTAINMENT

AUXILIARY JACK INSPECTION

id092000812600

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Console (See 09-17-12 CONSOLE REMOVAL/INSTALLATION.)
   (2) Side wall (See 09-17-10 SIDE WALL REMOVAL/INSTALLATION.)
   (3) Console panel (See 09-17-13 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (4) Auxiliary jack (See 09-20-24 AUXILIARY JACK REMOVAL/INSTALLATION.)
3. Connect a commercially-available nonresistant plug to the auxiliary jack.
4. Verify that the continuity between the auxiliary jack terminals is as indicated in the table.

○—○: Continuity

Test condition	Terminal			
	A	B	C	D
Plug is connected		○	——	○
Plug is not connected				

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- If not as indicated in the table, replace the auxiliary jack.

amxzzw0000168

09-21 POWER SYSTEMS

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POWER SYSTEMS

POWER SYSTEM LOCATION INDEX

id092100800700

amxzzw00002025

1	Main fuse block (See 09-21-2 UPPER BLOCK REMOVAL/ INSTALLATION.) (See 09-21-2 MAIN FUSE REMOVAL/ INSTALLATION.) (See 09-21-5 RELAY LOCATION.) (See 09-21-6 RELAY INSPECTION.)

2	Ignition switch (See 09-21-3 IGNITION SWITCH REMOVAL/ INSTALLATION) (See 09-21-3 IGNITION SWITCH INSPECTION.)
3	Key reminder switch (See 09-21-3 KEY REMINDER SWITCH REMOVAL/INSTALLATION) (See 09-21-4 KEY REMINDER SWITCH INSPECTION.)

FUSE SERVICE WARNINGS

id092100801700

Warning

- **For vehicles with DSC, if the room fuse is disconnected, the stored initial position of the steering angle sensor will be cleared and the DSC will not operate properly, making the vehicle unsafe to drive. Perform the steering angle sensor initialization procedure after connecting the room fuse. (See 04-15-15 STEERING ANGLE SENSOR INITIALIZATION PROCEDURE.)**

FUSE SERVICE CAUTIONS

id092100800400

Caution

- **Determine and correct the cause of the burnt fuse before replacing it. If the fuse is replaced before doing this, it may burn again.**

POWER SYSTEMS

UPPER BLOCK REMOVAL/INSTALLATION

id092100801800

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the main fuse block cover.
4. Remove in the order indicated in the table.

1	Nut
2	Connector
3	Upper block (See 09-21-2 Upper Block Removal Note)

5. Install in the reverse order of removal.

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Upper Block Removal Note

1. Press and remove the tabs on main fuse block at the positions indicated by the arrows.
2. Raise the upper cylinder block and remove it.

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MAIN FUSE REMOVAL/INSTALLATION

id092100801500

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the upper block. (See 09-21-2 UPPER BLOCK REMOVAL/INSTALLATION
4. Remove in the order indicated in the table.

1	Bolt
2	Main fuse

5. Install in the reverse order of removal.

e5u921zw5004

POWER SYSTEMS

IGNITION SWITCH INSPECTION

id092100800100

1. Verify that the continuity between the ignition switch terminals is as indicated in the table.
   - If not as indicated in the table, replace the ignition switch.

E5U921ZW5005

○——○: Continuity

Ignition key position	Terminal					
	A	B	C	D	E	F
LOCK						
ACC				○——○		
ON		○——○	○——○	○——○	○——○	○——○
START	○——○	○——○	○——○	○——○	○——○	○——○

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IGNITION SWITCH REMOVAL/INSTALLATION

id092100800200

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

1	Connector
2	Screw
3	Ignition switch

5. Install in the reverse order of removal.

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KEY REMINDER SWITCH REMOVAL/INSTALLATION

id092100801000

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.)
4. Disconnect the key reminder switch connector.
5. Remove the key reminder switch.
6. Install in the reverse order of removal.

chu0921w004

POWER SYSTEMS

KEY REMINDER SWITCH INSPECTION

id092100801100

1. Verify that the continuity between the key reminder switch terminals is as indicated in the table.
   - If not as indicated in the table, replace the key reminder switch.

○—○ : Continuity

Key position	Terminal	
	A	B
Key inserted	○	○
Key removed		

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A6E8110W117

TRUNK LID OPENER RELAY REMOVAL/INSTALLATION

id092100801900

Note
- Depending on the period of manufacture, the trunk lid opener relay and rear fog relay positions may be switched. When performing removal/installation and inspection, make determinations based on wiring color.
  — Terminal A: violet
  — Terminal C: blue/red
  — Terminal D: blue
  — Terminal E: blue/red (without power retractable hardtop), white/red (with power retractable hardtop)

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the trunk end trim. (See 09-17-12 TRUNK END TRIM REMOVAL/INSTALLATION.)
4. Remove the trunk lid opener relay.
5. Install in the reverse order of removal.

amxzzw0000215

REAR FOG LIGHT RELAY REMOVAL/INSTALLATION

id092100802600

Note
- Depending on the period of manufacture, the trunk lid opener relay and rear fog relay positions may be switched. When performing removal/installation and inspection, make determinations based on wiring color.
  — Terminal A: blue/red
  — Terminal C: light green
  — Terminal D: red/blue
  — Terminal E: black/green

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF].)
3. Remove the trunk end trim. (See 09-17-12 TRUNK END TRIM REMOVAL/INSTALLATION.)

POWER SYSTEMS

4. Remove the rear fog light relay.
5. Install in the reverse order of removal.

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RELAY LOCATION

id092100800600

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1	Main relay
2	Headlight relay
3	Ignition relay
4	Starter relay
5	Drive-by-wire relay
6	Blower relay
7	Fuel pump relay
8	Front fog light relay
9	A/C relay

10	TNS relay
11	Rear window defroster relay
12	Horn relay
13	Cooling fan relay No.3
14	Cooling fan relay No.2
15	Cooling fan relay No.1
16	Trunk lid opener relay
	Rear fog light relay

POWER SYSTEMS

RELAY INSPECTION

id092100800300

Relay type

Terminal type	Part name
Type A	• Main relay • Starter relay • Drive-by-wire relay • Blower relay • Fuel pump relay • Front fog light relay • A/C relay • TNS relay • Rear window defroster relay • Horn relay • Cooling fan relay No.1 • Cooling fan relay No.2 • Cooling fan relay No.3 • Trunk lid opener relay • Rear fog light relay
Type B	• Headlight relay • Ignition relay

Type A

1. Verify the continuity between the relay terminals.
   - If not as indicated in the table, replace the relay.

○—○ : Continuity

Step	Terminal			
	A	E	C	D
1	○	○		
2	GND	B+	○	○

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Type B

1. Verify the continuity between the relay terminals.
   - If not as indicated in the table, replace the relay.

○—○ : Continuity

Step	Terminal			
	A	B	C	D
1	○	○		
2	B+	GND	○	○

chu0921w006

A6E8110W125

09-22 INSTRUMENTATION/DRIVER INFO.

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INSTRUMENTATION/DRIVER INFO.

INSTRUMENTATION/DRIVER INFO. LOCATION INDEX

id092200495000

amxzzw0000170

1	Instrument cluster (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.) (See 09-22-3 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY.) (See 09-22-4 INSTRUMENT CLUSTER INSPECTION.) (See 09-22-6 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.) (See 09-22-15 INSTRUMENTATION/DRIVER INFO. PERSONALIZATION FEATURES SETTING PROCEDURE.)

2	Horn (See 09-22-5 HORN REMOVAL/INSTALLATION.)
3	Oil pressure switch (See 09-22-5 OIL PRESSURE SWITCH INSPECTION.)
4	Fuel gauge sender unit (See 09-22-5 FUEL GAUGE SENDER UNIT INSPECTION.)
5	Occupancy sensor (See 09-22-16 OCCUPANCY SENSOR INSPECTION.)

INSTRUMENTATION/DRIVER INFO.

INSTRUMENT CLUSTER REMOVAL/INSTALLATION

id092200496100

Caution
- **When replacing the instrument cluster, the configuration procedure must be performed before removing the instrument cluster. Replacing the instrument cluster without performing the configuration procedure will result in system malfunction.**

1. Perform the instrument cluster configuration when replacing it. (See 09-22-3 INSTRUMENT CLUSTER CONFIGURATION.)
2. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF])
3. Remove the lower panel. (See 09-17-8 LOWER PANEL REMOVAL/INSTALLATION.)
4. Remove the column cover. (See 09-17-7 COLUMN COVER REMOVAL/INSTALLATION.)
5. Remove the meter hood. (See 09-17-7 METER HOOD REMOVAL/INSTALLATION.)
6. Remove in the order indicated in the table.

1	Screw
2	Instrument cluster (See 09-22-2 Instrument Cluster Removal Note.)
3	Clip A
4	Connector
5	Clip B (See 09-22-3 Clip B Removal Note.)

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7. Install in the reverse order of removal.
8. When replacing the instrument cluster of vehicles with the immobilizer system, perform the following procedure:
   - See 09-14-25 IMMOBILIZER SYSTEM-RELATED PARTS PROGRAMMING.

Caution
- **The removed instrument cluster should be placed with the display side up to prevent grease from leaking from the meters.**

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Instrument Cluster Removal Note

1. Rotate the instrument cluster in the direction of the arrow and remove the instrument cluster.

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INSTRUMENTATION/DRIVER INFO.

Clip B Removal Note

1. Rotate the clip B **90**°, then remove the clip B from the instrument cluster.

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INSTRUMENT CLUSTER CONFIGURATION

id092200496200

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1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select “Module Programming”.
   - When using the PDS (Pocket PC)
     1. Select “Programming”.
     2. Select “Module Programming”.
3. Select “Programmable Module Installation”.
4. Select “IC” and perform procedures according to directions on the M-MDS screen.
   - If odometer data is to be transferred to a new instrument cluster, perform the following procedure:
     1. Select “Programmable Parameters” from the menu.
     2. Select “Odometer Write”, and perform the procedure following the screen.

   Note
   - During the odometer data writing procedure, As-Built Data (VIN and Vehicle Data) input is requested. Obtain the As-Built Sheet for the vehicle, and input the necessary data.

5. Retrieve DTCs using the M-MDS and verify that there is no DTC present.
   - If any DTC is present, perform applicable DTC inspection. (See 09-02B-1 DTC INSPECTION [INSTRUMENT CLUSTER].)

INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY

id092200496300

Caution
- **Do not drop the instrument cluster or damage the printed board. This will lead to a system malfunction.**

1. Disassemble in the order indicated in the table.

1	Screw
2	Cover
3	Instrument cluster unit
4	Lens

2. Assemble in the reverse order of disassembly.

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INSTRUMENTATION/DRIVER INFO.

INSTRUMENT CLUSTER INSPECTION

id092200496400

Speedometer

Using the input/output check mode

1. Inspect the speedometer by setting it to check code 12 of the input/output check mode. (See 09-22-6 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)

Using a speedometer tester

1. Adjust the tire pressure to the specification.
2. Using a speedometer tester, verify that the tester reading is as indicated in the table below.

Speedometer tester indication (km/h)	Allowable range (km/h)
20	20—26
40	41—46
60	61—67
80	82—88
100	102—109
120	123—130
140	143—151

Speedometer tester indication (mph)	Allowable range (mph)
10	10—14
20	20—24
30	30—34
40	41—45
50	51—55
60	61—66
70	71—76
80	82—87

3. Verify that the speedometer reading is within the range indicated in the table.
   - If the speedometer does not move or the indication is not within the allowable range, inspect the PCM and the related wiring harnesses.
     — If the PCM and the related wiring harnesses are normal, replace the instrument cluster.

Tachometer

Using the input/output check mode

1. Inspect the tachometer by setting it to check code 13 of the input/output check mode. (See 09-22-6 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)

Using M-MDS or external diagnostic equipment

Caution

- **If the engine speed exceeds the allowable range, the engine could be damaged. Therefore, when inspecting the tachometer, do not allow the engine speed to exceed the allowable range indication on the tachometer.**

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     — Select “DataLogger”
     — Select “Modules”
     — Select “IC”
   - When using the PDS (Pocket PC)
     — Select “Module Tests”.
     — Select “IC”
     — Select “DataLogger”

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INSTRUMENTATION/DRIVER INFO.

3. Compare the data monitor item (IC_TACHO) with the tachometer indication.
   - If the tachometer does not operate properly, inspect the PCM and the related wiring harnesses.
     — If the PCM and the related harnesses do not have any malfunction, replace the instrument cluster.

Fuel Gauge

1. Inspect the fuel gauge by setting it to check code 23 of the input/output check mode. (See 09-22-6 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)

Water Temperature Gauge

1. Inspect the water temperature gauge by setting it to check code 25 of the input/output check mode. (See 09-22-6 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)

Oil Pressure Gauge

1. Inspect the oil pressure gauge by setting it to check code 28 of the input/output check mode. (See 09-22-6 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)

FUEL GAUGE SENDER UNIT INSPECTION

id092200497100

1. Remove the fuel pump unit. (See 01-14-12 FUEL PUMP UNIT REMOVAL/INSTALLATION [L8, LF].)
2. Move the float to the topmost and bottommost positions, and verify that the resistance between terminals A and C of the unit and the position of the float are as indicated in the figure.

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- If they are not as indicated, replace the fuel gauge sender unit.

OIL PRESSURE SWITCH INSPECTION

id092200495300

1. Turn the ignition switch to the ON position and verify that the oil pressure gauge reading indicates L or below.
2. Start the engine and verify that the oil pressure gauge operates.
   - If the oil pressure gauge does not operate, inspect the related wiring harness.
     — If the related wiring harness is normal, inspect the oil pressure. (See 01-11-3 OIL PRESSURE INSPECTION [L8, LF].)
       - If the oil pressure is normal, replace the oil pressure switch.

HORN REMOVAL/INSTALLATION

id092200497400

1. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION [L8, LF])
2. Slightly bend back the under cover.
3. Remove in the order indicated in the table.

1	Connector
2	Bolt
3	Horn

4. Install in the reverse order of removal.

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INSTRUMENTATION/DRIVER INFO.

INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE

id092200801700

Note
- In this mode, it is possible to verify the items in the following chart.

Check Code Table

Check code	Check item	Related items
01	Buckle switch (driver-side)	Seat belt warning alarm
04	Door switch	• Lights-on reminder warning alarm
08	TNS relay	• Lights-on reminder warning alarm • Each illumination light
12	Speedometer	Speedometer
13	Tachometer	Tachometer
14	Buzzer	Buzzer
16	Fuel-level warning light	Fuel-level warning light
18	Ignition key illumination	Ignition key illumination
22	Fuel gauge sender unit	Fuel gauge
23	Fuel gauge	Fuel gauge
25	Water temperature gauge	Water temperature gauge
26	• Odometer/tripmeter (LCD) • Warning and indicator light	• Odometer/tripmeter (LCD) • Warning and indicator light
28	Oil pressure gauge	Oil pressure gauge
31	Key reminder switch	Key reminder switch
53	Ambient temperature sensor	Ambient temperature
57	Panel light control	Illumination light bulb
58	• Buckle switch (passenger-side) • Occupancy sensor	Seat belt warning alarm

Note
- Check codes which are not listed may be indicated, but they cannot be inspected.
- The check codes are displayed in numerical order. (While performing the inspection, if you want to inspect a check code with a number smaller than the code number you are currently inspecting, terminate the check mode then repeat the inspection from the beginning.)
- If a speed signal is input to the instrument cluster (the wheels are rotated), the input/output check mode will be cancelled.

INSTRUMENTATION/DRIVER INFO.

- The check codes can be fast-forwarded by pushing and holding the odometer/tripmeter switch for **1 s or more**.

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INSTRUMENTATION/DRIVER INFO.

Checking Order

Note
- When inspecting more than two check codes, begin with the code with the highest ranking.

Priority order of inspection	Ignition switch position	Check code
1	ON	22, 53
2		01, 04, 08, 12, 13, 14, 16, 18, 23, 25, 26, 28, 57, 58
3	LOCK	31

Check Code Inspection
Check code 01

Check code 01	Buckle switch (driver-side)		
STEP	**INSPECTION CONDITION**	**DISPLAY**	**ACTION**
1	Unfasten driver-side seat belt. (Buckle switch ON)	on	Go to the next step.
		off	Verify that the voltage of instrument cluster terminal 2A is **1.0 V or less**. • If the voltage is as specified, replace the instrument cluster. • If the voltage is not as specified, inspect the following parts: — Buckle switch (driver-side) — Wiring harness (Buckle switch (driver-side)— instrument cluster)
2	Fasten driver-side seat belt. (Buckle switch OFF)	on	Verify that the voltage of instrument cluster terminal 2A is **B+**. • If the voltage is as specified, replace the instrument cluster. • If the voltage is not as specified, inspect the following parts: — Buckle switch (driver-side) — Wiring harness (Buckle switch (driver-side)— instrument cluster)
		off	Input signal to the instrument cluster is normal.

INSTRUMENTATION/DRIVER INFO.

Check code 04

Check code 04	Door switch ON/OFF signal		
STEP	**INSPECTION CONDITION**	**DISPLAY**	**ACTION**
1	Open the driver-side door. (The door switch is on.)	ON	Close the driver-side door, then go to the next step.
		OFF	Verify that the voltage of instrument cluster terminal 2E is **1.0 V or less**. • If the voltage is as specified, replace the instrument cluster. • If the voltage is not as specified, inspect the following parts: — Door switch — Wiring harness (Instrument cluster—door switches)
2	Close all doors. (Door switches are off.)	ON	Verify that the voltage of instrument cluster terminal 2E is **B+**. • If the voltage is as specified, replace the instrument cluster. • If the voltage is not as specified, inspect the following parts: — Door switch — Wiring harness (Instrument cluster—door switches)
		OFF	Input signal to the instrument cluster is normal.

Check code 08

Check code 08	TNS relay ON/OFF signal		
STEP	**INSPECTION CONDITION**	**DISPLAY**	**ACTION**
1	Turn the headlight switch to the TNS position. (TNS relay ON)	ON	Go to the next step.
		OFF	Verify that the voltage of instrument cluster terminal 1B is **B+**. • If the voltage is as specified, replace the instrument cluster. • If the voltage is not as specified, inspect the following parts: — TNS relay — Wiring harness (Battery—TNS relay—instrument cluster)
2	Turn the headlight switch off. (TNS relay OFF)	ON	Verify that the voltage of the instrument cluster terminal 1B is **1.0 V or less**. • If the voltage is as specified, replace the instrument cluster. • If the voltage is not as specified, inspect the following parts: — TNS relay — Wiring harness (TNS relay—instrument cluster)
		OFF	Input signal to the instrument cluster is normal.

INSTRUMENTATION/DRIVER INFO.

Check code 12

Check code 12	Speedometer display signal		
INSPECTION CONDITION	**DISPLAY**	**ACTION**	
After selecting check code 12, wait for **approx. 2 s**.	00	The speedometer needle moves full scale then returns to **approx. 60 km/h** or **approx. 60mph**.	The speedometer is normal.
		Except above	Replace the instrument cluster.
	Err	—	

Check code 13

Check code 13	Tachometer operation signal		
INSPECTION CONDITION	**DISPLAY**	**ACTION**	
After selecting check code 13, wait for **approx. 2 s**.	00	The tachometer needle moves full scale then returns to **approx. 3,000 rpm**.	The tachometer is normal.
		Except above	Replace the instrument cluster.
	Err	—	

Check code 14

Check code 14	Buzzer operation signal		
INSPECTION CONDITION	**DISPLAY**	**ACTION**	
After selecting check code 14, wait **approx. 2 s**.	01	The buzzer sounds.	The buzzer is normal.
		The buzzer does not sound.	Replace the instrument cluster.

Check code 16

Check code 16	Fuel-level warning light flashing signal		
INSPECTION CONDITION	**DISPLAY**	**ACTION**	
After selecting check code 16, wait **approx. 2 s**.	01 (FLASHING)	Fuel-level warning light flashes **three times**.	The fuel-level warning light is normal.
		Except above	Replace the instrument cluster.

Check code 18

Check code 18	Ignition key illumination control signal		
INSPECTION CONDITION	**DISPLAY**	**ACTION**	
After selecting check code 18, wait **approx. 2 s**.	01 (FLASHING)	Ignition key illumination flashes **three times**.	The ignition key illumination is normal.
		Except above	Verify that the voltage of instrument cluster terminal 1K is **B+**. • If the voltage is as specified, replace the instrument cluster. • If the voltage is not as specified, inspect the following parts: — Ignition key illumination bulb — Wiring harness (Battery—ignition key illumination—instrument cluster)

INSTRUMENTATION/DRIVER INFO.

Check code 22

Check code 22	Fuel level signal		
STEP	**INSPECTION CONDITION**	**DISPLAY**	**ACTION**
1	Select check code 22 with the fuel gauge sender unit connector disconnected.	252 – 255	Go to the next step.
		Except above	Go to the Step 6.
2	Connect terminals 2R and 2T of the instrument cluster.	000 – 003	Go to the next step.
		Except above	Go to the Step 6.
3	Using the **SST** (Fuel and thermometer checker) or resistor, input **20 ohms** between instrument cluster terminals 2R and 2T.	017 – 023	Go to the next step.
		Except above	Go to the Step 6.
4	Using the **SST** (Fuel and thermometer checker) or resistor, input **60 ohms** between instrument cluster terminals 2R and 2T.	057 – 063	Go to the next step.
		Except above	Go to the Step 6.
5	Using the **SST** (Fuel and thermometer checker) or resistor, input **100 ohms** between instrument cluster terminals 2R and 2T.	097 – 103	Inspect the fuel gauge sender unit.
		Except above	Go to the next step.
6	Inspect the wiring harness and connector between instrument cluster and fuel gauge sender unit. • If there is any malfunction, repair or replace the wiring harness or connector. • If there is no malfunction, replace the instrument cluster.		

INSTRUMENTATION/DRIVER INFO.

Check code 23

Check code 23	Fuel gauge operation signal		
INSPECTION CONDITION	**DISPLAY**	**ACTION**	
After selecting check code 23, wait **approx. 2 s**.	00	The fuel gauge indicates status in the following order **approx. every 2 s**. • F → 1/2 → E → F (fixed)	The fuel gauge is normal.
		Except above	Replace the instrument cluster.
	Err	—	

Check code 25

Check code 25	Water temperature gauge operation signal		
INSPECTION CONDITION	**DISPLAY**	**ACTION**	
After selecting check code 25, wait approx. **2 s**.	00	The water temperature gauge indicates status in the following order **approx. every 2 s**. • H → Center → C → H (fixed)	The water temperature gauge is normal.
		Except above	Replace the instrument cluster.
	Err	—	

Check code 26

Check code 26	Odometer/tripmeter display signal		
INSPECTION CONDITION	**DISPLAY**	**ACTION**	
Select check code 26.	888888 km/LmpgL/100km TRIP A B 888.8	• Display is normal. • Warning and indicator light illuminated. — Generator warning light — AT warning light — DSC indicator light — DSC OFF light — ABS warning light — Brake system warning light — Selector indicator light — MIL — Cruise set indicator light — Cruise main indicator light — Security light — Keyless warning light — Keyless indicator light	• The odometer/tripmeter is normal. • Warning and indicator is normal.
		Except above	Replace the instrument cluster.

INSTRUMENTATION/DRIVER INFO.

Check code 28

Check code 28	Oil pressure gauge operation signal		
INSPECTION CONDITION	**DISPLAY**	**ACTION**	
After selecting check code 28, wait approx. **2 s**.	00	The oil pressure gauge indicates status in the following order **approx. every 2 s**. • H → Center → L → H (fixed)	The oil pressure gauge is normal.
		Except above	Replace the instrument cluster.
	Err	—	

Check code 31	Key reminder switch ON/OFF signal		
STEP	**INSPECTION CONDITION**	**DISPLAY**	**ACTION**
1	Remove the key from the steering lock, then reinsert the key into the steering lock after selecting check code 31. (The key reminder switch is on.)	on	Go to the next step.
		off	Verify that the voltage of instrument cluster terminal 2C is **B+**. • If the voltage is as specified, replace the instrument cluster. • If the voltage is not as specified, inspect the following parts: — Key reminder switch — Wiring harness (Battery—key reminder switch—instrument cluster)
2	Remove the key from the steering lock. (The key reminder switch is off.)	on	Verify that the voltage of instrument cluster terminal 2C is **1.0 V or less**. • If the voltage is as specified, replace the instrument cluster. • If the voltage is not as specified, inspect the following parts: — Key reminder switch — Wiring harness (Key reminder switch—instrument cluster)
		off	Input signal to the instrument cluster is normal.

Check code 53

Check code 53	Ambient temperature		
STEP	**INSPECTION CONDITION**	**DISPLAY**	**ACTION**
1	**With auto A/C or without setting ambient temperature sensor** Select check code 53	none	Instrument cluster is normal.
		Except above	Go to the Step 6.
	With manual A/C Select check code 53 with the ambient temperature sensor connector disconnected.	1000 | 1023	Go to the next step.
		Except above	Go to the Step 6.

INSTRUMENTATION/DRIVER INFO.

Check code 53	Ambient temperature		
STEP	**INSPECTION CONDITION**	**DISPLAY**	**ACTION**
2	Connect terminals 1I and 2P of the instrument cluster.	0000 – 0100	Go to the next step.
		Except above	Go to the Step 6.
3	Using the SST (Fuel and thermometer checker) or resistor, input 42.0 kilo ohms between instrument cluster terminals 1I and 2P.	0950 – 0980	Go to the next step.
		Except above	Go to the Step 6.
4	Using the SST (Fuel and thermometer checker) or resistor, input 6.6 kilo ohms between instrument cluster terminals 1I and 2P.	0720 – 0780	Go to the next step.
		Except above	Go to the Step 6.
5	Using the SST (Fuel and thermometer checker) or resistor, input 385 ohms between instrument cluster terminals 1I and 2P	0130 – 0150	Inspect the ambient temperature sensor.
		Except above	Go to the next step.
6	Inspect the wiring harness and connector between instrument cluster and ambient temperature sensor. • If there is any malfunction, repair or replace the wiring harness or connector. • If there is no malfunction, replace the instrument cluster.		

Check code 57

Check code 57	Panel light control signal		
INSPECTION CONDITION	**DISPLAY**	**ACTION**	
Turn the headlight switch to the TNS position. After selecting check code 57, wait **approx. 2 s**.	01 (FLASHING)	Illumination light (hazard warning switch, center panel module, etc.) flashes **three times**.	The panel light control signal is normal.
		Except above	Verify that the voltage of instrument cluster terminal 1F is **B+**. • If the voltage is as specified, replace the instrument cluster. • If the voltage is not as specified, inspect the following parts: — Illumination light (hazard warning switch, center panel module, etc.) — Wiring harness (Instrument cluster—illumination lights—TNS relay)

INSTRUMENTATION/DRIVER INFO.

Check code 58

Check code 58	Buckle switch (passenger-side) and occupancy sensor		
STEP	**INSPECTION CONDITION**	**DISPLAY**	**ACTION**
1	Seat one person in the passenger's seat, and unfasten passenger-side seat belt. (Occupancy sensor and buckle switch ON)	ON	Go to the next step.
		OFF	Verify that the voltage of instrument cluster terminal 2H is **1.0 V or less**. • If the voltage is as specified, replace the instrument cluster. • If the voltage is not as specified, inspect the following parts: — Buckle switch — Occupancy sensor — Wiring harness (Instrument cluster—occupancy sensor—buckle switch)
2	Seat one person in the passenger's seat, and fasten passenger-side seat belt. (Occupancy sensor ON and buckle switch OFF) Seat no person in the passenger's seat, and unfasten passenger-side seat belt. (Occupancy sensor OFF and buckle switch ON) Seat no person in the passenger's seat, and fasten passenger-side seat belt. (Occupancy sensor and buckle switch OFF)	ON	Verify that the voltage of instrument cluster terminal 2H is **B+**. • If the voltage is as specified, replace the instrument cluster. • If the voltage is not as specified, inspect the following parts: — Buckle switch — Occupancy sensor — Wiring harness (Instrument cluster—occupancy sensor—buckle switch)
		OFF	Input signal to the instrument cluster is normal.

INSTRUMENTATION/DRIVER INFO. PERSONALIZATION FEATURES SETTING PROCEDURE

id092200889900

Note
- Use the IDS (laptop PC) because the PDS (Pocket PC) does not support the INSTRUMENT CLUSTER CUSTOMIZED FUNCTION SETTING PROCEDURE.

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   1. Select the "Module Programming".
3. Then, select items from the screen menu in the following order.
   1. Select "Programmable Parameters".
   2. Select "Warning Lamps / Chimes".
4. Select an item name, and then select option.
   Items
   - Fuel logic (Disabled / Enabled)
   - DIS Correction (-15%, -10%, -5%, 0%, 5%, 10%, 15%)

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INSTRUMENTATION/DRIVER INFO.

DATA MONITORING AND RECORDING PROCEDURE

id092200801500

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     - — Select “DataLogger”.
     - — Select “Modules”.
     - — Select “IC”.
   - When using the PDS (Pocket PC)
     - — Select “Module Tests”.
     - — Select “IC”.
     - — Select “DataLogger”.
3. Select the applicable PID from the PID table.
4. Verify the PID data according to the directions on the screen.

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Note

- The PID data screen function is used for monitoring the calculated value. Therefore, if the monitored value of the output parts is not within the specification, inspection of the monitored value of input parts corresponding to applicable output part control is necessary. In addition, because the system does not display output part malfunction as abnormality in the monitored value, it is necessary to inspect the output part individually.

Indication Item Table

Monitor item	Input-output signal/part name	Unit/State	Terminal
IC_DTC_CNT	Number of continuous DTCs	—	—
IC_ECT	Water temperature gauge	°C	1J, 1L
IC_NUMKEYS	Number of key ID numbers registered with the vehicle	—	—
IC_ODO_CNT	Odometer	m	1J, 1L
IC_SPDMTR	Speedometer	KPH	
IC_TACHO	Tachometer	RPM	
IC_VPWR	Power supply voltage	V	1C

OCCUPANCY SENSOR INSPECTION

id092200801100

1. Turn the ignition switch to LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait **1 min or more**.
4. Remove the passenger-side seat. (See 09-13-4 SEAT REMOVAL/INSTALLATION.)
5. Disconnect the occupancy sensor connector.

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INSTRUMENTATION/DRIVER INFO.

6. Verify that the continuity between the occupancy sensor terminals is as indicated in the table.
   - If not as indicated in the table, replace the occupancy sensor.

○—○: Continuity

Condition	Terminal	
	A	B
Seat one person in the passenger's seat	○	○
Seat no person in the passenger's seat		

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TECHNICAL DATA

09-50 TECHNICAL DATA

BODY ELECTRICAL SYSTEM 09-50–1

TECHNICAL DATA

BODY ELECTRICAL SYSTEM

id095000800200

Item		Specifications (W) × number
Exterior light bulb capacity	Headlight bulb (high-beam)	60 × 2
	Discharge headlight (low-beam)	35 × 2
	Halogen headlight bulb (low-beam)	55 × 2
	Parking light bulb	5 × 2
	Front fog light bulb	55 × 2
	Front turn light bulb	21 × 2
	Side turn light bulb	5 × 2
	Brake/tail light bulb	21/5 × 2
	Rear turn light bulb	21 × 2
	Back-up light bulb (with rear fog light)	16 × 2 (16 × 1)
	License plate light bulb	5 × 2
	Rear fog light bulb	21 × 1
	High-mount brake light (LED)	1
Interior light bulb capacity	Map light bulb	10 × 1
	Trunk compartment light bulb	8 × 1
	Ignition key illumination bulb	1.4 × 1

SERVICE TOOLS

09-60 SERVICE TOOLS

BODY AND ACCESSORIES SST 09-60–1

SERVICE TOOLS

BODY AND ACCESSORIES SST

id096000800100

49 N088 0A0 Fuel and Thermometer checker	-	-

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