

GENERAL INFORMATION

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SECTION

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HOW TO USE THIS MANUAL

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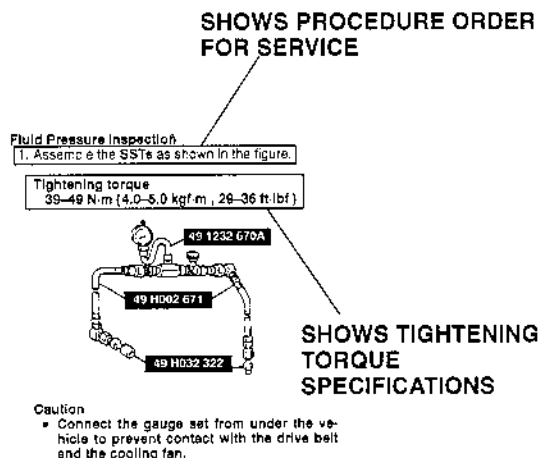
Range of Topics

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

Service Procedure

Inspection, adjustment

- The procedures for inspections and adjustments are divided into steps. Important points in regard to the location and contents of the procedures are explained in detail and are shown in the illustrations.

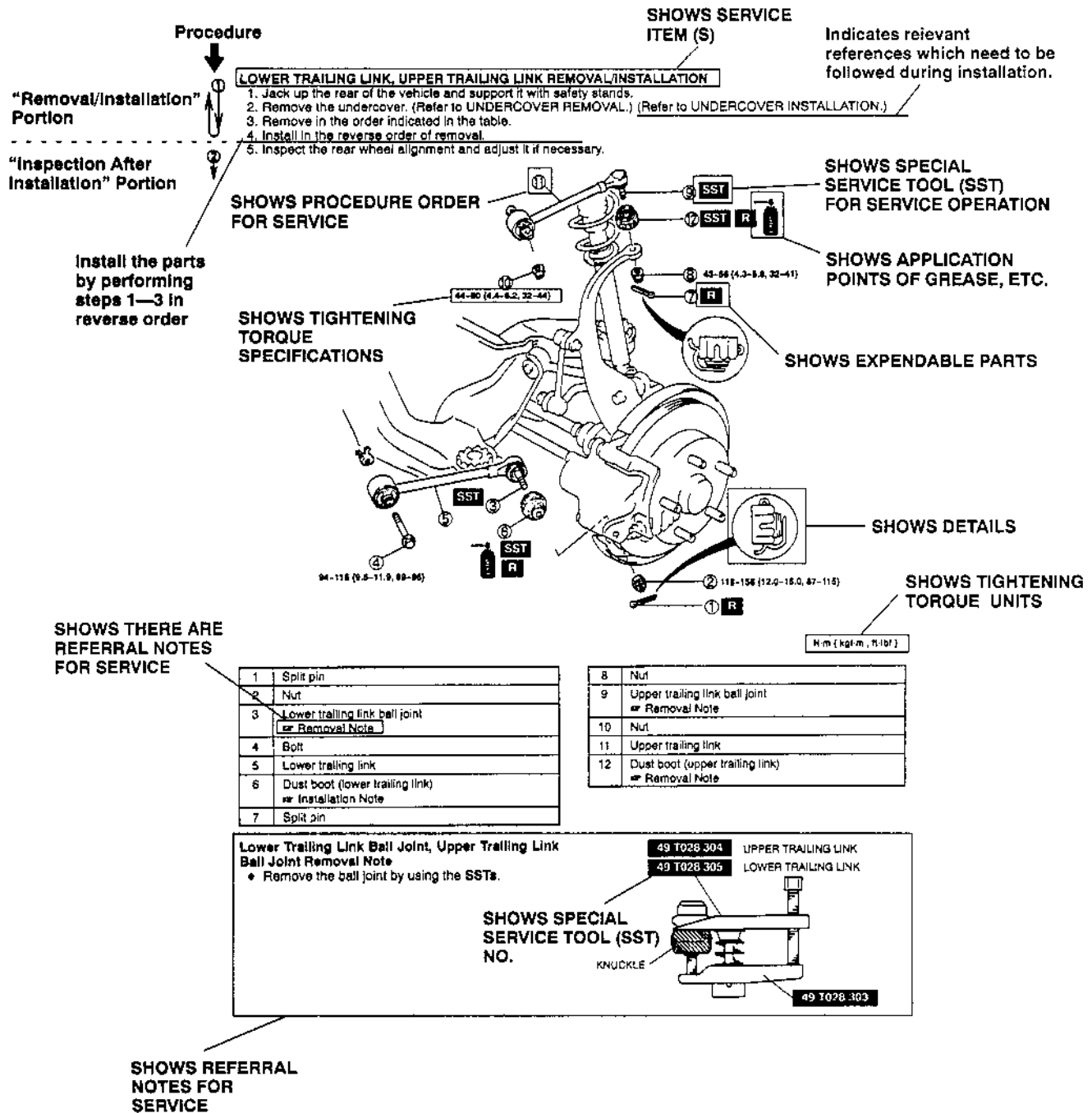


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Repair procedure

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 which 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 which require the use of special service tools are for removal/installation also shown.
3. The procedures 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 information concerning a procedure. Refer to this information when servicing the related part.

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Symbols

- There are eight symbols indicating oil, grease, sealant, and the use of **SSTs**. These symbols show the points of applying or using such materials during service.

Symbol	Meaning	Kind
 UXU00003	Apply oil	New appropriate engine oil or gear oil as appropriate
 UXU00004	Apply brake fluid	New appropriate brake fluid
 UXU00005	Apply automatic transaxle/transmission fluid	New appropriate automatic transaxle/transmission fluid
 UXU00006	Apply grease	Appropriate grease
 UXU00007	Apply sealant	Appropriate sealant
 UXU00008	Apply petroleum jelly	Appropriate petroleum jelly
 UXU00009	Replace part	O-ring, gasket, etc.
 UXU00010	Use SST	Appropriate SST

Advisory Messages

You'll 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 could result if the caution is ignored.

Note

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

Specification

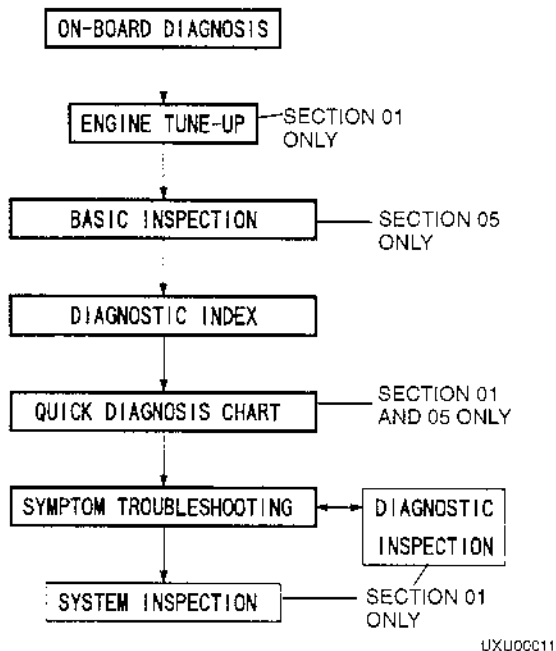
- The values indicate the allowable range when performing inspections or adjustments.

Upper and lower limits

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

Troubleshooting Procedure

Basic flow of troubleshooting



On-board diagnosis

- The Diagnostic trouble codes are important hints for repairing malfunctions that are difficult to simulate. By following the diagnostic trouble code, perform the inspection to quickly and accurately diagnose the malfunction.
- The on-board diagnostic function is used during inspection. When a diagnostic trouble code is shown, specifying the cause of a malfunction, continue the inspection according to the items indicated by the on-board diagnostic function.

Engine tune-up (section 01)

- Any necessary adjustments are made after starting the engine.

Basic inspection (section 05)

- The basic inspection is performed to quickly narrow down the possible causes after a malfunction occurs regardless of the symptoms. The basic inspection is performed to also locate the region of many malfunction symptoms.

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Diagnostic index

- The diagnostic index lists the symptoms of the malfunctions. Select the symptoms pertaining to or most closely pertaining to the actual malfunction.

Quick diagnosis chart (section 01 and 05)

- The quick diagnosis chart lists the diagnosis and inspection procedures to be performed specifically relating to the cause of the malfunction.

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Symptom troubleshooting

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

Procedures for Use

Using the basic inspection

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

SHOWS INSPECTION ORDER		SHOWS ITEM NAMES FOR THE DETAILED PROCEDURES		SHOWS POINTS REQUIRING ATTENTION IN REGARD TO INSPECTION RESULTS
STEP	INSPECTION		ACTION	
1	Turn ignition switch to ON Does hold indicator light (illuminate/go out) correspond to hold switch position (ON/OFF)?	Yes	Go to next step	
		No	Perform malfunction diagnosis according to No.26 "HOLD INDICATOR LIGHT DOES NOT ILLUMINATE WHEN HOLD SWITCH IS TURNED ON" or No.27 "HOLD INDICATOR LIGHT ILLUMINATES WHEN HOLD SWITCH IS NOT TURNED ON"	
2	Check the ATF color and condition Are ATF color and odor normal?	Yes	Go to next step	
		No	Repair or replace any defective parts	
3	Perform the line pressure test MECHANICAL SYSTEM TEST, Line Pressure Test Is line pressure OK?	Yes	Go to next step	
		No	Repair or replace any defective parts	
4	Perform the stall test MECHANICAL SYSTEM TEST, Stall Test Is stall speed OK?	Yes	Go to next step	
		No	Repair or replace any defective parts	
5		Yes	Perform symptom troubleshooting	

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Using the diagnostic index

- The symptoms of the malfunctions are listed in the diagnostic index for system troubleshooting.
- The exact malfunction symptoms can be selected by using the details.

No.	TROUBLESHOOTING ITEM	DESCRIPTION
1	Discharged battery	—
2	Will not crank or cranks slowly	—
3	No combustion	Engine cranks at normal speed but shows no sign of firing
4	Combustion observed but engine will not start	Engine shows combustion while cranking but will not continue to run when ignition switch is turned from STA to ON
5	Cranks normal but hard to start	Engine cranks at normal speed but requires excessive cranking time before starting Engine runs normally at idle after started
6	Low idle speed/Engine stalls or vibrates	Engine idles at low speed, stalls, or vibrates when engine is cold, hot, or normal temperature
7	High idle speed Idle speed hard to high	Idle speed excessively high and will not go down after warm-up
8	High idle speed Idle speed hard to lower	Idle speed excessively high and requires time to be lowered to normal speed after warm-up
9	Rough idle/Engine stalls when E/L, P/S, or A/C ON	Engine runs normally at idle with no load but stalls or vibrates excessively when load (E/L, P/S, or A/C) is ON
10		Engine runs normally at idle but stalls or vibrates excessively during N-D shift

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Using the quick diagnosis chart

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

PART WHICH MAY BE THE SYMPTOM

② PARTS WHICH MAY BE THE CAUSE OF PROBLEMS

QUICK DIAGNOSIS CHART

1	Discharged battery																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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THE PART CAUSING TROUBLE, AS DETERMINED FROM THE RESULT OF THE MECHANICAL SYSTEM TEST.

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Using the symptom troubleshooting

- Symptom troubleshooting shows diagnosis procedure, inspection method, and proper action to take for each trouble symptom.

TROUBLESHOOTING HINTS describes possible point of malfunction.

TROUBLE SYMPTOM

STEP shows the order of troubleshooting.

INSPECTION describes an inspection (method) to quickly determine the failed part.

Reference item(s) for the detailed procedure to perform INSPECTION is shown.

9 Engine stalls			
Troubleshooting hints			
Constant application of torque converter clutch piston			
STEP	INSPECTION	ACTION	
1	Does the vehicle shake at shift point as well as at other points when decelerating?	Yes	Troubleshoot according to "Vehicle vibrates back and forth or engine stalls during deceleration".
		No	Go to step 2.
2	Check the voltage at the following powertrain control module terminal. • Brake switch signal • 01-40 POWERTRAIN CONTROL MODULE (PCM) INSPECTION Is terminal voltage OK?	Yes	Go to step 3.
		No	Carry out the stall test. or 05-17 MECHANICAL SYSTEM TEST, Stall Test. Stall test procedure.
3	Does torque converter clutch solenoid valve voltage at powertrain control module terminal measure 0 V?	Yes	Go to step 4.
		No	Check for poor connection of the connectors from powertrain control module to torque converter clutch solenoid valve.
4	Check if torque converter clutch solenoid valve is sticking. Is solenoid valve OK?	Yes	Go to step 5.
		No	Replace torque converter clutch solenoid valve.
5	Overhaul the AT.	Yes	Go to step 6.
		No	Repair or replace torque converter clutch control valve or control valve body.

ACTION describes the appropriate action to take as a result (Yes/No) of INSPECTION.

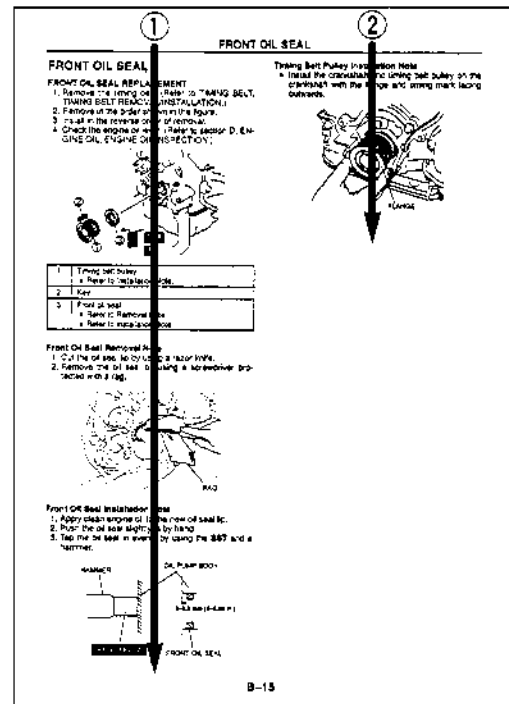
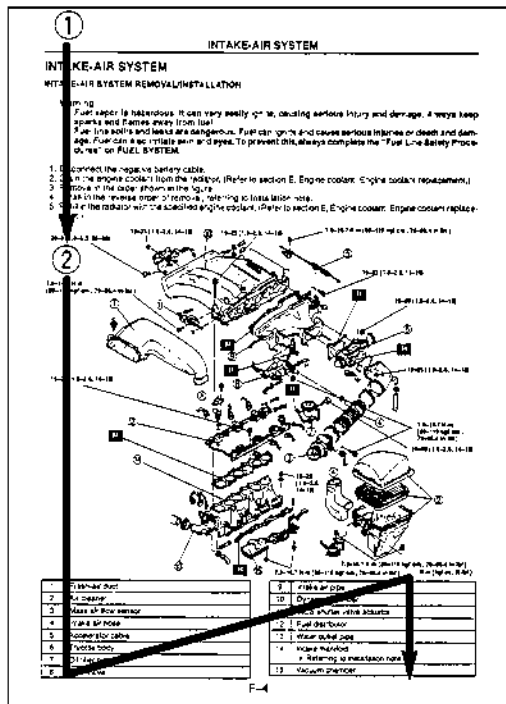
How to perform ACTION is described on the reference item(s) shown.

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Text Sequence

- The text sequence is as indicated by the arrows shown below.

Example:



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GENERAL INFORMATION

UNITS

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Electrical current	A (ampere)
Electric potential	V (volt)
Electric power	W (watt)
Length	mm (millimeter)
	in (inch)
Negative pressure	kPa (kilo Pascal)
	mmHg (millimeters of mercury)
	inHg (inches of mercury)
Positive pressure	kPa (kilo Pascal)
	kgf/cm ² (kilogram force per square centimeter)
	psi (pounds per square inch)
Resistance	Ω (ohm)
Torque	N·m (Newton meter)
	kgf·m (kilogram force per meter)
	kgf·cm (kilogram force per centimeter)
	ft·lbf (foot pound)
	in·lbf (inch pound)
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/cm² in the following specifications:

210—260 kPa {2.1—2.7 kgf/cm², 30—38 psi}
270—310 kPa {2.7—3.2 kgf/cm², 39—45 psi}

- The actual converted values for 2.7 kgf/cm² are 264 kPa and 38.4 psi. In the top specification, 2.7 is used as an upper limit, so its converted values are rounded down to 260 and 38. In the bottom specification, 2.7 is used as a lower limit, so its converted values are rounded up to 270 and 39.

GENERAL INFORMATION

SAE STANDARDS

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- In accordance with new regulations, SAE (Society of Automotive Engineers) standard names and abbreviations are now used in this manual. The table below lists the names and abbreviations that have been used in Mazda manuals up to now and their SAE equivalents.

Previous Standard		New Standard		
Abbr.	Name	Abbr.	Name	Remark
—	Accelerator Pedal	AP	Accelerator Pedal	
—	Air Cleaner	ACL	Air Cleaner	
—	Air Conditioning	A/C	Air Conditioning	
—	Airflow Meter	VAF	Volume Air Flow Sensor	
—	Airflow Sensor	MAF	Mass Air Flow Sensor	
—	Alternator	GEN	Generator	
—	ATF Thermosensor	—	Transmission (Transaxle) Fluid Temperature Sensor	
—	Atmospheric Pressure	BARO	Barometric Pressure	
V _B	Battery Voltage	B+	Battery Positive Voltage	
—	Catalytic Converter	OC	Oxidation Catalytic Converter	
		TWC	Three Way Catalytic Converter	
		WU-TWC	Warm Up Three Way Catalytic Converter	Directly connected to exhaust manifold
—	Circuit Opening Relay	FPR	Fuel Pump Relay	In some models, there is a fuel pump relay that controls pump speed. That relay is now called the fuel pump relay (speed).
—	Clutch Position	CPP	Clutch Pedal Position	
—	Crank Angle Sensor	CMP	Camshaft Position Sensor	
—	Crank Angle Sensor 2	CKP	Crankshaft Position Sensor	
—	Diagnosis Connector	DLC	Data Link Connector	
—	Diagnosis/Self-Diagnosis	OBD	On-Board Diagnostic	
—	Direct Ignition	DLI	Distributorless Ignition	
—	EC-AT Control Unit	TCM	Transmission (Transaxle) Control Module	
EGI	Electronic Gasoline Injection System	CIS	Continuous Fuel Injection System	
—	Electronic Spark Ignition	EI	Electronic Ignition	Controlled by the PCM
ECU	Engine Control Unit	PCM	Powertrain Control Module	Device that controls engine and powertrain
		ECM	Engine Control Module	
—	Engine Modification	EM	Engine Modification	
—	Engine RPM Signal	—	Engine Speed Input Signal	
—	Evaporative Emission	EVAP	Evaporative Emission	
—	Exhaust Gas Recirculation	EGR	Exhaust Gas Recirculation	
—	Fan Control	FC	Fan Control	
—	Feedback System	CLS	Closed Loop System	
—	Flexible Fuel	FF	Flexible Fuel	
—	Fuel Pump	FP	Fuel Pump	
—	Fully Closed	CTP	Closed Throttle Position	
—	Fully Open	WOT	Wide Open Throttle	
—	Ground/Earth	GND	Ground	
—	IC Regulator	VR	Voltage Regulator	
—	Idle Speed Control	IAC	Idle Air Control	

00

GENERAL INFORMATION

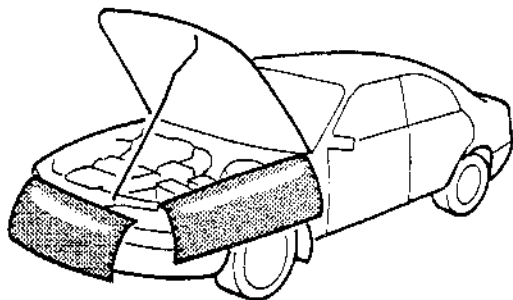
Previous Standard		New Standard		
Abbr.	Name	Abbr.	Name	Remark
—	Idle Switch	—	Closed Throttle Position Switch	
—	Igniter	ICM	Ignition Control Module	
—	Inhibitor	TR	Transmission (Transaxle) Range	
—	Intake Air Pressure	MAP	Manifold Absolute Pressure	
—	Intake Air Thermo	IAT	Intake Air Temperature	
—	Intercooler	CAC	Charge Air Cooler	
—	Knock Sensor	KS	Knock Sensor	
—	Line Pressure Solenoid Valve	—	Pressure Control Solenoid	
—	Lock-up	TCC	Torque Converter Clutch	
—	Malfunction Indicator Light	MIL	Malfunction Indicator Lamp	
—	Multiport Fuel Injection	MFI	Multiport Fuel Injection	
—	Open Loop	OL	Open Loop	
—	Overdrive	4GR	Fourth Gear	
—	Oxygen Sensor	HO2S	Heated Oxygen Sensor	With heater
		O2S	Oxygen Sensor	
—	Park/Neutral Range	PNP	Park/Neutral Position	
—	Power Steering Pressure	PSP	Power Steering Pressure	
—	Pulse Generator	—	Input/Turbine Speed Sensor	
—	Reed Valve	SAPV	Secondary Air Pulse Valve	
—	Secondary Air Injection System	PAIR	Pulsed Secondary Air Injection	Pulsed injection
		AIR	Secondary Air Injection	Inject with compressor
—	Sequential Fuel Injection	SFI	Sequential Multipoint Fuel Injection	
—	Service Code(s)	DTC	Diagnostic Trouble Code(s)	
—	Spark Ignition	DI	Distributor Ignition	
—	Stoplight Switch	—	Brake Switch	
—	Test Mode	DTM	Diagnostic Test Mode	Diagnostic trouble codes depend on the diagnostic test mode
—	Throttle Body	TB	Throttle Body	
—	Throttle Sensor	TP	Throttle Position Sensor	
—	Turbocharger	TC	Turbocharger	
—	Vehicle Speed Sensor	VSS	Vehicle Speed Sensor	
—	Vehicle Speed Sensor 1	—	Output Speed Sensor	
—	Water Thermo	ECT	Engine Coolant Temperature	
—	1-2 Shift Solenoid Valve	—	Shift Solenoid A	
	Shift + A Solenoid Valve			
—	2-3 Shift Solenoid Valve	—	Shift Solenoid B	
	Shift + B Solenoid Valve			
—	3-4 Shift Solenoid Valve	—	Shift Solenoid C	
—	3rd Gear	3GR	Third Gear	
—	—	—	Incorrect Gear Ratio	

FUNDAMENTAL PROCEDURES

X5U000W03

Protection of the Vehicle

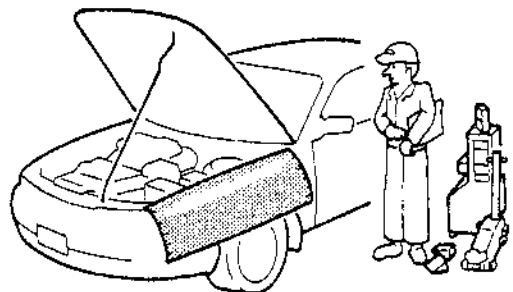
- Always be sure to cover fenders, seats, and floor areas before starting work.



UXU00017

Preparation of Tools and Measuring Equipment

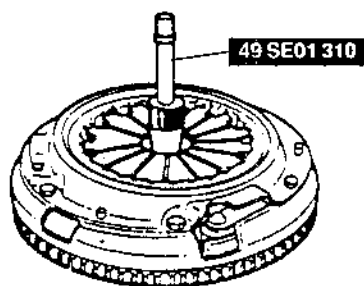
- Be sure that all necessary tools and measuring equipment are available before starting any work.



UXU00018

Special Tools

- Use special tools when they are required.



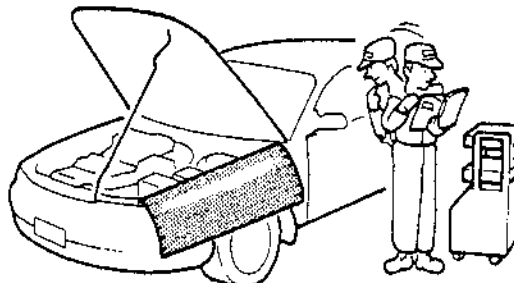
UXU00019

Disconnection of the Negative Battery Cable

- Before beginning any work, turn the ignition switch to LOCK, then disconnect the negative battery cable and wait for more than 1 minute to allow the backup power supply of the SAS unit and side air bag sensors to deplete its stored power.

Removal of Parts

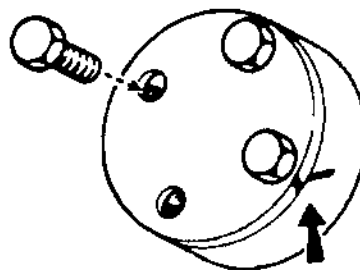
- While correcting a problem, try also to determine its cause. Begin work only after first learning which parts and subcomponents must be removed and disassembled for replacement or repair. After removing the part, plug all holes and ports to prevent foreign material from entering.



UXU00020

Disassembly

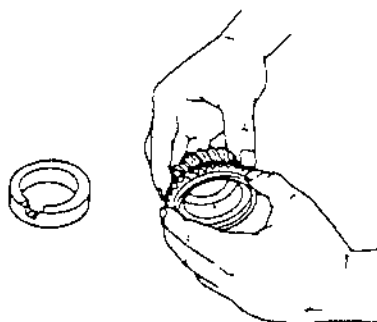
- If the disassembly procedure is complex, requiring many parts to be disassembled, all parts should be disassembled in a way that will not affect their performance or external appearance and identified so that reassembly can be performed easily and efficiently.



UXU00021

Inspection During Removal, Disassembly

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

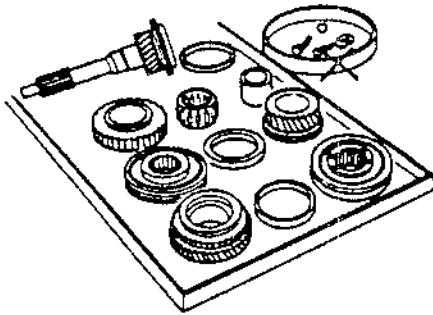


UXU00022

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.



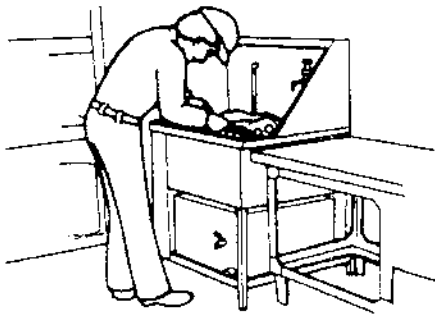
UXU00023

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.



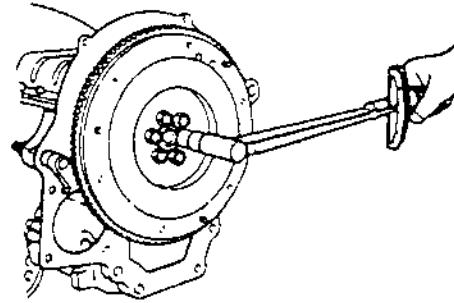
UXU00024

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:

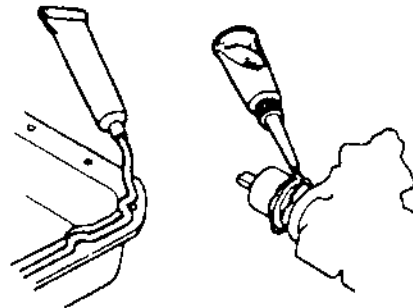
- Oil seals
- Gaskets
- O-rings
- Lockwashers
- Cotter pins
- Nylon nuts



UXU00025

Depending on location:

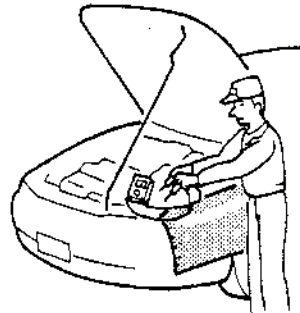
- Sealant, gasket, or both should be applied to the specified locations. When sealant is applied, parts should be installed before sealant hardens. Hardened sealant causes leaks.
- Oil should be applied to the moving components of parts.
- Specified oil or grease should be applied at the prescribed locations (such as oil seals) before reassembly.



UXU00026

Adjustments

- Use suitable gauges and testers when making adjustments.

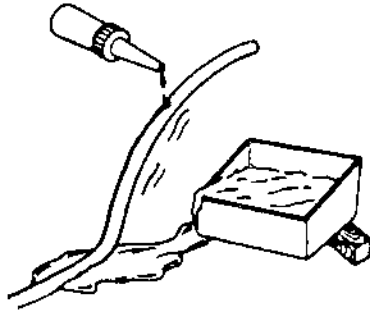


UXU00027

GENERAL INFORMATION

Rubber Parts and Tubing

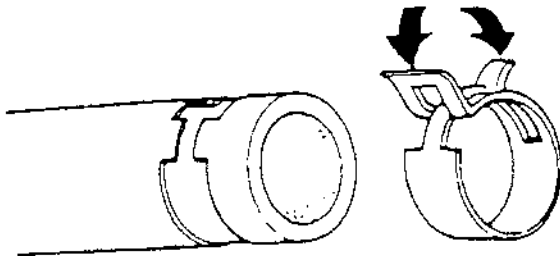
- Prevent gasoline or oil from spilling on rubber parts or tubing.



UXUC0029

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.



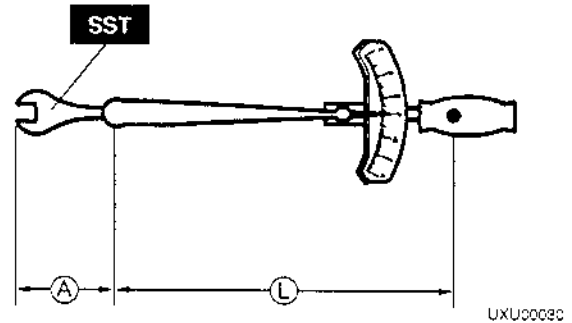
UXUC0029

Torque Formulas

- When using a torque wrench-SST combination, the written torque must be recalculated due to the extra length that the SST 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	$N \cdot m \times [L / (L + A)]$
kgf·m	$kgf \cdot m \times [L / (L + A)]$
kgf·cm	$kgf \cdot cm \times [L / (L + A)]$
ft·lbf	$ft \cdot lbf \times [L / (L + A)]$
in·lbf	$in \cdot lbf \times [L / (L + A)]$

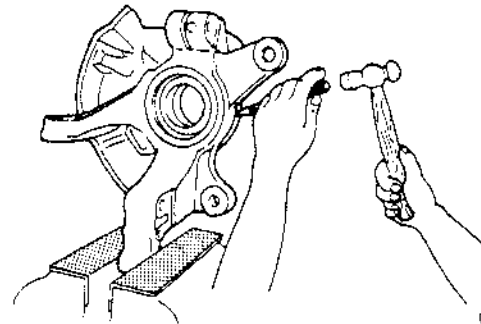
A : The length of the SST past the torque wrench drive.
L : The length of the torque wrench.



UXUC0030

Vise

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



UXUC0031

Dynamometer

- When test-running a vehicle on a dynamometer:
 - Place a fan, preferably a vehicle-speed proportional type, in front of the vehicle.
 - Connect an exhaust gas ventilation unit.
 - Cool the exhaust pipes with a fan.
 - Keep the area around the vehicle uncluttered.
 - Watch the water temperature gauge.

Note

- When the vehicle is on a chassis roller and only the front wheels rotate, the ABS warning light may illuminate. Refer to 04-01 PRECAUTION to turn off the warning light.

INSTALLATION OF RADIO SYSTEM

If a radio system is installed improperly or if a high-powered type is used, the CIS and other systems may be affected. When the vehicle is to be equipped with a radio, observe the following precautions:

1. Install the antenna at the farthest point from control modules.

2. Install the antenna feeder as far as possible from the control module harnesses.
3. Ensure that the antenna and feeder are properly adjusted.
4. Do not install a high-powered radio system.

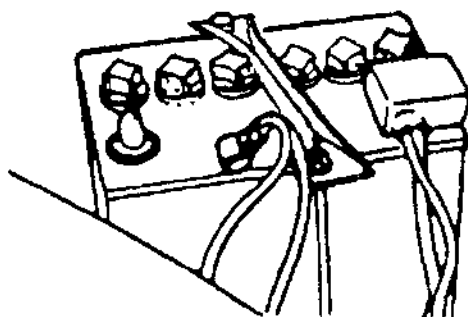
X5UC00W04

ELECTRICAL SYSTEM

Electrical Parts

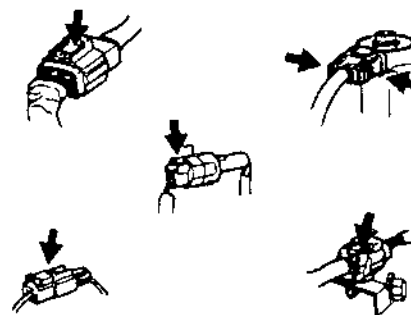
Battery cable

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



UXU00032

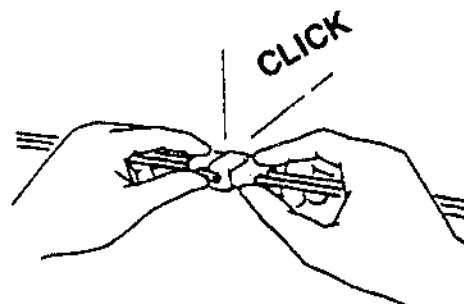
X6U000W35



UXU00035

Locking connector

- When locking connectors, listen for a click that will indicate they are securely locked.



UXU00036

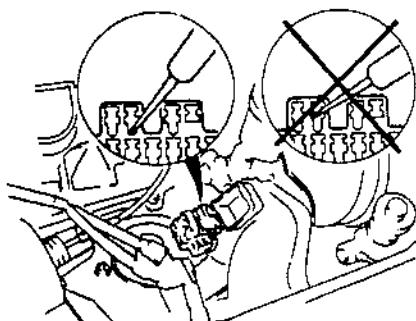
Connectors

Data link connector

- Insert the probe into the service hole when connecting a jumper wire to the data link connector.

Caution

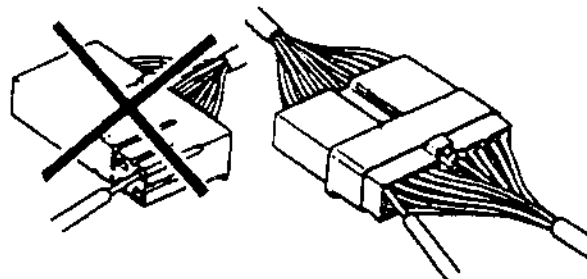
- Inserting a jumper wire probe into the data link connector terminal may damage the terminal.



UXU00033

Inspection

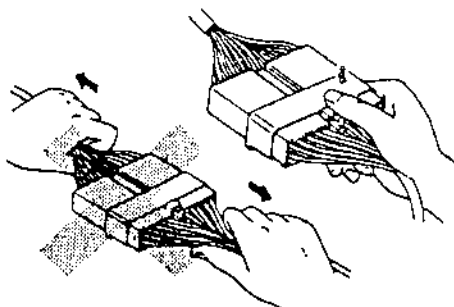
- When a tester is used to check for continuity or to measure voltage, insert the tester probe from the wiring harness side.



UXU00037

Disconnecting connectors

- When disconnecting two connectors, grasp the connectors, not the wires.



UXU00034

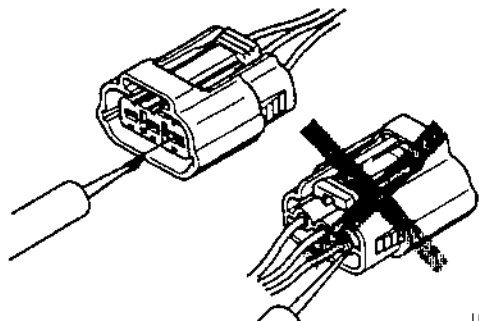
- Connectors can be disconnected by pressing or pulling the lock lever as shown.

GENERAL INFORMATION

- Check the terminals of waterproof connectors from the connector side, as they cannot be accessed from the wiring harness side.

Caution

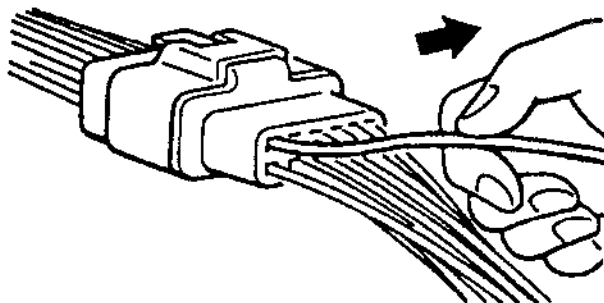
- To prevent damage to the terminal, wrap a thin wire around the lead before inserting it into the terminal.



UXU00038

Terminals Inspection

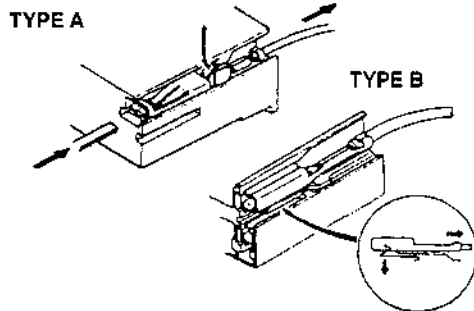
- Pull lightly on individual wires to check that they are secured in the terminal.



UXU00039

Replacement

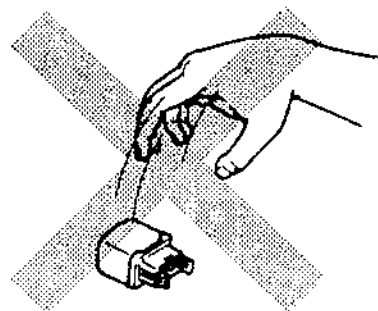
- Use the appropriate tools to remove a terminal as shown. When installing a terminal, be sure to insert it until it locks securely.
- Insert a thin piece of metal from the terminal side of the connector, and then, with the terminal locking tab pressed down, pull the terminal out from the connector.



UXU00040

Sensors, Switches, and Relays

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



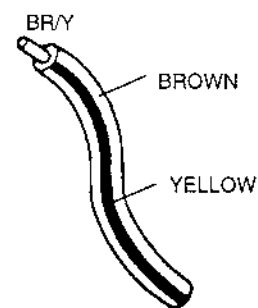
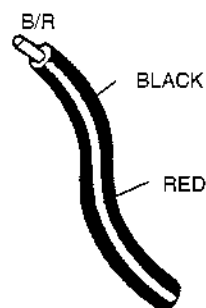
UXU00041

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 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		

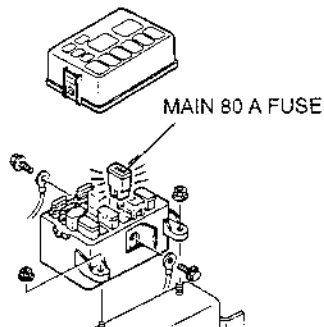


UXU00042

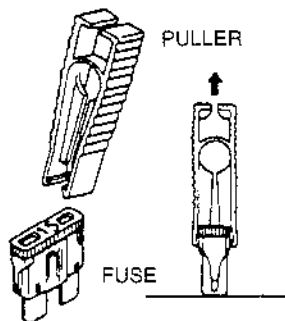
GENERAL INFORMATION

Fuse Replacement

1. When replacing a fuse, be sure to replace it with one of the specified capacity. If a fuse again fails after it has been replaced, the circuit probably has a short and the wiring should be checked.
2. Be sure the negative battery terminal is disconnected before replacing a main fuse.



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



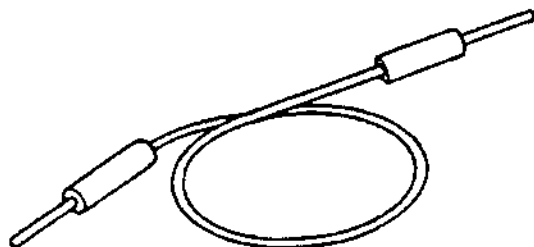
Electrical Troubleshooting Tools

Jumper wire

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

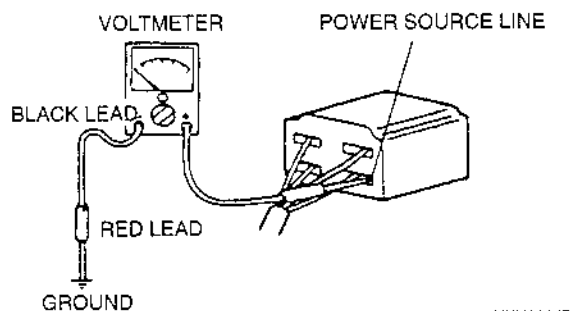
Caution

- 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.



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 is to be measured and the negative (–) probe (black lead wire) to a body ground.

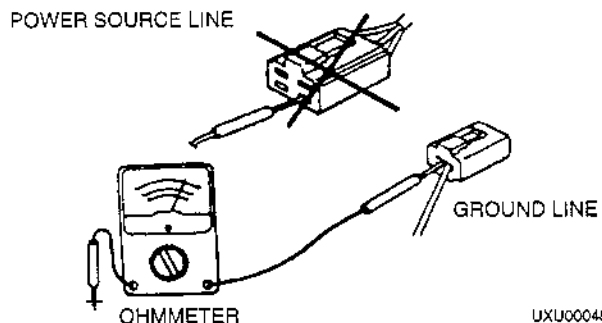


Ohmmeter

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

Caution

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



GENERAL INFORMATION

JACKING POSITIONS

X5U000W06

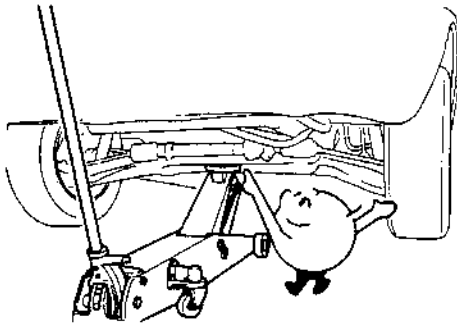
Warning

- 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 positions and block the wheels.

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

Front

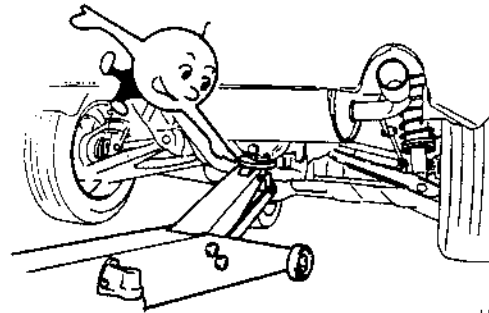
At the center of the crossmember



U5U00001

Rear

At the center of the differential



U5U00002

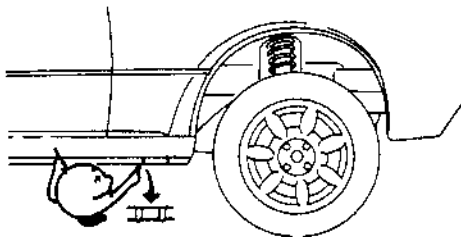
VEHICLE LIFT (2 SUPPORTS) AND SAFETY STAND (RIGID RACK) POSITION

X5U000W07

Vehicle Lift Positions

Front

Both sides of the vehicle, on side sills

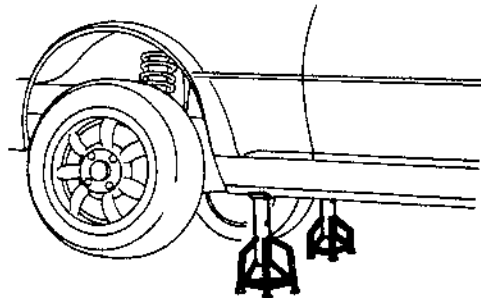


X5U000WA2

Safety Stand Positions

Front

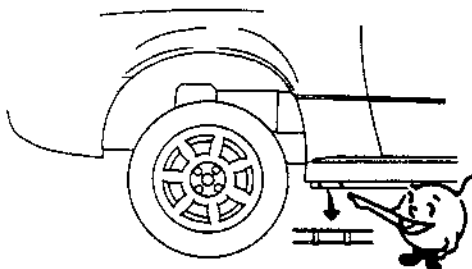
Both sides of the vehicle, on side sills



X5U000WA4

Rear

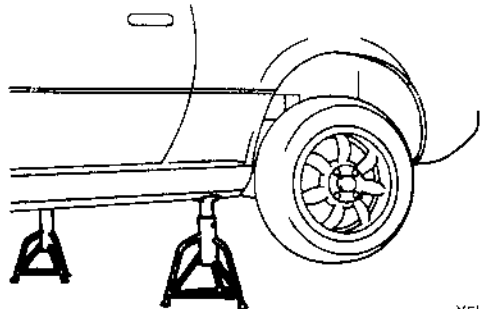
Both sides of the vehicle, on side sills



X5U000WA3

Rear

Both sides of the vehicle, on side sills

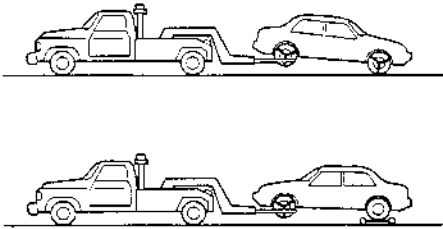


X5U000WA5

GENERAL INFORMATION

TOWING

X5U000W08



X5U000WA8

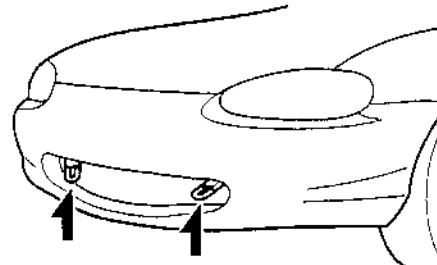
Proper lifting and towing are necessary to prevent damage to the vehicle. State and local laws must be followed.

A towed vehicle usually should have its rear wheels off the ground. If excessive damage or other conditions prevent this, use wheel dollies.

Caution

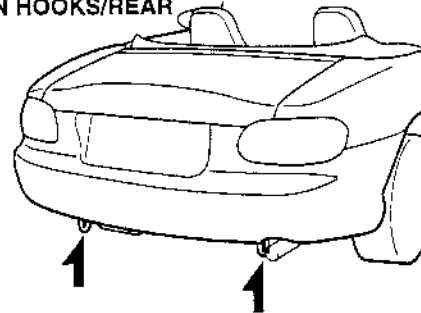
- Do not use the hook loops under the front and rear for towing. They are designed **ONLY** for tying down the vehicle when its' being transported. Using them for towing will damage the bumper.

TIEDOWN HOOKS/FRONT



X5U000WA6

TIEDOWN HOOKS/REAR

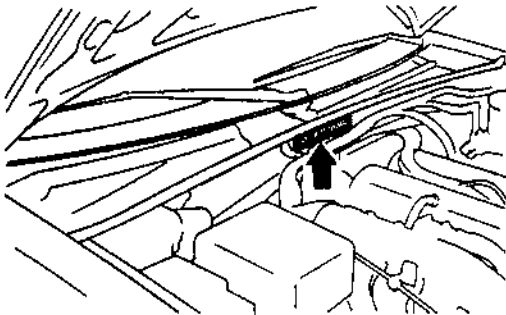


X5U000WA7

IDENTIFICATION NUMBER LOCATIONS

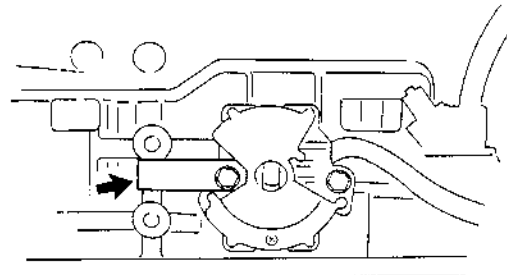
U5U000AG

Vehicle Identification Number (VIN)



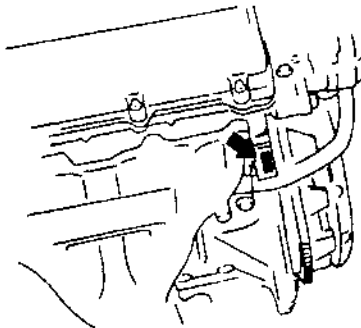
X5U000WA9

Automatic Transmission Number



X5U000WAB

Engine Identification Number



X5U000WAA

GENERAL INFORMATION

ABBREVIATIONS

XSUCC3W09

AAS	Air adjusting screw
ABS	Antilock brake system
A/C	Air conditioner
ACC	Accessories
ALR	Automatic locking retractor
AT	Automatic transmission
ATF	Automatic transmission fluid
AV	Pressure reduction valve
CDCV	Canister drain cut valve
CM	Control module
D	Drive
DRL	Daytime running light
EC-AT	Electronically controlled automatic transmission
ELR	Emergency locking retractor
EV	Pressure retention valve
EX	Exhaust
HI	High
HU	ABS hydraulic unit
IAC	Idle air control
IG	Ignition
IN	Intake
INT	Intermittent
LF	Left front
LH	Left hand

LO	Low
LR	Left rear
LSD	Limited slip differential
M	Motor
MT	Manual transmission
N	Neutral
O/D	Overdrive
OFF	Switch off
ON	Switch on
P	Park
PCV	Positive crankcase ventilation
PPF	Power plant frame
P/S	Power steering
R	Reverse
RF	Right front
RH	Right hand
RR	Right rear
SAS	Sophisticated air bag sensor
SST	Special service tool
SW	Switch
TAS	Throttle adjusting screw
TDC	Top dead center
TNS	Tail number side lights
TPCV	Tank pressure control valve
VICS	Variable inertia charging system

GENERAL INFORMATION

PRE-DELIVERY INSPECTION

XSU000W10

Pre-Delivery Inspection Table

Exterior

INSPECT and **ADJUST**, if necessary, the following items to specification:

- ☐ Glass, exterior bright metal and paint for damage
- ☐ Convertible top and detachable hardtop (if equipped) for damage
- ☐ Wheel lug nuts
- ☐ All weatherstrips for damage or detachment
- ☐ Operation of hood release and lock
- ☐ Operation of fuel lid
- ☐ Door operation and alignment
- ☐ Headlight aiming

INSTALL the following parts:

- ☐ Wheel caps (if equipped)
- ☐ Mast antenna (if equipped)

Under hood—engine off

INSPECT and **ADJUST**, if necessary, the following items to specification:

- ☐ Fuel, coolant, and hydraulic lines, fittings, connections, and components for leaks
- ☐ Engine oil level
- ☐ Power steering fluid level (if equipped)
- ☐ Brake and clutch master cylinder fluid level
- ☐ Windshield washer reservoir fluid level
- ☐ Radiator coolant level and specific gravity
- ☐ Tightness of battery terminals

Interior

CHECK the operation of the following items:

- ☐ Seat controls (sliding and reclining)
- ☐ Seat belts and warning system
- ☐ Air bag system using warning light
- ☐ Cruise control system (if equipped)
- ☐ Ignition switch and steering lock
- ☐ Starter interlock switch (clutch pedal)
- ☐ Power windows (if equipped)
- ☐ Door locks
- ☐ All lights including warning and indicator lights
- ☐ Horn, wipers, and washers
- ☐ Wiper blades performance
Clean the wiper blades and windshield, if necessary
- ☐ Audio system
- ☐ Cigarette lighter
- ☐ Power outside mirrors (if equipped)
- ☐ Heater, defroster, and air conditioner at all mode selections (if equipped)

CHECK the following items:

- ☐ Presence of spare fuse
- ☐ Upholstery and interior finish

CHECK and **ADJUST**, if necessary, the following items:

- ☐ Pedal height and free play of brake and clutch pedal (Refer to section 04 and 05)
- ☐ Parking brake (Refer to section 04)

Under hood—engine running at operating temperature

CHECK the following items:

- ☐ Automatic transmission oil level

On hoist

CHECK the following items:

- ☐ 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

CHECK the following items:

- ☐ Brake operation
- ☐ Clutch operation
- ☐ Steering control
- ☐ Operation of meters and gauges
- ☐ Squeaks, rattles, or unusual noises
- ☐ Overall engine performance
- ☐ Seat belt emergency locking retractors
- ☐ Cruise control system (if equipped)

After road test

CHECK for owner information materials, tools, and spare tire in vehicle

The following items must be done 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 floor mat protective covers
- ☐ Vacuum and clean interior of vehicle
- ☐ Inspect installation of option parts with invoice

GENERAL INFORMATION

SCHEDULED MAINTENANCE

X5U000W11

Scheduled Maintenance Table (Except Canada) Schedule 1 (Normal driving conditions)

- The vehicle is mainly operated where none of the "unique driving conditions" apply.

Maintenance Item	Maintenance Interval (Number of months or miles (kilometers), whichever comes first)									
	Months		6	12	18	24	30	36	42	48
	× 1000	Kilometers	12	24	36	48	60	72	84	96
		Miles	7.5	15	22.5	30	37.5	45	52.5	60

Engine

Engine valve clearance										I
Engine oil		R	R	R	R	R	R	R	R	R
Oil filter		R	R	R	R	R	R	R	R	R
Tension of all drive belts					I					I
Engine timing belt*1		Replace every 60,000 miles (96,000 km)								
Engine timing belt*2*3		Inspect at 60,000 miles (96,000 km), and again at 90,000 miles (144,000 km)								
		Replace every 105,000 miles (168,000 km)								

Ignition system

Spark plugs					R					R
-------------	--	--	--	--	---	--	--	--	--	---

Fuel system

Idle speed					I*3					I*3
Air cleaner element					R					R
Fuel filter										R*3
Fuel lines and hoses					I*3					I*3
Hoses and tubes for emission										I*3

Cooling system

Cooling system					I					I
Engine coolant		Replace at first 45,000 miles (72,000 km) or 36 months; after that, every 30,000 miles (48,000 km) or 24 months.								

Chassis and body

Brake lines, hoses and connections					I					I
Disc brakes					I					I
Manual transmission oil										R
Rear differential oil										R
Steering operation and linkages					I					I
Front suspension ball joints					I					I
Drive shaft dust boots					I					I
Bolts and nuts on chassis and body					I					I
Exhaust system heat shields					I					I
All locks and hinges		L	L	L	L	L	L	L	L	L

Air conditioner system (if equipped)

Refrigerant amount		I			I			I		I
Compressor operation		I			I			I		I

GENERAL INFORMATION

Chart symbols

I : Inspect and repair, clean, or replace if necessary. (As for the air cleaner element, inspect, and if necessary replace.)

R : Replace

L : Lubricate

Remarks

- After 48 months or 60,000 miles (96,000 km), continue to follow the described maintenance at the recommended intervals.
- *1 : Vehicles not covered under *2 below.
- *2 : Under the authority of § 177 of the Federal Clean Air Act, some states require that new vehicles registered in their jurisdictions comply with California's emission control system scheduled maintenance services requirements. If your vehicle was initially registered in such a state, or in California, the scheduled maintenance services set forth in this section apply to it.
- *3 : According to state and federal regulations, failure to perform maintenance on these items will not void your emissions warranties. However, Mazda recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

Schedule 2 (Unique driving conditions)

- Repeated short-distance driving.
- Driving in dusty conditions.
- Driving with extended use of brakes.
- Driving in areas where salt or other corrosive materials are used.
- Driving on rough or muddy roads.
- Extended periods of idling or low-speed operation.
- Driving for long periods in cold temperatures or extremely humid climates.

Maintenance Item	Maintenance Interval (Number of months or miles (kilometers), whichever comes first)													
	Months		4	8	12	16	20	24	28	32	36	40	44	48
	× 1000	Kilometers	8	16	24	32	40	48	56	64	72	80	88	96
		Miles	5	10	15	20	25	30	35	40	45	50	55	60

Engine

Engine valve clearance														I
Engine oil		R	R	R	R	R	R	R	R	R	R	R	R	R
Engine oil (Puerto Rico)		Replace every 3,000 miles (4,800 km) or 3 months												
Oil filter		R	R	R	R	R	R	R	R	R	R	R	R	R
Tension of all drive belts								I						I
Engine timing belt*1		Replace every 60,000 miles (96,000 km)												
Engine timing belt*2*3		Inspect at 60,000 miles (96,000 km), and again at 90,000 miles (144,000 km)												
		Replace every 105,000 miles (168,000 km)												

Ignition system

Spark plugs								R						R
-------------	--	--	--	--	--	--	--	---	--	--	--	--	--	---

Cooling system

Cooling system								I						I
Engine coolant		Replace at first 45,000 miles (72,000 km) or 36 months; after that, every 30,000 miles (48,000 km) or 24 months												

Fuel system

Fuel filter														R*3
Fuel lines and hoses								I*3						I*3
Idle speed								I*3						I*3
Air cleaner element				I*3				R			I*3			R
Hoses and tubes for emission														I*3

Chassis and body

Brake lines, hoses and connections								I						I
Disc brakes				I				I			I			I
Manual transmission oil								R						R
Rear differential oil								R						R
Steering operation and linkages								I						I

GENERAL INFORMATION

Maintenance Item	Maintenance Interval (Number of months or miles (kilometers), whichever comes first)													
	Months		4	8	12	16	20	24	28	32	36	40	44	48
	× 1000	Kilometers	8	16	24	32	40	48	56	64	72	80	88	96
		Miles	5	10	15	20	25	30	35	40	45	50	55	60
Front suspension ball joints								I						I
Drive shaft dust boots								I						I
Bolts and nuts on chassis and body					I			I			I			I
Exhaust system heat shields								I						I
All locks and hinges			L	L	L	L	L	L	L	L	L	L	L	L
Air conditioner system (if equipped)														
Refrigerant amount					I			I			I			I
Compressor operation					I			I			I			I

Chart symbols

I : Inspect and repair, clean, or replace if necessary. (As for the air cleaner element, inspect, and if necessary replace.)

R : Replace

L : Lubricate

Remarks

- After 48 months or 60,000 miles (96,000 km), continue to follow the described maintenance at the recommended intervals.
- *1 : Vehicles not covered under *2 below.
- *2 : Under the authority of § 177 of the Federal Clean Air Act, some states require that new vehicles registered in their jurisdictions comply with California's emission control system scheduled maintenance services requirements. If your vehicle was initially registered in such a state, or in California, the scheduled maintenance services set forth in this section apply to it.
- *3 : According to state and federal regulations, failure to perform maintenance on these items will not void your emissions warranties. However, Mazda recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

Scheduled Maintenance Table (Canada)

Maintenance Item	Maintenance Interval (Number of months or miles (kilometers), whichever comes first)													
	Months		5	10	15	20	25	30	35	40	45	50	55	60
	× 1000	Kilometers	8	16	24	32	40	48	56	64	72	80	88	96
		Miles	5	10	15	20	25	30	35	40	45	50	55	60
Engine														
Engine valve clearance														I
Engine oil		R	R	R	R	R	R	R	R	R	R	R	R	R
Oil filter		R	R	R	R	R	R	R	R	R	R	R	R	R
Tension of all drive belts		I	I	I	I	I	I	I	I	I	I	I	I	I
Engine timing belt*1														R
Ignition system														
Spark plugs							R							R
Cooling system														
Engine coolant level and strength		I	I	I	I	I	I	I	I	I	I	I	I	I
Cooling system for leaks				I			I			I				I
Engine coolant		Replace at first 45,000 miles (72,000 km) or 45 months; after that, every 30,000 miles (48,000 km) or 30 months												
Fuel system														
Idle speed				I			I			I				I
Air cleaner element				I			R			I				R
Fuel lines and hoses							I*2							I
Fuel filter							R							R
PCV valve*2														I

GENERAL INFORMATION

Maintenance Item	Maintenance Interval (Number of months or miles (kilometers), whichever comes first)													
	Months		5	10	15	20	25	30	35	40	45	50	55	60
	× 1000	Kilometers	8	16	24	32	40	48	56	64	72	80	88	96
		Miles	5	10	15	20	25	30	35	40	45	50	55	60
Emission hoses and tubes														I

Chassis and body

Automatic transmission fluid level	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Transmission oil (MT and AT)								R						R
Differential oil								R						R
Drive shaft dust boots								I						I
Brake lines and hoses								I						I
Brake and clutch fluid level	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Brake fluid								R*3						R*3
Disc brakes (front and rear)			I					I			I			I
Tire inflation pressure and tire wear	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Tires			Rt					Rt			Rt			Rt
Power steering fluid level	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Steering operation and linkages (Includes four wheel alignment)								I						I
Suspension components (front and rear)								I						I
All chassis and body nuts and bolts			I					I			I			I
Exhaust system heat shields								I						I
All locks and hinges	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Washer fluid level	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Function of all lights	I	I	I	I	I	I	I	I	I	I	I	I	I	I

Air conditioner system (if equipped)

Refrigerant amount		I		I			I		I		I		I	
Compressor operation		I		I			I		I		I		I	

Chart symbols

I : Inspect and repair, clean, or replace if necessary. (As for the air cleaner element, inspect, and if necessary replace.)

R : Replace

L : Lubricate

Rt : Rotate (tires)

Remarks

- After 60 months or 60,000 miles (96,000 km), continue to follow the described maintenance at the recommended intervals.
- Refer below for a description of items marked * in the maintenance chart.
- *1 : Replacement of the timing belt is required every 60,000 miles (96,000 km). Failure to replace this belt may result in damage to the engine.
- *2 : This maintenance is recommended by Mazda. However, it is not necessary for emission warranty coverage or manufacturer recall liability.
- *3 : This maintenance is recommended by Mazda.

ENGINE

01 SECTION

01

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FOREWORD

X5U101W01

Before proceeding with the following troubleshooting,

- Refer to section GI to understand the basic troubleshooting procedure.
- Perform the diagnostic trouble code inspection.
- If a diagnostic trouble code is displayed, proceed with inspection steps for the code.
- When the engine can be started, perform "ENGINE TUNE-UP".

ENGINE ON-BOARD DIAGNOSIS

X5U101W02

Descriptions

- Use the NGS tester for diagnosis on OBD-II equipped vehicles. The NGS tester has a generic scan tool function that is standard across the automotive industry in the United States. It also performs the manufacture's specific functions; that is, the NGS tester can perform various functions according to the vehicle and program card selected.

Generic Functions

- Use these functions by selecting "GENERIC OBDII FUNCTIONS" from the NGS tester menu screen. These functions enable you to monitor on-board diagnostic system data and Diagnostic Trouble Codes (DTCs) that are related to emissions, as defined and fixed by OBD-II regulations. These functions are found even in commonly marketed scan tools and are called "generic functions".

Specific Functions

- "Specific functions" are original scan tool functions created by various manufactures in order to be able to troubleshoot effectively. When using these functions, the correct vehicle model and program card must be selected.

Pending Trouble Codes

- The following functions are generic functions.
- These appear when a problem is detected in a monitored system. The MIL is illuminated when a problem is detected in two consecutive drive cycles. 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 problem is not found in the second drive cycle, 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 the second drive cycle too, the PCM judges that the system has failed, deletes the pending code, illuminates the MIL and stored the DTC.

Freeze Frame Data

- This is the technical data which indicates the engine's 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 the Misfire or Fuel System DTCs. Once freeze frame data for the Misfire or Fuel System DTC is stored, it will overwrite any previous data and the freeze frame will not be overwritten again.

On-Board System Readiness Test

- This shows OBD-II systems operating status. If any monitor function is incomplete, NGS tester will identify which monitor function has not been completed. Misfires, Fuel System and Comprehensive Components (CCM) are continuous monitoring-type functions and will display a "CONT" message on the screen of the NGS tester. The catalyst, EGR system, evaporation system and oxygen sensor will be monitored under drive cycles. The NGS tester will display a "YES" message once those system monitor functions are completed. The OBD-II diagnostic system is initialized by performing the DTC cancellation procedure or disconnecting the negative battery cable.

Diagnostic Monitoring Test Results

- These results from the intermittent monitor system's technical data, which are used to determine whether the system is normal or not. They also display the system's thresholds and diagnostic results. The intermittent monitor system monitors the oxygen sensor, evaporative purge system, catalyst and the EGR system.

Read/Clear Diagnostic Test Results

- The following functions are generic functions.
- This retrieves all stored Diagnostic Trouble Codes (DTCs) in the PCM and clears the DTC, Freeze Frame Data, On-Board Readiness Test Results, Diagnostic Monitoring Test Results and Pending Trouble Codes.

Parameter Identification (PID) Access

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

Simulation Test

- Output devices can be turned on and off by sending simulation command signals from the NGS tester to the Powertrain Control Module. The "Idling Test" and "Ignition ON Test" are available in this test. These tests will verify the PCM status, output devices, and related circuit wiring harnesses.

Diagnostic Support Procedure

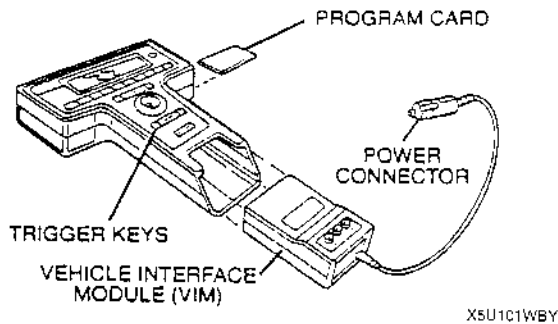
- This tests the ability of the powertrain control system to detect a change in certain input devices by following the instructions on the NGS tester. There are two options: **ALL TEST** and **SINGLE TEST**. **ALL TEST** takes you through all the diagnostic support tests. **SINGLE TEST** enables you to perform specific tests that relate to the particular diagnosis that you are conducting. This test **MUST** follow the instructions on the NGS tester. If not, a "**TEST CONDITIONS NOT CORRECT**" message will appear, or else the test result will be **FAULTY**.

On-Board Diagnostic Test New generation star (NGS) tester hook-up procedure

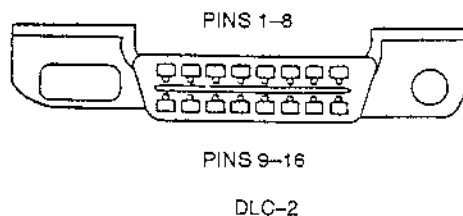
Note

- Make sure the ignition switch is off.

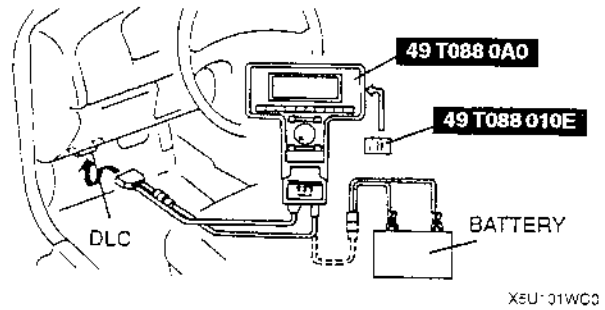
- Insert the vehicle interface module and latest program card into the hand-held NGS control unit.



- Plug the NGS OBD-II adapter into the vehicle interface module and the large 16 pin connector into the vehicle data link connector-2 (DLC-2) located under the left side of the center console.



- Plug the NGS tester power connector into the NGS OBD-II adapter power cable connector or cigarette lighter. Alternatively, enable to use a battery hook-up adapter.



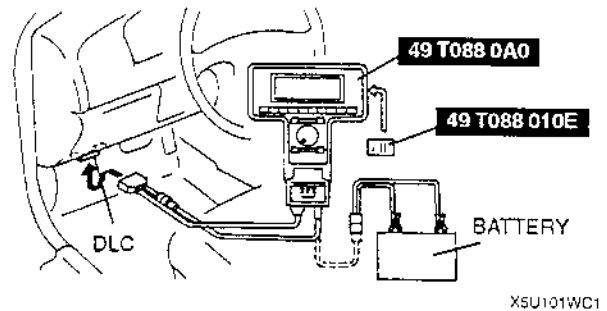
- Listen for a double beep. The NGS tester is now initialized. Begin the powertrain control system functional test.

DTCs reading procedure

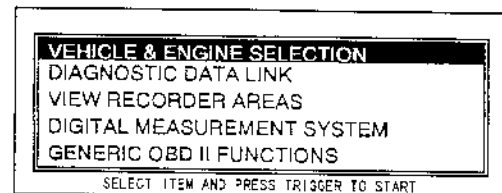
Note

- This is a specific function.
- Start engine and keep it running. If engine won't start, turn the ignition switch on during the procedure.

- Perform the necessary vehicle preparation and visual inspection. Hook the NGS Tester up to the vehicle.

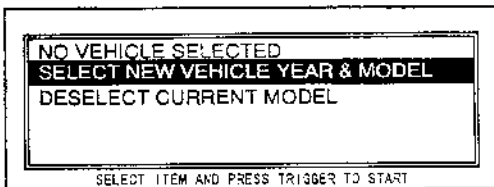


- Move the cursor to **VEHICLE & ENGINE SELECTION**. Press the trigger key to enter this function.



TROUBLESHOOTING [ENGINE CONTROL]

3. Move the cursor to **SELECT NEW VEHICLE YEAR & MODEL**. Press the trigger key to enter this selection.



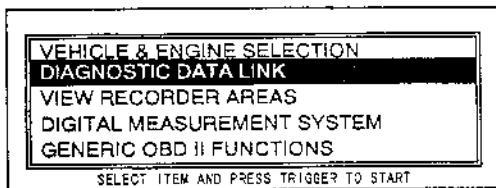
X5U101WC3

4. Move the cursor to **1999-VIN#10:X**. Press the trigger key to enter this selection.
5. Move the cursor to the appropriate model. Press the trigger key to enter this selection.

Note

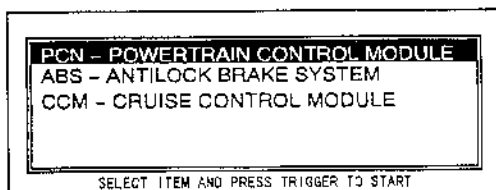
- Make sure the selected vehicle is correct.

6. A vehicle selection screen showing the selected vehicle will be displayed. Move the cursor to the vehicle selected. Press the trigger key.
7. Move the cursor to **DIAGNOSTIC DATA LINK** on the main menu screen. Press the trigger key to enter into menu system diagnostics.



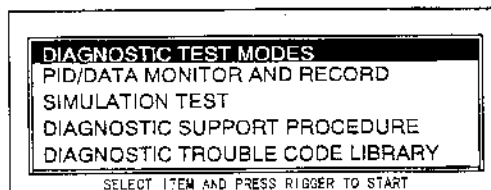
X5U101WC4

8. Move the cursor to **PCM - POWERTRAIN CONTROL MODULE**. Press the trigger key to enter this selection.



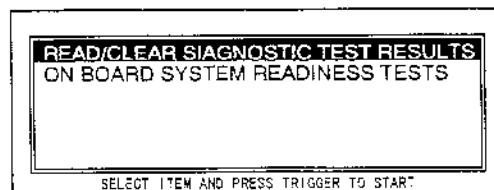
X5U101WC5

9. Move the cursor to **DIAGNOSTIC TEST MODES**. Press the trigger key to enter this selection.



X5U101WC6

10. Move the cursor to **READ/CLEAR DIAGNOSTIC TEST RESULTS**. Press trigger key to enter this selection.



X5U101WC7

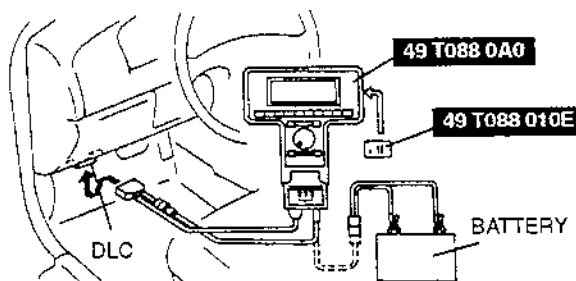
11. Press **START**.
12. Retrieve DTCs.

Pending trouble code access procedure

Note

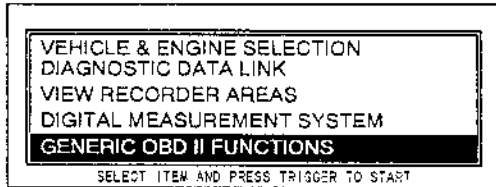
- This is a generic function.
- Start engine and keep it running. If engine won't start, turn the ignition switch on during the procedure.

1. Perform the necessary vehicle preparation and visual inspection. Hook the NGS Tester up to the vehicle.

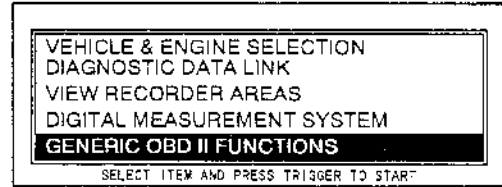


X5U101WC8

2. Move the cursor to **GENERIC OBDII FUNCTIONS**. Press the trigger key to enter this function.

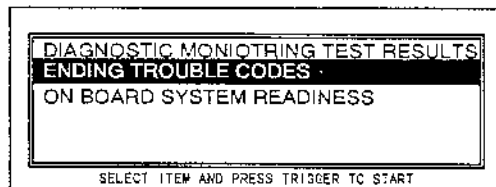


X5U101WC9



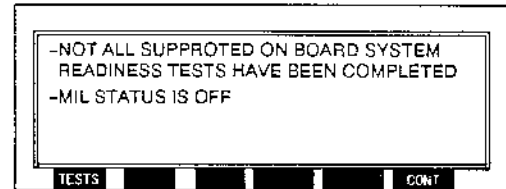
X5U101WCB

3. Press **CONT**.
4. Turn the menu dial clockwise to scroll the screen. Move the cursor to **PENDING TROUBLE CODES**. Press the trigger key to enter this selection.



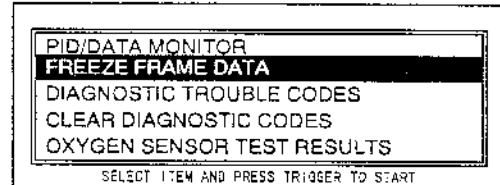
X5U101WCA

3. Press **CONT**.



X5U101WCC

4. Move the cursor to **FREEZE FRAME PID DATA**. Press the trigger key to enter this selection.



X5U101WCD

5. Press **START**.
6. Retrieve **PENDING** trouble codes.

Note

- If the "NO DTCS AVAILABLE/NO RESPONSE" message is shown on the screen, be sure to run the **PID DATA MONITOR** in **GENERIC OBDII FUNCTIONS** and confirm that the "LINK COMMUNICATION ERROR. MODULE NOT RESPONDING. CHECK IGNITION STATUS AND CABLE CONNECTIONS" message does not appear.

Freeze frame PID data access procedure

Note

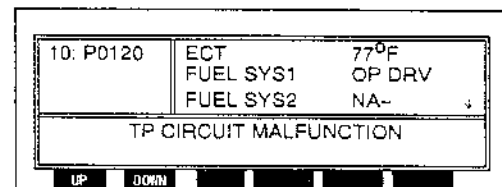
- This is a generic function.

1. Perform the NGS tester hook-up procedure.
2. Move the cursor to **GENERIC OBDII FUNCTIONS**. Press the trigger key to enter this selection.

5. Record the freeze frame PID data.

Note

- If the OBD-II system did not store any DTCs, the NGS tester display will show "NO TRIGGER CODE SET".



X5U101WCE

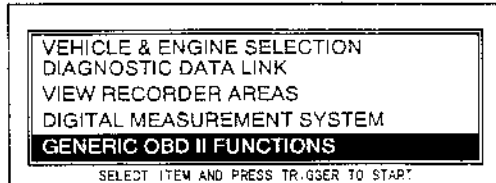
TROUBLESHOOTING [ENGINE CONTROL]

On-board system readiness tests access procedure

Note

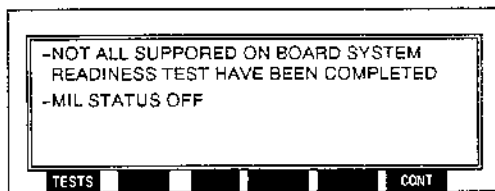
- This is a generic function.

- Perform the NGS tester hook-up procedure.
- Move the cursor to **GENERIC OBDII FUNCTIONS**. Press the trigger key to enter this selection.



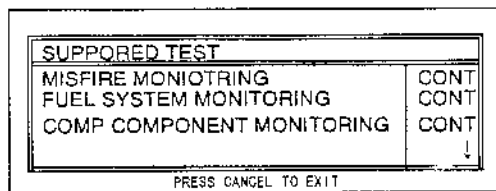
X5U101WCF

- Press **TESTS**.



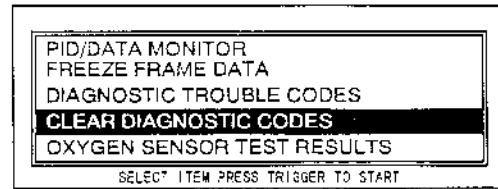
X5U101WCG

- Monitor the OBD-II systems operating status.



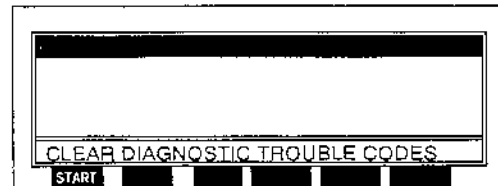
X5U101WCH

- If each system's status initialization is necessary, use the following procedures:
 - Press the cancel key until you return to the main menu.
 - Move the cursor to **GENERIC OBDII FUNCTIONS**. Press the trigger key to enter this selection.
 - Press **CONT**.
 - Move the cursor to **CLEAR DIAGNOSTIC CODES**. Press trigger key to enter this selection.



X5U101WCJ

- Press **START**.



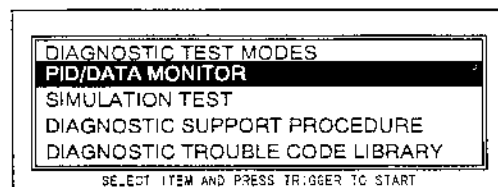
X5U101WCK

PID/DATA monitor and record procedure

Note

- This is a specific function.

- Perform the NGS tester Hook-up Procedure.
- Perform steps 1 through 8 from the DTCs Reading Procedure.
- Turn the ignition switch on or engine running.
- Move the cursor to **PID/DATA MONITOR AND RECORD**. Press the trigger key to enter this selection.



X5U101WCK

- Move the cursor to PID values to view. Press the trigger key. A star symbol will appear next to the item when it is selected.

Note

- Press the trigger key once again to deselect a PID.
- Press **CLEAR** to deselect all PIDs.

PCM 02	ACCS	AIRM	CCS
	ACP	ARCF	*CPP/PNP
	ACP V	BARO	DPFEGR
TOTAL=02	AIRA	BLWMTFR	DRIVECT
	AIRF	*BOO	DRUMP

X5U101WCL

TIME	ECT	TP	MAF
-0.8	182	55.5	10.8
0.0	183	99.3	11.3
+0.2	184	65.4	11.5
SEC	OF	%	G/S

SUDDEN SPIKE — POSSIBLE FAULT

X5U101WCN

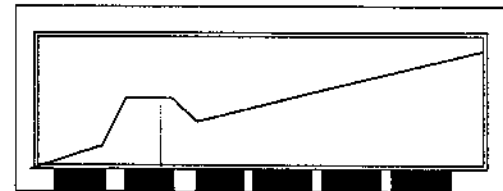
6. Press **START** to begin.
7. When ready to capture and store the selected PIDs, press the trigger key.
8. Press the trigger key again when ready to save information.
9. Move the cursor to **STORE RECORDING IN AREA 1**. Press the trigger key.

VIEW RECORDING
STORE RECORDING AREA 1
STORE RECORDING AREA 2
STORE RECORDING AREA 3

SELECT ITEM AND PRESS TRIGGER TO START

X5U101WCM

5. Graph format: Scroll through the PID data while analyzing the information. Look for sudden drops or spikes in the linear lines showing the transformation of values to the line graph.



NON LINEAR —
POSSIBLE FAULT IN SENSOR/CIRCUIT

X5U101WCO

10. Follow the instructions displayed on the NGS tester to save the recording data.

Playback of stored PIDs procedure

Note

- This is a specific function.
- Look for abnormal behavior or values that are clearly incorrect. Inspect the signals for abrupt or unexpected changes.
- Look for agreement in related signals.
- Make sure signals act in proper sequence.

1. Select **VIEW RECORDER AREAS**.
2. Select a view area.
3. Select up to the four PIDs to review in the table format or two PIDs to review in the graph mode.
4. Table format: Scroll through the PID data while analyzing the information. Look for sudden drops or spikes in the values.

Diagnostic monitoring test results access procedure

Note

- This is a generic function.

1. Perform the NGS tester hook-up procedure.
2. Move the cursor to **GENERIC OBDII FUNCTIONS**. Press the trigger key to enter this selection.

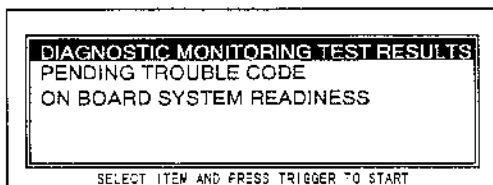
VEHICLE & ENGINE SELECTION
DIAGNOSTIC DATA LINK
VIEW RECORDER AREAS
DIGITAL MEASUREMENT SYSTEM
GENERIC OBD II FUNCTIONS

SELECT ITEM PRESS TRIGGER TO START

X5U101WCP

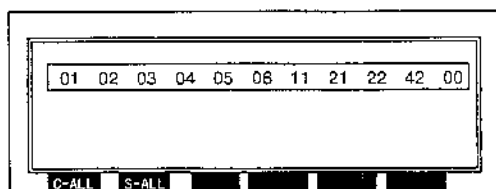
3. Press **CONT**.
4. Turn the menu dial clockwise to scroll the screen. Move the cursor to **DIAGNOSTIC MONITORING TEST RESULTS**. Press the trigger key to enter this selection.

TROUBLESHOOTING [ENGINE CONTROL]



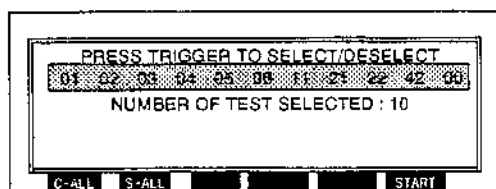
X5U101WCQ

5. Select and press **C-ALL** or **S-ALL**.



X5U101WCR

6. Press **START**.



X5U101WCS

7. The screen immediately displays the results of each test with thresholds. Read the values.

TEST#	MEAS	MIN	MAX
10:01:11	68		280
10:02:11	4		100
10:03:11	3		80

PRESS CANCEL TO EXIT

X5U101WCT

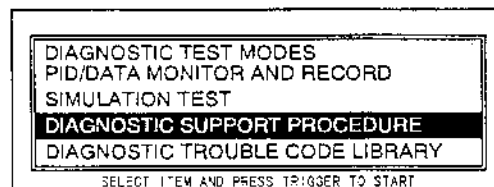
Diagnostic support procedure

Note

- This is a specific function.

- Perform the NGS Tester Hook-up Procedure.
- Perform steps 1 through 8 from the "DTCs Reading Procedure".

3. Move the cursor to **DIAGNOSTIC SUPPORT PROCEDURE**. Press the trigger key to enter this selection.

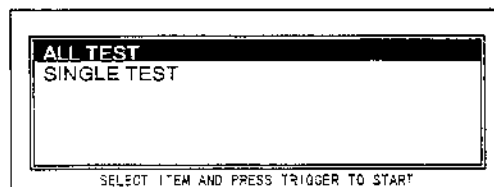


X5U101WCU

4. Move the cursor to **ALL TEST** or **SINGLE TEST**. Press the trigger key.

Note

- ALL TEST** inspects each item according to an established programmed order. With **SINGLE TEST**, enable to select and inspect any test item in any order, one at a time.

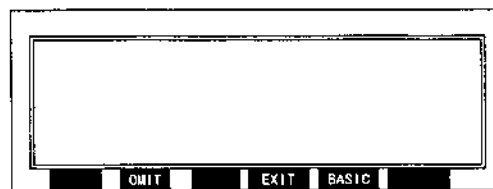


X5U101WCV

5. Follow the instructions displayed on the NGS tester and press the trigger key.

Note

- To skip a test item, press **OMIT**.
- Before performing the test, the basic condition on the test vehicle must be set-up in order to get exact data. Press **BASIC** to view the basic condition instruction screen.
- If the screen shows **PASSED**, the system operates correctly.
- If the screen shows **FAULTY**, the system operates incorrectly.



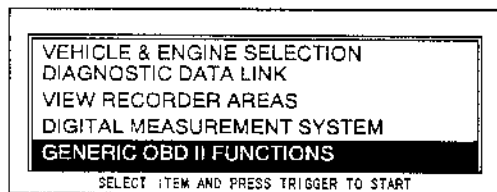
X5U101WCW

Oxygen sensor test results access procedure

Note

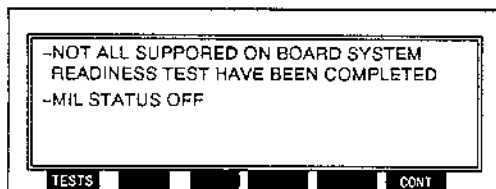
- This is a generic function.

- Perform the NGS Tester Hook-up Procedure.
- Move the cursor to **GENERIC OBDII FUNCTIONS**. Press the trigger key to enter this function.



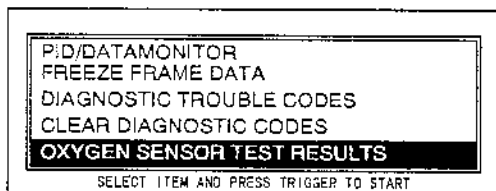
X5U101WCX

- Press **CONT**.



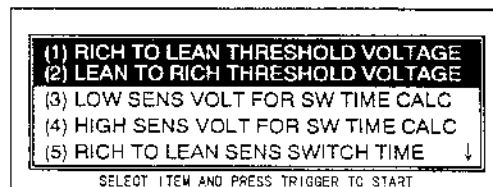
X5U101WCY

- Move the cursor to **OXYGEN SENSOR TEST RESULTS**. Press the trigger key to enter this selection.



X5U101WCZ

- Select **RICH TO LEAN THRESHOLD VOLTAGE** or **LEAN TO RICH THRESHOLD VOLTAGE**. Press the trigger key.



X5U101WD0

- Read voltage.

BANK	MEAS	MIN	MAX	UNIT
1-1	0.445	0.0	1.275	VOLT
1-2	0.445	0.0	1.275	VOLT
2-1	NA			

X5U101WD1

- Press the cancel key.

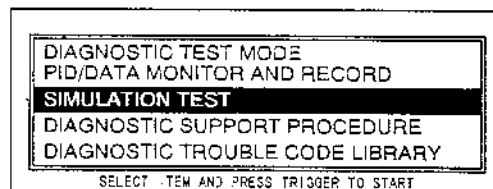
Simulation test procedure

Note

- This is a specific function.

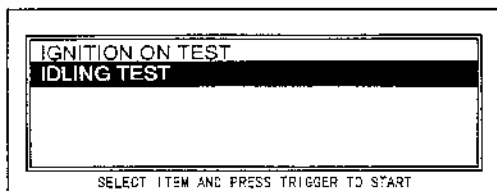
Idling test

- Perform the NGS tester hook-up procedure.
- Perform steps 1 through 8 from the **DTCs Reading Procedure**.
- Start the engine and run it at idle.
- Move the cursor to **SIMULATION TEST**. Press the trigger key to enter this selection.

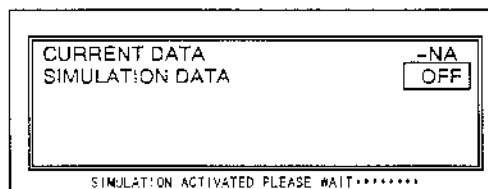


X5U101WD2

- Move the cursor to **IDLING TEST**. Press the trigger key to enter this selection.



X5U101WD3

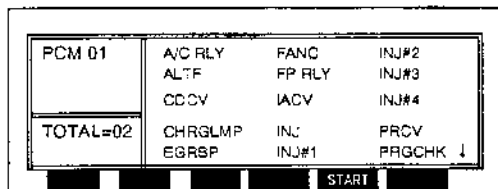


X5U101WD6

6. The screen will display PIDs. Select the appropriate PID for testing, then press the trigger.

Note

- Only one PID can be selected at a time.

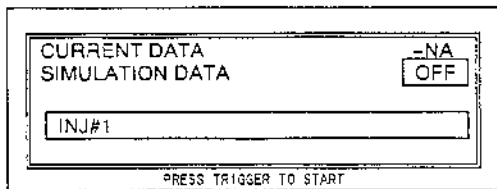


X5U101WD4

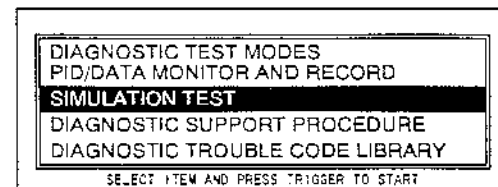
7. Press **START**.

Note

- If the screen displays "**TEST CONDITION NOT CORRECT**", check the following three signal conditions and determine whether or not they are normal:
 - Idle SW: ON (Equipped vehicles)
 - TR SW: P or N
 - RPM: above 550

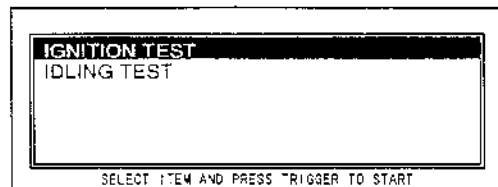


X5U101WD5



X5U101WD7

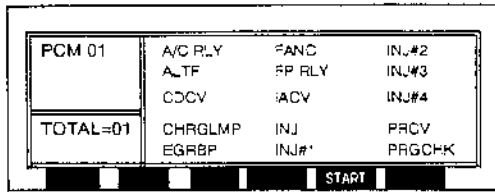
3. Move the cursor to **IGNITION ON TEST**. Press the trigger key to enter this selection.



X5U101WD8

8. Press trigger key.
 9. The simulation is performed for **3 seconds**, and a "**SIMULATION ACTIVATED PLEASE WAIT**" message is displayed during those 3 seconds.

4. The screen will display a list of PIDs. Select the appropriate PID for testing, then press trigger.

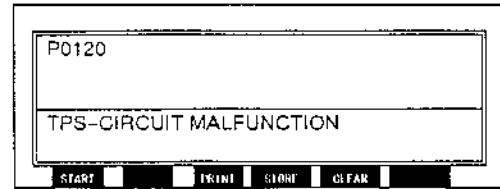


X5U101WD9

5. Press **START**.

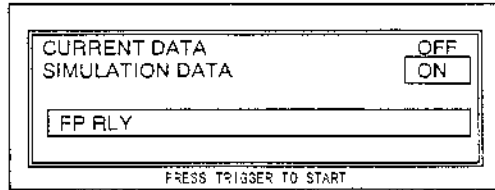
After repair procedure

1. After repairs have been made, perform the **DTCs Reading procedure**.
2. Press **CLEAR**.



X5U101WDD

3. Press the trigger key.
4. Press the cancel key.
5. Ensure that the customer's concern has been resolved.



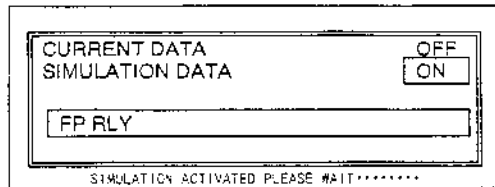
X5U101WDA

6. Press trigger key.
7. The simulation is performed for 3 seconds, and a **"SIMULATION ACTIVATED PLEASE WAIT"** message is displayed during those 3 seconds.

OBD II Drive Mode Procedure

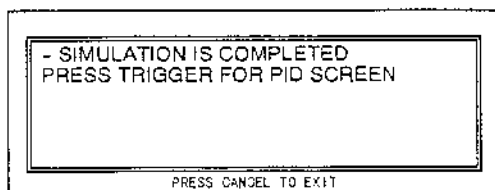
Note

- Disconnecting the battery will reset the memory. Do not disconnect the battery during and after this procedure.
- Vehicle speed and engine speed detected by the PCM may differ from that indicated by the speedometer and the tachometer. Check the vehicle speed and engine speed during driving mode by using the NGS tester.
- If the OBD II system check is not completed while the drive mode procedure is carried out, the following cause is guessed.
 1. The OBD II system detects the malfunction.
 2. The drive mode procedure is not completed correctly.



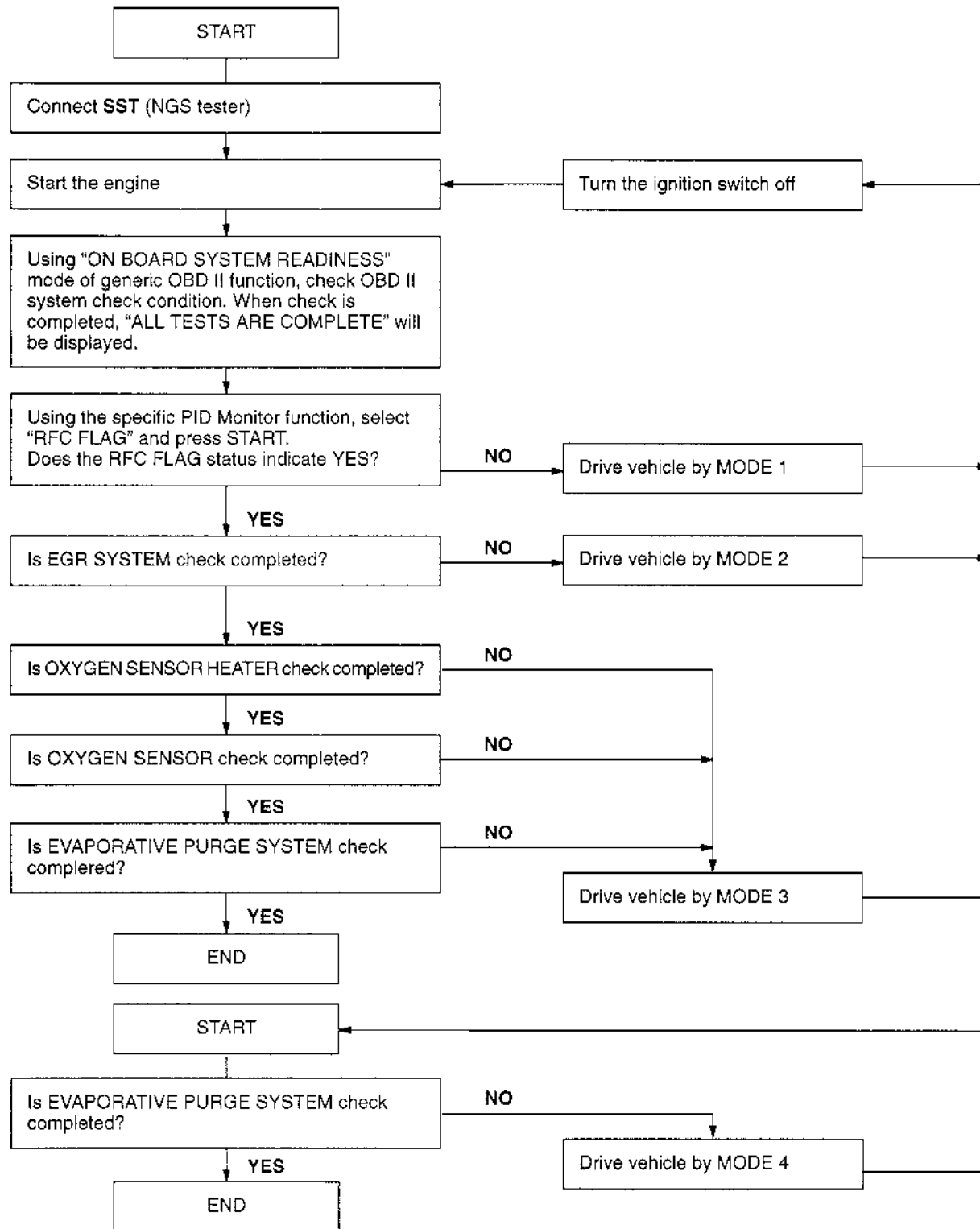
X5U101WDB

8. To perform the simulation again, press the trigger key. To exit the ignition on test, press the cancel key.



X5U101WDC

TROUBLESHOOTING [ENGINE CONTROL]



MODE 1

1. Start the engine and warm it up completely.
2. Verify that all electrical loads (headlight, blower motor and rear window defroster) and A/C loads are off.
3. Verify that the initial ignition timing and the initial idle speed are within the specification.
4. If not as specified, adjust the ignition timing and idle speed.
5. Verify that terminals TEN and GND of the data link connector are not connected.

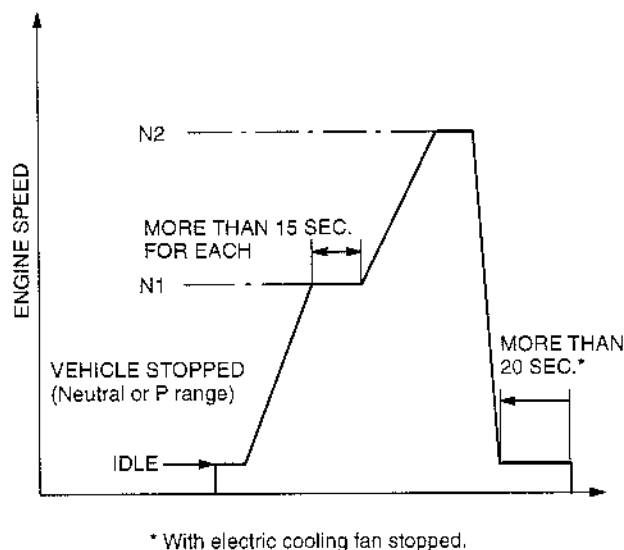
6. Carry out no-load racing at the specified speed for each model. Race the engine for more than 15 seconds at each time. Refer to the following engine speed table for engine speed.

Engine speed table

N1 (rpm)	N2 (rpm)
1800—2200	3000—3400

X5U101WA2

- Idle the engine for more than 20 seconds with the electric cooling fan stopped.



X5U101WA3

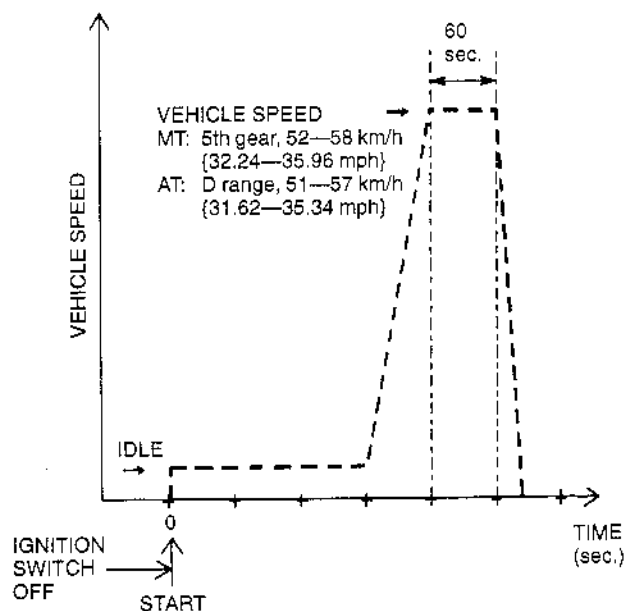
MODE 2

- Start the engine and warm it up completely.
- Verify that all electrical loads (headlight, blower motor and rear window defroster) and A/C load are off.

Note

- Driving mode before the constant speed driving is not specified.

- Drive the vehicle at the constant speed of MT: 52—58 km/h {32.24—35.96 mph}, AT: 51—57 km/h {31.62—35.34 mph} for 60 seconds. (MT: 5th gear, AT: D range)



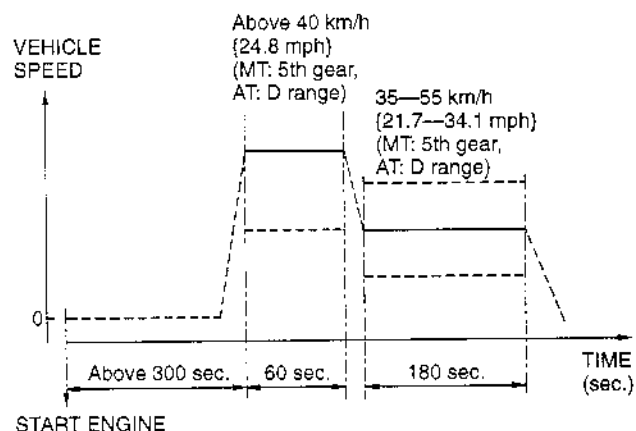
X5U101WA4

MODE 3

- Start the engine and warm it up completely.
- Verify that all electrical loads (headlight, blower motor and rear window defroster) and A/C load are off.
- Drive the vehicle at the constant speed of above 40 km/h {24.8 mph} for 60 seconds after the above 300 seconds from engine start. (MT: 5th gear, AT: D range)
- Drive the vehicle at the constant speed 35—55 km/h {21.7—34.1 mph} for 180 seconds. (MT: 5th gear, AT: D range)

Note

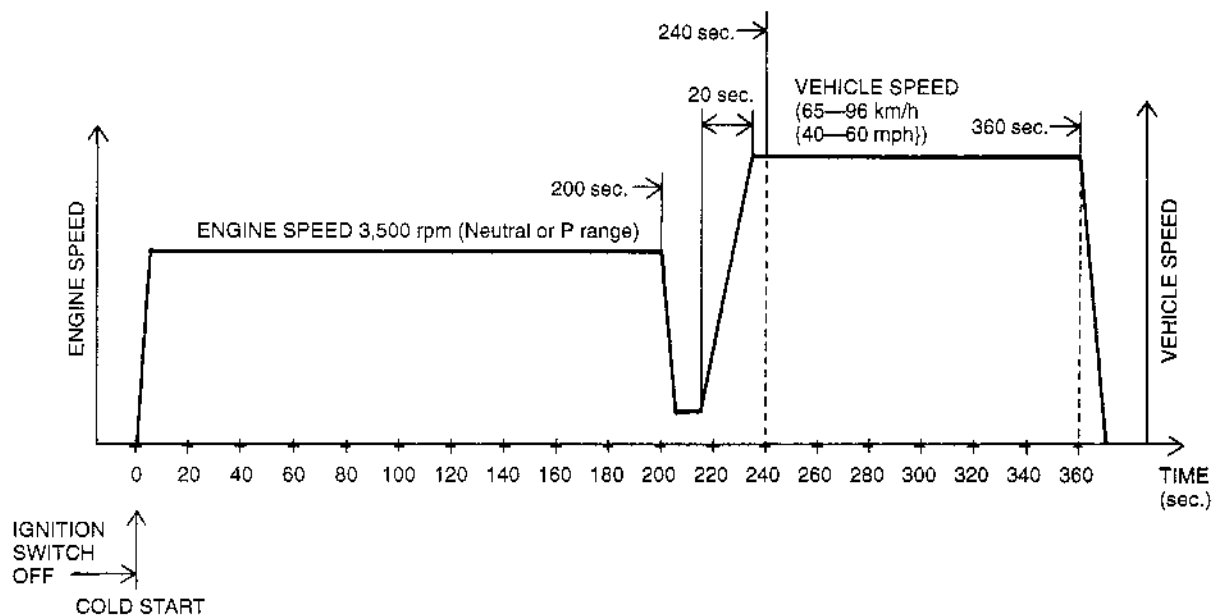
- Driving mode before the constant speed driving is not specified.



X5U101WA5

MODE 4

1. Verify that all following conditions are satisfied.
 - Engine coolant temperature is 0—30 °C {32—86 °F}.
 - Intake air temperature is 10—60 °C {50—140 °F}.
 - Barometric pressure is 72.0 kPa {540 mmHg, 21.3 inHg} or higher.
 - Fuel gauge needle points within 15—85%.
2. Start the engine and race it at 3,500 rpm for 200 seconds to warm it up completely.
3. Within 240 seconds after engine start, start the vehicle and accelerate to 65—96 km/h {40—60 mph} in approximately 20 seconds.
4. Drive the vehicle at the constant speed of 65—96 km/h {40—60 mph} till 360 seconds after engine start.



X5U101WA6

TROUBLESHOOTING [ENGINE CONTROL]

Failure Indication Function Diagnostic trouble codes table

○: Applied ×: Not applied

DTC No.	Condition	MIL	DC	*1Monitor item	Memory function
P0102	Mass air flow circuit low input	ON	1	CCM	○
P0103	Mass air flow circuit high input	ON	1	CCM	○
P0106	Barometric pressure circuit performance problem	ON	2	CCM	○
P0107	Barometric pressure circuit low input	ON	1	CCM	○
P0108	Barometric pressure circuit high input	ON	1	CCM	○
P0111	Intake air temperature circuit performance problem	ON	2	CCM	○
P0112	Intake air temperature circuit low input	ON	1	CCM	○
P0113	Intake air temperature circuit high input	ON	1	CCM	○
P0117	Engine coolant temperature circuit low input	ON	1	CCM	○
P0118	Engine coolant temperature circuit high input	ON	1	CCM	○
P0122	Throttle position circuit low input	ON	1	CCM	○
P0123	Throttle position circuit high input	ON	1	CCM	○
P0125	Excessive time to enter closed loop fuel control	ON	2	CCM	○
P0130	Front heated oxygen sensor circuit malfunction	ON	2	O2 sensor	○
P0134	Front heated oxygen sensor circuit no activity detected	ON	2	CCM	○
P0138	Rear heated oxygen sensor circuit high input	ON	2	CCM	○
P0140	Rear heated oxygen sensor circuit no activity detected	ON	2	CCM	×
P0171	Fuel trim system too lean	ON	2	Fuel	○
P0172	Fuel trim system too rich	ON	2	Fuel	○
P0300	Random misfire detected	Flashing or ON	1 or 2	Misfire	○
P0301	Cylinder 1 misfire detected	Flashing or ON	1 or 2	Misfire	○
P0302	Cylinder 2 misfire detected	Flashing or ON	1 or 2	Misfire	○
P0303	Cylinder 3 misfire detected	Flashing or ON	1 or 2	Misfire	○
P0304	Cylinder 4 misfire detected	Flashing or ON	1 or 2	Misfire	○
P0325	Knock sensor circuit malfunction	ON	1	CCM	○
P0335	Crankshaft position sensor circuit malfunction	ON	1	CCM	○
P0339	Crankshaft position sensor circuit intermittent	ON	2	CCM	○
P0401	Exhaust gas recirculation flow insufficient detected	ON	2	EGR	○
P0402	Exhaust gas recirculation flow excessive detected	ON	2	EGR	○
*3P0420	Warm up catalyst system efficiency below threshold	ON	2	Catalyst	○
*2P0421	Warm up catalyst system efficiency below threshold	ON	2	Catalyst	○
P0422	Evaporative emission control system malfunction (Leak check)	ON	2	Evaporative	○
P0443	Evaporative emission control system purge control valve circuit malfunction (Equip leak check)	OFF	*1	*4Other	×
P0446	Evaporative emission control system malfunction (vent control malfunction)	ON	2	CCM	○
P0452	Evaporative emission control system pressure sensor low input	ON	2	CCM	○

TROUBLESHOOTING [ENGINE CONTROL]

DTC No.	Condition	MIL	DC	*1 Monitor Item	Memory function
P0453	Evaporative emission control system pressure sensor high input	ON	2	CCM	○
P0455	Evaporative emission control system malfunction (con. leak detected)	ON	2	Evaporative	○
P0461	Fuel level sensor circuit range/performance	ON	2	CCM	○
P0462	Fuel level sensor circuit low input	ON	2	CCM	○
P0463	Fuel level sensor circuit high input	ON	2	CCM	○
P0500	Vehicle speed sensor malfunction	ON	2	CCM	○
P0506	Idle control system RPM lower than expected	ON	2	CCM	○
P0507	Idle control system RPM higher than expected	ON	2	CCM	○
P0550	P/S pressure switch circuit malfunction	ON	2	CCM	○
P0703	Brake switch input malfunction	ON	2	CCM	○
P0704	Clutch switch input circuit malfunction	ON	2	CCM	○
P0705	Transmission range switch circuit malfunction (AT)	➤ 05-01 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC			
	Neutral switch circuit malfunction (MT)	ON	2	CCM	○
P0706	Transmission range switch circuit malfunction (Open circuit)	➤ 05-01 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC			
P0715	Input/turbine speed sensor circuit malfunction	➤ 05-01 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC			
P0720	Output speed sensor circuit malfunction	➤ 05-01 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC			
P0725	Engine speed input circuit malfunction	➤ 05-01 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC			
P0741	Torque converter clutch control solenoid valve stuck off	➤ 05-01 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC			
P0742	Torque converter clutch control solenoid valve stuck on	➤ 05-01 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC			
P1751	Shift solenoid A circuit open	➤ 05-01 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC			
P1752	Shift solenoid A circuit short	➤ 05-01 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC			
P0751	Shift solenoid A stuck off	➤ 05-01 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC			
P0752	Shift solenoid A stuck on	➤ 05-01 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC			
P1756	Shift solenoid B circuit open	➤ 05-01 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC			
P1757	Shift solenoid B circuit short	➤ 05-01 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC			
P0756	Shift solenoid B stuck off	➤ 05-01 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC			
P0757	Shift solenoid B stuck on	➤ 05-01 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC			
P1102	Mass air flow inconsistent with throttle position sensor (Lower than expected)	ON	2	CCM	○
P1103	Mass air flow inconsistent with RPM (Greater than expected)	ON	2	CCM	○
P1122	Throttle position CLOSE stuck	ON	2	CCM	○
P1123	Throttle position OPEN stuck	ON	2	CCM	○
P1135	Front heated oxygen sensor heater circuit low	ON	2	O2 sensor heater	○
P1136	Front heated oxygen sensor heater circuit high	ON	2	O2 sensor heater	○
P1141	Rear heated oxygen sensor heater circuit low	ON	2	O2 sensor heater	×

TROUBLESHOOTING [ENGINE CONTROL]

DTC No.	Condition	MIL	DC	*1 Monitor item	Memory function
P1142	Rear heated oxygen sensor heater circuit high	ON	2	O2 sensor heater	×
P1170	Front inversion heated oxygen sensor	ON	2	CCM	○
P1345	No SGC signal	ON	1	CCM	○
P1449	Canister drain cut valve (CDCV) open or short	OFF	*1	*4Other	×
P1450	Evaporative emission control system malfunction	ON	2	CCM	○
P1487	EGR boost sensor solenoid valve open or short	OFF	*1	*4Other	×
P1496	EGR valve motor coil 1 open or short	OFF	*1	*4Other	×
P1497	EGR valve motor coil 2 open or short	OFF	*1	*4Other	×
P1498	EGR valve motor coil 3 open or short	OFF	*1	*4Other	×
P1499	EGR valve motor coil 4 open or short	OFF	*1	*4Other	×
P1504	Idle air control circuit malfunction	ON	1	CCM	○
P1523	VICS circuit malfunction	OFF	*1	*4Other	×
P1562	PCM +BB voltage low	ON	1	CCM	○
P1601	PCM-TCM communication line error (AT)	ON	1	CCM	○
P1608	PCM internal circuit malfunction	OFF	*1	*4Other	×
P1609	PCM internal circuit malfunction (Knock sensor circuit)	OFF	1	*4Other	○
P1631	Generator output voltage signal no electricity	OFF	1	*4Other	○
P1632	Battery voltage monitor signal circuit malfunction	OFF	1	*4Other	○
P1633	Battery overcharge	OFF	1	*4Other	○
P1634	Generator terminal B circuit open	OFF	1	*4Other	○
P1740	Torque converter clutch control solenoid valve open	05-01 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC			
P1742	Torque converter clutch control solenoid valve short	05-01 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC			
P1771	Throttle position sensor open	05-01 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC			
P1772	Throttle position sensor short	05-01 AUTOMATIC TRANSMISSION ON-BOARD DIAGNOSTIC			

* : Detected when ignition switch is ON. (Engine stopped.)

*1 : Indicates the applicable item in On-Board System Readiness Tests defined by CARB.

*2 : CALIFORNIA emission regulations applicable model.

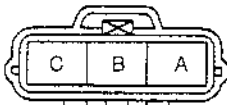
*3 : Except CALIFORNIA emission regulations applicable model.

*4 : Indicates the DTC set originally by Mazda (other than On-Board System Readiness Tests defined by CARB).

TROUBLESHOOTING [ENGINE CONTROL]

Diagnostic Trouble Code Troubleshooting

DTC P0102		Mass air flow circuit low input	
DETECTION CONDITION		● Input voltage from mass air flow sensor is below 0.86 V when time from engine started is 3 seconds	
POSSIBLE CAUSE		● Mass air flow sensor malfunction ● Open or short circuit in wiring from main relay terminal D to mass air flow sensor terminal C ● Open or short circuit in wiring from PCM terminal 2L to mass air flow sensor terminal B ● Open circuit in wiring from PCM terminal 3C to mass air flow sensor terminal A	
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Does mass air flow sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector, then go to step 9.
		No	Go to next step.
3	Implement PID/DATA MONITOR AND RECORD (MAF V) of DIAGNOSTIC DATA LINK by using NGS. Is the voltage as specified?	Yes	Go to step 6.
		No	Check for open circuit in wiring harness. (PCM terminal 2L — Mass air flow sensor terminal B), then go to step 9.
4	Disconnect mass air flow sensor connector. Turn ignition switch to ON. Is there battery positive voltage at connector terminal C?	Yes	Go to next step.
		No	Check for open or short circuit in wiring harness. (Main relay terminal D — Mass air flow sensor terminal C), then go to step 9.
5	Is there continuity between connector terminal A and PCM terminal 3C?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to step 8.
6	Is mass air flow sensor okay?	Yes	Go to next step.
		No	Replace mass air flow sensor, then go to step 8.
7	Clear diagnostic trouble code from memory. Is same code No. present after performing After repair procedure?	Yes	Get assistance from technical Hotline/your distributor, then replace PCM if necessary.
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness), then go to next step.
8	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL CONNECTOR)

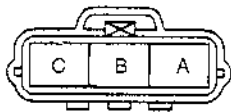
X5U101WDE

XEU101WDE

DTC P0103		Mass air flow circuit high input	
DETECTION CONDITION	<ul style="list-style-type: none">Input voltage from mass air flow sensor is above 4.9 V when time from engine started is 3 seconds		
POSSIBLE CAUSE	<ul style="list-style-type: none">Mass air flow sensor malfunction (short)Open or short circuit in wiring from PCM terminal 2L to mass air flow sensor terminal B		
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Does mass air flow sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector, then go to step 7.
		No	Go to next step.
3	Implement PID/DATA MONITOR AND RECORD (MAF V) of DIAGNOSTIC DATA LINK by using NGS. Is the voltage as specified?	Yes	Go to step 5.
		No	Go to next step.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION		ACTION
4	Is there continuity between connector terminal B and PCM terminal 2L?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to step 7.
5	Is mass air flow sensor okay?	Yes	Go to next step.
		No	Replace mass air flow sensor, then go to step 7.
6	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes	Get assistance from technical Hotline/your distributor, then replace PCM if necessary.
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness), then go to next step.
7	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.



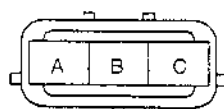
HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL CONNECTOR)

X5U-31WDF

DTC P0106		Barometric pressure circuit performance problem	
DETECTION CONDITION	● Barometric pressure variation in specified condition is less than 4.45 kPa {33.4 mmHg, 1.31 inHg}		
POSSIBLE CAUSE	● EGR boost sensor malfunction ● EGR boost sensor vacuum hose loosed, damaged and clogged ● EGR boost sensor solenoid valve malfunction ● Open or short circuit in wiring from EGR boost sensor terminal B to PCM terminal 3S ● Open or short circuit in wiring from EGR boost sensor terminal C to PCM terminal 2I ● Open or short circuit in wiring from EGR boost sensor terminal A to PCM terminal 3F ● Open or short circuit in wiring from EGR boost sensor solenoid valve terminal A to main relay terminal D ● Open or short circuit in wiring from EGR boost sensor solenoid valve terminal B to PCM terminal 3T		
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Does EGR boost sensor connector, EGR boost sensor solenoid valve connector or PCM connector have poor connection?	Yes	Repair or replace connector, then go to step 13.
		No	Go to next step.
3	Does connection of EGR boost vacuum hose have loose, damage and/or clog?	Yes	Repair or replace EGR boost sensor vacuum hose, then go to step 13.
		No	Go to next step.
4	Implement PID/DATA MONITOR RECORD (BARO V) of DIAGNOSTIC DATA LINK by using NGS tester. Is operation as specified?	Yes	Go to step 7.
		No	Go to next step.
5	Disconnect EGR boost sensor connector. Turn ignition switch to ON. Is there 5 V at harness connector terminal C?	Yes	Go to next step.
		No	Check for open or short circuit in wiring harness, then go to step (PCM terminal 2I — EGR boost sensor terminal C), then go to step 13.
6	Is there continuity between connector terminal A and PCM terminal 3F?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to step 13.
7	Is there continuity between connector terminal B and PCM terminal 3S?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to step 13.
8	Is EGR boost sensor okay? ☞ 01-40 EGR BOOST SENSOR INSPECTION	Yes	Go to next step.
		No	Repair or replace EGR boost sensor, then go to step 13.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION
9	Disconnect EGR boost sensor solenoid connector. Turn ignition switch to ON. Is there 5 V at harness connector terminal A?	Yes Go to next step.
		No Check for open or short circuit in wiring harness, then go to step (Main relay terminal D — EGR boost sensor solenoid valve connector terminal A), then go to step 13.
10	Is there continuity between connector terminal B and PCM terminal 3T?	Yes Go to next step.
		No Repair or replace wiring harness, then go to step 13.
11	Is EGR boost sensor solenoid valve okay? ☞ 01-16 EGR BOOST SENSOR SOLENOID VALVE INSPECTION	Yes Go to next step.
		No Replace EGR boost sensor solenoid valve, then go to step 13.
12	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes Get assistance from Technical Hotline/your distributor, then replace PCM if necessary.
		No Intermittent poor connection in harness or connector. Repair connector and/or harness, then go to next step.
13	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes Go to applicable DTC inspection.
		No Troubleshooting completed.



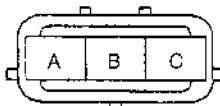
HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL CONNECTOR)

X5U1C*WDC

DTC P0107		Barometric pressure circuit low input	
DETECTION CONDITION		<ul style="list-style-type: none"> Input voltage from EGR boost sensor is below 0.2 V 	
POSSIBLE CAUSE		<ul style="list-style-type: none"> EGR boost sensor malfunction Open or short circuit in wiring from EGR boost sensor terminal B to PCM terminal 3S Open or short circuit in wiring from EGR boost sensor terminal C to PCM terminal 2I Short circuit in wiring from EGR boost sensor terminal A to PCM terminal 3F 	
STEP	INSPECTION	ACTION	
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Does EGR boost sensor connector and PCM connector have poor connection?	Yes	Repair or replace connector, then go to step 9.
		No	Go to next step.
3	Implement PID/DATA MONITOR RECORD (BARO V) of DIAGNOSTIC DATA LINK by using NGS tester. Is voltage specified?	Yes	Go to step 9.
		No	Go to next step.
4	Disconnect EGR boost sensor connector. Is there 5 V at connector terminal C?	Yes	Go to next step.
		No	Check for open or short circuit in wiring harness, then go to step 9. (PCM terminal 2I — EGR boost sensor terminal C)
5	Is there continuity between connector terminal A and PCM terminal 3F?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to step 9.
6	Is there continuity between connector terminal B and PCM terminal 3S?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to step 9.
7	Is EGR boost sensor okay? ☞ 01-40 EGR BOOST SENSOR INSPECTION	Yes	Go to next step.
		No	Replace EGR boost sensor, then go to step 9.
8	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes	Get assistance from Technical Hotline/your distributor, then replace PCM if necessary.
		No	Intermittent poor connection in harness or connector. Repair connector and/or harness, then go to next step.

TROUBLESHOOTING [ENGINE CONTROL]

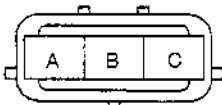
STEP	INSPECTION	ACTION	
9	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code after performing "After Repair Procedure"?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL CONNECTOR)

X5U10:WDH

DTC P0108 Barometric pressure circuit high input			
DETECTION CONDITION	<ul style="list-style-type: none"> Input voltage from EGR boost sensor (Barometric pressure) is above 4.79 V 		
POSSIBLE CAUSE	<ul style="list-style-type: none"> EGR boost sensor malfunction Short circuit in wiring from EGR boost sensor terminal B to PCM terminal 3S Short circuit in wiring from EGR boost sensor terminal C to PCM terminal 2I Open circuit in wiring from EGR boost sensor terminal A to PCM terminal 3F 		
STEP	INSPECTION	ACTION	
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Does EGR boost sensor connector and PCM connector have poor connection?	Yes	Repair or replace connector, then go to step 9.
		No	Go to next step.
3	Implement PID/DATA MONITOR RECORD (BARO V) of DIAGNOSTIC DATA LINK by using NGS tester.	Yes	Go to step 9.
		No	Go to next step.
4	Disconnect EGR boost sensor connector. Is there 5 V at connector terminal C?	Yes	Go to next step.
		No	Check for short circuit in wiring harness, then go to step 9. (PCM terminal 2I — EGR boost sensor terminal C)
5	Is there continuity between connector terminal A and PCM terminal 3F?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to step 9.
6	Is there continuity between connector terminal B and PCM terminal 3S?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to step 9.
7	Is EGR boost sensor okay? 01-40 EGR BOOST SENSOR INSPECTION	Yes	Go to next step.
		No	Replace EGR boost sensor, then go to step 9.
8	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes	Get assistance from Technical Hotline/your distributor, then replace PCM if necessary.
		No	Intermittent poor connection in harness or connector. Repair connector and/or harness, then go to next step.
9	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code after performing "After Repair Procedure"?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

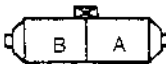


HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL CONNECTOR)

X5U10:WDI

TROUBLESHOOTING [ENGINE CONTROL]

DTC P0111		Intake air temperature circuit performance problem	
DETECTION CONDITION		● Intake air temperature is higher than engine coolant temperature by 40 °C {104 °F}	
POSSIBLE CAUSE		● Intake air temperature sensor malfunction or substandard performance ● Engine coolant temperature sensor malfunction or substandard performance ● Open or short circuit in wiring from intake air temperature sensor terminal B to PCM terminal 2B ● Open or short circuit in wiring from engine coolant temperature sensor terminal A to PCM terminal 2E ● Open circuit in wiring from intake air temperature sensor terminal A to PCM terminal 3F ● Open circuit in wiring from engine coolant temperature sensor terminal B to PCM terminal 3F	
STEP	INSPECTION		ACTION
1	Have FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Do intake air temperature sensor connector, engine coolant temperature sensor connector and PCM connector have poor connection?	Yes	Repair or replace connector, then go to step 7.
		No	Go to next step.
3	Verify stored DTC. Have DTCs P0112, P0113, P0117 and/or P0118 been stored?	Yes	Inspect and repair DTC P0112, P0113, P0117 or P0118, then go to step 7.
		No	Go to next step.
4	Measure and record the temperature around the intake-air temperature sensor. Implement PID/DATA MONITOR and RECORD (IAT) of DIAGNOSTIC DATA LINK by using NGS. Does the recorded temperature correspond with IAT valve?	Yes	Go to next step.
		No	Inspect intake air temperature sensor, then go to step 7.
5	Verify engine is cool condition. Implement PID/DATA MONITOR AND RECORD (ECT) of DIAGNOSTIC DATA LINK by using NGS. Does "ECT" value increase (above 60 °C {140 °F}) when the engine is warmed up to normal operating temperature.	Yes	Go to next step.
		No	Inspect engine coolant temperature sensor, then go to step 7.
6	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes	Get assistance from Technical Hotline, then replace PCM if necessary.
		No	Intermittent poor connection in harness or connector. Repair connector and/or harness, then go to next step.
7	Clear diagnostic trouble code from memory. Is there a diagnostic trouble code present after performing "After Repair Procedure"?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL CONNECTOR)

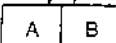
X5U101WE

X5U101WEC

DTC P0112		Intake air temperature circuit low input	
DETECTION CONDITION		<ul style="list-style-type: none"> Input voltage from intake air temperature sensor is below 0.16 V when engine is started 	
POSSIBLE CAUSE		<ul style="list-style-type: none"> Intake air temperature sensor malfunction Short circuit in wiring from intake air temperature sensor terminal B to PCM terminal 2B Short circuit in wiring from intake air temperature sensor terminal A to PCM terminal 3F 	
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Does mass air flow sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector, then go to step 8.
		No	Go to next step.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION	
3	Implement PID/DATA MONITOR AND RECORD (IAT V) of DIAGNOSTIC DATA LINK by using NGS. Is the voltage as specified?	Yes	Go to step 7.
		No	Go to next step.
4	Disconnect intake air temperature sensor connector. Turn ignition switch to ON. Is there 5 V at connector terminal B?	Yes	Go to next step.
		No	Check for open or short circuit in wiring harness. (PCM terminal 2B — intake air temperature sensor terminal B, then go to step 8.)
5	Is there continuity between connector terminal B and PCM terminal 3F?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to step 8.
6	Is intake air temperature sensor okay? ➤ 01-40 INTAKE AIR TEMPERATURE SENSOR INSPECTION	Yes	Go to next step.
		No	Replace intake air temperature sensor, then go to step 8.
7	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes	Get assistance from technical Hotline/your distributor, then replace PCM if necessary.
		No	Intermittent poor connection of harness of connector (Repair connector and/or harness), then go to next step.
8	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.



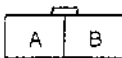
HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL CONNECTOR)

XSU101W0J

DTC P0113		Intake air temperature circuit high input	
DETECTION CONDITION		• Input voltage from intake air temperature sensor is above 4.84 V when engine is started	
POSSIBLE CAUSE		• Intake air temperature sensor malfunction • Open circuit in wiring from intake air temperature sensor terminal A to ECM terminal 3F • Open circuit in wiring from intake air temperature sensor terminal B to ECM terminal 2B	
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Does mass air flow sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector, then go to step 8.
		No	Go to next step.
3	Implement PID/DATA MONITOR AND RECORD (IAT V) of DIAGNOSTIC DATA LINK by using NGS. Is the voltage as specified?	Yes	Go to step 8.
		No	Go to next step.
4	Disconnect intake air temperature sensor connector. Turn ignition switch to ON. Is there 5 V at connector terminal B?	Yes	Go to next step.
		No	Check for open or short circuit in wiring harness. (PCM terminal 2B — Mass air flow sensor terminal B, then go to step 8.)
5	Is there continuity between connector terminal A and PCM terminal 3F?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to step 8.
6	Is intake air temperature sensor okay? ➤ 01-40 INTAKE AIR TEMPERATURE SENSOR INSPECTION	Yes	Go to next step.
		No	Replace intake air temperature sensor, then go to step 8.
7	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes	Get assistance from technical Hotline/your distributor, then replace PCM if necessary.
		No	Intermittent poor connection of harness of connector (Repair connector and/or harness), then go to next step.

TROUBLESHOOTING [ENGINE CONTROL]

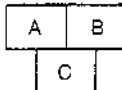
STEP	INSPECTION		ACTION
8	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL CONNECTOR)

X5U101WDK

DTC P0117 Engine coolant temperature circuit low input			
DETECTION CONDITION	<ul style="list-style-type: none"> Input voltage from engine coolant temperature sensor is below 0.2 V when ignition switch is turned ON 		
POSSIBLE CAUSE	<ul style="list-style-type: none"> Engine coolant temperature sensor malfunction Short circuit in wiring from engine coolant temperature sensor terminal A to PCM terminal 2E Short circuit in wiring from engine coolant temperature sensor terminal B to PCM terminal 3F 		
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Does engine coolant temperature sensor connector and PCM connector have poor connection?	Yes	Repair or replace connector, then go to step 8.
		No	Go to next step.
3	Implement PID/DATA MONITOR RECORD (ECT V) of DIAGNOSTIC DATA LINK by using NGS tester. Is voltage as specified?	Yes	Go to step 8.
		No	Go to next step.
4	Disconnect engine coolant temperature sensor connector. Turn ignition switch ON. Is there 5 V at connector terminal A?	Yes	Go to next step.
		No	Check for open or short circuit in wiring harness. (PCM terminal 2E — Engine coolant temperature sensor terminal A)
5	Is there continuity between connector terminal B and PCM terminal 3F?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to step 8.
6	Is resistance between engine coolant temperature sensor terminal A and B as specified? ☞ 01-40 ENGINE COOLANT TEMPERATURE SENSOR INSPECTION	Yes	Go to next step.
		No	Replace engine coolant temperature sensor, then go to step 8.
7	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes	Get assistance from Technical Hotline/your distributor, then replace PCM if necessary.
		No	Intermittent poor connection of harness or connector. Repair connector and/or harness, then go to next step.
8	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL CONNECTOR)

X5U101WDL

TROUBLESHOOTING [ENGINE CONTROL]

DTC P0118		Engine coolant temperature circuit high input	
DETECTION CONDITION		• Input voltage from engine coolant temperature sensor is above 4.9 V when ignition switch is turned ON	
POSSIBLE CAUSE		• Engine coolant temperature sensor malfunction • Open circuit in wiring from engine coolant temperature sensor terminal A to PCM terminal 2E • Open circuit in wiring from engine coolant temperature sensor terminal B to PCM terminal 3F	
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Does engine coolant temperature sensor connector and PCM connector poor connection?	Yes	Repair or replace connector, then go to step 8.
		No	Go to next step.
3	Implement PID/DATA MONITOR RECORD (ECT V) of DIAGNOSTIC DATA LINK by using NGS tester. Is voltage as specified?	Yes	Go to step 8.
		No	Go to next step.
4	Disconnect engine coolant temperature sensor connector. Turn ignition switch ON. Is there 5 V at connector terminal A?	Yes	Go to next step.
		No	Check for open or short circuit in wiring harness. (PCM terminal 2E — Engine coolant temperature sensor terminal A)
5	Is there continuity between connector terminal B and PCM terminal 3F?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to step 8.
6	Is resistance between engine coolant temperature sensor terminal A and B as specified? 01-40 ENGINE COOLANT TEMPERATURE SENSOR INSPECTION	Yes	Go to next step.
		No	Replace engine coolant temperature sensor, then go to step 8.
7	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes	Get assistance from Technical Hotline/your distributor, then replace PCM if necessary.
		No	Intermittent poor connection of harness or connector. Repair connector and/or harness, then go to next step.
8	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

A	B	
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C		

HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL CONNECTOR)

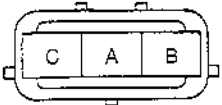
XSU101WDM

X5U101WDM

DTC P0122		Throttle position circuit low input	
DETECTION CONDITION		<ul style="list-style-type: none"> Input voltage from throttle position sensor is below 0.1 V when ignition switch is turned ON 	
POSSIBLE CAUSE		<ul style="list-style-type: none"> Throttle position sensor malfunction Open or short circuit in wiring from throttle position sensor terminal A to PCM terminal 2I Short circuit in wiring from throttle position sensor terminal C to PCM terminal 3E 	
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Does throttle position sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector, then go to step 8.
		No	Go to next step.
3	Implement PID/DATA MONITOR AND RECORD (TP V) of DIAGNOSTIC DATA LINK by using NGS. Is the voltage as specified?	Yes	Go to next step.
		No	Go to step 5.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION
4	Is voltage increase linear according to throttle valve opening angle?	Yes Go to step 8.
		No Replace throttle position sensor, then go to step 8.
5	Disconnect throttle position sensor connector. Turn ignition switch to ON. Is there 5 V at connector terminal A?	Yes Go to next step.
		No Check for open or short circuit in wiring harness. (PCM terminal 2I — Throttle position sensor terminal A), then go to step 9.
6	Is there continuity between connector terminal C and PCM terminal 3E?	Yes Check throttle position sensor, then go to next step.
		No Repair or replace wiring harness, then go to step 8.
7	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes Get assistance from technical Hotline/your distributor, then replace PCM if necessary.
		No Intermittent poor connection of harness or connector (Repair connector and/or harness), then go to step 8.
8	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes Go to applicable DTC inspection.
		No Troubleshooting completed.



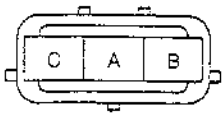
THROTTLE POSITION SENSOR
SIDE CONNECTOR

X5U1C:WDN

DTC P0123		Throttle position circuit high input	
DETECTION CONDITION		<ul style="list-style-type: none"> Input voltage from throttle position sensor is above 4.8 V when ignition switch is turned ON Input voltage from throttle position sensor is below 0.37 V when engine coolant temperature is over 80 °C {176 °F} and mass intake airflow amount is above 67 g/sec (2.4 oz/sec) Input voltage from throttle position sensor is above 1.48 V when engine speed is above 500 rpm and mass intake airflow is below 2.45 g/sec {0.0865 oz/sec} 	
		<ul style="list-style-type: none"> Throttle position sensor malfunction Open circuit in wiring from throttle position sensor terminal B to PCM terminal 3F Open circuit in wiring from throttle position sensor terminal C to PCM terminal 3E Mass air flow sensor malfunction 	
STEP	INSPECTION	ACTION	
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Does throttle position sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector, then go to step 8.
		No	Go to next step.
3	Implement PID/DATA MONITOR AND RECORD (TP V) of DIAGNOSTIC DATA LINK by using NGS. Is the voltage as specified?	Yes	Go to next step.
		No	Check for open circuit in wiring harness. (PCM terminal 3E — Throttle position sensor terminal C, then go to step 5.)
4	Is voltage increase linear according to throttle valve opening angle?	Yes	Go to step 8.
		No	Replace throttle position sensor, then go to step 8.
5	Is there continuity between connector terminal B and PCM terminal 3F?	Yes	Check throttle position sensor, then go to next step.
		No	Repair or replace wiring harness, then go to step 8.
6	Is mass air flow sensor okay? 01-40 MASS AIR FLOW SENSOR INSPECTION	Yes	Go to next step.
		No	Replace mass air flow sensor, then go to step 8.
7	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes	Get assistance from technical Hotline/your distributor, then replace PCM if necessary.
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness).

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION		ACTION
8	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.



THROTTLE POSITION SENSOR
SIDE CONNECTOR

X5U101WDO

DTC P0125		Excessive fuel control time to enter closed loop	
DETECTION CONDITION		<ul style="list-style-type: none">• Engine coolant temperature will not increase after engine is started and certain period of time is passed	
POSSIBLE CAUSE		<ul style="list-style-type: none">• Engine coolant temperature sensor malfunction• Thermostat malfunction• Engine coolant fan system malfunction• Water pump malfunction• Engine coolant passage clogged or leaks• Engine coolant level and protection incorrect	
STEP	INSPECTION		ACTION
1	Have FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Is electrical fan control system okay? ➤ 01-01A ENGINE SYSTEM INSPECTION, Cooling Fan Control System Inspection	Yes	Go to next step.
		No	Repair or replace engine coolant fan system.
3	Is engine coolant temperature sensor resistance okay? ➤ 01-40 ENGINE COOLANT TEMPERATURE SENSOR INSPECTION	Yes	Go to next step.
		No	Replace engine coolant temperature sensor.
4	Is cooling system okay?	Yes	Go to next step.
		No	Repair or replace.
5	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes	Get assistance from Technical Hotline/your distributor, then replace PCM if necessary.
		No	Intermittent poor connection in harness or connector. Repair connector and/or harness, then go to next step.
6	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

TROUBLESHOOTING [ENGINE CONTROL]

DTC P0130		Front heated oxygen sensor circuit malfunction	
DETECTION CONDITION	Heated oxygen sensor (front) signal inverses at intervals of 2.67 sec. (MT), 2.90 sec. (AT) or longer while driving in following conditions: <ul style="list-style-type: none"> • Engine speed 750—3,090 rpm (MT), 810—3,090 rpm (AT) • Vehicle speed over 5.6 km/h (3.5 MPH) • Engine speed variation in 0.51 sec. is less than 670 rpm (MT), 580 rpm (AT) • Charging efficiency variation in 0.51 sec. is less than 50% (MT), 16% (AT) • Input voltage from throttle position sensor variation in 0.51 sec. is less than 0.31 V (MT), 0.16 V (AT) 		
	POSSIBLE CAUSE	<ul style="list-style-type: none"> • Heated oxygen sensor (front) deterioration • Heated oxygen sensor heater (front) malfunction • Fuel injector malfunction • Pressure regulator malfunction • Pulsation damper malfunction • Fuel pump malfunction • Fuel filter clogged • Fuel delivery hose clogged or leaking • Fuel return hose clogged • Leakage intake-air system • Leakage exhaust system • Positive crankcase ventilation valve malfunction • Purge solenoid valve malfunction • Purge solenoid hoses hooked up incorrectly • Ignition coil malfunction • Ignition control module malfunction • Insufficient compression • Mass air flow sensor malfunction • Engine coolant temperature sensor malfunction • Throttle position sensor malfunction • Vehicle speed sensor malfunction • EGR system malfunction • Open or short circuit in wiring harness • Poor connection of connector • Vacuum hoses damaged or loose 	
<p>Warning The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:</p> <ul style="list-style-type: none"> • 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 leaks 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 REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual. <p>➤ 01-14 BEFORE REPAIR PROCEDURE ➤ 01-14 AFTER REPAIR PROCEDURE</p>			
STEP	INSPECTION		ACTION
1	Have FREEZE FRAME PID DATA and DIAGNOSTIC MONITORING TEST RESULTS been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to next step.
2	Verify stored DTC. Have DTCs P0102, P0103, P0117, P0118, P0122, P0123, P0443, P0500, P1102, P1103, P1122, P1123, P1496, P1497, P1498 and/or P1499 been stored?	Yes	Inspect and repair DTC P0102, P0103, P0117, P0118, P0122, P0123, P0443, P0500, P1102, P1103, P1122, P1123, P1496, P1497, P1498 or P1499, then go to step 33.
		No	Go to next step.
3	Is DTC P0130 on FREEZE FRAME PID DATA?	Yes	Go to next step.
		No	Inspect and repair DTC on FREEZE FRAME PID DATA, then go to step 33.
4	Temporarily clear DTC. Run DRIVE MODE. Verify TEST # 10:01:11, 10:02:11, or 10:03:11 on DIAGNOSTIC MONITORING TEST RESULTS. Does either one exceed MAX value?	Yes	Trouble is in process. Go to next step.
		No	Go to "01-01A ENGINE SYMPTOM TROUBLESHOOTING, INTERMITTENT CONCERNS".

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION		ACTION
5	Implement PID/DATA MONITOR AND RECORD (ECT V, MAF V, RPM, TP V, VS) from DIAGNOSTIC DATA LINK by using NGS tester. Is there any signal that is far out of specification when ignition switch is at ON, and run engine at idle?	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 33.
		No	Go to next step.
6	Continue monitoring items on previous step. Is there any input signal which causes drastic changes when it is set to be in trouble condition?	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 33.
		No	Go to next step.
7	Inspect exhaust system upstream from heated oxygen sensor (front). Is there any gas leak?	Yes	Repair or replace faulty exhaust parts, then go to step 33.
		No	Go to next step.
8	Inspect installation of heated oxygen sensor (front). Is it okay?	Yes	Go to next step.
		No	Install heated oxygen sensor properly, then go to step 33.
9	Implement PID/DATA MONITOR AND RECORD (FHO2S) from DIAGNOSTIC DATA LINK by using NGS tester. Is voltage on heated oxygen sensor as follows while racing engine (in neutral)? <ul style="list-style-type: none"> More than 0.45 V when suddenly the accelerator pedal: rich condition Less than 0.45 V during fuel cut: lean condition 	Yes	Go to next step.
		No	Inspect and repair or replace faulty heated oxygen sensor (front), harness connector or terminal. ➤ 01-40 HEATED OXYGEN SENSOR INSPECTION Then go to step 33.
10	Inspect heated oxygen sensor heater (front) and related harness, connector and terminal. ➤ 01-40 HEATED OXYGEN SENSOR INSPECTION Is it okay?	Yes	Go to next step.
		No	Repair or replace faulty heated oxygen sensor (front), harness, connector or terminal, then go to step 33.
11	Inspect for open, poor connection and other problems on following harnesses, connectors and terminals (for fuel injector at each cylinders): <ul style="list-style-type: none"> From main relay to fuel injector From fuel injector to PCM Is there any trouble?	Yes	Repair or replace faulty harness, connector or terminal, then go to step 33.
		No	Go to next step.
12	Inspect injection amount of each fuel injector. ➤ 01-14 FUEL INJECTOR INSPECTION, Volume Test Is there any fuel injector in abnormal condition for amount or condition of injection?	Yes	Replace faulty fuel injector, then go to step 33.
		No	Go to next step.
13	Inspect LONGFT1 and SHRTFT1 on FREEZE FRAME PID DATA which are verified at step 1. Does it shift to negative side: lean side?	Yes	Go to next step.
		No	Go to step 18.
14	Inspect purge control system. ➤ 01-01A ENGINE SYSTEM INSPECTION, Purge Control Inspection Is it okay?	Yes	Go to next step.
		No	By following system inspection, repair or replace faulty parts, then go to step 33.
15	Inspect positive crankcase ventilation valve operation. ➤ 01-16 PCV VALVE INSPECTION Is it okay?	Yes	Go to next step.
		No	Replace positive crankcase ventilation valve, then go to step 33.
16	Inspect fuel line pressure under trouble condition. ➤ 01-01A ENGINE SYSTEM INSPECTION, Fuel Line Pressure Inspection Is fuel line pressure okay?	Yes	Inspect on fuel leakage and injection amount. ➤ 01-14 FUEL INJECTOR INSPECTION Replace faulty fuel injector, then go to step 33.
		No	Go to next step.
17	Inspect pressure regulator. ➤ 01-14 PRESSURE REGULATOR INSPECTION Is it okay?	Yes	Inspect and repair clogged fuel return hose, then go to step 33.
		No	Replace pressure regulator, then go to step 33.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION		ACTION
18	Inspect for air suction at followings: • From air cleaner to throttle body • From throttle body to dynamic chamber • From dynamic chamber to intake manifold Visually inspect cracks and damages, and check fluctuation after spraying rust penetrating agent, then select air suction area. Can air suction be confirmed?	Yes	Repair or replace source of air suction, then go to step 33.
		No	Go to next step.
19	Inspect for air suction on vacuum hose which has negative pressure on intake manifold, same way as previous step. Can air suction be confirmed?	Yes	Repair or replace source of air suction, then go to step 33.
		No	Go to next step.
20	Inspect fuel line pressure under trouble condition. ☞ 01-01A ENGINE SYSTEM INSPECTION, Fuel Line Pressure Inspection Is fuel line pressure okay?	Yes	Go to step 27.
		No	Go to next step.
21	Inspect fuel pump maximum pressure. ☞ 01-14 FUEL PUMP INSPECTION, Fuel Pump Maximum Pressure Is it okay?	Yes	Go to next step.
		No	Replace fuel pump, then go to step 33.
22	Inspect pulsation damper for leaks and clogging. Is it okay?	Yes	Go to next step.
		No	Replace pulsation damper, then go to step 33.
23	Inspect clogging at fuel filter (high-pressure side). Is there any foreign material in fuel on fuel pump side of fuel filter?	Yes	Go to next step.
		No	Go to step 25.
24	Inspect inside of fuel tank for foreign materials and stain. Is inside of fuel tank okay?	Yes	Replace fuel filter (high-pressure side), then go to step 33.
		No	Clean inside of fuel tank and fuel filter (low-pressure side). Replace fuel filter (high-pressure side), then go to step 33.
25	Inspect for leaks and clogging in fuel line from fuel distributor to fuel pump. Is it okay?	Yes	Go to next step.
		No	Repair or replace source of fuel leaks or clogging, then go to step 33.
26	Inspect for leaks in fuel line from fuel filter (high-pressure side) to fuel tank (return side). Is it okay?	Yes	Replace pressure regulator, then go to step 33.
		No	Repair or replace source of fuel leaks, then go to step 33.
27	Verify blinking condition on each cylinders by setting timing light on high-tension lead under trouble condition. Does it blink regularly and stable?	Yes	Go to step 30.
		No	Go to next step.
28	Inspect resistance of ignition coil. ☞ 01-18 IGNITION COIL INSPECTION Is it okay?	Yes	Go to next step.
		No	Replace ignition coil, then go to step 33.
29	Inspect ignition control module. ☞ 01-18 IGNITION CONTROL MODULE INSPECTION Is it okay?	Yes	Inspect harness for poor connection, contacting body and wear from ignition control module to PCM. Repair faulty harness, then go to step 33.
		No	Replace ignition coil, then go to step 33.
30	Inspect EGR control system. ☞ 01-01A ENGINE SYSTEM INSPECTION, EGR Control Inspection Is it okay?	Yes	Go to next step.
		No	By following system inspection, repair or replace faulty parts, then go to step 33.
31	Remove radiator cap. Implement procedure to bleed air from engine coolant, then run engine at idle. Is there any small bubble which makes engine coolant white at filling opening? Note • Large bubbles are normal since they are remaining air coming out from 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 faulty parts, then go to step 33.
		No	Go to next step.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION
32	Inspect engine compression. ☞ 01-10 COMPRESSION INSPECTION Is it okay?	Yes Go to next step.
		No Implement engine overhaul, then go to next step.
33	Clear DTC. Run DRIVE MODE. Verify TEST # 10:01:11, 10:02:11, and 10:03:11 on DIAGNOSTIC MONITORING TEST RESULTS. Are they all below MAX value?	Yes Go to next step.
		No Go back to step 2. Note • If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.
34	Verify stored PENDING TROUBLE CODE, DTC and DIAGNOSTIC MONITORING TEST RESULTS. Is there any code stored and/or out of specification?	Yes Go to applicable DTC inspection.
		No Troubleshooting completed.

DTC P0134	Front heated oxygen sensor circuit no activity detected
DETECTION CONDITION	When heated oxygen sensor (front) signal does not exceed 0.45 V after the engine is started, or stays below 0.45 V for 52.4 seconds after the engine has reached normal operating temperature, input voltage from throttle position sensor is above 0.62 V and running at 1,500 rpm or over
POSSIBLE CAUSE	<ul style="list-style-type: none"> • Heated oxygen sensor (front) malfunction • Heated oxygen sensor heater (front) malfunction • Open or short circuit in wiring harness • Poor connection of connector • Fuel injector malfunction • Pressure regulator malfunction • Pulsation damper malfunction • Fuel pump malfunction • Fuel filter clogged • Fuel delivery hose clogged or leaking • Leakage intake-air system • Leakage exhaust system • Ignition coil malfunction • Ignition control module malfunction • Insufficient compression • Mass air flow sensor malfunction • Engine coolant temperature sensor malfunction • Throttle position sensor malfunction • EGR system malfunction • Vacuum hoses damaged or loose <p>Warning The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:</p> <ul style="list-style-type: none"> • 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 leaks 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 REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual. <p>☞ 01-14 BEFORE REPAIR PROCEDURE ☞ 01-14 AFTER REPAIR PROCEDURE</p>

STEP	INSPECTION	ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes Go to next step.
		No Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Verify stored DTC. Have DTCs P0102, P0103, P0117, P0118, P0500, P1102, P1103, P1496, P1497, P1498 and/or P1499 been stored?	Yes Inspect and repair DTC P0102, P0103, P0117, P0118, P0500, P1102, P1103, P1496, P1497, P1498 or P1499, then go to step 28.
		No Go to next step.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION		ACTION
3	Is DTC P0134 on FREEZE FRAME PID DATA?	Yes	Go to next step.
		No	Inspect and repair DTC on FREEZE FRAME PID DATA, then go to step 28.
4	Temporarily clear DTC. Verify RPM, LOAD, ECT and VSS on FREEZE FRAME PID DATA. Drive in normal mode for approx. 2 minutes under same condition. Is either P0134 stored on PENDING TROUBLE CODE?	Yes	Trouble is in process. Go to next step.
		No	Go to "01-01A ENGINE SYMPTOM TROUBLESHOOTING, INTERMITTENT CONCERNS".
5	Implement PID/DATA MONITOR AND RECORD (ECT V, RPM, TP V) from DIAGNOSTIC DATA LINK by using NGS tester. Is there any signal that is far out of specification when ignition switch is at ON, and run engine at idle?	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 28.
		No	Go to next step.
6	Continue monitoring items on previous step. Is there any input signal which causes drastic changes when it is set to be in trouble condition?	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 28.
		No	Go to next step.
7	Inspect exhaust system upstream from heated oxygen sensor (front). Is there any gas leak?	Yes	Repair or replace faulty exhaust parts, then go to step 28.
		No	Go to next step.
8	Inspect installation of heated oxygen sensor (front). Is it okay?	Yes	Go to next step.
		No	Install heated oxygen sensor properly, then go to step 28.
9	Implement PID/DATA MONITOR AND RECORD (FHO2S) from DIAGNOSTIC DATA LINK by using NGS tester. Is voltage on heated oxygen sensor as follows while racing engine (in neutral)? ● More than 0.45 V when suddenly accelerator pedal: rich condition ● Less than 0.45 V during fuel cut: lean condition	Yes	Go to next step.
		No	Inspect and repair or replace faulty heated oxygen sensor (front), harness, connector or terminal. ➤ 01-40 HEATED OXYGEN SENSOR INSPECTION Then go to step 28.
10	Inspect heated oxygen sensor heater (front) and related harness, connector and terminal. ➤ 01-40 HEATED OXYGEN SENSOR INSPECTION Is it okay?	Yes	Go to next step.
		No	Repair or replace faulty heated oxygen sensor (front), harness, connector or terminal, then go to step 28.
11	Inspect for open, poor connection and other problems on following harnesses, connectors and terminals (for fuel injector at each cylinders): ● From main relay to fuel injector ● From fuel injector to PCM Is there any trouble?	Yes	Repair or replace faulty harness, connector or terminal, then go to step 28.
		No	Go to next step.
12	Inspect injection amount of each fuel injector. ➤ 01-14 FUEL INJECTOR INSPECTION, Volume Test Is there any fuel injector in abnormal condition for amount or condition of injection?	Yes	Replace faulty fuel injector, then go to step 28.
		No	Go to next step.
13	Inspect for air suction at followings ● From air cleaner to throttle body ● From throttle body to dynamic chamber ● From dynamic chamber to intake manifold Visually inspect cracks, and damages, and check fluctuation after spraying rust penetrating agent, then select air suction area. Can air suction be confirmed?	Yes	Repair or replace source of air suction, then go to step 28.
		No	Go to next step.
14	Inspect for air suction on vacuum hose which has negative pressure on intake manifold, same way as previous step. Can air suction be confirmed?	Yes	Repair or replace source of air suction, then go to step 28.
		No	Go to next step.

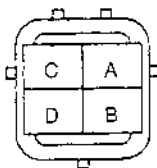
TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION		ACTION
15	Inspect fuel line pressure under trouble condition. ➤ 01-01A ENGINE SYSTEM INSPECTION, Fuel Line Pressure Inspection Is fuel line pressure okay?	Yes	Go to step 22.
		No	Go to next step.
16	Inspect fuel pump maximum pressure. ➤ 01-14 FUEL PUMP INSPECTION, Fuel Pump Maximum Pressure Is it okay?	Yes	Go to next step.
		No	Replace fuel pump, then go to step 28.
17	Inspect pulsation damper for leaks and clogging. Is it okay?	Yes	Go to next step.
		No	Replace pulsation damper, then go to step 28.
18	Inspect clogging at fuel filter (high-pressure side). Is there any foreign material in fuel on fuel pump side of fuel filter?	Yes	Go to next step.
		No	Go to step 20.
19	Inspect inside of fuel tank for foreign materials and stain. Is inside of fuel tank okay?	Yes	Replace fuel filter (high-pressure side), then go to step 28.
		No	Clean inside of fuel tank and fuel filter (low-pressure side). Replace fuel filter (high-pressure side), then go to step 28.
20	Inspect for leaks and clogging in fuel line from fuel distributor to fuel pump. Is it okay?	Yes	Go to next step.
		No	Repair or replace source of fuel leaks or clogging, then go to step 28.
21	Inspect for leaks in fuel line from fuel filter (high-pressure side) to fuel tank (return side). Is it okay?	Yes	Replace pressure regulator, then go to step 28.
		No	Repair or replace source of fuel leaks, then go to step 28.
22	Verify blinking condition on each cylinders by setting timing light on high-tension lead under trouble condition. Does it blink regularly and stable?	Yes	Go to step 25.
		No	Go to next step.
23	Inspect resistance of ignition coil. ➤ 01-18 IGNITION COIL INSPECTION Is it okay?	Yes	Go to next step.
		No	Replace ignition coil, then go to step 28.
24	Inspect ignition control module. ➤ 01-18 IGNITION CONTROL MODULE INSPECTION Is it okay?	Yes	Inspect harness for poor connection, contacting body and wear from ignition control module to PCM. Repair faulty harness, then go to step 28.
		No	Replace ignition coil, then go to step 28.
25	Inspect EGR control system. ➤ 01-01A ENGINE SYSTEM INSPECTION, EGR Control Inspection Is it okay?	Yes	Go to next step.
		No	By following system inspection, repair or replace faulty parts, then go to step 28.
26	Remove radiator cap. Implement procedure to bleed air from engine coolant, then run engine at idle. Is there any small bubble which makes engine coolant white at filling opening? Note • Large bubbles are normal since they are remaining air coming out from 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 faulty parts, then go to step 28.
		No	Go to next step.
27	Inspect engine compression. ➤ 01-10 COMPRESSION INSPECTION Is it okay?	Yes	Go to next step.
		No	Implement engine overhaul, then go to next step.
28	Clear DTC. Verify stored PENDING TROUBLE CODE and DTC, after running under DRIVE MODE. Is there any PENDING TROUBLE CODE and/or DTC stored?	Yes	Go to applicable DTC inspection. Note • If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.
		No	Troubleshooting completed.

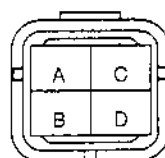
TROUBLESHOOTING [ENGINE CONTROL]

DTC P0138		Rear heated oxygen sensor circuit high input	
DETECTION CONDITION		When heated oxygen sensor (rear) signal stays above 0.45 V for 6 seconds in deceleration fuel cut after the engine has reached normal operating temperature.	
POSSIBLE CAUSE		• Short circuit in Heated oxygen sensor (rear) wiring harness	
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Is DTC P0138 on FREEZE FRAME PID DATA?	Yes	Go to next step.
		No	Inspect or repair DTC on FREEZE FRAME PID DATA, then go to step 5.
3	Temporarily clear DTC. Verify RPM, LOAD, ECT and VSS on FREEZE FRAME PID DATA. Drive for approx. 1 minute under same condition. Is P0138 stored on PENDING TROUBLE CODE?	Yes	Trouble is process. Go to next step.
		No	Go to "01-01A ENGINE SYSTEM TROUBLESHOOTING, INTERMITTENT CONCERNS".
4	Disconnect the heated oxygen sensor (rear) and PCM connectors. Check if there is continuity between the following terminals: • heated oxygen sensor (rear) terminal A and B • heated oxygen sensor (rear) vehicle harness side connector terminal A and B • heated oxygen sensor (rear) terminal C and D • heated oxygen sensor (rear) vehicle harness side connector terminal C and D Is it okay?	Yes	Go to next step.
		No	Repair or replace faulty heated oxygen sensor (rear), harness, connector or terminal, then go to next step.
5	Clear DTC. Verify stored PENDING TROUBLE CODE and DTC, after running under DRIVE MODE. Is there any PENDING TROUBLE CODE and/or DTC stored?	Yes	Go to applicable DTC inspection. Note • If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.
		No	Troubleshooting completed.

*1 (REAR)



*2 (REAR)



SENSOR SIDE CONNECTOR
(VIEW FROM TERMINAL CONNECTOR)

X5U101WE0

X5U101WED

*1 : Except California emission regulations applicable model

*2 : California emission regulations applicable model

TROUBLESHOOTING [ENGINE CONTROL]

DTC P0140		Rear heated oxygen sensor circuit no activity detected	
DETECTION CONDITION		When heated oxygen sensor (rear) signal does not exceed 0.45 V after the engine is started, or stays below 0.45 V for 19 seconds after the engine has reached normal operating temperature, input voltage from throttle position sensor is above 0.62 V, running at 1,500 rpm or over and power is supplied to heated oxygen sensor heater (rear)	
POSSIBLE CAUSE		<ul style="list-style-type: none"> • Heated oxygen sensor (rear) malfunction • Heated oxygen sensor heater (rear) malfunction • Fuel injector malfunction • Pressure regulator malfunction • Pulsation damper malfunction • Fuel pump malfunction • Fuel filter clogged • Fuel delivery hose clogged or leaking • Leakage intake-air system • Leakage exhaust system • Ignition coil malfunction • Ignition control module malfunction • Insufficient compression • Mass air flow sensor malfunction • Engine coolant temperature sensor malfunction • Throttle position sensor malfunction • EGR system malfunction • Open or short circuit in wiring harness • Poor connection of connector • Vacuum hoses damaged or loose <p>Warning The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:</p> <ul style="list-style-type: none"> • 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 leaks 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 REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual. <p>☞ 01-14 BEFORE REPAIR PROCEDURE ☞ 01-14 AFTER REPAIR PROCEDURE</p>	
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Verify stored DTC. Have DTCs P0102, P0103, P0117, P0118, P0500, P1102, P1103, P1496, P1497, P1498 and/or P1499 been stored?	Yes	Inspect and repair DTC P0102, P0103, P0117, P0118, P0500, P1102, P1103, P1496, P1497, P1498 or P1499, then go to step 29.
		No	Go to next step.
3	Is DTC P0140 on FREEZE FRAME PID DATA?	Yes	Go to next step.
		No	Inspect and repair DTC on FREEZE FRAME PID DATA, then go to step 29.
4	Verify stored PENDING TROUBLE CODE. Is P0134 stored?	Yes	Inspect and repair P0134 on DTC, then go to step 29.
		No	Go to next step.
5	Temporarily clear DTC. Verify RPM, LOAD, ECT and VSS on FREEZE FRAME PID DATA. Drive for approx. 2 minutes under same condition. Is P0140 stored in PENDING TROUBLE CODE?	Yes	Trouble is in process. Go to next step.
		No	Go to "01-01A ENGINE SYMPTOM TROUBLESHOOTING, INTERMITTENT CONCERNS".
6	Implement PID/DATA MONITOR AND RECORD (ECT V, RPM, TP V) from DIAGNOSTIC DATA LINK by using NGS tester. Is there any signal that is far out of specification when ignition switch is at ON, and run engine at idle?	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 29.
		No	Go to next step.
7	Continue monitoring items on previous step. Is there any input signal which causes drastic changes when it is set to be in trouble condition?	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 29.
		No	Go to next step.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION		ACTION
8	Inspect exhaust system upstream from heated oxygen sensor (rear). Is there any gas leak?	Yes	Repair or replace faulty exhaust parts, then go to step 29.
		No	Go to next step.
9	Inspect installation of heated oxygen sensor (rear). Is it okay?	Yes	Go to next step.
		No	Install heated oxygen sensor properly, then go to step 29.
10	Implement PID/DATA MONITOR AND RECORD (RHO2S) from DIAGNOSTIC DATA LINK by using NGS tester. Is voltage on heated oxygen sensor as follows while racing engine (in neutral)? ● Heated oxygen sensor voltage increases from 0 to 1V when accelerator pedal is pressed, and decreases when accelerator pedal is released.	Yes	Go to next step.
		No	Inspect and repair or replace faulty heated oxygen sensor (rear), harness, connector or terminal. ☞ 01-40 HEATED OXYGEN SENSOR INSPECTION Then go to step 29.
11	Inspect heated oxygen sensor heater (rear) and related harness, connector and terminal. ☞ 01-40 HEATED OXYGEN SENSOR INSPECTION Is it okay?	Yes	Go to next step.
		No	Repair or replace faulty heated oxygen sensor (rear), harness, connector or terminal, then go to step 29.
12	Inspect for open, poor connection and other problems on following harnesses, connectors and terminals (for fuel injector at each cylinders): ● From main relay to fuel injector ● From fuel injector to PCM Is there any trouble?	Yes	Repair or replace faulty harness, connector or terminal, then go to step 29.
		No	Go to next step.
13	Inspect injection amount of each fuel injector. ☞ 01-14 FUEL INJECTOR INSPECTION, Volume Test Is there any fuel injector in abnormal condition for amount or condition of injection?	Yes	Replace faulty fuel injector, then go to step 29.
		No	Go to next step.
14	Inspect for air suction at followings: ● From air cleaner to throttle body ● From throttle body to dynamic chamber ● From dynamic chamber to intake manifold Visually inspect cracks, and damages, and check fluctuation after spraying rust penetrating agent, then select air suction area. Can air suction be confirmed?	Yes	Repair or replace source of air suction, then go to step 29.
		No	Go to next step.
15	Inspect for air suction on vacuum hose which has negative pressure on intake manifold, same way as previous step. Can air suction be confirmed?	Yes	Repair or replace source of air suction, then go to step 29.
		No	Go to next step.
16	Inspect fuel line pressure under trouble condition. ☞ 01-01A ENGINE SYSTEM INSPECTION, Fuel Line Pressure Inspection. Is fuel line pressure okay?	Yes	Go to step 23.
		No	Go to next step.
17	Inspect fuel pump maximum pressure. ☞ 01-14 FUEL PUMP INSPECTION, Fuel Pump Maximum Pressure Is it okay?	Yes	Go to next step.
		No	Replace fuel pump, then go to step 29.
18	Inspect pulsation damper for leaks and clogging. Is it okay?	Yes	Go to next step.
		No	Replace pulsation damper, then go to step 29.
19	Inspect clogging at fuel filter (high-pressure side). Is there any foreign material in fuel on fuel pump side of filter?	Yes	Go to next step.
		No	Go to step 21.
20	Inspect inside of fuel tank for foreign materials and stain. Is inside of fuel tank okay?	Yes	Replace fuel filter (high-pressure side), then go to step 29.
		No	Clean inside of fuel tank and fuel filter (low-pressure side). Replace fuel filter (high-pressure side), then go to step 29.
21	Inspect for leaks and clogging in fuel line from fuel distributor to fuel pump. Is it okay?	Yes	Go to next step.
		No	Repair or replace source of fuel leaks or clogging, then go to step 29.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION	
22	Inspect for leaks in fuel line from fuel filter (high-pressure side) to fuel tank (return side). Is it okay?	Yes	Replace pressure regulator, then go to step 29.
		No	Repair or replace source of fuel leaks, then go to step 29.
23	Verify blinking condition on each cylinders by setting timing light on high-tension lead under trouble condition. Does it blink regularly and stable?	Yes	Go to step 26.
		No	Go to next step.
24	Inspect resistance of ignition coil. ☞ 01-18 IGNITION COIL INSPECTION Is it okay?	Yes	Go to next step.
		No	Replace ignition coil, then go to step 29.
25	Inspect ignition control module. ☞ 01-18 IGNITION CONTROL MODULE INSPECTION Is it okay?	Yes	Inspect harness for poor connection, contacting body and wear from ignition control module to PCM. Repair faulty harness, then go to step 29.
		No	Replace ignition coil, then go to step 29.
26	Inspect EGR control system. ☞ 01-01A ENGINE SYSTEM INSPECTION, EGR Control Inspection Is it okay?	Yes	Go to next step.
		No	By following system inspection, repair or replace faulty parts, then go to step 29.
27	Remove radiator cap. Implement procedure to bleed air from engine coolant, then run engine at idle. Is there any small bubble which makes engine coolant white at filling opening? Note ● Large bubbles are normal since they are remaining air coming out from 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 faulty parts, then go to step 29.
		No	Go to next step.
28	Inspect engine compression. ☞ 01-10 COMPRESSION INSPECTION Is it okay?	Yes	Go to next step.
		No	Implement engine overhaul, then go to next step.
29	Clear DTC. Verify stored PENDING TROUBLE CODE and DTC, after running under DRIVE MODE. Is there any PENDING TROUBLE CODE and/or DTC stored?	Yes	Go to applicable DTC inspection. Note ● If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.
		No	Troubleshooting completed.

TROUBLESHOOTING [ENGINE CONTROL]

DTC P0171		Fuel trim system too lean
DETECTION CONDITION	Fuel injection closed loop correction and learning correction are above the specified value because of system too lean	
POSSIBLE CAUSE	<ul style="list-style-type: none"> Fuel injector malfunction Fuel pump malfunction Fuel filter clogged Fuel delivery hose clogged or leaking Pressure regulator malfunction Pulsation damper malfunction Ignition coil malfunction Ignition control module malfunction High-tension lead malfunction Spark plug malfunction Leakage in intake-air system Leakage exhaust system Insufficient compression Mass air flow sensor malfunction Engine coolant temperature sensor malfunction Throttle position sensor malfunction Heated oxygen sensor (front) malfunction Open or short circuit in wiring harness Poor connection of connector Vacuum hoses damaged or loose <p>Warning The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:</p> <ul style="list-style-type: none"> 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 leaks 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 REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual. <p>☐ 01-14 BEFORE REPAIR PROCEDURE ☐ 01-14 AFTER REPAIR PROCEDURE</p>	
STEP	INSPECTION	ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes Go to next step.
		No Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Verify stored DTC. Have DTCs P0102, P0103, P0117, P0118, P0122, P0123, P0443, P0500 P1102, P1103 P1122, and/or P1123 been stored?	Yes Inspect and repair DTC P0102, P0103, P0117, P0118, P0122, P0123, P0443, P0500, P1102, P1103, P1122 or P1123, then go to step 27.
		No Go to next step.
3	Is DTC P0171 on FREEZE FRAME PID DATA?	Yes Go to next step.
		No Inspect and repair DTC on FREEZE FRAME PID DATA, then go to step 27.
4	Temporarily clear DTC. Verify RPM, LOAD ECT and VSS on FREEZE FRAME PID DATA. Drive for approx. 20 seconds under same condition. Is P0171 stored to PENDING TROUBLE CODE?	Yes Trouble is in process. Go to next step.
		No Go to "01-01A ENGINE SYMPTOM TROUBLESHOOTING, INTERMITTENT CONCERNS".
5	Implement PID/DATA MONITOR AND RECORD (ECT V, MAF V, TP V, VS) from DIAGNOSTIC DATA LINK by using NGS tester. Is there any signal that is far out of specification when ignition switch is at ON, and run engine at idle?	Yes Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 27.
		No Go to next step.
6	Continue monitoring items on previous step. Is there any input signal which causes drastic changes when it is set to be in trouble condition?	Yes Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 27.
		No Go to next step.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION
7	Implement PID/DATA MONITOR AND RECORD (FHO2S) from DIAGNOSTIC DATA LINK by using NGS tester. Is voltage on heated oxygen sensor as follows while racing engine (in neutral)? • More than 0.45 V when suddenly accelerator pedal: rich condition • Less than 0.45 V during fuel cut: lean condition	Yes Go to next step.
		No Inspect and repair or replace faulty heated oxygen sensor (front), harness, connector or terminal. ➤ 01-40 HEATED OXYGEN SENSOR INSPECTION Then go to step 27.
8	Inspect for air suction at followings: • From air cleaner to throttle body • From throttle body to dynamic chamber • From dynamic chamber to intake manifold Visually inspect cracks, and damages, and check fluctuation after spraying rust penetrating agent, then select air suction area. Can air suction be confirmed?	Yes Repair or replace source of air suction, then go to step 27.
		No Go to next step.
9	Inspect for air suction on vacuum hose which has negative pressure on intake manifold, same way as previous step. Can air suction be confirmed?	Yes Repair or replace source of air suction, then go to step 27.
		No Go to next step.
10	Inspect exhaust system. Is there any gas leak?	Yes Repair or replace faulty exhaust parts, then go to step 27.
		No Go to next step.
11	Inspect fuel line pressure under trouble condition. ➤ 01-01A ENGINE SYSTEM INSPECTION, Fuel Line Pressure Inspection Is fuel line pressure okay?	Yes Go to step 18.
		No Go to next step.
12	Inspect fuel pump maximum pressure. ➤ 01-14 FUEL PUMP INSPECTION, Fuel Pump Maximum Pressure Is it okay?	Yes Go to next step.
		No Replace fuel pump, then go to step 27.
13	Inspect pulsation damper for leaks and clogging. Is it okay?	Yes Go to next step.
		No Replace pulsation damper, then go to step 27.
14	Inspect clogging at fuel filter (high-pressure side). Is there any foreign material in fuel on fuel pump side of filter?	Yes Go to next step.
		No Go to step 16.
15	Inspect inside of fuel tank for foreign materials and stain. Is inside of fuel tank okay?	Yes Replace fuel filter (high-pressure side), then go to step 27.
		No Clean inside of fuel tank and fuel filter (low-pressure side). Replace fuel filter (high-pressure side), then go to step 27.
16	Inspect for leaks and clogging in fuel line from fuel distributor to fuel pump. Is it okay?	Yes Go to next step.
		No Repair or replace source of fuel leaks or clogging, then go to step 27.
17	Inspect for leaks in fuel line from fuel filter (high-pressure side) to fuel tank (return side). Is it okay?	Yes Replace pressure regulator, then go to step 27.
		No Repair or replace source of fuel leaks, then go to step 27.
18	Inspect for open, poor connection and other problems on following harnesses, connectors and terminals (for fuel injector at each cylinders): • From main relay to fuel injector • From fuel injector to PCM Is there any trouble?	Yes Repair or replace faulty harness, connector or terminal, then go to step 27.
		No Go to next step.
19	Inspect injection amount of each fuel injector. ➤ 01-14 FUEL INJECTOR INSPECTION, Volume Test Is there any fuel injector in abnormal condition for amount or condition of injection?	Yes Replace faulty fuel injector, then go to step 27.
		No Go to next step.
20	Inspect spark plugs at each cylinders. Is it okay?	Yes Go to next step.
		No Replace faulty spark plug, then go to step 27.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION	
21	Verify blinking condition on each cylinders by setting timing light on high-tension lead under trouble condition. Does it blink regularly and stable? Note • When it occurs at idle, inspect spark plugs on each cylinders and verify that sparks are stable.	Yes	Go to step 25.
		No	Go to next step.
22	Inspect high-tension leads for installation condition, corrosion on terminal, open lead and damaged cover. Are they okay?	Yes	Go to next step.
		No	Repair or replace faulty high-tension lead, then go to step 27.
23	Inspect resistance of ignition coil. ☞ 01-18 IGNITION COIL INSPECTION Is it okay?	Yes	Go to next step.
		No	Replace ignition coil, then go to step 27.
24	Inspect ignition control module. ☞ 01-18 IGNITION CONTROL MODULE INSPECTION Is it okay?	Yes	Inspect harness for poor connection, contacting body and wear from ignition control module to PCM. Repair faulty harness, then go to step 27.
		No	Replace ignition coil, then go to step 27.
25	Remove radiator cap. Implement procedure to bleed air from engine coolant, then run engine at idle. Is there any small bubble which makes engine coolant white at filling opening? Note • Large bubbles are normal since they are remaining air coming out from 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 faulty parts, then go to step 27.
		No	Go to next step.
26	Inspect engine compression. ☞ 01-10 COMPRESSION INSPECTION Is it okay?	Yes	Go to next step.
		No	Implement engine overhaul, then go to next step.
27	Idle engine after warming up, then run monitor on PID/DATA MONITOR (LONGFT1, SHRTFT1) from GENERIC OBD II FUNCTIONS by using NGS tester. Add LONGFT1 and SHRTFT1 value. Is the value within -15% to +15%?	Yes	Go to next step.
		No	Go back to step 4. Note • If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.
28	Clear DTC. Verify stored PENDING TROUBLE CODE and DTC, after running under DRIVE MODE. Is there any PENDING TROUBLE CODE and/or DTC stored?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

TROUBLESHOOTING [ENGINE CONTROL]

DTC P0172		Fuel trim system too rich	
DETECTION CONDITION		Fuel injection closed loop correction and learning correction are above the specified value because of system too rich	
POSSIBLE CAUSE		<ul style="list-style-type: none"> Fuel injector malfunction Fuel return hose clogged Pressure regulator malfunction Purge solenoid malfunction Mass air flow sensor malfunction Engine coolant temperature sensor malfunction Throttle position sensor malfunction Heated oxygen sensor (front) malfunction Open or short circuit in wiring harness Poor connection of connector <p>Warning The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:</p> <ul style="list-style-type: none"> 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 leaks 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 REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual. <p>➤ 01-14 BEFORE REPAIR PROCEDURE ➤ 01-14 AFTER REPAIR PROCEDURE</p>	
STEP	INSPECTION	ACTION	
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Verify stored DTC. Have DTCs P0102, P0103, P0117, P0118, P0122, P0123, P0443, P0500, P1102, P1103, P1122, and/or P1123 been stored?	Yes	Inspect and repair DTC P0102, P0103, P0117, P0118, P0122, P0123, P0443, P0500, P1102, P1103, P1122 or P1123, then go to step 12.
		No	Go to next step.
3	Is DTC P0172 on FREEZE FRAME PID DATA?	Yes	Go to next step.
		No	Inspect and repair DTC on FREEZE FRAME PID DATA, then go to step 12.
4	Temporarily clear DTC. Verify RPM, LOAD ECT and VSS on FREEZE FRAME PID DATA. Drive for approx. 20 seconds under same condition. Is P0172 stored to PENDING TROUBLE CODE?	Yes	Trouble is in process. Go to next step.
		No	Go to "01-01A ENGINE SYMPTOM TROUBLESHOOTING, INTERMITTENT CONCERNS".
5	Implement PID/DATA MONITOR AND RECORD (ECT V, MAF V, TP V, VS) from DIAGNOSTIC DATA LINK by using NGS tester. Is there any signal that is far out of specification when ignition switch is at ON, and run engine at idle?	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 12.
		No	Go to next step.
6	Continue monitoring items on previous step. Is there any input signal which causes drastic changes when it is set to be in trouble condition?	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 12.
		No	Go to next step.
7	Implement PID/DATA MONITOR AND RECORD (FHO2S) from DIAGNOSTIC DATA LINK by using NGS tester. Is voltage on heated oxygen sensor as follows while racing engine (in neutral)? <ul style="list-style-type: none"> More than 0.45 V when suddenly accelerator pedal: rich condition Less than 0.45 V during fuel cut: lean condition 	Yes	Go to next step.
		No	Inspect and repair or replace faulty heated oxygen sensor (front), harness, connector or terminal. ➤ 01-40 HEATED OXYGEN SENSOR INSPECTION Then go to step 13.
8	Inspect purge control system. ➤ 01-01A ENGINE SYSTEM INSPECTION, Purge Control Inspection Is it okay?	Yes	Go to next step.
		No	By following system inspection, repair or replace faulty parts, then go to step 12.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION	
9	Inspect positive crankcase ventilation valve operation. ☞ 01-16 PCV VALVE INSPECTION Is it okay?	Yes	Go to next step.
		No	Replace positive crankcase ventilation valve, then go to step 12.
10	Inspect fuel line pressure under trouble condition. ☞ 01-01A ENGINE SYSTEM INSPECTION, Fuel Line Pressure Inspection Is fuel line pressure okay?	Yes	Inspect on fuel leakage and injection amount. ☞ 01-14 FUEL INJECTOR INSPECTION Replace faulty fuel injector, then go to step 13.
		No	Go to next step.
11	Inspect pressure regulator. ☞ 01-14 PRESSURE REGULATOR INSPECTION Is it okay?	Yes	Inspect and repair clogged fuel return hose, then go to step 12.
		No	Replace pressure regulator, then go to step 12.
12	Idle engine after warming up, then run monitor on PID/DATA MONITOR (LONGFT1, SHRTFT1) from GENERIC OBD II FUNCTIONS by using NGS tester. Add LONGFT1 and SHRTFT1 value. Is the value within -15% to +15%?	Yes	Go to next step.
		No	Go back to step 4. Note ● If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.
13	Clear DTC. Verify stored PENDING TROUBLE CODE and DTC, after running under DRIVE MODE. Is there any PENDING TROUBLE CODE and/or DTC stored?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

TROUBLESHOOTING [ENGINE CONTROL]

DTC P0300		Random misfire detected	
DETECTION CONDITION		PCM input signal from crankshaft position sensor signal is irregular	
POSSIBLE CAUSE		<ul style="list-style-type: none"> • Ignition timing without specification • Air gap of crankshaft position sensor without specification • Ignition coil malfunction • Ignition control module malfunction • High-tension lead malfunction • Spark plug malfunction • Fuel injector malfunction • Fuel pump malfunction • Fuel filter clogged • Fuel delivery hose clogged or leaking • Fuel return hose clogged • Pressure regulator malfunction • Pulsation damper malfunction • Purge solenoid valve malfunction • Positive crankcase ventilation valve malfunction • Leakage in intake-air system • Insufficient compression • EGR system malfunction • Vibration of drive unit • Excessive load of A/C compressor, power steering oil pump, and generator • Mass air flow sensor malfunction • Engine coolant temperature sensor malfunction • Intake air temperature sensor malfunction • Crankshaft position sensor malfunction • Camshaft position sensor malfunction • Throttle position sensor malfunction • Heated oxygen sensor (front) malfunction • Vehicle speed sensor malfunction • Break switch malfunction • Open or short circuit in wiring harness • Poor connection of connector • Vacuum hoses damaged or loose <p>Warning The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:</p> <ul style="list-style-type: none"> • 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 leaks 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 REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual. <p>☞ 01-14 BEFORE REPAIR PROCEDURE ☞ 01-14 AFTER REPAIR PROCEDURE</p>	
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Verify stored DTC. Have DTCs P0102, P0103, P0111, P0112, P0113, P0117, P0118, P0120, P0335, P0443, P0500, P0703, P1102, P1103, P1496, P1497, P1498 and/or P1499 been stored?	Yes	Inspect or repair DTC P0102, P0103, P0111, P0112, P0113, P0117, P0118, P0120, P0335, P0443, P0500, P0703, P1102, P1103, P1496, P1497, P1498 or P1499, then go to step 39.
		No	Go to next step.
3	Is DTC P0300 on FREEZE FRAME PID DATA?	Yes	Go to next step.
		No	Inspect or repair DTC on FREEZE FRAME PID DATA, then go to step 39.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION		ACTION
4	Temporarily clear DTC. Race engine 2 to 3 times in neutral. Then verify RPM, LOAD, ECT and VSS on FREEZE FRAME PID DATA. Operate under condition simulating constant drives for length that allows engine to revolve 1,000 times. For example, at 2,000 rpm, $1,000 \times 60 / 2,000 =$ more than 30 seconds. Is P0300 set on PENDING TROUBLE CODE? Note • Adjust electrical load, A/C load, and AT range or MT gear position to simulate condition reported by customer.	Yes	Trouble is in process. Go to step 6.
		No	Go to next step.
5	Drive vehicle under condition reported by customer. For example, speed, acceleration, AT range or MT gear position, rough or winding road at which MIL illuminates. Is P0300 set on either PENDING TROUBLE CODE or DTC?	Yes	Trouble is in process. Go to next step.
		No	Go to "01-01A ENGINE SYMPTOM TROUBLESHOOTING, INTERMITTENT CONCERNS".
6	Is vehicle vibration due to vehicle speed felt when driving under trouble reiteration condition? Note • When it is vibrating, change AT range or MT gear position to verify whether vibration is caused by vehicle speed or running engine.	Yes	Diagnose and repair for vibration from drive shaft to tire, then go to step 39.
		No	Go to next step.
7	Implement PID/DATA MONITOR AND RECORD (RPM, TP V, ECT V, IAT V, MAF V, BRK SW, VS) from DIAGNOSTIC DATA LINK by using NGS tester. Is there any signal that is far out of specification when ignition switch is at ON, and run engine at idle?	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 39.
		No	Go to next step.
8	Continue monitoring items on previous step. Is there any input signal which causes drastic changes when it is set to be in trouble condition?	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 39.
		No	Go to next step.
9	Inspect ignition timing. ➤ 01-10 ENGINE TUNE-UP, Ignition Timing Is it okay?	Yes	Go to step 12.
		No	Go to next step.
10	Adjust ignition timing. ➤ 01-10 ENGINE TUNE-UP, Ignition Timing Is it adjusted properly?	Yes	Go to step 39.
		No	Go to next step.
11	Inspect camshaft position sensor. ➤ 01-40 CAMSHAFT POSITION SENSOR INSPECTION Is it okay?	Yes	Inspect installation condition and damages on timing belt and gears, repair faulty parts, then go to step 39.
		No	Replace camshaft position sensor, then go to step 39.
12	Inspect crankshaft pulley for loose or unstable installation, and shape and installation condition of sensor plate. Is it okay?	Yes	Go to next step.
		No	Repair or replace faulty parts, then go to step 39.
13	Inspect crankshaft position sensor for loose installation and air gap. Is it okay?	Yes	Go to next step.
		No	Install crankshaft position sensor properly or adjust air gap. ➤ 01-40 CRANKSHAFT POSITION SENSOR ADJUSTMENT Then go to step 39.
14	Inspect spark plug condition. Is it okay?	Yes	Go to next step.
		No	Replace spark plug, then go to step 39.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION		ACTION
15	Verify blinking condition on each cylinders by setting timing light on high-tension lead under trouble condition. Does it blink regularly and stable? Note • When it occurs at idle, inspect spark plugs on each cylinders and verify that sparks are stable.	Yes	Go to step 19.
		No	Go to next step.
16	Inspect high-tension leads for installation condition, corrosion on terminal, open lead and damaged cover. Is condition of high-tension lead okay?	Yes	Go to next step.
		No	Repair or replace faulty high-tension lead, then go to step 39.
17	Inspect resistance of ignition coil. ☞ 01-18 IGNITION COIL INSPECTION Is it okay?	Yes	Go to next step.
		No	Replace ignition coil, then go to step 39.
18	Inspect ignition control module. ☞ 01-18 IGNITION CONTROL MODULE INSPECTION Is it okay?	Yes	Inspect harness for poor connection, contacting body and wear from ignition control module to PCM. Repair faulty harness, then go to step 39.
		No	Replace ignition coil, then go to step 39.
19	Remove radiator cap. Implement procedure to bleed air from engine coolant, then run engine at idle. Is there any small bubble which makes engine coolant white at filling opening? Note • Large bubbles are normal since they are remaining air coming out from 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 faulty parts, then go to step 39.
		No	Go to next step.
20	Inspect engine compression. ☞ 01-10 COMPRESSION INSPECTION Is it okay?	Yes	Go to next step.
		No	Implement engine overhaul, then go to step 39.
21	Inspect drive belt and other for squeaking, and damage. Is it okay?	Yes	Go to next step.
		No	Replace damaged belt, then go to step 39.
22	Inspect for loose installation and excessive load on idler pulley. Is it okay?	Yes	Go to next step.
		No	Install properly or replace idler pulley, then go to step 39.
23	Inspect following parts for loose installation and excessive load: • A/C: refrigerant gas pressure • Power steering: hydraulic pressure • Generator: drastic changes in output voltage It is necessary to investigate cause if there is problem. Is it okay?	Yes	Go to next step.
		No	Repair or replace faulty parts, then go to step 39.
24	Inspect EGR control system. ☞ 01-01A ENGINE SYSTEM INSPECTION, EGR Control Inspection Is it okay?	Yes	Go to next step.
		No	By following system inspection, repair or replace faulty parts, then go to step 39.
25	Implement PID/DATA MONITOR AND RECORD (FHO2S) from DIAGNOSTIC DATA LINK by using NGS tester. Verify heated oxygen sensor turnover under trouble condition. Does it turnover regularly?	Yes	Implement engine overhaul, then go to step 39.
		No	Go to next step.

TROUBLESHOOTING [ENGINE CONTROL]


STEP	INSPECTION		ACTION
26	Implement PID/DATA MONITOR AND RECORD (FHO2S) from DIAGNOSTIC DATA LINK by using NGS tester. Is voltage on heated oxygen sensor as follows while racing engine (in neutral)? • More than 0.45 V when suddenly accelerator pedal: rich condition • Less than 0.45 V during fuel cut: lean condition	Yes	Go to next step.
		No	Inspect and repair or replace faulty heated oxygen sensor (front), harness, connector or terminal. ➡ 01-40 HEATED OXYGEN SENSOR INSPECTION Then go to step 39.
27	Continue monitoring items on previous step. Is voltage of heated oxygen sensor longer at 0.45 V on rich condition?	Yes	Go to next step.
		No	Go to step 30.
28	Inspect purge control system. ➡ 01-01A ENGINE SYSTEM INSPECTION, Purge Control Inspection Is it okay?	Yes	Go to next step.
		No	By following system inspection, repair or replace faulty parts, then go to step 39.
29	Inspect positive crankcase ventilation operation. ➡ 01-16 PCV VALVE INSPECTION Is it okay?	Yes	Inspect on fuel leakage and injection amount. ➡ 01-14 FUEL INJECTOR INSPECTION Replace faulty fuel injector, then go to step 39.
		No	Replace positive crankcase ventilation valve, then go to step 39.
30	Inspect for air suction at followings: • From air cleaner to throttle body • From throttle body to dynamic chamber • From dynamic chamber to intake manifold Visually inspect cracks, and damages, and check fluctuation after spraying rust penetrating agent, then select air suction area. Can air suction be confirmed?	Yes	Repair or replace source of air suction, then go to step 39.
		No	Go to next step.
31	Inspect for air suction on vacuum hose which has negative pressure on intake manifold, same way as previous step. Can air suction be confirmed?	Yes	Repair or replace source of air suction, then go to step 39.
		No	Go to next step.
32	Inspect fuel line pressure under trouble condition. ➡ 01-01A ENGINE SYSTEM INSPECTION, Fuel Line Pressure Inspection Is fuel line pressure okay?	Yes	Inspect on fuel leakage and injection amount. ➡ 01-14 FUEL INJECTOR INSPECTION Replace faulty fuel injector, then go to step 39.
		No	Go to next step.
33	Inspect fuel pump maximum pressure. ➡ 01-14 FUEL PUMP INSPECTION, Fuel Pump Maximum Pressure Is it okay?	Yes	Go to next step.
		No	Replace fuel pump, then go to step 39.
34	Inspect pulsation damper for leaks and clogging. Is it okay?	Yes	Go to next step.
		No	Replace pulsation damper, then go to step 39.
35	Inspect for clogging at fuel filter (high-pressure side). Is there any foreign material in fuel on fuel pump side of filter?	Yes	Go to next step.
		No	Go to step 37.
36	Inspect inside of fuel tank for foreign materials and stain. Is inside of fuel tank okay?	Yes	Replace fuel filter (high-pressure side), then go to step 39.
		No	Clean inside of fuel tank and fuel filter (low-pressure side). Replace fuel filter (high-pressure side), then go to step 39.
37	Inspect for leaks and clogging in fuel hose from fuel distributor to fuel pump. Is it okay?	Yes	Go to next step.
		No	Repair or replace source of fuel leaks or clogging, then go to step 39.
38	Inspect for leaks in fuel hose from fuel filter (high-pressure side) to fuel tank return side. Is it okay?	Yes	Replace pressure regulator, then go to next step.
		No	Repair or replace source of fuel leaks, then go to next step.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION		ACTION
39	Clear DTC. Verify stored PENDING TROUBLE CODE and DTC, after running under DRIVE MODE. Is there any PENDING TROUBLE CODE and/or DTC stored?	Yes	Go to applicable DTC inspection. Note • If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.
		No	Troubleshooting completed.

DTC P0301, P0302, P0303, P0304		Cylinder 1—4 misfire detected	
DETECTION CONDITION		PCM input signal from crankshaft position sensor signal for cylinder No.1, 2, 3 or 4 is irregular	
POSSIBLE CAUSE		<ul style="list-style-type: none"> • Ignition timing without specification • Air gap of crankshaft position sensor without specification • Ignition coil malfunction • Ignition control module malfunction • High-tension lead malfunction • Spark plug malfunction • Fuel injector malfunction • Fuel pump malfunction • Fuel filter clogged • Fuel delivery hose clogged or leaking • Fuel return hose clogged • Pressure regulator malfunction • Pulsation damper malfunction • Purge solenoid valve malfunction • Positive crankcase ventilation valve malfunction • Leakage in intake-air system • Insufficient compression • EGR system malfunction • Vibration of drive unit • Excessive load of A/C compressor, power steering oil pump, and generator • Mass air flow sensor malfunction • Engine coolant temperature sensor malfunction • Intake air temperature sensor malfunction • Crankshaft position sensor malfunction • Camshaft position sensor malfunction • Throttle position sensor malfunction • Heated oxygen sensor (front) malfunction • Vehicle speed sensor malfunction • Break switch malfunction • Open or short circuit in wiring harness • Poor connection of connector • Vacuum hoses damaged or loose <p>Warning The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:</p> <ul style="list-style-type: none"> • 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 leaks 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 REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual. <p>☞ 01-14 BEFORE REPAIR PROCEDURE ☞ 01-14 AFTER REPAIR PROCEDURE</p>	
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION	
2	Verify stored DTC. Have DTCs P0102, P0103, P0111, P0112, P0113, P0117, P0118, P0122, P0123, P0335, P0443, P0500, P0703, P1102, P1103, P1122, P1123, P1496, P1497, P1498 and/or P1499 been stored?	Yes	Inspect and repair DTC P0102, P0103, P0111, P0112, P0113, P0117, P0118, P0122, P0123, P0335, P0443, P0500, P0703, P1102, P1103, P1122, P1123, P1496, P1497, P1498 or P1499, then go to step 36.
		No	Go to next step.
3	Is DTC P0301, P0302, P0303 or P0304 on FREEZE FRAME PID DATA?	Yes	Go to next step.
		No	Inspect and repair DTC on FREEZE FRAME PID DATA, then go to step 35.
4	Temporarily clear DTC. Race engine 2 to 3 times in neutral. Then verify RPM, LOAD, ECT and VSS on FREEZE FRAME PID DATA. Operate under condition simulating constant drives for length that allows engine to revolve 1,000 times. For example, at 2,000 rpm, $1,000 \times 60 / 2,000 =$ more than 30 seconds. Is P0300 set on PENDING TROUBLE CODE? Note <ul style="list-style-type: none"> Adjust electrical load, A/C load, and AT range or MT gear position to simulate condition reported by customer. 	Yes	Trouble is in process. Go to step 6.
		No	Go to next step.
5	Drive vehicle under condition reported by customer. For example, speed, acceleration, AT range or MT gear position, rough or winding road at which MIL illuminates. Are P0301, P0302, P0303 or P0304 set on either PENDING TROUBLE CODE or DTC?	Yes	Trouble is in process. Go to next step.
		No	Go to "01-01A ENGINE SYMPTOM TROUBLESHOOTING, INTERMITTENT CONCERNS".
6	Implement PID/DATA MONITOR AND RECORD (RPM, TP V, ECT V IAT V, MAF V, BRK SW, VS) from DIAGNOSTIC DATA LINK by using NGS tester. Is there any signal that is far out of specification when ignition switch is at ON, and run engine at idle?	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 36.
		No	Go to next step.
7	Continue monitoring items on previous step. Is there any input signal which causes drastic changes when it is set to be in trouble condition?	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 36.
		No	Go to next step.
8	Exchange faulty spark plugs with plugs on other cylinders, then drive under trouble condition. Is misfire detection DTC or PENDING TROUBLE CODE on cylinder which faulty spark plugs are placed, stored?	Yes	Replace faulty spark plug, then go to step 36.
		No	Go to next step.
9	Verify blinking condition on faulty cylinders by setting timing light on high-tension lead under trouble condition. Does it blink regularly and stable? Note <ul style="list-style-type: none"> When it occurs at idle, inspect spark plugs on faulty cylinders and verify that sparks are stable. 	Yes	Go to step 13.
		No	Go to next step.
10	Inspect high-tension lead for installation, condition, corrosion on terminal, open harness, and damaged cover. Are they okay?	Yes	Go to next step.
		No	Repair or replace faulty high-tension lead, then go to step 36.
11	Inspect resistance of ignition coil. <div>  01-18 IGNITION COIL INSPECTION </div> Is it okay?	Yes	Go to next step.
		No	Replace ignition coil, then go to step 36.

TROUBLESHOOTING [ENGINE CONTROL]


STEP	INSPECTION		ACTION
12	Inspect ignition control module. ➤ 01-18 IGNITION CONTROL MODULE INSPECTION Is it okay?	Yes	Inspect harness for poor connection, contacting body and wear from ignition control module to PCM. Repair faulty harness, then go to step 36.
		No	Replace ignition coil, then go to step 36.
13	Carry out IDLING TEST from SIMULATION TEST by using NGS tester. Turn off faulty injectors and compare decrease in engine speeds with injectors on other cylinders. Is collapse on running speed of faulty cylinder lesser than others?	Yes	Go to next step.
		No	Go to step 15.
14	Inspect for open, poor connection and other problems on following harnesses, connectors and terminals (for fuel injector at faulty cylinder): ● From main relay to fuel injector ● From fuel injector to PCM Is there any trouble?	Yes	Repair or replace faulty harness, connector or terminal, then go to step 36.
		No	Replace fuel injector, then go to step 36.
15	Inspect ignition timing. ➤ 01-10 ENGINE TUNE-UP, Ignition Timing Is it okay?	Yes	Go to step 18.
		No	Go to next step.
16	Adjust ignition timing. ➤ 01-10 ENGINE TUNE-UP, Ignition Timing Is it adjusted properly?	Yes	Go to step 36.
		No	Go to next step.
17	Inspect camshaft position sensor. ➤ 01-40 CAMSHAFT POSITION SENSOR INSPECTION Is it okay?	Yes	Inspect installation condition and damages on timing belt and gears, repair faulty parts, then go to step 36.
		No	Replace camshaft position sensor, then go to step 36.
18	Inspect crankshaft position sensor for loose installation and air gap. Is it okay?	Yes	Go to next step.
		No	Install crankshaft position sensor properly or adjust air gap. ➤ 01-40 CRANKSHAFT POSITION SENSOR ADJUSTMENT Then go to step 36.
19	Inspect crankshaft pulley for loose or unstable installation, and shape or installation condition of sensor plate. Is it okay?	Yes	Go to next step.
		No	Repair or replace faulty parts, then go to step 36.
20	Remove radiator cap. Implement procedure to bleed air from engine coolant, then run engine at idle. Is there any small bubble which makes engine coolant white at filling opening? Note ● Large bubbles are normal since they are remaining air coming out from 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 faulty parts, then go to step 36.
		No	Go to next step.
21	Inspect engine compression. ➤ 01-10 COMPRESSION INSPECTION Is it okay?	Yes	Go to next step.
		No	Implement engine overhaul, then go to step 36.
22	Inspect EGR control system. ➤ 01-01A ENGINE SYSTEM INSPECTION, EGR Control Inspection Is it okay?	Yes	Go to next step.
		No	By following system inspection, repair or replace faulty parts, then go to step 36.
23	Implement PID/DATA MONITOR AND RECORD (FHO2S) from DIAGNOSTIC DATA LINK by using NGS tester. Is voltage on heated oxygen sensor as follows while racing engine (in neutral)? ● More than 0.45 V when suddenly accelerator pedal: rich condition ● Less than 0.45 V during fuel cut: lean condition	Yes	Go to next step.
		No	Inspect and repair or replace faulty heated oxygen sensor (front), harness, connector or terminal. ➤ 01-40 HEATED OXYGEN SENSOR INSPECTION Then go to step 36.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION	
24	Continue monitoring items on previous step. Is voltage of heated oxygen sensor longer at 0.45 V on rich condition?	Yes	Go to next step.
		No	Go to step 27.
25	Inspect purge control system. ➤ 01-01A ENGINE SYSTEM INSPECTION, Purge Control Inspection Is it okay?	Yes	Go to next step.
		No	By following system inspection, repair or replace faulty parts, then go to step 36.
26	Inspect positive crankcase ventilation operation. ➤ 01-16 PCV VALVE INSPECTION Is it okay?	Yes	Inspect on fuel leakage and injection amount. ➤ 01-14 FUEL INJECTOR INSPECTION Replace faulty fuel injector, then go to step 36.
		No	Replace positive crankcase ventilation valve, then go to step 36.
27	Inspect for air suction at followings: • From air cleaner to throttle body • From throttle body to dynamic chamber • From dynamic chamber to intake manifold Visually inspect cracks, and damages, and check fluctuation after spraying rust penetrating agent, then select air suction area. Can air suction be confirmed?	Yes	Repair or replace source of air suction, then go to step 36.
		No	Go to next step.
28	Inspect for air suction on vacuum hose which has negative pressure on intake manifold, same way as previous step. Can air suction be confirmed?	Yes	Repair or replace source of air suction, then go to step 36.
		No	Go to next step.
29	Inspect fuel line pressure under trouble condition. ➤ 01-01A ENGINE SYSTEM INSPECTION, Fuel Line Pressure Inspection Is fuel line pressure okay?	Yes	Inspect on fuel leakage and injection amount. ➤ 01-14 FUEL INJECTOR INSPECTION Replace faulty fuel injector, then go to step 36.
		No	Go to next step.
30	Inspect fuel pump maximum pressure. ➤ 01-14 FUEL PUMP INSPECTION, Fuel Pump Maximum Pressure Is it okay?	Yes	Go to next step.
		No	Replace fuel pump, then go to step 36.
31	Inspect pulsation damper for leaks and clogging. Is it okay?	Yes	Go to next step.
		No	Replace pulsation damper, then go to step 36.
32	Inspect for clogging on fuel filter (high-pressure side). Is there any foreign material in fuel on fuel pump side of filter?	Yes	Go to next step.
		No	Go to step 34.
33	Inspect inside of fuel tank for foreign materials and stain. Is inside of fuel tank okay?	Yes	Replace fuel filter (high-pressure side), then go to step 36.
		No	Clean inside of fuel tank and fuel filter (low-pressure side). Replace fuel filter (high-pressure side), then go to step 36.
34	Inspect for leaks and clogging in fuel hose from fuel distributor to fuel pump. Is it okay?	Yes	Go to next step.
		No	Repair or replace source of fuel leaks or clogging, then go to step 36.
35	Inspect for leaks in fuel hose from fuel filter (high-pressure side) to fuel tank (return side). Is it okay?	Yes	Replace pressure regulator, then go to next step.
		No	Repair or replace source of fuel leaks, then go to next step.
36	Clear DTC. Verify stored PENDING TROUBLE CODE and DTC, after running under DRIVE MODE. Is there any PENDING TROUBLE CODE and/or DTC stored?	Yes	Go to applicable DTC inspection. Note • If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.
		No	Troubleshooting completed.

TROUBLESHOOTING [ENGINE CONTROL]

DTC P0325		Knock sensor circuit malfunction	
DETECTION CONDITION		Input voltage from knock sensor is below 1.25 V or above 3.75 V after engine started	
POSSIBLE CAUSE		<ul style="list-style-type: none">• Knock sensor malfunction• Knock sensor installation incorrect• Open or short circuit in wiring from PCM terminal 2F to knock sensor terminal A	
STEP	INSPECTION		ACTION
1	Have FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Does knock sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector, then go to step 6.
		No	Go to next step.
3	Disconnect knock sensor connector. Is there continuity between connector terminal A and PCM terminal 2F?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to step 6.
4	Is resistance of knock sensor okay? ☞ 01-40 KNOCK SENSOR INSPECTION	Yes	Go to next step.
		No	Repair or replace knock sensor, then go to step 6.
5	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes	Get assistance from Technical Hotline, then replace PCM if necessary.
		No	Intermittent poor connection in harness or connector. Repair connector and/or harness, then go to next step.
6	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

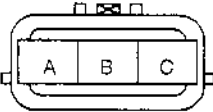
X3U:01WD0

X5U-01WDP

DTC P0335		Crankshaft position sensor circuit malfunction	
DETECTION CONDITION		No NE signal input from crankshaft position sensor while engine is running	
POSSIBLE CAUSE		<ul style="list-style-type: none"> Crankshaft position sensor malfunction Crankshaft position sensor air gap incorrect Open or short circuit in wiring from PCM terminal 2J to crankshaft position sensor terminal B Open or short circuit in wiring from main relay terminal D to crankshaft position sensor terminal A 	
STEP	INSPECTION	ACTION	
1	Have FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Does crankshaft position sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector, then go to step 7.
		No	Go to next step.
3	Disconnect crankshaft position sensor connector. Is there continuity between connector terminal B and PCM terminal 2J? Is there any continuity between connector terminal A and main relay terminal D?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to step 7.
4	Is crankshaft position sensor air gap okay? Specification: 0.5—1.5 mm {0.020—0.059 in}	Yes	Go to next step.
		No	Adjust crankshaft position sensor air gap, then go to step 7.
5	Is crankshaft position sensor okay? ☞ 01-40 CRANKSHAFT POSITION SENSOR INSPECTION	Yes	Go to next step.
		No	Replace crankshaft position sensor, then go to step 7.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION		ACTION
6	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes	Get assistance from Technical Hotline/your distributor, then replace PCM if necessary.
		No	Intermittent poor connection in harness or connector. Repair connector and/or harness, then go to next step.
7	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.



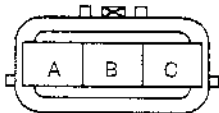
HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL CONNECTOR)

XSU101WDQ

DTC P0339 Crankshaft position sensor circuit intermittent			
DETECTION CONDITION		Crankshaft position sensor outputs less than or more 8 pulses while the crankshaft rotates twice	
POSSIBLE CAUSE		<ul style="list-style-type: none"> • Crankshaft position sensor malfunction • Crankshaft position sensor air gap incorrect • Intermittent open or short circuit in wiring harness from PCM terminal 2J to crankshaft position sensor terminal B • Intermittent open or short circuit in wiring harness from main relay terminal D to crankshaft position sensor terminal A • Damaged crankshaft pulley 	
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Are crankshaft position sensor and PCM connector s and terminals okay?	Yes	Repair or replace connector or terminal, then go to step 8.
		No	Go to next step.
3	Inspect the any damages of the crankshaft pulley teeth. Are the crankshaft pulley teeth okay?	Yes	Go to next step.
		No	Replace the crankshaft pulley, then go to step 8.
4	Measure the air gap between the crankshaft position sensor and teeth of crankshaft pulley. Is air gap within specifications? Specification: 0.5—1.5 mm (0.020—0.059 in)	Yes	Go to next step.
		No	Adjust the crankshaft position sensor air gap, then go to step 8.
5	Disconnect the crankshaft position sensor, main relay and PCM connectors. Check for intermittent open circuit between the following terminals while wiggle and pull each wiring harness: <ul style="list-style-type: none"> • PCM connector terminal 2J and crankshaft position sensor connector terminal B • Main relay connector and crankshaft position sensor connector terminal A Are all wiring harnesses okay?	Yes	Go to next step.
		No	Repair or replace the wiring harness, then go to step 8.
6	Check if there is continuity between the crankshaft position sensor connector terminals while wiggle and pull each wiring harnesses. Is there continuity?	Yes	There is a short circuit. Repair or replace the wiring harness, then go to step 8.
		No	Go to next step.
7	Clear diagnostic trouble code from memory. Is same code No. present after performing "After repair procedure"?	Yes	Replace the crankshaft position sensor, then go to next step. If same diagnostic code is retrieved, get assistance from Technical Hotline/your distributor, then replace PCM if necessary.
		No	Go to next step.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION
8	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After repair procedure"?	Yes Go to applicable DTC inspection.
		No Troubleshooting completed.



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL CONNECTOR)

X5U101WDR

DTC P0401		Exhaust gas recirculation flow insufficient detected	
DETECTION CONDITION		Difference in intake manifold pressure when EGR is operated and when it is stopped is too small	
POSSIBLE CAUSE		<ul style="list-style-type: none">• EGR valve malfunction• EGR boost sensor malfunction• EGR boost sensor solenoid valve malfunction• Clogging or leakage in piping of EGR system• Mass air flow sensor malfunction• Throttle position sensor malfunction• Intake air temperature sensor malfunction• Vehicle speed sensor malfunction• Open or short circuit in wiring harness• Vacuum hoses damaged or loose	
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Verify stored DTC. Have DTCs P0102, P0103, P0106, P0107, P0108, P0111, P0112, P0113, P0122, P0123, P1102, P1103, P1122, P1123, P1487, P1496, P1497, P1498 and/or P1499 been stored?	Yes	Inspect and repair DTC P0102, P0103, P0106, P0107, P0108, P0111, P0112, P0113, P0122, P0123, P1102, P1103, P1122, P1123, P1487, P1496, P1497, P1498 or P1499, then go to step 15.
		No	Go to next step.
3	Inspect intake manifold negative pressure at idle. ☞ 01-01A ENGINE SYSTEM INSPECTION, Intake Manifold Vacuum Inspection Is it okay?	Yes	Go to next step.
		No	Repair or replace source of air suction, then go to step 15.
4	Is DTC P0401 on FREEZE FRAME PID DATA?	Yes	Go to next step.
		No	Go to step 6.
5	Temporarily clear DTC. Verify RPM, LOAD, ECT and VSS on FREEZE FRAME PID DATA. Operate constant driving to be same condition. ☞ DRIVE MODE Is TEST # 10:41:00 less than MIN value on DIAGNOSTIC MONITORING TEST RESULTS?	Yes	Trouble is in process. Go to step 7.
		No	Go to "01-01A ENGINE SYMPTOM TROUBLESHOOTING, INTERMITTENT CONCERNS".
6	Temporarily clear DTC. Perform test drive by referring customers questionnaire and DRIVE MODE. Is TEST # 10:41:00 less than MIN value on DIAGNOSTIC MONITORING TEST RESULTS?	Yes	Trouble is in process. Go to next step.
		No	Go to "01-01A ENGINE SYMPTOM TROUBLESHOOTING, INTERMITTENT CONCERNS".
7	Implement PID/DATA MONITOR AND RECORD (BARO V, IAT V, MAF V, RPM, TP V, VS) from DIAGNOSTIC DATA LINK by using NGS tester. Is there any signal that is far out of specification when ignition switch is at ON, and run engine at idle?	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 15.
		No	Go to next step.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION	
8	Continue monitoring items on previous step. Is there any input signal which causes drastic changes when they are driven stable for approx. 1 minute under same trouble condition? Note <ul style="list-style-type: none"> While EGR is diagnosing, it is normal that switches BARO V over from barometric pressure to intake manifold negative pressure, do not misdiagnose it. 	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 15.
		No	Go to next step.
9	Carry out IGNITION ON TEST from SIMULATION TEST by using NGS tester. Is EGR boost sensor solenoid operating sound heard when EGRBV is turned from OFF to ON?	Yes	Go to next step.
		No	Go to step 13.
10	Carry out IDLING TEST from SIMULATION TEST by using NGS tester. Disconnect vacuum hose on EGR boost sensor, then switch EGRBV from OFF to ON and measuring pressure on vacuum hose using vacuum gauge. Is the pressure change from barometric to intake manifold?	Yes	Go to step 14.
		No	Go to next step.
11	Inspect for loose connection, miss connection, clogging, cracking or broken on following hoses using vacuum pump: <ul style="list-style-type: none"> From dynamic chamber to EGR boost sensor solenoid valve From EGR boost sensor solenoid valve to EGR boost sensor Is there any trouble?	Yes	Repair or replace faulty parts, then go to step 15.
		No	Go to next step.
12	Inspect EGR boost sensor solenoid for valve damage, air leak and air tightness. ➡ 01-16 EGR BOOST SENSOR SOLENOID VALVE INSPECTION Is it okay?	Yes	Inspect EGR boost passage in dynamic chamber and replace dynamic chamber if necessary, then go to step 15.
		No	Replace EGR boost sensor solenoid valve, then go to step 15.
13	Inspect for open, poor connection and other problems on following harnesses, connectors and terminals: <ul style="list-style-type: none"> From main relay to EGR boost sensor solenoid valve From EGR boost sensor solenoid valve to PCM Is there any trouble?	Yes	Repair or replace faulty harness, connector or terminal, then go to step 15.
		No	Replace EGR boost sensor solenoid valve, then go to step 15.
14	Inspect EGR control system. ➡ 01-01A ENGINE SYSTEM INSPECTION, EGR Control Inspection Is it okay?	Yes	Remove and clean carbon stuck in EGR valve, dynamic chamber, and EGR system passage of exhaust side pipe. Assemble it properly, then go to next step. Also clean EGR boost sensor solenoid side passage.
		No	Repair or replace faulty parts, then go to next step.
15	Clear DTC. Drive constantly under trouble reiteration condition. ➡ DRIVE MODE Is TEST # 10:41:00 out of specification on DIAGNOSTIC MONITORING TEST RESULTS?	Yes	Go to next step.
		No	Go back to step 2. Note <ul style="list-style-type: none"> If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.
16	Verify stored PENDING TROUBLE CODE, DTC and DIAGNOSTIC MONITORING TEST RESULTS. Is there any code stored and/or out of specification?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

TROUBLESHOOTING [ENGINE CONTROL]

DTC P0402		Exhaust gas recirculation flow excessive detected	
DETECTION CONDITION		Difference in intake manifold pressure when EGR is operated and when it is stopped is too large	
POSSIBLE CAUSE		<ul style="list-style-type: none"> • EGR valve malfunction • EGR boost sensor malfunction • Mass air flow sensor malfunction • Throttle position sensor malfunction • Intake air temperature sensor malfunction • Vehicle speed sensor malfunction • Open or short circuit in wiring harness • Vacuum hoses damaged or loose 	
STEP	INSPECTION	ACTION	
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Verify stored DTC. Have DTCs P0102, P0103, P0106, P0107, P0108, P0111, P0112, P0113, P0122, P0123, P1102, P1103, P1122, P1123, P1487, P1496, P1497, P1498 and/or P1499 been stored?	Yes	Inspect and repair DTC P0102, P0103, P0106, P0107, P0108, P0111, P0112, P0113, P0122, P0123, P1102, P1103, P1122, P1123, P1487, P1496, P1497, P1498 or P1499, then go to step 9.
		No	Go to next step.
3	Inspect intake manifold negative pressure at idle. ➤ 01-01A ENGINE SYSTEM INSPECTION, Intake Manifold Vacuum Inspection. Is it okay?	Yes	Go to next step.
		No	Repair or replace source of air suction, then go to step 9.
4	Is DTC P0402 on FREEZE FRAME PID DATA?	Yes	Go to next step.
		No	Go to step 6.
5	Temporarily clear DTC. Verify RPM, LOAD, ECT and VSS on FREEZE FRAME PID DATA. Operate constant driving to be same condition. ➤ DRIVE MODE Is TEST # 10:41:00 greater than MAX value on DIAGNOSTIC MONITORING TEST RESULTS?	Yes	Trouble is in process. Go to step 7.
		No	Go to "01-01A ENGINE SYMPTOM TROUBLESHOOTING, INTERMITTENT CONCERNS".
6	Temporarily clear DTC. Perform test drive by referring customers questionnaire and DRIVE MODE. Is TEST # 10:41:00 greater than MAX value on DIAGNOSTIC MONITORING TEST RESULTS?	Yes	Trouble is in process. Go to next step.
		No	Go to "01-01A ENGINE SYMPTOM TROUBLESHOOTING, INTERMITTENT CONCERNS".
7	Implement PID/DATA MONITOR AND RECORD (BARO V, IAT V, MAF V, RPM, TPS V, VS) from DIAGNOSTIC DATA LINK by using NGS tester. Is there any signal that is far out of specification when ignition switch is at ON, and run engine at idle?	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 9.
		No	Go to next step.
8	Inspect EGR control system. ➤ 01-01A ENGINE SYSTEM INSPECTION, EGR Control Inspection Is it okay?	Yes	Remove and clean carbon stuck in EGR valve, dynamic chamber, and EGR system passage of exhaust side pipe. Assemble it properly, then go to next step. Also clean EGR boost sensor solenoid side passage.
		No	Repair or replace faulty parts, then go to next step.
9	Clear DTC. Drive constantly under trouble reiteration condition. ➤ DRIVE MODE Is TEST # 10:41:00 out of specification on DIAGNOSTIC MONITORING TEST RESULTS?	Yes	Go to next step.
		No	Go back to step 2. Note • If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.
10	Verify stored PENDING TROUBLE CODE, DTC and DIAGNOSTIC MONITORING TEST RESULTS. Is there any code stored and/or out of specification?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

TROUBLESHOOTING [ENGINE CONTROL]

DTC P0420*2		Warm up catalyst system efficiency below threshold	
DETECTION CONDITION		Number of heated oxygen sensor (rear) inversion becomes closer to that of heated oxygen sensor (front)	
POSSIBLE CAUSE		<ul style="list-style-type: none"> • Warm up three way catalytic converter deterioration • Leakage exhaust system • Heated oxygen sensor (front) malfunction • Heated oxygen sensor (rear) malfunction • Mass air flow sensor malfunction • Throttle position sensor malfunction • Vehicle speed sensor malfunction 	
STEP	INSPECTION		ACTION
1	Have FREEZE FRAME PID DATA and DIAGNOSTIC MONITORING TEST RESULTS been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to next step.
2	Verify stored DTC. Have DTCs P0100, P0120 and/or P0500 been stored?	Yes	Inspect and repair DTC P0100, P0120 or P0500, then go to step 11.
		No	Go to next step.
3	Is DTC P0420 on FREEZE FRAME PID DATA?	Yes	Go to next step.
		No	Inspect and repair DTC on FREEZE FRAME PID DATA, then go to step 11.
4	Temporarily clear DTC. Run DRIVE MODE. Is TEST # 10:11:11 less than MIN value on DIAGNOSTIC MONITORING TEST RESULTS?	Yes	Trouble is in process. Go to next step.
		No	Go to "01-01A ENGINE SYSTEM TROUBLESHOOTING, INTERMITTENT CONCERNS".
5	Implement PID/DATA MONITOR AND RECORD (MAF V, RPM, TP V, VS) from DIAGNOSTIC DATA LINK by using NGS tester. Is there any signal that is far out of specification when ignition switch is at ON, and run engine at idle?	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 11.
		No	Go to next step.
6	Continue monitoring items on previous step. Is there any input signal which causes drastic changes when it is set to be in trouble condition?	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 11.
		No	Go to next step.
7	Inspect exhaust system. Is there any gas leak?	Yes	Repair or replace faulty exhaust parts, then go to step 11.
		No	Go to next step.
8	Inspect installation of heated oxygen sensor (rear). Is it okay?	Yes	Go to next step.
		No	Install heated oxygen sensor (rear) properly, then go to step 11.
9	Inspect heated oxygen sensor (rear), and related harness, connector and terminal. ☞ 01-40 HEATED OXYGEN SENSOR INSPECTION Is it okay?	Yes	Go to next step.
		No	Repair or replace heated oxygen sensor (rear), harness, connector or terminal, then go to step 11.
10	Inspect heated oxygen sensor heater (rear) and related harness, connector and terminal. ☞ 01-40 HEATED OXYGEN SENSOR INSPECTION Is it okay?	Yes	Replace catalytic converter, then go to next step.
		No	Repair or replace faulty heated oxygen sensor (rear), harness, connector or terminal, then go to next step.
11	Clear DTC. Run DRIVE MODEL. Is TEST # 10:11:11 more than MIN value on DIAGNOSTIC MONITORING TEST RESULTS?	Yes	Go to next step.
		No	Go back to step 2. Note <ul style="list-style-type: none"> • If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION
12	Verify stored PENDING TROUBLE CODE, DTC and DIAGNOSTIC MONITORING TEST RESULTS. Is there any code stored and/or out of specification?	Yes Go to applicable DTC inspection.
		No Troubleshooting completed.

*2 : Except California emission regulations applicable model

DTC P0421*1		Warm up catalyst system efficiency below threshold	
DETECTION CONDITION		Number of heated oxygen sensor (rear) inversion becomes closer to that of heated oxygen sensor (front)	
POSSIBLE CAUSE		<ul style="list-style-type: none">• Warm up three way catalytic converter deterioration• Leakage exhaust system• Heated oxygen sensor (front) malfunction• Heated oxygen sensor (rear) malfunction• Mass air flow sensor malfunction• Throttle position sensor malfunction• Vehicle speed sensor malfunction	
STEP	INSPECTION	ACTION	
1	Have FREEZE FRAME PID DATA and DIAGNOSTIC MONITORING TEST RESULTS been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to next step.
2	Verify stored DTC. Have DTCs P0102, P0103, P0122, P0123, P0500, P1102, P1103, P1122 and/or P1123 been stored?	Yes	Inspect and repair DTC P0102, P0103, P0122, P0123, P0500, P1102, P1103, P1122 or P1123, then go to step 11.
		No	Go to next step.
3	Is DTC P0421 on FREEZE FRAME PID DATA?	Yes	Go to next step.
		No	Inspect and repair DTC on FREEZE FRAME PID DATA, then go to step 11.
4	Temporarily clear DTC. Run DRIVE MODE. Is TEST # 10:11:11 less than MIN value on DIAGNOSTIC MONITORING TEST RESULTS?	Yes	Trouble is in process. Go to next step.
		No	Go to "01-01A ENGINE SYSTEM TROUBLESHOOTING, INTERMITTENT CONCERNS".
5	Implement PID/DATA MONITOR AND RECORD (MAF V, RPM, TP V, VS) from DIAGNOSTIC DATA LINK by using NGS tester. Is there any signal that is far out of specification when ignition switch is at ON, and run engine at idle?	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 11.
		No	Go to next step.
6	Continue monitoring items on previous step. Is there any input signal which causes drastic changes when it is set to be in trouble condition?	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 11.
		No	Go to next step.
7	Inspect exhaust system. Is there any gas leak?	Yes	Repair or replace faulty exhaust parts, then go to step 11.
		No	Go to next step.
8	Inspect installation of heated oxygen sensor (rear). Is it okay?	Yes	Go to next step.
		No	Install heated oxygen sensor (rear) properly, then go to step 11.
9	Inspect heated oxygen sensor (rear), and related harness, connector and terminal. ☞ 01-40 HEATED OXYGEN SENSOR INSPECTION Is it okay?	Yes	Go to next step.
		No	Repair or replace heated oxygen sensor (rear), harness, connector or terminal, then go to step 11.
10	Inspect heated oxygen sensor heater (rear) and related harness, connector and terminal. ☞ 01-40 HEATED OXYGEN SENSOR INSPECTION Is it okay?	Yes	Replace catalytic converter, then go to next step.
		No	Repair or replace faulty heated oxygen sensor (rear), harness, connector or terminal, then go to next step.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION		ACTION
11	Clear DTC. Run DRIVE MODE. Is TEST # 10:11:11 more than MIN value on DIAGNOSTIC MONITORING TEST RESULTS?	Yes	Go to next step.
		No	Go back to step 2. Note • If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.
12	Verify stored PENDING TROUBLE CODE, DTC and DIAGNOSTIC MONITORING TEST RESULTS. Is there any code stored and/or out of specification?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

*1 : California emission regulations applicable model

DTC P0442		Evaporative emission control system malfunction (Leak check)	
DETECTION CONDITION		Excessive difference in fuel tank pressures measured immediately after purge control is stopped with canister drain cut valve closed	
POSSIBLE CAUSE		<ul style="list-style-type: none">• Purge solenoid valve malfunction• Canister drain cut valve malfunction• Tank pressure control valve malfunction• Vent cut valve malfunction• Loose fuel filler cup• Charcoal canister malfunction• Catch tank malfunction• Rollover valve malfunction• Cracked fuel tank• Fuel tank component parts poorly installed• Evaporative hose damaged or loose• EGR boost sensor malfunction• Fuel tank level sensor malfunction• Fuel tank pressure sensor malfunction• Engine coolant temperature sensor malfunction• Intake air temperature sensor malfunction• Throttle position sensor malfunction• Mass air flow sensor malfunction• Vehicle speed sensor malfunction• Open or short circuit in wiring harness• Poor connection of connector	
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Verify stored DTC. Have DTCs P0102, P0103, P0111, P0112, P0123, P0117, P0118, P0122, P0123, P0335, P0443, P0500, P1102, P1103, P1122, P1123 and/or P1449 been stored?	Yes	Inspect and repair DTC P0102, P0103, P0111, P0112, P0123, P0117, P0118, P0122, P0123, P0335, P0443, P0500, P1102, P1103, P1122, P1123, P1449, then go to step 19.
		No	Go to next step.
3	Implement PID/DATA MONITOR AND RECORD (BARO V, ECT V, FTL V, FTP V, IAT V, MAF V, TP V, VS) from DIAGNOSTIC DATA LINK by using NGS tester. Is there any signal that is far out of specification when ignition switch is at ON and run engine at idle?	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 19.
		No	Go to next step.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION	
4	Continue monitoring items on previous step. Is there any input signal which causes drastic changes when they are driven stable for approx. 1 minute under same trouble condition? Note • While EGR is diagnosing, it is normal that switched BARO V over from barometric pressure to intake manifold negative pressure, do not misdiagnose it.	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 19.
		No	Go to next step.
5	Verify filler cap is not either disconnected, loose or damaged. Is it okay? Note • When filler caps other than OEM caps are attached, it is considered malfunction.	Yes	Go to next step.
		No	Replace or properly attach filler cap, then go to step 19.
6	Implement "01-01A ENGINE SYSTEM INSPECTION, Evaporative Emission Control System Inspection, Whole system check". Does NGS tester value change under to specified readings and hold for minimum of 2 minutes?	Yes	No leaks were detected in evaporative emission control system at this time, go to step 19.
		No	Go to next step.
7	Find hose, which is led from tank pressure control valve to charcoal canister. Clamp on this hose and remove filler cap. Implement PID/DATA MONITOR AND RECORD (FTP, FTP V) from DIAGNOSTIC DATA LINK by using NGS tester. Are FTP and FTPV values same as atmospheric pressure?	Yes	Install filler cap, then go to step 9.
		No	Go to next step.
8	Inspect fuel tank pressure sensor. ☞ 01-40 FUEL TANK PRESSURE SENSOR INSPECTION Is it okay?	Yes	Go to the next step.
		No	Replace fuel tank pressure sensor, then go to step 19.
9	Implement "01-01A ENGINE SYSTEM INSPECTION, Evaporative Emission Control System Inspection, Check from charcoal canister to fuel tank". Does NGS tester value change under to specified readings and hold for a minimum of 2 minutes?	Yes	Go to step 14.
		No	Go to next step.
10	Inspect tank pressure control valve for damage and air leak. ☞ 01-16 TANK PRESSURE CONTROL VALVE INSPECTION Is it okay?	Yes	Go to next step.
		No	Replace tank pressure control valve, then go to step 19.
11	Remove fuel tank and visually inspect for damage, insufficient sealing or poorly attached accessories on fuel tank, such as fuel gauge. Is it okay?	Yes	Go to next step.
		No	Repair or replace fuel tank or sealing, then go to step 19.
12	Inspect rollover valve for damage. ☞ 01-16 ROLLOVER VALVE INSPECTION Is it okay?	Yes	Go to next step.
		No	Replace rollover valve, then go to step 19.
13	Inspect vent cut valve for leakage. ☞ 01-14 VENT CUT VALVE INSPECTION Is it okay?	Yes	Inspect and repair or replace for detached, incorrectly installed or cracked on following hoses: • From charcoal canister to vent cut valve • From vent cut valve to fuel tank Then go to step 19.
		No	Replace filler pipe component, then go to step 19.
14	Implement "01-01A ENGINE SYSTEM INSPECTION, Evaporative Emission Control System Inspection, Check from charcoal canister to purge solenoid valve". Does vacuum change under to specified readings and hold for a minimum of 2 minutes?	Yes	Go to step 18.
		No	Go to next step.

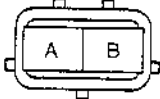
TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION
15	Remove catch tank and inspect for plugging, damages and pinhole using vacuum pump. Is it okay?	Yes Go to next step.
		No Replace catch tank, then go to step 19.
16	Inspect purge solenoid valve for damage and air leak. ➤ 01-16 PURGE SOLENOID VALVE INSPECTION Is it okay?	Yes Go to next step.
		No Replace purge solenoid valve, then go to step 19.
17	Remove charcoal canister and inspect for damage and pinhole. ➤ 01-16 CHARCOAL CANISTER INSPECTION Is it okay?	Yes Go to next step.
		No Replace charcoal canister, then go to step 19.
18	Inspect canister drain cut valve for damage and air leak. ➤ 01-16 CANISTER DRAIN CUT VALVE INSPECTION Is it okay?	Yes Inspect and repair or replace for detached, incorrectly installed or cracked hoses from charcoal canister to canister drain cut valve. Then go to next step.
		No Replace canister drain cut valve, then go to next step.
19	Implement PID/DATA MONITOR AND RECORD from DIAGNOSTIC DATA LINK by using NGS tester. Verify that following PID's are within indicated ranges when ignition switch is at ON. • BAROV 72.0 kPa (21.3 inHg) or higher • ECTV 0—35 °C (32—95 °F) • IAT 10—60 °C (50—140 °F) Verify that fuel gauge reads within 1/4—3/4 of tank. Were readings within indicated ranges?	Yes Correct condition, then go to next step.
		No Take corrective action, then go to next step. Note • Readings need to be in the indicated ranges to perform DRIVE MODE.
20	Clear DTC. Run DRIVE MODE. ➤ 01-01A ENGINE DIAGNOSTIC INSPECTION, Fuel Tank Pressure Graph Recording Procedure Verify that CDCV and FTP graphs. Is there any problem detected?	Yes Go back to step 2. Note • If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.
		No Go to next step.
21	Verify TEST # 10:21:00 on DIAGNOSTIC MONITORING TEST RESULTS. Is it below MAX value?	Yes Go to next step.
		No Go back to step 2. Note • If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.
22	Verify stored PENDING TROUBLE CODE, DTC and DIAGNOSTIC MONITORING TEST RESULTS. Is there any code stored and/or out of specification?	Yes Go to appropriate DTC inspection.
		No Troubleshooting completed.

DTC P0443		Evaporative emission control system purge control valve circuit malfunction (Equip leak check)	
DETECTION CONDITION	<ul style="list-style-type: none">• Voltage when solenoid valve is ON is too low• Voltage when solenoid valve is OFF is too high		
POSSIBLE CAUSE	<ul style="list-style-type: none">• Purge solenoid valve malfunction• Open or short circuit in wiring from purge solenoid valve terminal A to main relay terminal D• Open or short circuit in wiring from purge solenoid valve terminal B to PCM terminal 3L		
STEP	INSPECTION		ACTION
1	Does purge solenoid valve connector or PCM connector have poor connection?	Yes	Repair or replace connector, then go to step 9.
		No	Go to next step.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION	
2	Is purge solenoid valve okay? ➤ 01-16 PURGE SOLENOID VALVE INSPECTION	Yes	Go to next step.
		No	Repair or replace as necessary, then go to step 9.
3	Verify that evaporative hose between purge solenoid valve and intake manifold damaged or clogged. Is evaporative hose okay?	Yes	Go to next step.
		No	Repair or replace as necessary, then go to step 9.
4	Implement PID/DATA MONITOR AND RECORD (PRG V) of DIAGNOSTIC DATA LINK by using NGS tester. Does it operate normally?	Yes	Go to step 6.
		No	Go to next step.
5	Disconnect purge solenoid valve (High) connector. Turn ignition switch to ON. Is there battery positive voltage at connector terminal A?	Yes	Go to next step.
		No	Check for open or short circuit in wiring harness. (Main relay terminal D — Purge solenoid valve terminal A), then go to step 9.
6	Is there continuity between connector terminal B and PCM terminal 3L?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to step 10.
7	Is there continuity between purge solenoid valve connector terminals A and B?	Yes	Go to next step.
		No	Replace purge solenoid valve, then go to step 10.
8	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes	Get assistance from Technical Hotline/your distributor, then replace PCM if necessary.
		No	Intermittent poor connection in harness or connector. Repair connector and/or harness, then go to next step.
9	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL CONNECTOR)

X5U101WDS

DTC P0446		Evaporative emission control system malfunction (Vent control malfunction)	
DETECTION CONDITION	<ul style="list-style-type: none">• Difference in fuel tank pressures measured when canister drain cut valve is released and several seconds after it is too small• Tank pressure control valve is opened while canister drain cut valve is opening		
POSSIBLE CAUSE	<ul style="list-style-type: none">• Canister drain cut valve malfunction• Tank pressure control valve malfunction• Charcoal canister malfunction• Air filter clogged• Check valve (two-way) clogging• Evaporative hose clogged• EGR boost sensor malfunction• Fuel tank level sensor malfunction• Fuel tank pressure sensor malfunction• Engine coolant temperature sensor malfunction• Intake air temperature sensor malfunction• Throttle position sensor malfunction• Mass air flow sensor malfunction• Vehicle speed sensor malfunction• Open or short circuit in wiring harness• Poor connection of connector		
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION		ACTION
2	Verify stored DTC. Have DTCs P0102, P0103, P0111, P0112, P0123, P0117, P0118, P0122, P0123, P0335, P0443, P0500, P1102, P1103, P1122, P1123, and/or P1449 been stored?	Yes	Inspect and repair DTC P0102, P0103, P0111, P0112, P0123, P0117, P0118, P0122, P0123, P0335, P0443, P0500, P1102, P1103, P1122, P1123, P1449, then go to step 19.
		No	Go to next step.
3	Implement PID/DATA MONITOR AND RECORD (BARO V, ECT V, FTL V, FTP V, IAT V, MAF V, TP V, VS) from DIAGNOSTIC DATA LINK by using NGS tester. Is there any signal that is far out of specification when ignition switch is at ON and run engine at idle?	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 13.
		No	Go to next step.
4	Continue monitoring items on previous step. Is there any input signal which causes drastic changes when they are driven stable for approx. 1 minute under same trouble condition? Note • While EGR is diagnosing, it is normal that switches BAROV over from barometric pressure to intake manifold negative pressure, do not misdiagnose it.	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 13.
		No	Go to next step.
5	Carry out IGNITION ON TEST from SIMULATION TEST by using NGS tester. Is canister drain cut valve and tank pressure control valve operating sound heard when CDCV is turned from OFF to ON?	Yes	Go to step 8.
		No	Go to next step.
6	Inspect canister drain cut valve for air tightness and closed stuck. ☞ 01-16 CANISTER DRAIN CUT VALVE INSPECTION Is it okay?	Yes	Go to next step.
		No	Replace canister drain cut valve, then go to step 13.
7	Inspect tank pressure control valve for air tightness and closed stuck. ☞ 01-16 TANK PRESSURE CONTROL VALVE INSPECTION Is it okay?	Yes	Inspect and repair or replace on following harness, connector or terminal: • From main relay to canister drain cut valve • From main relay to tank pressure control valve • From canister drain cut valve to PCM • From tank pressure control valve to PCM Then go to step 13.
		No	Replace tank pressure control valve, then go to step 13.
8	Remove charcoal canister and inspect for clogging. ☞ 01-16 CHARCOAL CANISTER INSPECTION Is it okay?	Yes	Go to next step.
		No	Replace charcoal canister, then go to step 13.
9	Find hose, which is led from tank pressure control valve to charcoal canister. Clamp on this hose and remove filler cap. Implement PID/DATA MONITOR AND RECORD (FTP, FTP V) from DIAGNOSTIC DATA LINK by using NGS tester. Are FTP and FTPV values same as atmospheric pressure?	Yes	Install filler cap, then go to step 11.
		No	Go to next step.
10	Inspect fuel tank pressure sensor. ☞ 01-40 FUEL TANK PRESSURE SENSOR INSPECTION Is it okay?	Yes	Go to the next step.
		No	Replace fuel tank pressure sensor, then go to step 13.
11	Remove and inspect check valve (two-way) for clogging. ☞ 01-16 CHECK VALVE (TWO-WAY) INSPECTION Is it okay?	Yes	Go to next step.
		No	Replace check valve (two-way), then go to step 13.

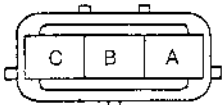
TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION		ACTION
12	Remove and inspect air filter for clogged. Is it okay?	Yes	Inspect and repair or replace for clogged on following hoses: <ul style="list-style-type: none"> • From charcoal canister to canister drain cut valve • From canister drain cut valve to air filter • From air filter to two-way check valve Then go to next step.
		No	Replace air filter, then go to next step.
13	Implement PID/DATA MONITOR AND RECORD from DIAGNOSTIC DATA LINK by using NGS tester. Verify that following PID's are within indicated ranges when ignition switch at ON. <ul style="list-style-type: none"> • BAROV 72.0 kPa {21.3 inHg} or higher • ECTV 0—35 °C {32—95 °F} • IAT 10—60 °C {50—140 °F} Verify that fuel gauge reads within 1/4—3/4 of tank. Were readings within indicated ranges?	Yes	Correct condition, then go to next step.
		No	Take corrective action, then go to next step. Note <ul style="list-style-type: none"> • Readings need to be in the indicated ranges to perform DRIVE MODE.
14	Clear DTC. Run DRIVE MODE. <ul style="list-style-type: none"> ☞ 01-01A ENGINE DIAGNOSTIC INSPECTION, Fuel Tank Pressure Graph Recording Procedure Verify that CDCV and FTP graphs. Is there any problem detected?	Yes	Go back to step 2. Note <ul style="list-style-type: none"> • If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.
		No	Go to next step.
15	Verify stored PENDING TROUBLE CODE, DTC and DIAGNOSTIC MONITORING TEST RESULTS. Is there any code stored and/or out of specification?	Yes	Go to appropriate DTC inspection.
		No	Troubleshooting completed.

DTC P0452		Evaporative emission control system pressure sensor low input	
DETECTION CONDITION		• While engine coolant temperature is below 80 °C {176 °F}, input voltage from fuel tank pressure sensor is below 0.2 V when while time from engine started is 1—3 seconds	
POSSIBLE CAUSE		• Fuel tank pressure sensor malfunction • Open circuit in wiring from fuel tank pressure sensor terminal A to PCM terminal 2A • Open or short circuit in wiring from fuel tank pressure sensor terminal C to PCM terminal 2I	
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Does fuel tank pressure sensor connector and PCM connector have poor connection?	Yes	Repair or replace connector, then go to step 9.
		No	Go to next step.
3	Implement PID/DATA MONITOR AND RECORD (FTP V) of DIAGNOSTIC DATA LINK by using NGS tester. Is voltage as specified?	Yes	Go to step 9.
		No	Go to next step.
4	Are fuel tank pressure sensor and connecting hose free of freezing, breaking, and clogs?	Yes	Repair or replace, then go to step 9.
		No	Go to next step.
5	Disconnect fuel tank pressure sensor connector. Turn ignition switch to ON. Is there 5 V at harness connector terminal C?	Yes	Go to next step.
		No	Check for open or short circuit in wiring harness, then go to step 9. (PCM terminal 2I — Fuel tank pressure sensor terminal C)
6	Is there continuity between connector terminal A and PCM terminal 2A?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to step 9.
7	Is fuel tank pressure sensor okay? ☞ 01-40 FUEL TANK PRESSURE SENSOR INSPECTION	Yes	Go to next step.
		No	Replace fuel tank pressure sensor, then go to step 9.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION
8	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes Get assistance from Technical Hotline/your distributor, then replace PCM if necessary.
		No Intermittent poor connection in harness or connector. Repair connector and/or harness, then go to next step.
9	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes Go to applicable DTC inspection.
		No Troubleshooting completed.



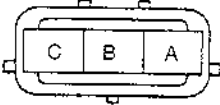
HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL CONNECTOR)

XEU101WDT

DTC P0453		Evaporative emission control system pressure sensor high input	
DETECTION CONDITION		• While engine coolant temperature is below 80 °C {176 °F}, input voltage from fuel tank pressure sensor is above 4.8 V when while time from engine started is 1—3 seconds	
POSSIBLE CAUSE		• Fuel tank pressure sensor malfunction • Short circuit in wiring from fuel tank pressure sensor terminal A to PCM terminal 2A • Open circuit in wiring from fuel tank pressure sensor terminal B to PCM terminal 3F • Short circuit in wiring from fuel tank pressure sensor terminal C to PCM terminal 2I	
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Does fuel tank pressure sensor connector and PCM connector have poor connection?	Yes	Repair or replace connector, then go to step 9.
		No	Go to next step.
3	Implement PID/DATA MONITOR AND RECORD (FTP V) of DIAGNOSTIC DATA LINK by using NGS tester. Is voltage as specified?	Yes	Go to step 9.
		No	Go to next step.
4	Are fuel tank pressure sensor and connecting hose free of freezing, breaking, and clogs?	Yes	Repair or replace, then go to step 9.
		No	Go to next step.
5	Disconnect fuel tank pressure sensor connector. Turn ignition switch to ON. Is there 5 V at harness connector terminal C?	Yes	Go to next step.
		No	Check for open or short circuit in wiring harness, then go to step 10. (PCM terminal 2I — Fuel tank pressure sensor terminal C)
6	Is there continuity between connector terminal A and PCM terminal 2A?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to step 10.
7	Is there continuity between connector terminal B and PCM terminal 3F?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to step 10.
8	Is fuel tank pressure sensor okay? 01-40 FUEL TANK PRESSURE SENSOR INSPECTION	Yes	Go to next step.
		No	Replace fuel tank pressure sensor, then go to step 10.
9	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes	Get assistance from Technical Hotline/your distributor, then replace PCM if necessary.
		No	Intermittent poor connection in harness or connector. Repair connector and/or harness, then go to next step.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION		ACTION
10	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL CONNECTOR)

X5U10:WDU

DTC P0455		Evaporative emission control system malfunction (Con. leak detected)	
DETECTION CONDITION	Fuel tank pressure measured immediately after purge control is stopped with canister drain cut valve closed is too high		
POSSIBLE CAUSE	<ul style="list-style-type: none">• Purge solenoid valve malfunction• Canister drain cut valve malfunction• Tank pressure control valve malfunction• Vent cut valve malfunction• Loose fuel filler cup• Charcoal canister malfunction• Catch tank malfunction• Rollover valve malfunction• Cracked Fuel tank• Fuel tank component parts poorly installed• Evaporative hose damaged or loose• Insufficient manifold absolute pressure• EGR boost sensor malfunction• Fuel tank level sensor malfunction• Fuel tank pressure sensor malfunction• Engine coolant temperature sensor malfunction• Intake air temperature sensor malfunction• Throttle position sensor malfunction• Mass air flow sensor malfunction• Vehicle speed sensor malfunction• Open or short circuit in wiring harness• Poor connection of connector		
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Verify stored DTC. Have DTCs P0102, P0103, P0111, P0112, P0123, P0117, P0118, P0122, P0123, P0335, P0443, P0500, P1102, P1103, P1122, P1123, and/or P1449 been stored?	Yes	Inspect and repair DTC P0102, P0103, P0111, P0112, P0123, P0117, P0118, P0122, P0123, P0335, P0443, P0500, P1102, P1103, P1122, P1123, P1449, then go to step 19.
		No	Go to next step.
3	Connect vacuum gauge on negative pressure port beside purge control system to measure intake manifold negative pressure at idle. ☞ 01-01A ENGINE SYSEM INSPECTION, Intake Manifold Vacuum Inspection Is intake manifold negative pressure okay?	Yes	Go to next step.
		No	Inspect and repair troubles on intake-air system and engine, then go to step 26.
4	Implement PID/DATA MONITOR AND RECORD (BARO V, ECT V, FTL V, FTP V, IAT V, MAF V, TP V, VS) from DIAGNOSTIC DATA LINK by using NGS tester. Is there any signal that is far out of specification when ignition switch is at ON and run engine at idle?	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 26.
		No	Go to next step.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION		ACTION
5	Continue monitoring items on previous step. Is there any input signal which causes drastic changes when they are driven stable for approx. 1 minute under same trouble condition? Note • While EGR is diagnosing, it is normal that switches BAROV over from barometric pressure to intake manifold negative pressure, do not misdiagnose it.	Yes	Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 26.
		No	Go to next step.
6	Confirm filler cap is not either disconnected, loose or damaged. Is it okay? Note • When filler caps other than OEM caps are attached, it is considered malfunction.	Yes	Go to next step.
		No	Replace or properly attach filler cap, then go to step 26.
7	Carry out IGNITION ON TEST from SIMULATION TEST by using NGS tester. Is canister drain cut valve and tank pressure control valve operating sound heard when CDCV is turned from OFF to ON?	Yes	Go to step 10.
		No	Go to next step.
8	Inspect canister drain cut valve for damage, air leak and air tightness. ➤ 01-16 CANISTER DRAIN CUT VALVE INSPECTION Is it okay?	Yes	Go to next step.
		No	Replace canister drain cut valve, then go to step 26.
9	Inspect tank pressure control valve for damage, air leak and air tightness. ➤ 01-16 TANK PRESSURE CONTROL VALVE INSPECTION Is it okay?	Yes	Inspect and repair or replace on following harness, connector or terminal: • From main relay to canister drain cut valve • From main relay to tank pressure control valve • From canister drain cut valve to PCM • From tank pressure control valve to PCM Then go to step 26.
		No	Replace tank pressure control valve, then go to step 26.
10	Inspect purge control system. ➤ 01-01A ENGINE SYSTEM INSPECTION, Purge Control Inspection Is it okay?	Yes	Go to next step.
		No	Repair or replace the faulty parts, then go to step 26.
11	Implement "01-01A ENGINE SYSTEM INSPECTION, Evaporative Emission Control System Inspection, Whole system check". Does NGS tester value change under to specified readings and hold for minimum of 2 minutes?	Yes	No leaks were detected in evaporative emission control system at this time, go to step 26.
		No	Go to next step.
12	Find hose, which is led from tank pressure control valve to charcoal canister. Clamp on this hose and remove filler cap. Implement PID/DATA MONITOR AND RECORD (FTP, FTP V) from DIAGNOSTIC DATA LINK by using NGS tester. Are FTP and FTPV values same as atmospheric pressure?	Yes	Install filler cap, then go to step 15.
		No	Go to next step.
13	Inspect fuel tank pressure sensor. ➤ 01-40 FUEL TANK PRESSURE SENSOR INSPECTION Is it okay?	Yes	Go to the next step.
		No	Replace fuel tank pressure sensor, then go to step 26.
14	Inspect rollover valve for air flow operation. ➤ 01-16 ROLLOVER VALVE INSPECTION Is it okay?	Yes	Inspect and repair or replace plugging of the hose between fuel tank pressure sensor and fuel tank, then go to step 26.
		No	Replace rollover valve, then go to step 26.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION	
15	Implement "01-01A ENGINE SYSTEM INSPECTION, Evaporative Emission Control System Inspection, Check from charcoal canister to fuel tank". Does NGS tester value change under to the specified readings?	Yes	Go to step 17.
		No	Go to next step.
16	Inspect that there is no plugging on vent cut valve. ➡ 01-14 VENT CUT VALVE INSPECTION Is it okay?	Yes	Inspect and repair or replace for detached or plugged on following hoses: <ul style="list-style-type: none"> From charcoal canister to vent cut valve From vent cut valve to fuel tank pressure sensor Then go to step 26.
		No	Replace filler pipe assembly, then go to step 26.
17	At step 15, does NGS tester value hold for a minimum of 2 minutes?	Yes	Go to step 21.
		No	Go to next step.
18	Remove fuel tank and visually inspect for damage, insufficient sealing or poorly attached accessories on the fuel tank, such as fuel gauge. Is it okay?	Yes	Go to next step.
		No	Repair or replace fuel tank or sealing, then go to step 26.
19	Inspect rollover valve for damage. ➡ 01-16 ROLLOVER VALVE INSPECTION Is it okay?	Yes	Go to next step.
		No	Replace rollover valve, then go to step 26.
20	Inspect vent cut valve for leakage. ➡ 01-14 VENT CUT VALVE INSPECTION Is it okay?	Yes	Inspect and repair or replace for detached or plugged on following hoses: <ul style="list-style-type: none"> From charcoal canister to vent cut valve From vent cut valve to fuel tank pressure sensor Then go to step 26.
		No	Replace filler pipe assembly, then go to step 26.
21	Remove charcoal canister and inspect for plugging, damage and pinhole. ➡ 01-16 CHARCOAL CANISTER INSPECTION Is it okay?	Yes	Go to next step.
		No	Replace charcoal canister, then go to step 26.
22	Implement "01-01A ENGINE SYSTEM INSPECTION, Evaporative Emission Control System Inspection, Check from charcoal canister to purge solenoid valve". Does vacuum change under to the specified readings and hold for a minimum of 2 minutes?	Yes	Go to step 26.
		No	Go to next step.
23	Inspect for detached, incorrectly installed or cracked on following hoses: <ul style="list-style-type: none"> From charcoal canister to catch tank From catch tank to purge solenoid valve Is there any trouble?	Yes	Repair or replace faulty hose, then go to step 26.
		No	Go to next step.
24	Remove catch tank and inspect for plugging, damages and pinhole using vacuum pump. Is it okay?	Yes	Go to next step.
		No	Replace catch tank, then go to step 26.
25	Inspect purge solenoid valve for damage, air leak and open stuck. ➡ 01-16 PURGE SOLENOID VALVE INSPECTION Is it okay?	Yes	Inspect and repair or replace on following harness, connector or terminal: <ul style="list-style-type: none"> From main relay to purge solenoid valve From purge solenoid valve to PCM Then go to next step.
		No	Replace purge solenoid valve, then go to next step.
26	Implement PID/DATA MONITOR AND RECORD from DIAGNOSTIC DATA LINK by using NGS tester. Verify that following PID's are within indicated ranges when ignition switch is at ON. <ul style="list-style-type: none"> BAROV 72.0 kPa (21.3 inHg) or higher ECT V 0—35 °C (32—95 °F) IAT 10—60 °C (50—140 °F) Verify that fuel gauge reads within 1/4—3/4 of tank. Were readings within indicated ranges?	Yes	Correct condition, then go to next step.
		No	Take corrective action, then go to next step. Note <ul style="list-style-type: none"> Readings need to be in the indicated ranges to perform DRIVE MODE.

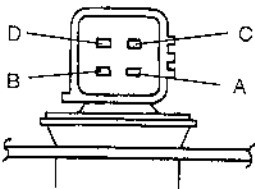
TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION
27	Clear DTC. Run DRIVE MODE. ☐ 01-01A ENGINE DIAGNOSTIC INSPECTION, Fuel Tank Pressure Graph Recording Procedure Verify that CDCV and FTP graphs. Is there any problem detected?	Yes Go back to step 2. Note • If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.
		No Go to next step.
28	Verify TEST # 10:22:00 on DIAGNOSTIC MONITORING TEST RESULTS. Is it below MAX value?	Yes Go to next step.
		No Go back to step 2. Note • If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.
29	Verify stored PENDING TROUBLE CODE, DTC and DIAGNOSTIC MONITORING TEST RESULTS. Is there any code stored and/or out of specification?	Yes Go to appropriate DTC inspection.
		No Troubleshooting completed.

DTC P0461 Fuel level sensor circuit range/performance		
DETECTION CONDITION	• Fuel gauge sender unit operation range is narrow when fuel consumption volume is over 16 litres	
POSSIBLE CAUSE	<ul style="list-style-type: none"> • Fuel gauge sender unit malfunction or substandard performance • Open or short circuit in wiring from fuel pump terminal C to PCM terminal 3K • Open or short circuit in wiring from main relay terminal A to fuel pump terminal C • Open circuit in wiring from fuel pump terminal A to ground • Instrument cluster malfunction 	
STEP	INSPECTION	ACTION
1	Have FREEZE FRAME PID DATA been recorded?	Yes Go to next step.
		No Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Do fuel pump connector and PCM connector have poor connection?	Yes Repair or replace connector, then go to step 7.
		No Go to next step.
3	Verify stored DTC. Have DTCs P0462 and/or P0463 been stored?	Yes Inspect and repair DTC P0462 or P0463, then go to step 7.
		No Go to next step.
4	Implement PID/DATA MONITOR AND RECORD (FLT V) of DIAGNOSTIC DATA LINK by using NGS. Is voltage as specified?	Yes Go to next step.
		No Inspect fuel gauge sender unit continuity and bend in the float rod, then go to step 7.
5	Is fuel gauge sender unit continuity. ☐ 09-22 FUEL GAUGE SENDER UNIT INSPECTION Is circuit okay?	Yes Go to next step.
		No Repair or replace instrument cluster.
6	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes Get assistance from Technical Hotline, then replace PCM if necessary.
		No Intermittent poor connection in harness or connector. Repair connector and/or harness, then go to next step.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION
7	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes Go to applicable DTC inspection.
		No Troubleshooting completed.

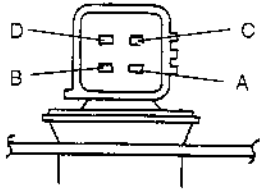


HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL CONNECTOR)

XSU10*WEB

DTC P0462 Fuel level sensor circuit high input	
DETECTION CONDITION	<ul style="list-style-type: none"> Input voltage from fuel gauge sender unit is above 5.4 V when battery positive voltage is 11—16 V
POSSIBLE CAUSE	<ul style="list-style-type: none"> Fuel gauge sender unit malfunction Open or short circuit in wiring from fuel pump terminal C to PCM terminal 3K Short circuit in wiring from main relay terminal A to fuel pump terminal C Open circuit in wiring from fuel pump terminal A to ground Instrument cluster malfunction

STEP	INSPECTION	ACTION
1	Have FREEZE FRAME PID DATA been recorded?	Yes Go to next step.
		No Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Do fuel pump connector and PCM connector have poor connection?	Yes Repair or replace connector, then go to step 8.
		No Go to next step.
3	Implement PID/DATA MONITOR AND RECORD (FLT V) of DIAGNOSTIC DATA LINK by using NGS. Is voltage as specified?	Yes Go to step 8.
		No Go to next step.
4	Is there continuity between fuel pump side connector terminal C and PCM terminal 3K?	Yes Go to next step.
		No Repair or replace wiring harness, then go to step 8.
5	Is there continuity between fuel pump side connector terminal A and ground?	Yes Go to next step.
		No Repair or replace wiring harness, then go to step 8.
6	Is fuel gauge sender unit continuity and bend in the float rod okay? ➡ 09-22 FUEL GAUGE SENDER UNIT INSPECTION	Yes Go to next step.
		No Replace fuel gauge sender unit, then go to step 8.
7	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes Get assistance from Technical Hotline, then replace PCM if necessary.
		No Intermittent poor connection in harness or connector. Repair connector and/or harness, then go to next step.
8	Clear diagnostic trouble code from memory. Is there a diagnostic trouble code present after performing "After Repair Procedure"?	Yes Go to applicable DTC inspection.
		No Troubleshooting completed.

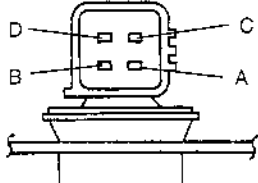


HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL CONNECTOR)

XSU10*WEA

TROUBLESHOOTING [ENGINE CONTROL]

DTC P0463		Fuel level sensor circuit low input	
DETECTION CONDITION		● Input voltage from fuel gauge sender unit is below 0.07 V when battery positive voltage is 11—16 V	
POSSIBLE CAUSE		● Fuel gauge sender unit malfunction ● Open or short circuit in wiring from fuel pump terminal C to PCM terminal 3K ● Open circuit in wiring from main relay terminal A to fuel pump terminal C ● Instrument cluster malfunction	
STEP	INSPECTION	ACTION	
1	Have FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Do fuel pump connector and PCM connector have poor connection?	Yes	Repair or replace connector, then go to step 8.
		No	Go to next step.
3	Implement PID/DATA MONITOR AND RECORD (FLT V) of DIAGNOSTIC DATA LINK by using NGS. Is voltage as specified?	Yes	Go to step 8.
		No	Go to next step.
4	Is there continuity between fuel pump side connector terminal C and PCM terminal 3K?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to step 8.
5	Is there continuity between main relay side connector terminal A and fuel gauge sender unit side connector terminal C?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to step 8.
6	Is fuel gauge sender unit continuity and bend in the float rod okay? 09-22 FUEL GAUGE SENDER UNIT INSPECTION	Yes	Go to next step.
		No	Replace fuel gauge sender unit, then go to step 8.
7	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes	Get assistance from Technical Hotline, then replace PCM if necessary.
		No	Intermittent poor connection in harness or connector. Repair connector and/or harness, then go to next step.
8	Clear diagnostic trouble code from memory. Is there a diagnostic trouble code present after performing "After Repair Procedure"?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL CONNECTOR)

X5U101WES

X5U101WE9

DTC P0500		Vehicle speed sensor malfunction	
DETECTION CONDITION		<ul style="list-style-type: none">Vehicle speed signal is less than 3.77 km/h (2.34 mph) for more than 25.5 sec. while driving in following condition:<ul style="list-style-type: none">Engine speed is over 2,000 rpmCharging efficiency is over 40%	
POSSIBLE CAUSE		<ul style="list-style-type: none">Speedometer sensor malfunctionOpen or short circuit in wiring from ignition switch to speedometer sensorOpen or short circuit in wiring from speedometer sensor to GNDOpen or short circuit in wiring from speedometer sensor to vehicle speed sensorOpen or short circuit in wiring from vehicle speed sensor to PCM terminal 2D	
STEP	INSPECTION		ACTION
1	Have FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Does vehicle speed sensor connector or PCM connector have poor connection?	Yes	Repair or replace connector, then go to step 8.
		No	Go to next step.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION
3	Implement PID/DATA MONITOR AND RECORD (VS) of DIAGNOSTIC DATA LINK by using NGS tester. Does it operate normally?	Yes Go to step 6.
		No Go to next step.
4	Is there continuity between vehicle speed sensor terminal and PCM terminal 2D?	Yes Go to next step.
		No Repair or replace wiring harness, then go to step 8.
5	Is there continuity between vehicle speed sensor and speedometer sensor terminals?	Yes Go to next step.
		No Repair or replace speedometer sensor and wiring harness, then go to step 8.
6	Is vehicle speed sensor okay?	Yes Go to next step.
		No Repair or replace as necessary, then go to step 8.
7	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes Get assistance from Technical Hotline/your distributor, then replace PCM if necessary.
		No Intermittent poor connection in harness or connector. Repair connector and/or harness, then go to next step.
8	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes Go to applicable DTC inspection.
		No Troubleshooting completed.

DTC P0506		Idle control system RPM is lower than expected	
DETECTION CONDITION	If the actual idle speed is lower (by approximately 100 rpms or more) than expected for 14 seconds while the brake pedal is depressed (brake switch is on) and the steering wheel is straight ahead (power steering switch is off).		
POSSIBLE CAUSE	<ul style="list-style-type: none">• Open circuit in wiring diagram• Damaged or clogged IAC valve• Damaged throttle body• Air leaks• PCV valve malfunction• Engine coolant temperature sensor malfunction• Purge control solenoid valve malfunction• Fuel system malfunction• A/C compressor stays on• Low engine compression• EGR valve malfunction		
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to next step.
2	Confirm the pending and stored DTC. Have DTC P0171, P0172, P0443, P1496, P1497, P1498, P1499, P0507, and P1504 for the fuel system, purge solenoid valve, EGR valve or IAC valve been set beside P0506?	Yes	Inspect and repair the DTC except the system related areas, then go to step 13.
		No	Go to next step.
3	Inspect the ignition timing or engine speed. ☞ 01-10 ENGINE TUNE-UP Is ignition timing or engine speed okay?	Yes	Go to next step.
		No	Adjust the ignition timing or engine speed.
4	Inspect for air leaks in the intake air system. Is there an air leak finding in the intake air system?	Yes	Repair or replace if necessary, then go to step 13.
		No	Go to next step.
5	Perform the IAC operation inspection. ☞ 01-01A ENGINE SYSTEM INSPECTION, Idle Air control inspection Is IAC system operation okay?	Yes	Go to step 7.
		No	Go to next step.
6	Perform the IAC valve inspection. ☞ 01-13 IDLE AIR CONTROL VALVE INSPECTION Is IAC valve okay?	Yes	Go to next step.
		No	Check if IAC valve is clogged or stuck. Repair or replace if necessary. Go to step 13.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION
7	Remove the throttle body. Inspect for bends or damage on the throttle valve or throttle body. Are there any bends or damage?	Yes Replace the throttle body, then go to step 13.
		No Go to next step.
8	Start the engine. Make sure that the A/C switch is turned off. Does the A/C compressor operate?	Yes Check the root cause in the A/C system. Go to step 13 after repair is completed.
		No Go to next step.
9	Pinch the vacuum hose between intake manifold and purge solenoid valve. Does engine condition improve?	Yes Inspect purge solenoid valve. ➤ 01-16 PURGE SOLENOID VALE INSPECTION Go to step 13 after repair is completed.
		No Go to next step.
10	Inspect PCV valve and hose. ➤ 01-16 PCV VALVE INSPECTION Are PCV valve and hose okay?	Yes Go to next step.
		No Replace defective part if necessary, then go to step 13.
11	Check if the EGR valve is stuck open. ➤ 01-16 EGR VALVE INSPECTION Is EGR valve okay?	Yes Go to next step.
		No Repair or replace the EGR valve, then go to step 13.
12	Inspect engine compression. ➤ 01-10 COMPRESSION INSPECTION Is engine compression okay?	Yes Inspect for fuel injector. ➤ 01-14 FUEL INJECTOR INSPECTION Repair or replace if necessary. Go to next step.
		No Repair or replace any defective part, then go to next step.
13	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes Get assistance from Technical Hotline, then replace PCM if necessary.
		No Troubleshooting completed.

DTC P0507		Idle control system RPM is higher than expected	
DETECTION CONDITION		If the actual idle speed is higher (by approximately 200 rpms or more) than expected for 14 seconds while the brake pedal is depressed (brake switch is on) and the steering wheel is straight ahead (power steering switch is off).	
POSSIBLE CAUSE		<ul style="list-style-type: none">• Short circuit in wiring diagram• IAC solenoid valve malfunction• Damaged IAC solenoid valve• IAC solenoid valve malfunction• Vacuum leaks• Damaged throttle body• Engine coolant temperature sensor malfunction• Accelerator cable not adjusted correctly	
STEP	INSPECTION	ACTION	
1	Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to next step.
2	Confirm the pending and stored DTC. Have the DTC P0117, P0118, P0506, and P1504, for engine coolant temperature sensor and IAC valve been set beside P0507?	Yes	Inspect and repair the DTC and repair or replace as necessary. Go to step 9.
		No	Go to next step.
3	Inspect the ignition timing or engine speed. ➤ 01-10 ENGINE TUNE-UP Is ignition timing or engine speed okay?	Yes	Go to next step.
		No	Adjust the ignition timing or engine speed.
4	Inspect for accelerator free play. ➤ 01-13 ACCELERATOR CABLE INSPECTION/ADJUSTMENT Is free play okay?	Yes	Go to next step.
		No	Adjust the accelerator cable free play, then go to step 9.
5	Inspect for vacuum leaks in the intake air system. Is any vacuum leak found?	Yes	Repair or replace if necessary, then go to step 8.
		No	Go to next step.
6	Perform the IAC operation inspection. ➤ 01-01A ENGINE SYSTEM INSPECTION, Idle Air Control inspection Is IAC system operation okay?	Yes	Go to step 8.
		No	Go to next step.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION
7	Perform the IAC valve inspection. 01-13 IDLE AIR CONTROL VALVE INSPECTION Is IAC valve okay?	Yes Go to next step.
		No Check if IAC valve is stuck open. Repair or replace if necessary. Go to step 9.
8	Remove the throttle body. Inspect for bends or damage on the throttle valve or throttle body. Are there any bends or damage?	Yes Replace the throttle body, then go to next step.
		No Go to next step.
9	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes Get assistance from Technical Hotline, then replace PCM if necessary.
		No Troubleshooting completed.

DTC P0550		P/S SW malfunction	
DETECTION CONDITION		• The vehicle is running faster than 60 km/h {37.4 mph}, engine coolant temperature is above 60 °C {140 °F} and the power steering pressure switch is, continuously, at ON for more than 60 seconds	
POSSIBLE CAUSE		• Power steering pressure switch malfunction • Short circuit in wiring from PCM terminal 1G to power steering pressure switch • Power steering system malfunction	
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME PID DATA on repair order sheet?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Implement PID/DATA MONITOR AND RECORD (PSP SW) of DIAGNOSTIC DATA LINK by using NGS tester. Does it operate normally?	Yes	Go to step 6.
		No	Go to next step.
3	Is there continuity between power steering pressure switch connector terminal A and PCM terminal 1G?	Yes	Go to next step.
		No	Repair or replace wiring harness.
4	Is power steering fluid pressure okay? ➡ 06-12 POWER STEERING FLUID INSPECTION	Yes	Replace power steering pressure switch.
		No	Check for power steering system.
5	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes	Get assistance from technical Hotline/your distributor, then replace PCM if necessary.
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness), then go to next step.
6	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0703		Brake switch input malfunction	
DETECTION CONDITION		<ul style="list-style-type: none">Accelerated/decelerated 0—30 km/h {0—19 mph} repeatedly for more than 10 times	
POSSIBLE CAUSE		<ul style="list-style-type: none">Brake switch malfunctionOpen or short circuit in wiring from PCM terminal 1F to brake switch terminalOpen or short circuit in wiring from brake switch terminal to battery terminal	
STEP	INSPECTION		ACTION
1	Have FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Does brake switch connector or PCM connector have poor connection?	Yes	Repair or replace connector, then go to step 6.
		No	Go to next step.
3	Implement PID/DATA MONITOR AND RECORD (BRK SW) of DIAGNOSTIC DATA LINK by using NGS tester. Does it operate normally?	Yes	Go to step 5.
		No	Go to next step.

TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION		ACTION
4	Is there continuity between brake switch terminal and PCM terminal 1F?	Yes	Check for open or short circuit in wiring harness. (Battery — Brake switch) Check brake switch, then go to step 6.
		No	Repair or replace wiring harness, then go to step 6.
5	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes	Get assistance from Technical Hotline/your distributor, then replace PCM if necessary.
		No	Intermittent poor connection in harness or connector. Repair connector and/or harness, then go to next step.
6	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0704		Clutch switch input circuit malfunction	
DETECTION CONDITION	<ul style="list-style-type: none">Clutch switch never turns on/off after engine is started and accelerated/decelerated to 0—30 km/h {0—19 mph} repeatedly for more than 10 timesClutch switch never turns off when engine speed below 400 rpm		
POSSIBLE CAUSE	<ul style="list-style-type: none">Clutch switch malfunctionPCM malfunctionOpen or short circuit in wiring from clutch switch to PCM terminal 3I		
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Does PCM connector have poor connection?	Yes	Repair or replace connector, then go to step.
		No	Go to next step.
3	Implement PID/DATA MONITOR AND RECORD (CLT SW) of DIAGNOSTIC DATA LINK by using NGS. Does it operate normally?	Yes	Go to step 7.
		No	Go to next step.
4	Is there continuity between clutch switch terminal and PCM terminal 3I?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to step 7.
5	Is clutch switch okay? ☞ 01-40 CLUTCH SWITCH INSPECTION	Yes	Go to next step.
		No	Repair or replace clutch switch, then go to step 7.
6	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes	Get assistance from technical Hotline/your distributor, then replace PCM if necessary.
		No	Intermittent poor connection of harness or connector (Repair connector and/or harness), then go to step 7.
7	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0705		Neutral switch circuit malfunction (MT)	
DETECTION CONDITION		<ul style="list-style-type: none">Neutral switch never turns on/off after engine is started and accelerated/decelerated to 0—30 km/h {0—19 mph} repeatedly for more than 10 timesNeutral switch never turns off when engine speed below 400 rpm	
POSSIBLE CAUSE		<ul style="list-style-type: none">Neutral switch malfunctionPCM malfunctionOpen or short circuit in wiring from neutral switch to PCM terminal	
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	Does PCM connector have poor connection?	Yes	Repair or replace connector, then go to step 7.
		No	Go to next step.

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STEP	INSPECTION	ACTION
3	Implement PID/DATA MONITOR AND RECORD (NL SW) of DIAGNOSTIC DATA LINK by using NGS. Does it operate normally?	Yes Go to step 7.
		No Go to next step.
4	Is there continuity between neutral switch terminal and PCM terminal 1V?	Yes Go to next step.
		No Repair or replace wiring harness, then go to step 7.
5	Is neutral switch okay? ➔ NEUTRAL SWITCH INSPECTION	Yes Go to next step.
		No Repair or replace neutral switch, then go to step 7.
6	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes Get assistance from technical Hotline/your distributor, then replace PCM if necessary.
		No Intermittent poor connection of harness or connector. (Repair connector and/or harness), then go to step 7.
7	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes Go to applicable DTC inspection.
		No Troubleshooting completed.

DTC P1102		Mass air flow inconsistent with throttle position sensor (Lower than expected)	
DETECTION CONDITION		Mass air flow volume is less than expected for 5 seconds or more when engine speed is more than 500 rpm and throttle valve is opened 50% or more	
POSSIBLE CAUSE		<ul style="list-style-type: none">• Open or short circuit in wiring diagram• Damaged mass airflow sensor• Blockage on mass airflow sensor screen• Throttle position sensor malfunction or incorrect installation position	
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to next step.
2	Confirm the pending and stored DTC. Have the DTC P0102, P0103, P0122, P0123, P0506, P0507, and P1103, for throttle position sensor, mass airflow sensor or IAC valve been set beside P1102?	Yes	Go to applicable DTC and repair or replace as necessary. Go to step 7.
		No	Go to next step.
3	Start the engine. Access MAF V PID. Check MAF V PID. Is MAF V PID okay?	Yes	Go to step 6.
		No	Go to next step.
4	Remove the mass airflow sensor. Check if there is any blockage on the screen or any damages. Is mass airflow sensor okay?	Yes	Go to next step.
		No	Remove any blockage on the screen or if any blockage is found. Replace the mass airflow sensor as necessary. Go to step 7.
5	Inspect the throttle position sensor. ➤ 01-40 THROTTLE POSITION SENSOR INSPECTION Is throttle position sensor okay?	Yes	Go to next step.
		No	Repair or replace throttle position sensor.
6	Turn the ignition switch on. Access TP V PID. Inspect TP V PID. Is TP V PID okay?	Yes	Go to next step.
		No	Inspect for throttle position sensor. Repair or replace if necessary. Go to next step.
7	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes	Get assistance from Technical Hotline, then replace PCM if necessary.
		No	Troubleshooting completed.

TROUBLESHOOTING [ENGINE CONTROL]

DTC P1103		Mass air flow inconsistent with RPM (Grater than expected)	
DETECTION CONDITION		Mass airflow volume is higher than expected for 5 seconds or more when the engine speed is less than 2000 rpm and engine coolant temperature is above 80 °C {176 °F}	
POSSIBLE CAUSE		<ul style="list-style-type: none"> • Open or short circuit in wiring diagram • Mass airflow sensor malfunction • Low battery • Damaged mass airflow sensor • Intake air leaks around mass airflow sensor 	
STEP	INSPECTION		ACTION
1	Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to next step.
2	Confirm the pending and stored DTC. Have the DTC P0117, P0118, P0506, P0507, P1504, P1102, P0102, and P0103, for engine coolant temperature sensor, mass airflow sensor or IAC valve been set beside P1103?	Yes	Go to applicable DTC and repair or replace as necessary. Go to step 6.
		No	Go to next step.
3	Start the engine. Access MAF V PID. Check MAF V PID. Is MAF V PID okay?	Yes	Go to step 6.
		No	Go to next step.
4	Inspect for intake air leaks around mass airflow sensor. Is there an air leak around the mass airflow sensor?	Yes	Repair or replace if necessary, then go to step 6.
		No	Go to next step.
5	Remove the mass airflow sensor. Check if there is any blockage on the screen or any damages. Is mass airflow sensor okay?	Yes	Go to next step.
		No	Remove any blockage on the screen if any blockage is found. Replace the mass airflow sensor as necessary. Go to step 6.
6	Clear diagnostic trouble code from memory. Is same code No. present after performing "After Repair Procedure"?	Yes	Get assistance from Technical Hotline, then replace PCM if necessary.
		No	Troubleshooting completed.