

# GENERAL INFORMATION

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SECTION

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## GENERAL INFORMATION .... 00-00

### 00-00 GENERAL INFORMATION

HOW TO USE THIS MANUAL .....	00-00-2
Range of Topics .....	00-00-2
Service Procedure .....	00-00-2
Symbols .....	00-00-4
Advisory Messages .....	00-00-4
Troubleshooting Procedure .....	00-00-4
Procedures for Use .....	00-00-5
Text Sequence .....	00-00-7
UNITS .....	00-00-8
Conversion to SI Units (Système International d'Unités) .....	00-00-8
Rounding Off .....	00-00-8
Upper and Lower Limits .....	00-00-8
SAE STANDARDS .....	00-00-9
FUNDAMENTAL PROCEDURES .....	00-00-11
Protection of the Vehicle .....	00-00-11
Preparation of Tools and Measuring Equipment .....	00-00-11
Special Tools .....	00-00-11
Disconnection of the Negative Battery Cable .....	00-00-11
Removal of Parts .....	00-00-11
Disassembly .....	00-00-11
Inspection During Removal, Disassembly .....	00-00-11
Arrangement of Parts .....	00-00-12
Cleaning of Parts .....	00-00-12
Reassembly .....	00-00-12
Adjustments .....	00-00-12
Rubber Parts and Tubing .....	00-00-13
Hose Clamps .....	00-00-13
Torque Formulas .....	00-00-13
Vise .....	00-00-13
Dynamometer .....	00-00-13
INSTALLATION OF RADIO SYSTEM .....	00-00-13
ELECTRICAL SYSTEM .....	00-00-14
Electrical Parts .....	00-00-14
Connectors .....	00-00-14
Terminals .....	00-00-15
Sensors, Switches, and Relays .....	00-00-15
Wiring Harness .....	00-00-15
Fuse .....	00-00-16
Electrical Troubleshooting Tools .....	00-00-16
JACKING POSITIONS .....	00-00-17
VEHICLE LIFT (2 SUPPORTS) AND SAFETY	
STAND (RIGID RACK) POSITION .....	00-00-17
Vehicle Lift Positions .....	00-00-17
Safety Stand Positions .....	00-00-17
TOWING .....	00-00-18
IDENTIFICATION NUMBER	
LOCATIONS .....	00-00-18
Vehicle Identification Number (VIN) .....	00-00-18
Engine Identification Number .....	00-00-18
Automatic Transmission Number .....	00-00-18
ABBREVIATIONS .....	00-00-19
PRE-DELIVERY INSPECTION .....	00-00-20
Pre-Delivery Inspection Table .....	00-00-20
SCHEDULED MAINTENANCE .....	00-00-21
Scheduled Maintenance Table (Except Canada) .....	00-00-21
Scheduled Maintenance Table (Canada) .....	00-00-23

# GENERAL INFORMATION

## 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

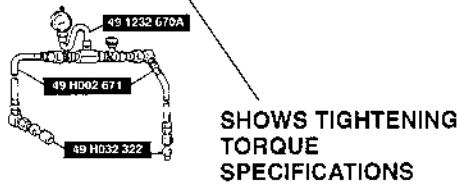
#### Inspection, adjustment

- 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.

### SHOWS PROCEDURE ORDER FOR SERVICE

Fluid Pressure Inspection  
1. Assemble the SSTs as shown in the figure.

Tightening torque  
39–49 N·m (4.0–5.0 kgf·m, 29–36 ft·lbf)



### SHOWS TIGHTENING TORQUE SPECIFICATIONS

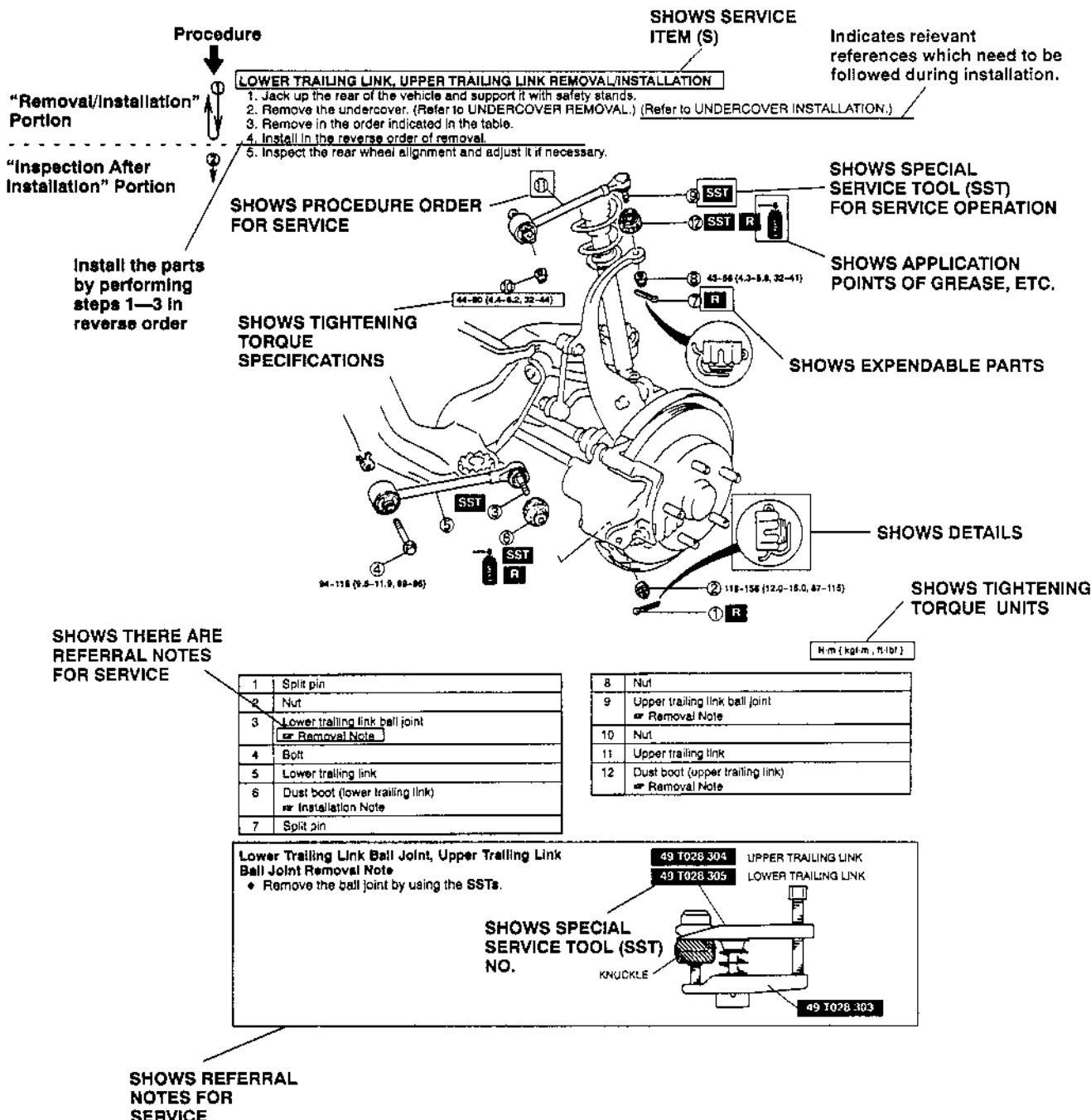
#### Caution

- Connect the gauge set from under the vehicle to prevent contact with the drive belt and the cooling fan.

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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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# GENERAL INFORMATION

## 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.

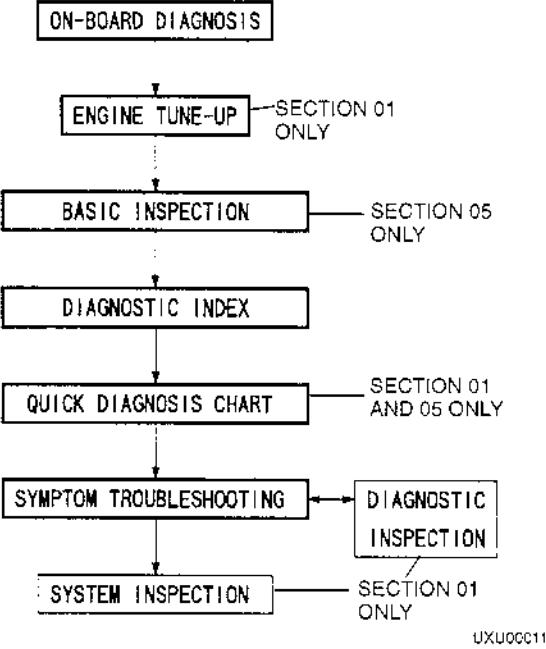
## Specification

- 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



UXU00011

## 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.

# GENERAL INFORMATION

## 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.

REFERENCE COLUMN	STEP	INSPECTION	SHOWS INSPECTION ORDER		SHOWS ITEM NAMES FOR THE DETAILED PROCEDURES		SHOWS POINTS REQUIRING ATTENTION IN REGARD TO INSPECTION RESULTS	
			1	2	3	4	5	
	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 <small>MECHANICAL SYSTEM TEST, Line Pressure Test</small> Is line pressure OK?			Yes	Go to next step		
					No	Repair or replace any defective parts		
	4	Perform the stall test <small>MECHANICAL SYSTEM TEST, Stall Test</small> Is stall speed OK?			Yes	Go to next step		
					No	Repair or replace any defective parts		
	5				Yes	Perform symptom troubleshooting		

UXU00012

### 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.

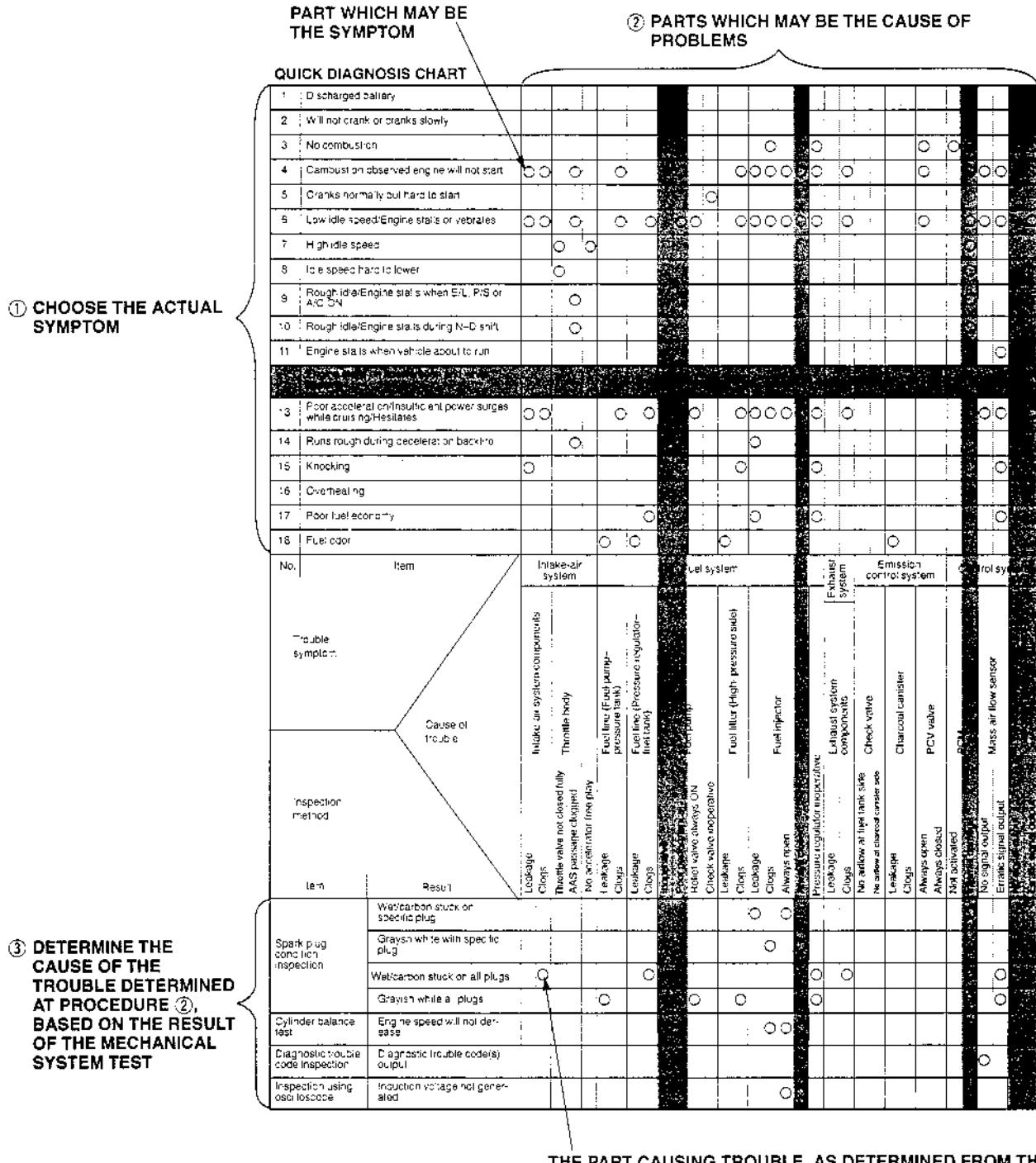
No.	TROUBLESHOOTING ITEM	DESCRIPTION
1	Discharged battery	—
2	Will not crank or cranks slowly	—
3	No combustion	Engine cranks at normal speed but shows no sign of firing
4	Combustion observed but engine will not start	Engine shows combustion while cranking but will not continue to run when ignition switch is turned from STA to ON
5	Crank normal by 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	Engines 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

UXU00013

## **GENERAL INFORMATION**

## **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.

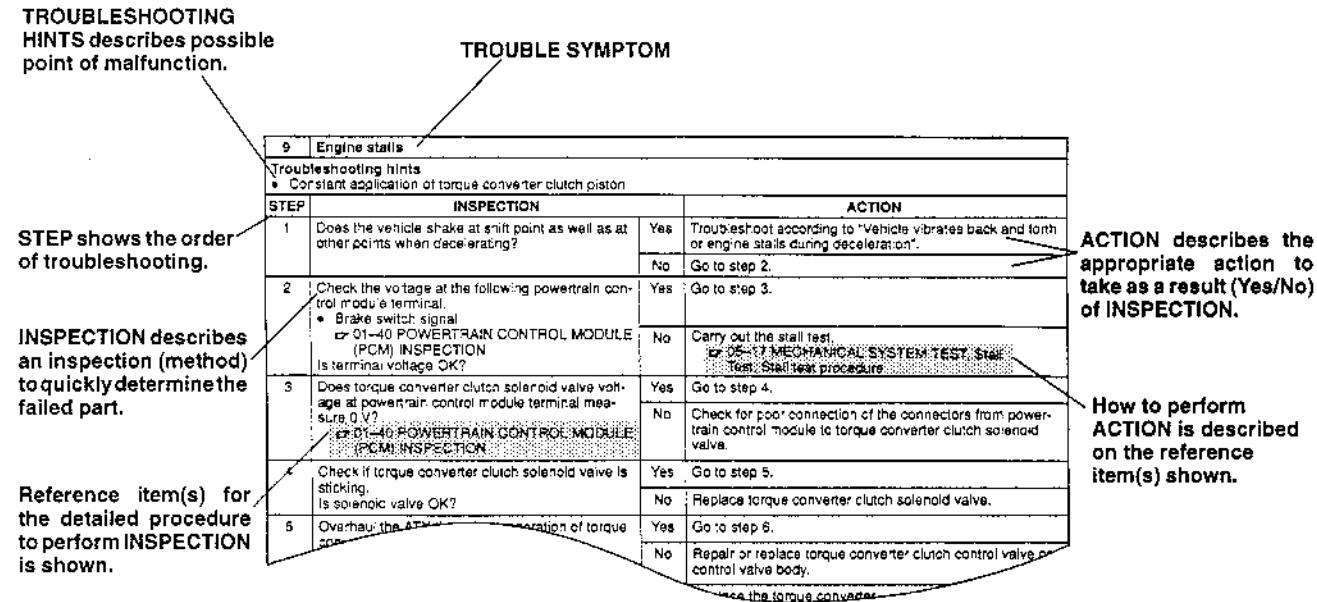


THE PART CAUSING TROUBLE, AS DETERMINED FROM THE RESULT OF THE MECHANICAL SYSTEM TEST.

X5U000WA1

## Using the symptom troubleshooting

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

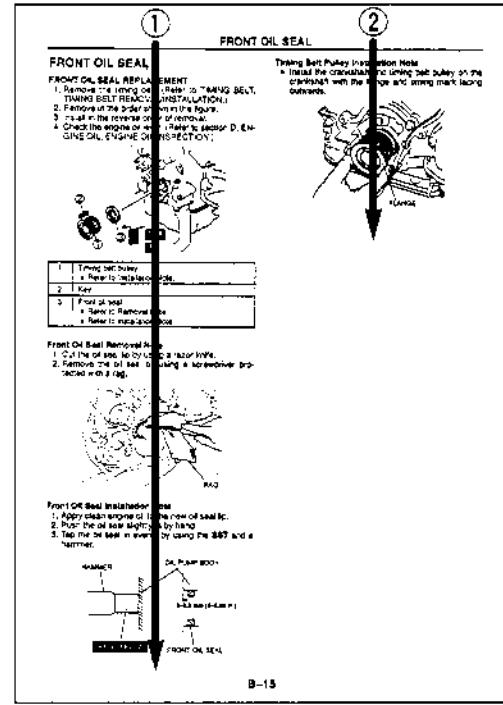
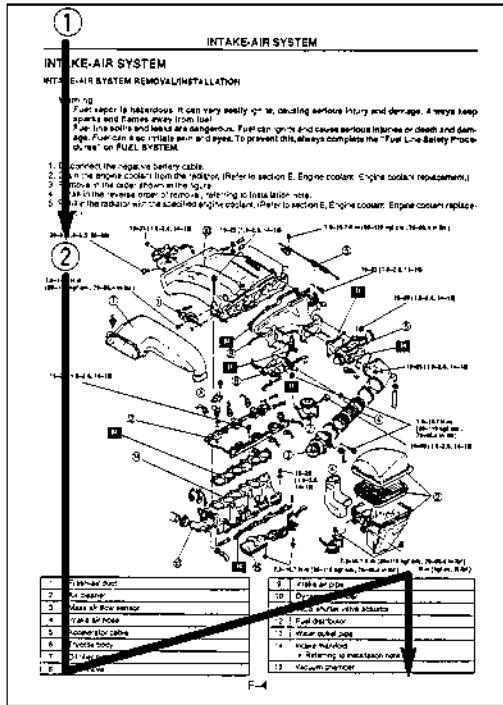


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## Text Sequence

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

### **Example:**



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# GENERAL INFORMATION

## UNITS

UXU000AF

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 <sup>2</sup> (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/cm<sup>2</sup> in the following specifications:

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

- The actual converted values for 2.7 kgf/cm<sup>2</sup> 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

XSU000W02

- 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.

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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 <sub>B</sub>	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	

# GENERAL INFORMATION

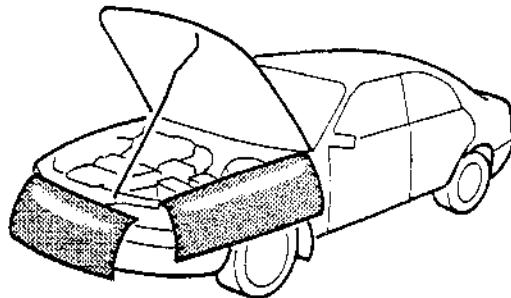
Previous Standard		New Standard		
Abbr.	Name	Abbr.	Name	Remark
—	Idle Switch	—	Closed Throttle Position Switch	
—	Igniter	ICM	Ignition Control Module	
—	Inhibitor	TR	Transmission (Transaxle) Range	
—	Intake Air Pressure	MAP	Manifold Absolute Pressure	
—	Intake Air Thermo	IAT	Intake Air Temperature	
—	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	
—	Multipoint Fuel Injection	MFI	Multipoint 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	

# GENERAL INFORMATION

## FUNDAMENTAL PROCEDURES

### Protection of the Vehicle

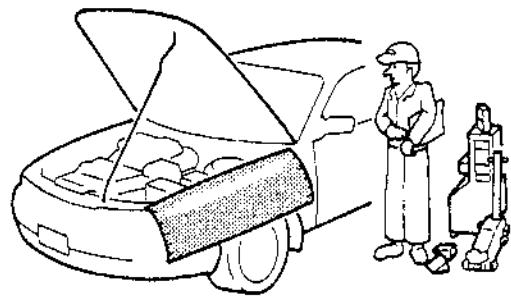
- Always be sure to cover fenders, seats, and floor areas before starting work.



UXU00007

### Preparation of Tools and Measuring Equipment

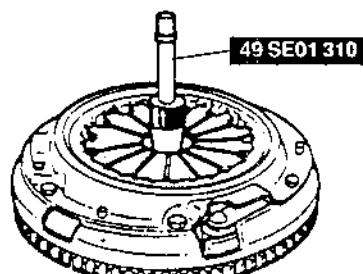
- Be sure that all necessary tools and measuring equipment are available before starting any work.



UXU00018

### Special Tools

- Use special tools when they are required.



UXU00019

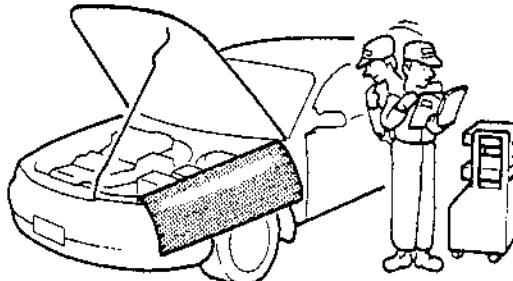
### Disconnection of the Negative Battery Cable

- 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.

X6U000W03

### Removal of Parts

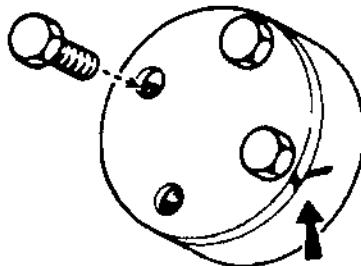
- While correcting a problem, try also to determine its cause. Begin work only after first learning which parts and subcomponents must be removed and disassembled for replacement or repair. After removing the part, plug all holes and ports to prevent foreign material from entering.



UXU00020

### Disassembly

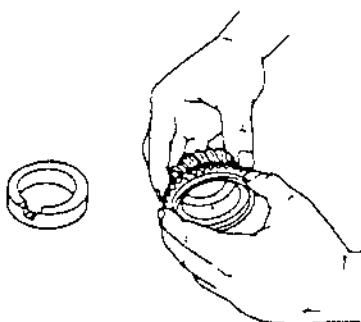
- If the disassembly procedure is complex, requiring many parts to be disassembled, all parts should be disassembled in a way that will not affect their performance or external appearance and identified so that reassembly can be performed easily and efficiently.



UXU00021

### Inspection During Removal, Disassembly

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

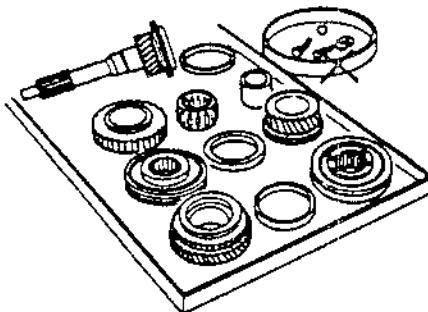


UXU00022

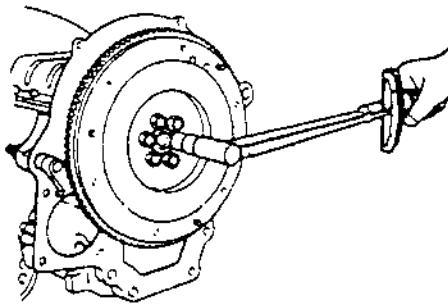
## GENERAL INFORMATION

### 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.



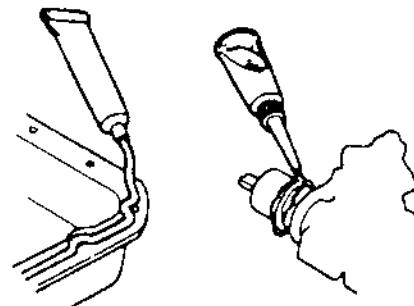
UXU00023



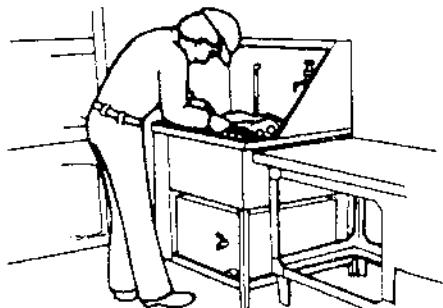
UXU00025

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



UXU00024

### Reassembly

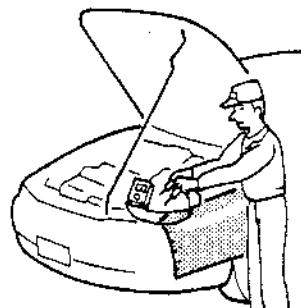
- Standard values, such as torques and certain adjustments, must be strictly observed in the reassembly of all parts.

If removed, these parts should be replaced with new ones:

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

### Adjustments

- Use suitable gauges and testers when making adjustments.

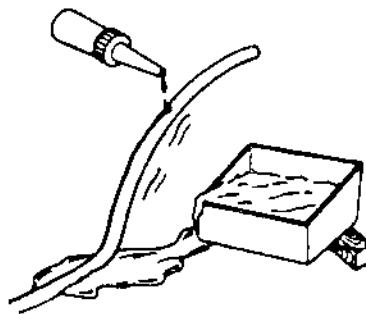


UXU00027

## GENERAL INFORMATION

### Rubber Parts and Tubing

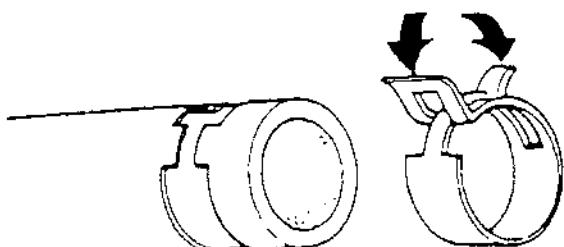
- Prevent gasoline or oil from spilling on rubber parts or tubing.



UXUC0028

### 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	$in\cdot lbf \times [L/(L+A)]$

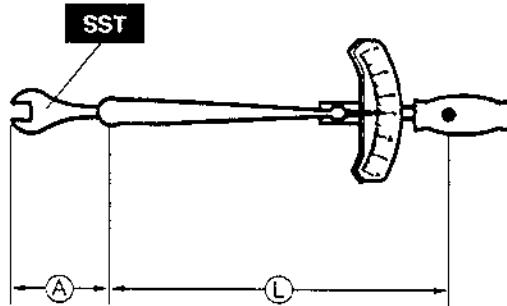
A : The length of the SST past the torque wrench drive.

L : The length of the torque wrench.

### 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:

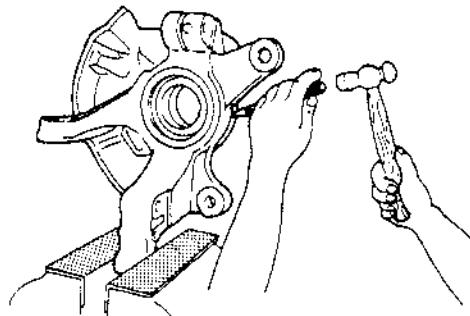
- Install the antenna at the farthest point from control modules.



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.

UXUC00W04

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

# GENERAL INFORMATION

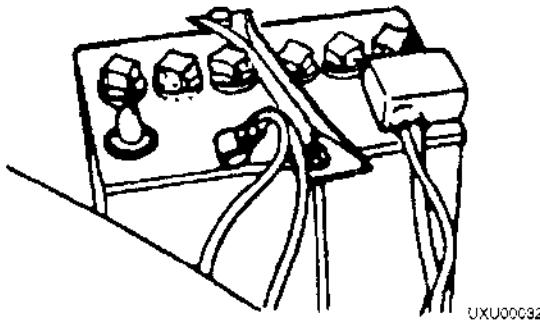
## ELECTRICAL SYSTEM

XU0000W05

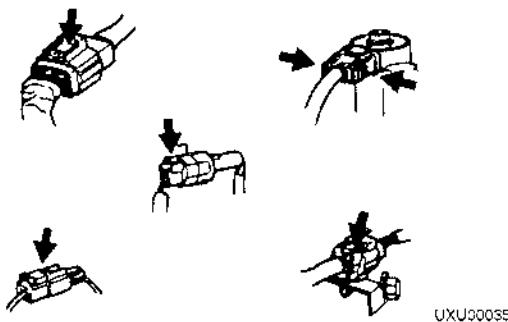
### Electrical Parts

#### Battery cable

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



UXU00032



UXU00035

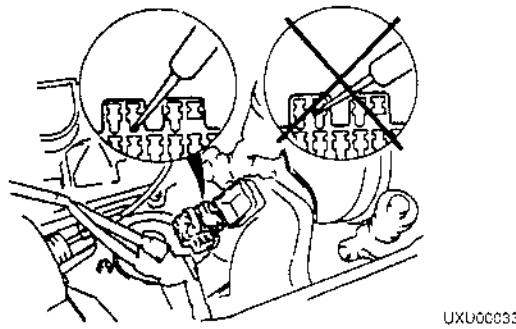
### Connectors

#### Data link connector

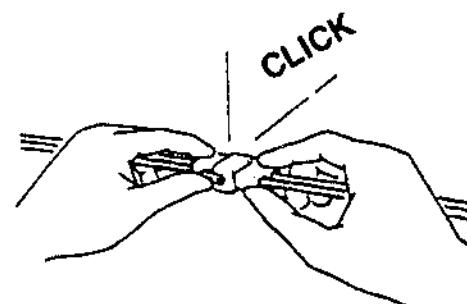
- Insert the probe into the service hole when connecting a jumper wire to the data link connector.

#### Caution

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



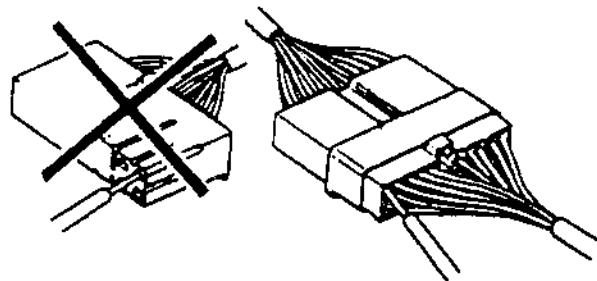
UXU00033



UXU00036

#### Inspection

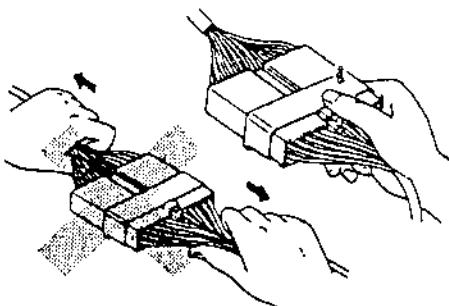
1. When a tester is used to check for continuity or to measure voltage, insert the tester probe from the wiring harness side.



UXU00037

#### Disconnecting connectors

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



UXU00034

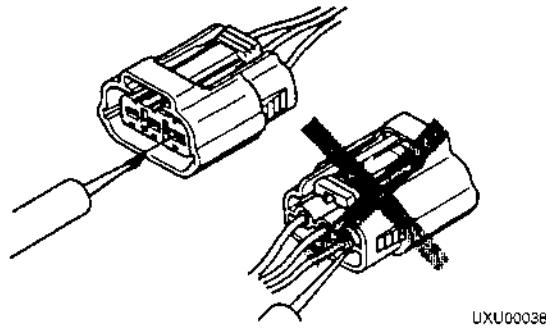
- Connectors can be disconnected by pressing or pulling the lock lever as shown.

## GENERAL INFORMATION

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

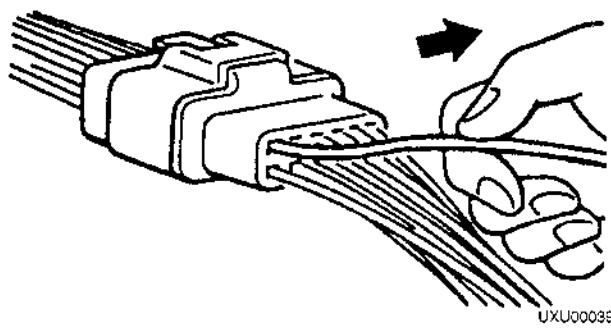
**Caution**

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



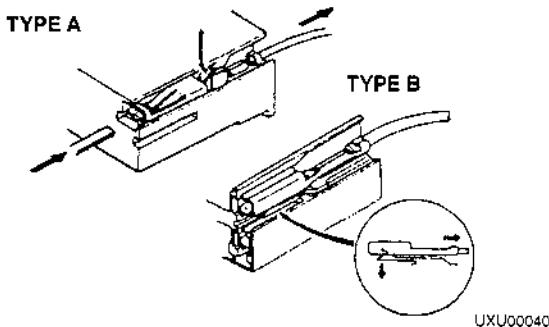
**Terminals  
Inspection**

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



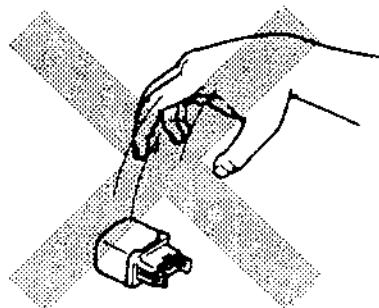
**Replacement**

- 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.



**Sensors, Switches, and Relays**

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



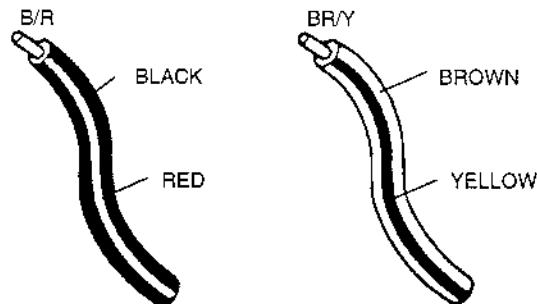
UXU00041

**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		



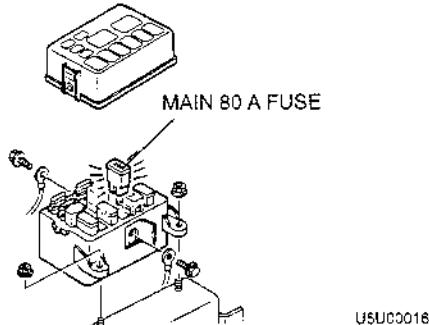
UXU00042

## GENERAL INFORMATION

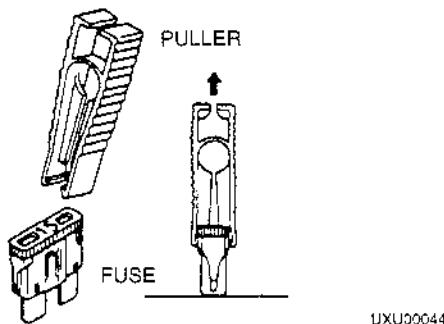
### Fuse

#### 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.



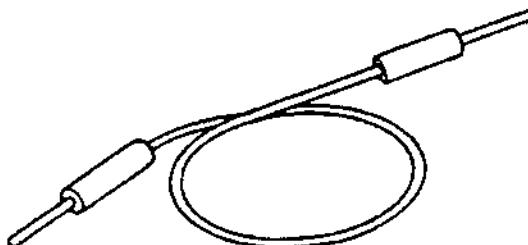
### Electrical Troubleshooting Tools

#### 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

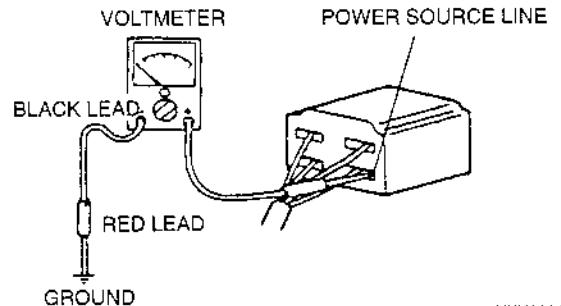
- Do not connect a jumper wire from the power source line to a body ground; this may cause burning or other damage to wiring harnesses or electronic components.



UXU00046

#### 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.

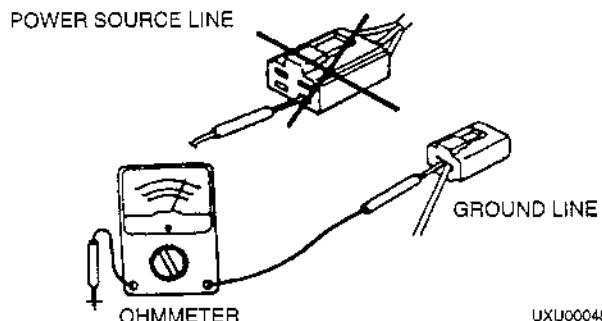


#### Ohmmeter

- 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

#### Warning

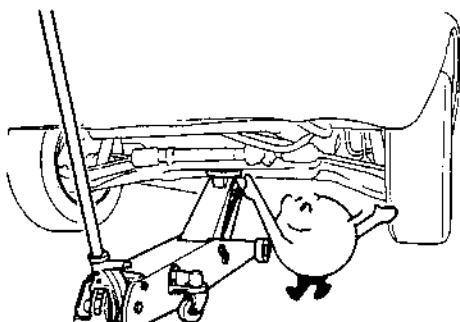
- Improperly jacking a vehicle is dangerous. The vehicle can slip off the jack and cause serious injury. Use only the correct front and rear jacking positions and block the wheels.

X5U000W06

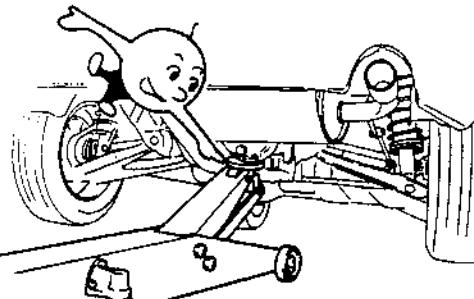
Use safety stands to support the vehicle after it has been lifted.

#### Front

At the center of the crossmember



U5U00001



U5U00002

#### Rear

At the center of the differential

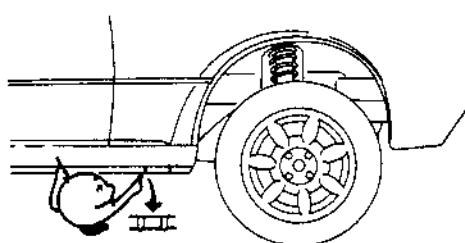
### VEHICLE LIFT (2 SUPPORTS) AND SAFETY STAND (RIGID RACK) POSITION

X5U000W07

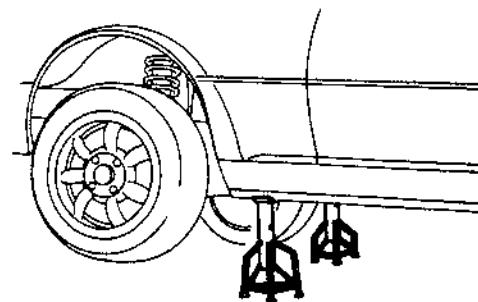
#### Vehicle Lift Positions

##### Front

Both sides of the vehicle, on side sills



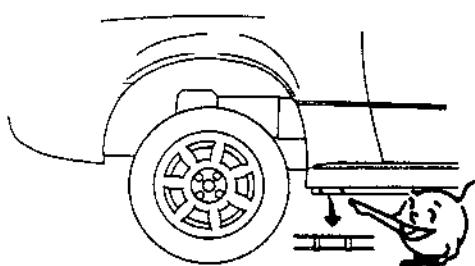
X5U000WA2



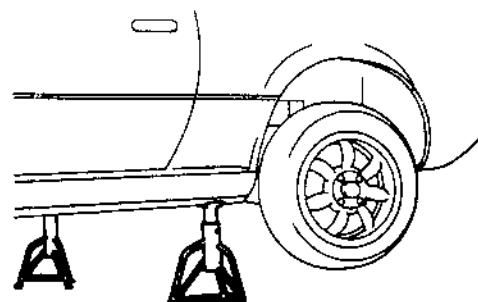
X5U000WA4

##### Rear

Both sides of the vehicle, on side sills



X5U000WA3

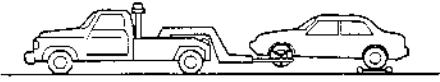


X5U000WA5

## GENERAL INFORMATION

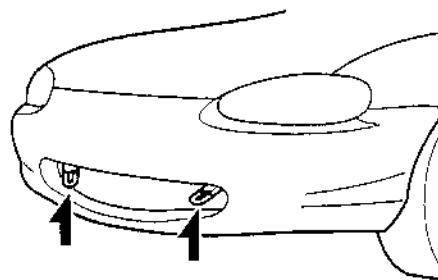
### TOWING

X5U000W08



X5U000WA8

#### TIEDOWN HOOKS/FRONT



X5U000WA6

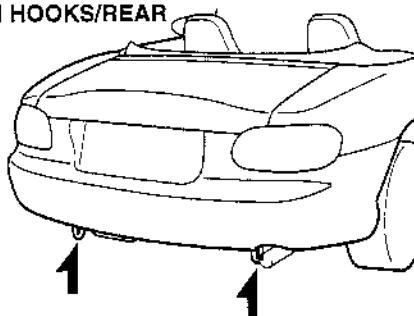
Proper lifting and towing are necessary to prevent damage to the vehicle. State and local laws must be followed.

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 it's being transported. Using them for towing will damage the bumper.**

#### TIEDOWN HOOKS/REAR

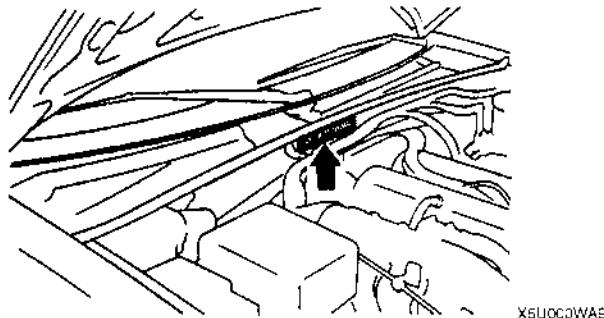


X5U000WA7

### IDENTIFICATION NUMBER LOCATIONS

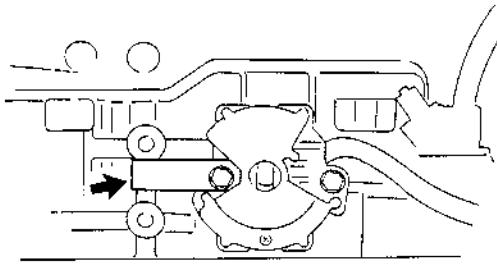
U5U000AG

#### Vehicle Identification Number (VIN)



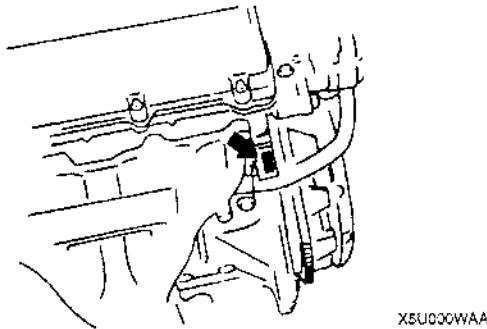
X5U000WA9

#### Automatic Transmission Number



X5U000WAB

#### Engine Identification Number



X5U000WAA

# GENERAL INFORMATION

## ABBREVIATIONS

XSLCCCW09

AAS	Air adjusting screw	LO	Low
ABS	Antilock brake system	LR	Left rear
A/C	Air conditioner	LSD	Limited slip differential
ACC	Accessories	M	Motor
ALR	Automatic locking retractor	MT	Manual transmission
AT	Automatic transmission	N	Neutral
ATF	Automatic transmission fluid	O/D	Overdrive
AV	Pressure reduction valve	OFF	Switch off
CDCV	Canister drain cut valve	ON	Switch on
CM	Control module	P	Park
D	Drive	PCV	Positive crankcase ventilation
DRL	Daytime running light	PPF	Power plant frame
EC-AT	Electronically controlled automatic transmission	P/S	Power steering
ELR	Emergency locking retractor	R	Reverse
EV	Pressure retention valve	RF	Right front
EX	Exhaust	RH	Right hand
HI	High	RR	Right rear
HU	ABS hydraulic unit	SAS	Sophisticated air bag sensor
IAC	Idle air control	SST	Special service tool
IG	Ignition	SW	Switch
IN	Intake	TAS	Throttle adjusting screw
INT	Intermittent	TDC	Top dead center
LF	Left front	TNS	Tail number side lights
LH	Left hand	TPCV	Tank pressure control valve
		VICS	Variable inertia charging system

# GENERAL INFORMATION

## PRE-DELIVERY INSPECTION

X5U000W10

### 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
<b>Engine</b>										
Engine valve clearance									I	
Engine oil	R	R	R	R	R	R	R	R		
Oil filter	R	R	R	R	R	R	R	R		
Tension of all drive belts				I				I		
Engine timing belt* <sup>1</sup>	Replace every 60,000 miles (96,000 km)									
Engine timing belt* <sup>2+3</sup>	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)									
<b>Ignition system</b>										
Spark plugs				R				R		
<b>Fuel system</b>										
Idle speed					I <sup>3</sup>			I <sup>3</sup>		
Air cleaner element				R				R		
Fuel filter								R <sup>3</sup>		
Fuel lines and hoses				I <sup>3</sup>				I <sup>3</sup>		
Hoses and tubes for emission								I <sup>3</sup>		
<b>Cooling system</b>										
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.									
<b>Chassis and body</b>										
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		
<b>Air conditioner system (if equipped)</b>										
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
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## 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	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	
<b>Engine</b>														
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	
<b>Ignition system</b>														
Spark plugs							R						R	
<b>Cooling system</b>														
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													
<b>Fuel system</b>														
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	96
	Miles	5	10	15	20	25	30	35	40	45	50	55	60
Emission hoses and tubes													1
<b>Chassis and body</b>													
Automatic transmission fluid level	I	I	I	I	I	I	I	I	I	I	I	I	
Transmission oil (MT and AT)						R						R	
Differential oil					I	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	
Brake fluid						R <sup>*3</sup>						R <sup>*3</sup>	
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	
Tires			Rt			Rt			Rt			Rt	
Power steering fluid level	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						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	
Washer fluid level	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	
<b>Air conditioner system (if equipped)</b>													
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

<b>TROUBLESHOOTING</b>	
[ENGINE CONTROL] .....	01-01A
<b>TROUBLESHOOTING</b>	
[CRUISE CONTROL SYSTEM]	01-01C
<b>MECHANICAL</b>	01-10
<b>LUBRICATION SYSTEM</b>	01-11
<b>COOLING SYSTEM</b>	01-12
<b>INTAKE-AIR SYSTEM</b>	01-13
<b>FUEL SYSTEM</b>	01-14

<b>EXHAUST SYSTEM</b> .....	01-15
<b>EMISSION SYSTEM</b> .....	01-16
<b>CHARGING SYSTEM</b> .....	01-17
<b>IGNITION SYSTEM</b> .....	01-18
<b>STARTING SYSTEM</b> .....	01-19
<b>CRUISE CONTROL SYSTEM</b> ..	01-20
<b>CONTROL SYSTEM</b> .....	01-40
<b>TECHNICAL DATA</b> .....	01-50
<b>SERVICE TOOLS</b> .....	01-60

## 01-01A TROUBLESHOOTING [ENGINE CONTROL]

<b>FOREWORD</b> .....	01-01A-2
<b>ENGINE ON-BOARD DIAGNOSIS</b> .....	01-01A-2
Descriptions .....	01-01A-2
Generic Functions .....	01-01A-2
Specific Functions .....	01-01A-2
Pending Trouble Codes .....	01-01A-2
Freeze Frame Data .....	01-01A-2
On-Board System Readiness Test ..	01-01A-2
Diagnostic Monitoring Test Results ..	01-01A-2
Read/Clear Diagnostic Test Results ..	01-01A-2
Parameter Identification (PID) Access	01-01A-2
Simulation Test .....	01-01A-3
Diagnostic Support Procedure .....	01-01A-3
On-Board Diagnostic Test .....	01-01A-3
OBD II Drive Mode Procedure .....	01-01A-11
Failure Indication Function .....	01-01A-15
Diagnostic Trouble Code	
Troubleshooting .....	01-01A-18
<b>ENGINE SYMPTOM</b>	
<b>TROUBLESHOOTING</b> .....	01-01A-97
Diagnostic Index .....	01-01A-97
Quick Diagnostic Chart .....	01-01A-99
Description of Drivability Problems ..	01-01A-101
Fuel Pressure Release and	
Servicing Fuel System .....	01-01A-101
Fuel Line Safety Procedures .....	01-01A-101
Symptom Troubleshooting .....	01-01A-102
<b>ENGINE DIAGNOSTIC INSPECTION</b> ..	01-01A-142
Spark Plug Condition Inspection	
Purpose .....	01-01A-142
Procedure .....	01-01A-142
Input Signal System Investigation	
Procedure .....	01-01A-145
Finding Unusual Signals .....	01-01A-145
Locating the Source of Unusual	
Signals .....	01-01A-145

Variable Resistance Type 1 (Throttle Position, Fuel Tank Pressure and Barometric Absolute Pressure Sensors) .....	01-01A-145
Variable Resistance Type 2 (Fuel Tank Level and Mass Airflow Sensors) .....	01-01A-145
Thermistor Type (Intake Air Temperature and Engine Coolant Temperature Sensors) .....	01-01A-146
Vehicle Speed Sensor .....	01-01A-146
Inspection Using an Oscilloscope (Reference) Purpose .....	01-01A-147
Fuel Tank Pressure, Graph Recording Procedure .....	01-01A-147
<b>ENGINE SYSTEM INSPECTION</b> .....	01-01A-149
Intake Manifold Vacuum Inspection ..	01-01A-149
BAC Valve Operation Inspection ..	01-01A-149
Idle Air Control Inspection .....	01-01A-149
VICS Operation Inspection .....	01-01A-150
Fuel Line Pressure Inspection .....	01-01A-151
Fuel Hold Pressure Inspection .....	01-01A-151
Fuel Pump Operation Inspection .....	01-01A-152
Fuel Pump Control Inspection .....	01-01A-152
Evaporative Emission Control System Inspection .....	01-01A-153
Purge Control Inspection .....	01-01A-156
EGR Control Inspection .....	01-01A-156
Main Relay Operation Inspection ..	01-01A-157
Ignition Timing Control Inspection ..	01-01A-157
A/C Cut Control Inspection .....	01-01A-157
Cooling Fan Control System Inspection .....	01-01A-158
Spark Test .....	01-01A-159
Fuel Injector Operation Inspection ..	01-01A-159
Fuel Cut Control Inspection .....	01-01A-160

# TROUBLESHOOTING [ENGINE CONTROL]

## FOREWORD

Before proceeding with the following troubleshooting,

- Refer to section GI to understand the basic troubleshooting procedure.
- Perform the diagnostic trouble code inspection.

X5U101W01

- If a diagnostic trouble code is displayed, proceed with inspection steps for the code.
- When the engine can be started, perform "ENGINE TUNE-UP".

X5U101W02

## ENGINE ON-BOARD DIAGNOSIS

### 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 manufacturer'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 manufacturers 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.

# TROUBLESHOOTING [ENGINE CONTROL]

## 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**.

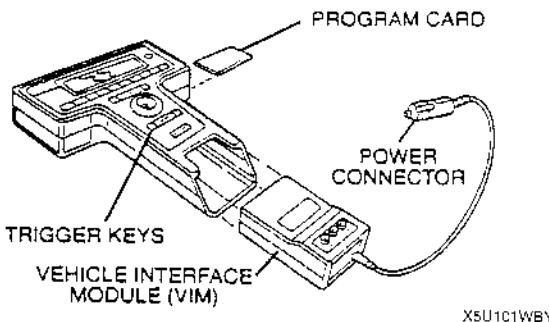
## On-Board Diagnostic Test

### New generation star (NGS) tester hook-up procedure

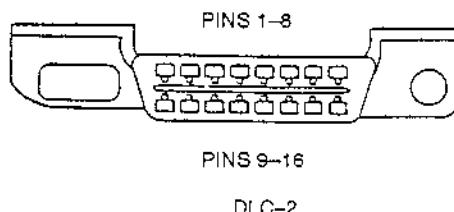
#### Note

- Make sure the ignition switch is off.

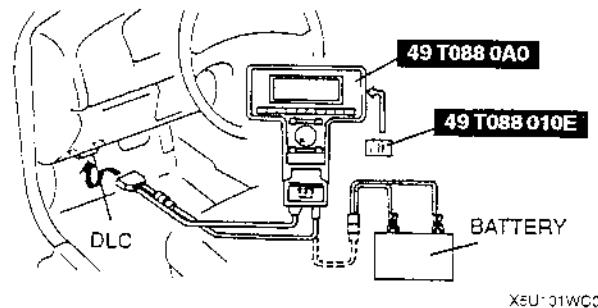
1. Insert the vehicle interface module and latest program card into the hand-held NGS control unit.



2. 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.



3. 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.



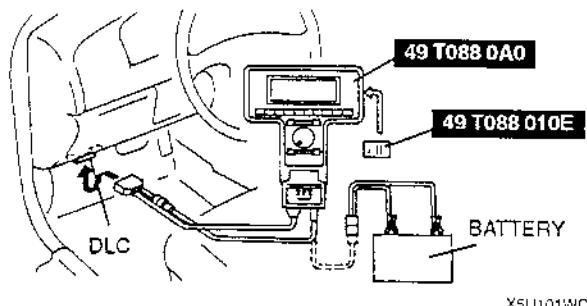
4. Listen for a double beep. The NGS tester is now initialized. Begin the powertrain control system functional test.

## DTCs reading procedure

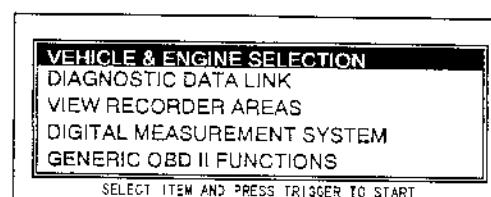
#### Note

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

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

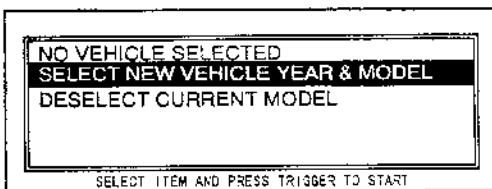


2. Move the cursor to **VEHICLE & ENGINE SELECTION**. Press the trigger key to enter this function.



## TROUBLESHOOTING [ENGINE CONTROL]

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



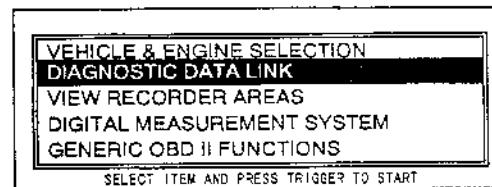
X5U101WC3

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**

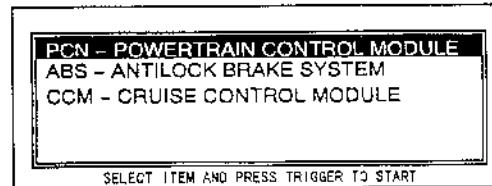
- Make sure the selected vehicle is correct.

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.



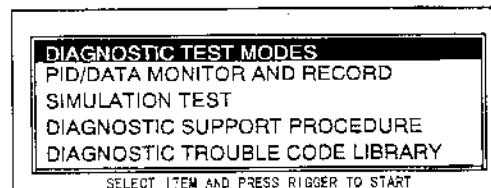
X5U101WC4

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



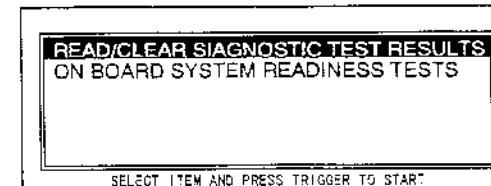
X5U101WC5

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

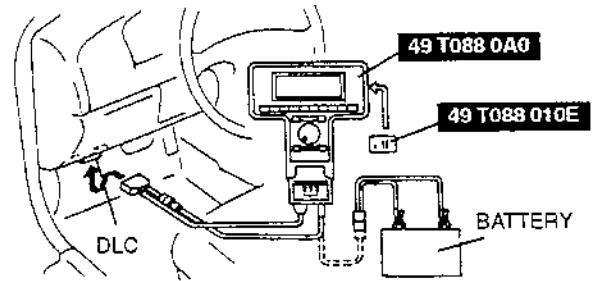
11. Press **START**.  
 12. Retrieve DTCs.

### 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.

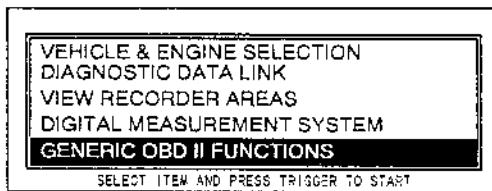
1. Perform the necessary vehicle preparation and visual inspection. Hook the NGS Tester up to the vehicle.



X5U101WC8

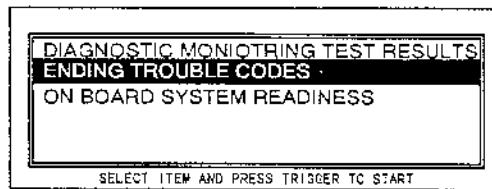
2. Move the cursor to **GENERIC OBDII FUNCTIONS**. Press the trigger key to enter this function.

# TROUBLESHOOTING [ENGINE CONTROL]



X5U101WC9

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

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

#### Note

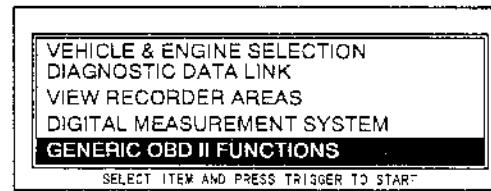
- If the "NO DTCS AVAILABLE/NO RESPONSE" message is shown on the screen, be sure to run the **PID DATA MONITOR** in **GENERIC OBDII FUNCTIONS** and confirm that the "LINK COMMUNICATION ERROR. MODULE NOT RESPONDING. CHECK IGNITION STATUS AND CABLE CONNECTIONS" message does not appear.

#### Freeze frame PID data access procedure

#### Note

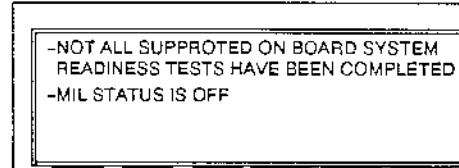
- This is a generic function.

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



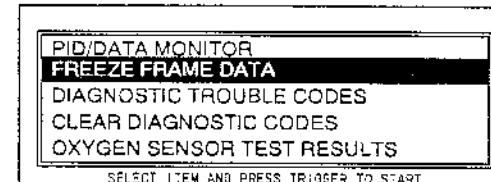
X5U101WCB

3. Press **CONT.**



X5U101WCC

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

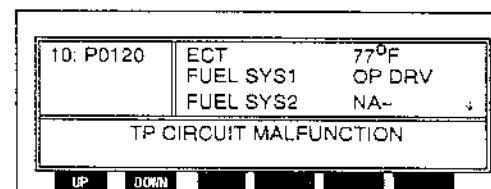


X5U101WCD

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

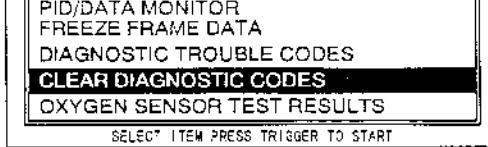
# TROUBLESHOOTING [ENGINE CONTROL]

## On-board system readiness tests access procedure

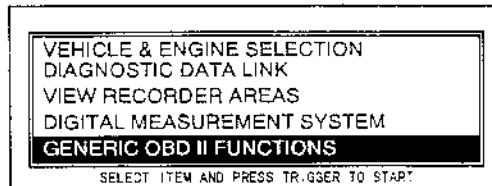
### Note

- This is a generic function.

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

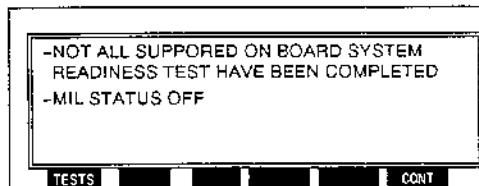


X5U101WCJ



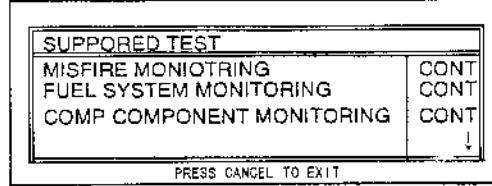
X5U101WCF

3. Press **TESTS**.



X5U101WCG

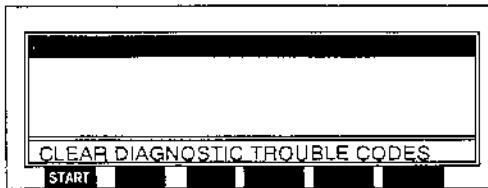
4. Monitor the OBD-II systems operating status.



X5U101WCH

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

- (5) Press **START**.



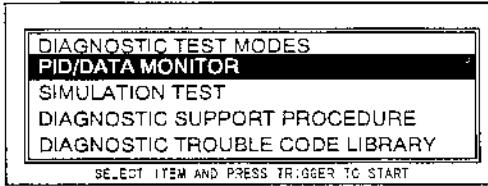
X5U101WCJ

## PID/DATA monitor and record procedure

### Note

- This is a specific function.

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



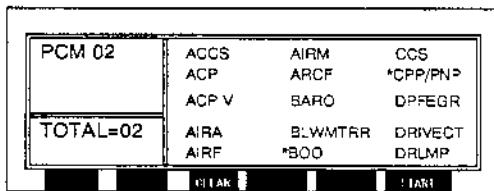
X5U101WCK

5. 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

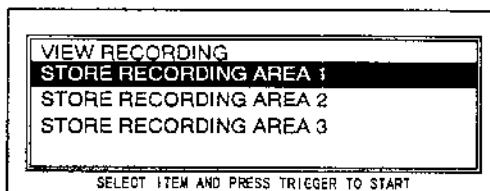
- Press the trigger key once again to deselect a PID.
- Press **CLEAR** to deselect all PIDs.

# TROUBLESHOOTING [ENGINE CONTROL]



X5U101WCL

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.



X5U101WCM

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.

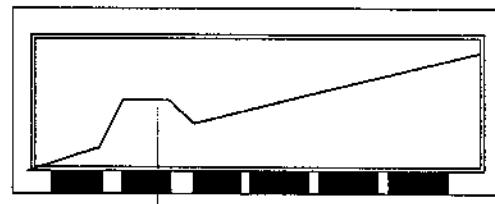
1. Select **VIEW RECORDER AREAS**.
2. Select a view area.
3. Select up to the four PIDs to review in the table format or two PIDs to review in the graph mode.
4. Table format: Scroll through the PID data while analyzing the information. Look for sudden drops or spikes in the values.

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	°F	%	G/S

SUDDEN SPIKE — POSSIBLE FAULT

X5U101WCN

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

## 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
<b>GENERIC OBD II FUNCTIONS</b>

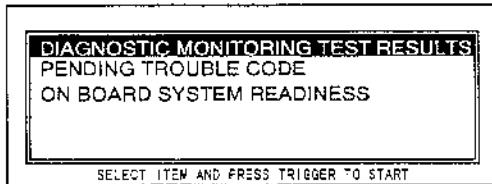
SELECT ITEM PRESS TRIGGER TO START

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.

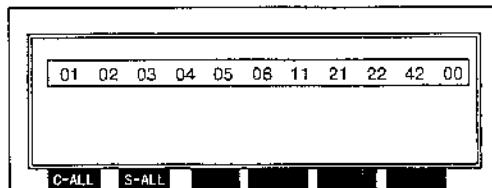
# TROUBLESHOOTING [ENGINE CONTROL]

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



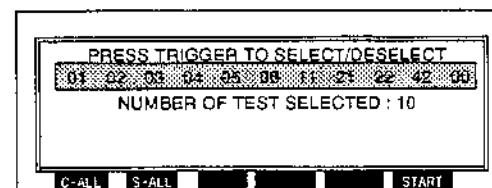
X5U101WCQ

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

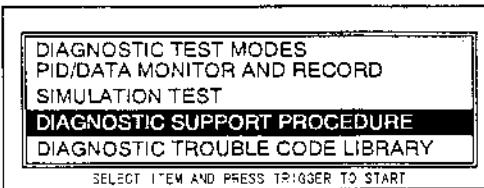
X5U101WCT

## Diagnostic support procedure

### Note

- This is a specific function.

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



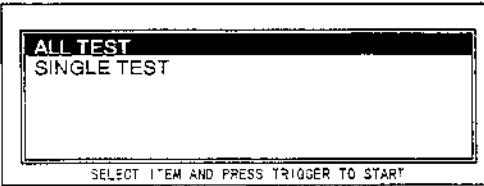
SELECT ITEM AND PRESS TRIGGER TO START

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.



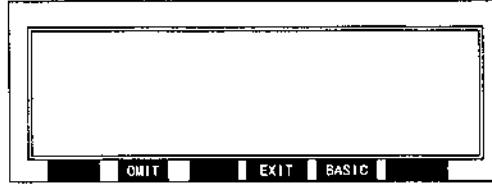
SELECT ITEM AND PRESS TRIGGER TO START

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.



X5U101WCV

# TROUBLESHOOTING [ENGINE CONTROL]

## Oxygen sensor test results access procedure

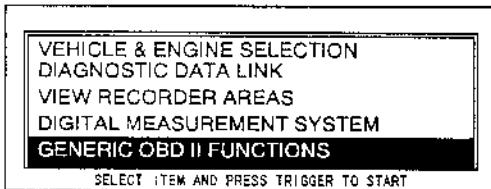
### Note

- 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 function.

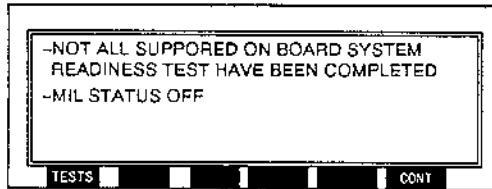
(1) RICH TO LEAN THRESHOLD VOLTAGE  
(2) LEAN TO RICH THRESHOLD VOLTAGE  
(3) LOW SENS VOLT FOR SW TIME CALC  
(4) HIGH SENS VOLT FOR SW TIME CALC  
(5) RICH TO LEAN SENS SWITCH TIME ↓  
SELECT ITEM AND PRESS TRIGGER TO START

01



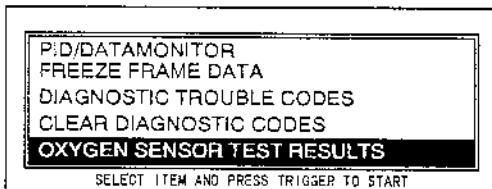
X5U101WCX

3. Press **CONT.**



X5U101WCY

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



X5U101WCZ

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

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			

X5U101WD0

6. Read voltage.

X5U101WD1

7. Press the cancel key.

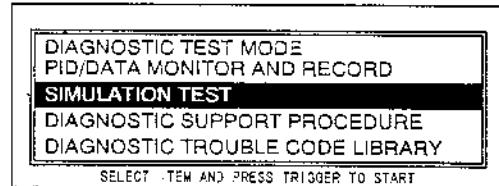
## Simulation test procedure

### Note

- This is a specific function.

### Idling test

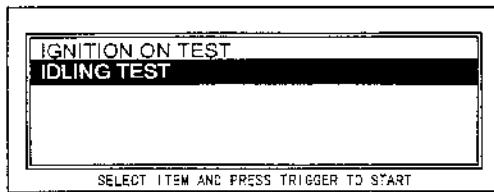
1. Perform the NGS tester hook-up procedure.
2. Perform steps 1 through 8 from the **DTCs Reading Procedure**.
3. Start the engine and run it at idle.
4. Move the cursor to **SIMULATION TEST**. Press the trigger key to enter this selection.



X5U101WD2

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

# TROUBLESHOOTING [ENGINE CONTROL]



X5U101WD3

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.

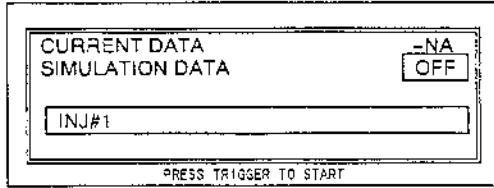
PCM 01	A/C RLY	FAN	INJ#2
	ALTF	FP RLY	INJ#3
	CCCV	IACV	INJ#4
TOTAL=02	CHRGMLP	INC	PROV
	EGRSP	INJ#1	PRGCHK

X5U101WD4

7. Press **START**.

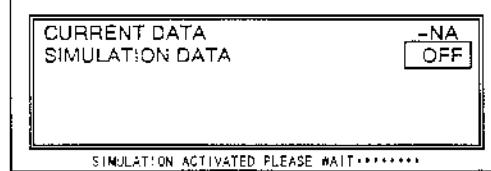
**Note**

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



X5U101WD5

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.

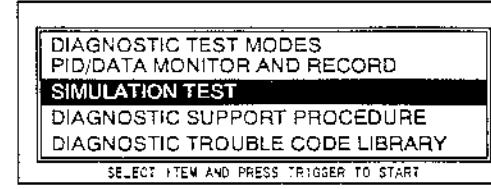


X5U101WD6

10. To perform the simulation again, press the trigger key. To exit the idling test, press the cancel key.

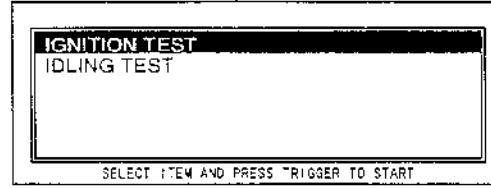
**Ignition on test**

1. Perform steps 1 through 8 from the **DTCs Reading Procedure**.
2. Turn ignition switch on. Move the cursor to **SIMULATION TEST**. Press the trigger key to enter this selection.



X5U101WD7

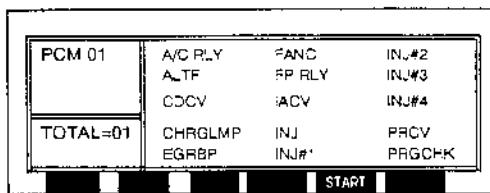
3. Move the cursor to **IGNITION ON TEST**. Press the trigger key to enter this selection.



X5U101WD8

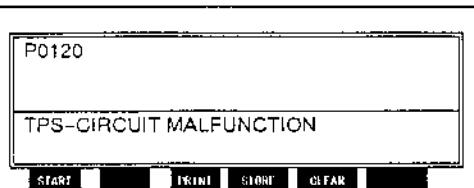
4. The screen will display a list of PIDs. Select the appropriate PID for testing, then press trigger.

# TROUBLESHOOTING [ENGINE CONTROL]



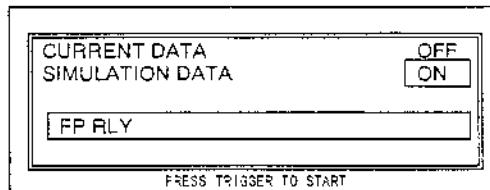
X5U101WD9

5. Press **START**.



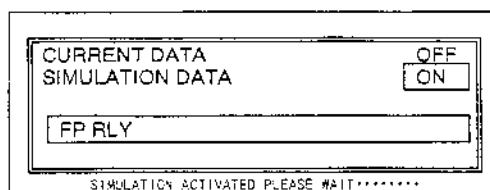
X5U101WDD

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



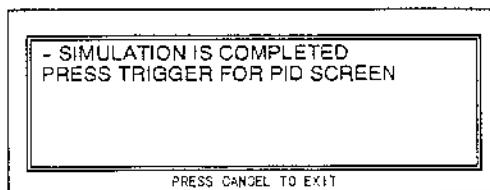
X5U1C1WDA

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.



X5U101WDB

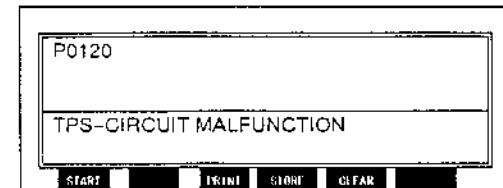
8. To perform the simulation again, press the trigger key. To exit the ignition on test, press the cancel key.



X5U101WDC

## After repair procedure

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



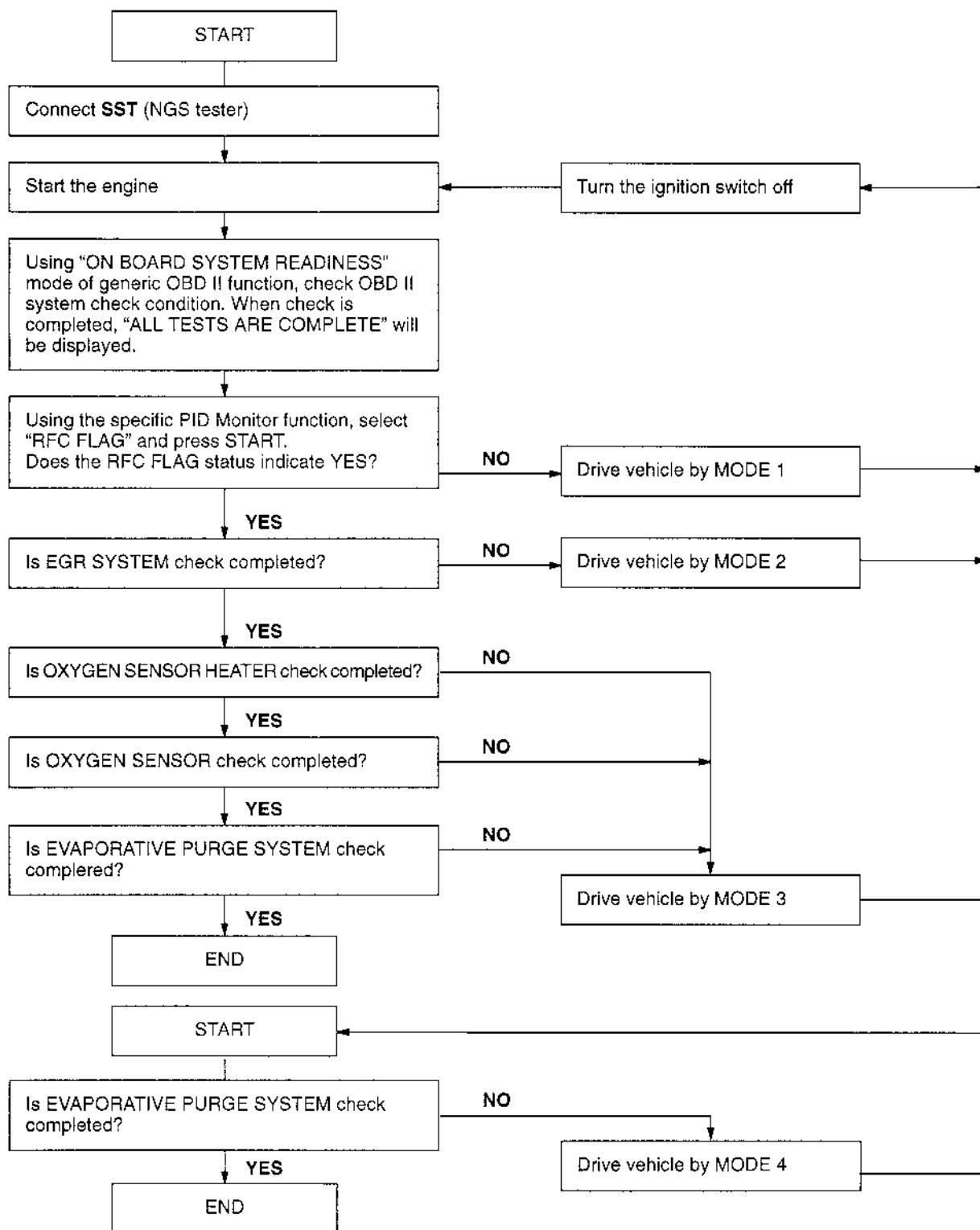
X5U101WDD

## 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.

# TROUBLESHOOTING [ENGINE CONTROL]



X6U101WA2

## 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.

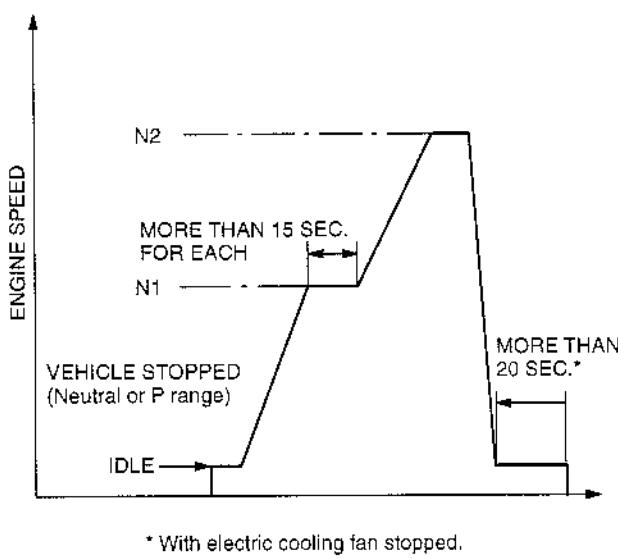
6. Carry out no-load racing at the specified speed for each model. Race the engine for more than 15 seconds at each time. Refer to the following engine speed table for engine speed.

**Engine speed table**

N1 (rpm)	N2 (rpm)
1800—2200	3000—3400

# TROUBLESHOOTING [ENGINE CONTROL]

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



## 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.
- 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)

### Note

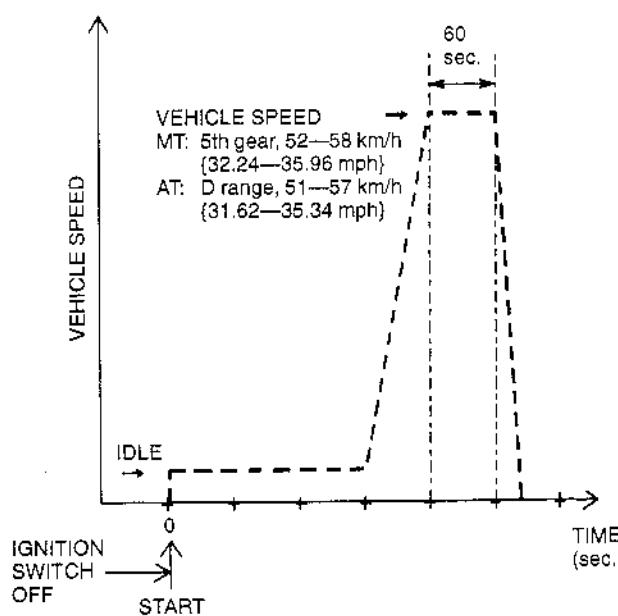
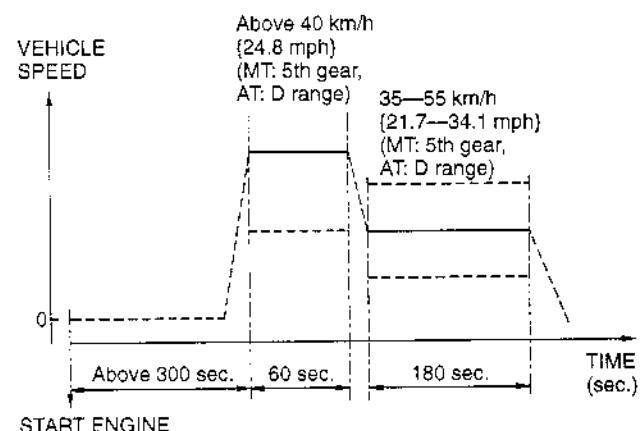
- Driving mode before the constant speed driving is not specified.

## 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

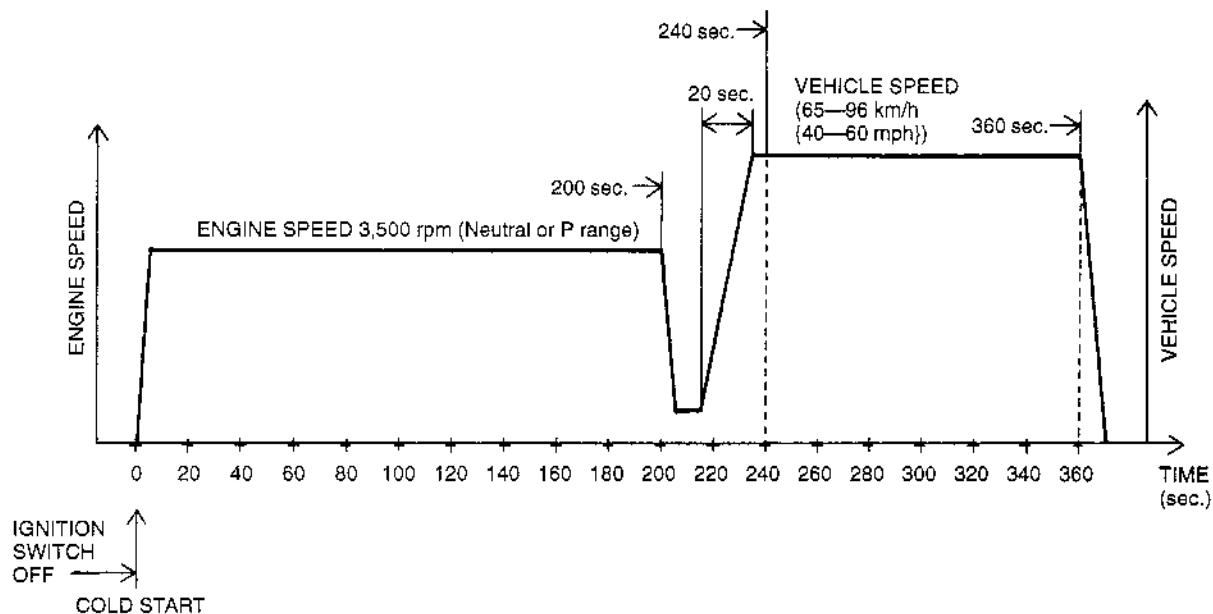
- Driving mode before the constant speed driving is not specified.



# TROUBLESHOOTING [ENGINE CONTROL]

## 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	*4 Other	×
P1450	Evaporative emission control system malfunction	ON	2	CCM	○
P1487	EGR boost sensor solenoid valve open or short	OFF	*1	*4 Other	×
P1496	EGR valve motor coil 1 open or short	OFF	*1	*4 Other	×
P1497	EGR valve motor coil 2 open or short	OFF	*1	*4 Other	×
P1498	EGR valve motor coil 3 open or short	OFF	*1	*4 Other	×
P1499	EGR valve motor coil 4 open or short	OFF	*1	*4 Other	×
P1504	Idle air control circuit malfunction	ON	1	CCM	○
P1523	VICS circuit malfunction	OFF	*1	*4 Other	×
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	*4 Other	×
P1609	PCM internal circuit malfunction (Knock sensor circuit)	OFF	1	*4 Other	○
P1631	Generator output voltage signal no electricity	OFF	1	*4 Other	○
P1632	Battery voltage monitor signal circuit malfunction	OFF	1	*4 Other	○
P1633	Battery overcharge	OFF	1	*4 Other	○
P1634	Generator terminal B circuit open	OFF	1	*4 Other	○
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.

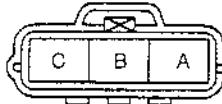
\*2 : CALIFORNIA emission regulations applicable model.

\*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]

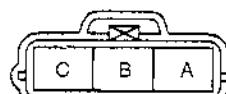
## Diagnostic Trouble Code Troubleshooting

DTC P0102 Mass air flow circuit low input		
DETECTION CONDITION	<ul style="list-style-type: none"> <li>Input voltage from mass air flow sensor is below 0.86 V when time from engine started is 3 seconds</li> </ul>	
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.
 <b>Harness Side Connector (View from Terminal Connector)</b>		X5U101WDE

DTC P0103 Mass air flow circuit high input		
DETECTION CONDITION	<ul style="list-style-type: none"> <li>Input voltage from mass air flow sensor is above 4.9 V when time from engine started is 3 seconds</li> </ul>	
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.



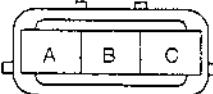
Harness side connector  
(view from terminal connector)

X5U-31WDF

DTC P0106		Barometric pressure circuit performance problem			
DETECTION CONDITION	<ul style="list-style-type: none"> <li>Barometric pressure variation in specified condition is less than 4.45 kPa {33.4 mmHg, 1.31 inHg}</li> </ul>				
POSSIBLE CAUSE	<ul style="list-style-type: none"> <li>EGR boost sensor malfunction</li> <li>EGR boost sensor vacuum hose loosed, damaged and clogged</li> <li>EGR boost sensor solenoid valve malfunction</li> <li>Open or short circuit in wiring from EGR boost sensor terminal B to PCM terminal 3S</li> <li>Open or short circuit in wiring from EGR boost sensor terminal C to PCM terminal 2I</li> <li>Open or short circuit in wiring from EGR boost sensor terminal A to PCM terminal 3F</li> <li>Open or short circuit in wiring from EGR boost sensor solenoid valve terminal A to main relay terminal D</li> <li>Open or short circuit in wiring from EGR boost sensor solenoid valve terminal B to PCM terminal 3T</li> </ul>				
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? <input checked="" type="checkbox"/> 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 10 (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.



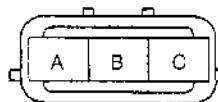
HARNESS SIDE CONNECTOR  
(VIEW FROM TERMINAL CONNECTOR)

X8U1C-WDG

DTC P0107		Barometric pressure circuit low input			
DETECTION CONDITION	<ul style="list-style-type: none"> <li>Input voltage from EGR boost sensor is below 0.2 V</li> </ul>				
POSSIBLE CAUSE	<ul style="list-style-type: none"> <li>EGR boost sensor malfunction</li> <li>Open or short circuit in wiring from EGR boost sensor terminal B to PCM terminal 3S</li> <li>Open or short circuit in wiring from EGR boost sensor terminal C to PCM terminal 2I</li> <li>Short circuit in wiring from EGR boost sensor terminal A to PCM terminal 3F</li> </ul>				
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]

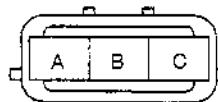
STEP	INSPECTION	ACTION	
9	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code after performing "After Repair Procedure"?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.



HARNESS SIDE CONNECTOR  
(VIEW FROM TERMINAL CONNECTOR)

X5U101W0H

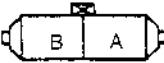
DTC P0108   Barometric pressure circuit high input					
DETECTION CONDITION	POSSIBLE CAUSE				
	<ul style="list-style-type: none"> <li>Input voltage from EGR boost sensor (Barometric pressure) is above 4.79 V</li> </ul>				
	<ul style="list-style-type: none"> <li>EGR boost sensor malfunction</li> <li>Short circuit in wiring from EGR boost sensor terminal B to PCM terminal 3S</li> <li>Short circuit in wiring from EGR boost sensor terminal C to PCM terminal 2I</li> <li>Open circuit in wiring from EGR boost sensor terminal A to PCM terminal 3F</li> </ul>				
STEP	INSPECTION				
1	Has FREEZE FRAME PID DATA been recorded?				
	<table border="1"> <tr> <td>Yes</td><td>Go to next step.</td></tr> <tr> <td>No</td><td>Record FREEZE FRAME PID DATA on repair order, then go to next step.</td></tr> </table>	Yes	Go to next step.	No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
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?				
	<table border="1"> <tr> <td>Yes</td><td>Repair or replace connector, then go to step 9.</td></tr> <tr> <td>No</td><td>Go to next step.</td></tr> </table>	Yes	Repair or replace connector, then go to step 9.	No	Go to next step.
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.				
	<table border="1"> <tr> <td>Yes</td><td>Go to step 9.</td></tr> <tr> <td>No</td><td>Go to next step.</td></tr> </table>	Yes	Go to step 9.	No	Go to next step.
Yes	Go to step 9.				
No	Go to next step.				
4	Disconnect EGR boost sensor connector. Is there 5 V at connector terminal C?				
	<table border="1"> <tr> <td>Yes</td><td>Go to next step.</td></tr> <tr> <td>No</td><td>Check for short circuit in wiring harness, then go to step 9. (PCM terminal 2I — EGR boost sensor terminal C)</td></tr> </table>	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)
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?				
	<table border="1"> <tr> <td>Yes</td><td>Go to next step.</td></tr> <tr> <td>No</td><td>Repair or replace wiring harness, then go to step 9.</td></tr> </table>	Yes	Go to next step.	No	Repair or replace wiring harness, then go to step 9.
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?				
	<table border="1"> <tr> <td>Yes</td><td>Go to next step.</td></tr> <tr> <td>No</td><td>Repair or replace wiring harness, then go to step 9.</td></tr> </table>	Yes	Go to next step.	No	Repair or replace wiring harness, then go to step 9.
Yes	Go to next step.				
No	Repair or replace wiring harness, then go to step 9.				
7	Is EGR boost sensor okay? <input checked="" type="checkbox"/> 01-40 EGR BOOST SENSOR INSPECTION				
	<table border="1"> <tr> <td>Yes</td><td>Go to next step.</td></tr> <tr> <td>No</td><td>Replace EGR boost sensor, then go to step 9.</td></tr> </table>	Yes	Go to next step.	No	Replace EGR boost sensor, then go to step 9.
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"?				
	<table border="1"> <tr> <td>Yes</td><td>Get assistance from Technical Hotline/your distributor, then replace PCM if necessary.</td></tr> <tr> <td>No</td><td>Intermittent poor connection in harness or connector. Repair connector and/or harness, then go to next step.</td></tr> </table>	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.
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"?				
	<table border="1"> <tr> <td>Yes</td><td>Go to applicable DTC inspection.</td></tr> <tr> <td>No</td><td>Troubleshooting completed.</td></tr> </table>	Yes	Go to applicable DTC inspection.	No	Troubleshooting completed.
Yes	Go to applicable DTC inspection.				
No	Troubleshooting completed.				



HARNESS SIDE CONNECTOR  
(VIEW FROM TERMINAL CONNECTOR)

X5U101W0I

# TROUBLESHOOTING [ENGINE CONTROL]

<b>DTC P0111</b>		Intake air temperature circuit performance problem	
<b>DETECTION CONDITION</b>		<ul style="list-style-type: none"> <li>Intake air temperature is higher than engine coolant temperature by 40 °C (104 °F)</li> </ul>	
<b>POSSIBLE CAUSE</b>		<ul style="list-style-type: none"> <li>Intake air temperature sensor malfunction or substandard performance</li> <li>Engine coolant temperature sensor malfunction or substandard performance</li> <li>Open or short circuit in wiring from intake air temperature sensor terminal B to PCM terminal 2B</li> <li>Open or short circuit in wiring from engine coolant temperature sensor terminal A to PCM terminal 2E</li> <li>Open circuit in wiring from intake air temperature sensor terminal A to PCM terminal 3F</li> <li>Open circuit in wiring from engine coolant temperature sensor terminal B to PCM terminal 3F</li> </ul>	
<b>STEP</b>		<b>INSPECTION</b>	
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.
 <b>Harness Side Connector (View from Terminal Connector)</b>			

<b>DTC P0112</b>		Intake air temperature circuit low input	
<b>DETECTION CONDITION</b>		<ul style="list-style-type: none"> <li>Input voltage from intake air temperature sensor is below 0.16 V when engine is started</li> </ul>	
<b>POSSIBLE CAUSE</b>		<ul style="list-style-type: none"> <li>Intake air temperature sensor malfunction</li> <li>Short circuit in wiring from intake air temperature sensor terminal B to PCM terminal 2B</li> <li>Short circuit in wiring from intake air temperature sensor terminal A to PCM terminal 3F</li> </ul>	
<b>STEP</b>		<b>INSPECTION</b>	
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? <b>☞ 01-40 INTAKE AIR TEMPERATURE SENSOR INSPECTION</b>	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)

X5U101WDJ

DTC P0113		Intake air temperature circuit high input			
DETECTION CONDITION	<ul style="list-style-type: none"> <li>Input voltage from intake air temperature sensor is above 4.84 V when engine is started</li> </ul>				
POSSIBLE CAUSE	<ul style="list-style-type: none"> <li>Intake air temperature sensor malfunction</li> <li>Open circuit in wiring from intake air temperature sensor terminal A to ECM terminal 3F</li> <li>Open circuit in wiring from intake air temperature sensor terminal B to ECM terminal 2B</li> </ul>				
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? <b>☞ 01-40 INTAKE AIR TEMPERATURE SENSOR INSPECTION</b>		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]

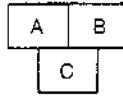
STEP	INSPECTION		ACTION
8	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.



HARNESS SIDE CONNECTOR  
(VIEW FROM TERMINAL CONNECTOR)

X5U101WDK

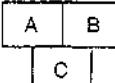
DTC P0117 Engine coolant temperature circuit low input		
DETECTION CONDITION	POSSIBLE CAUSE	
	<ul style="list-style-type: none"> <li>Input voltage from engine coolant temperature sensor is below 0.2 V when ignition switch is turned ON</li> <li>Engine coolant temperature sensor malfunction</li> <li>Short circuit in wiring from engine coolant temperature sensor terminal A to PCM terminal 2E</li> <li>Short circuit in wiring from engine coolant temperature sensor terminal B to PCM terminal 3F</li> </ul>	
STEP	INSPECTION	
1 Has FREEZE FRAME PID DATA been recorded?		
1	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?		
2	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?		
3	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?		
4	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?		
5	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		
6	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"?		
7	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"?		
8	Yes	Go to applicable DTC inspection.
	No	Troubleshooting completed.



HARNESS SIDE CONNECTOR  
(VIEW FROM TERMINAL CONNECTOR)

X5U101WDL

## TROUBLESHOOTING [ENGINE CONTROL]

<b>DTC P0118</b>		Engine coolant temperature circuit high input			
<b>DETECTION CONDITION</b>	<ul style="list-style-type: none"> <li>Input voltage from engine coolant temperature sensor is above 4.9 V when ignition switch is turned ON</li> </ul>				
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>Engine coolant temperature sensor malfunction</li> <li>Open circuit in wiring from engine coolant temperature sensor terminal A to PCM terminal 2E</li> <li>Open circuit in wiring from engine coolant temperature sensor terminal B to PCM terminal 3F</li> </ul>				
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.		
 <b>Harness Side Connector (View from Terminal Connector)</b>					
X5U101WDM					

<b>DTC P0122</b>		Throttle position circuit low input			
<b>DETECTION CONDITION</b>	<ul style="list-style-type: none"> <li>Input voltage from throttle position sensor is below 0.1 V when ignition switch is turned ON</li> </ul>				
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>Throttle position sensor malfunction</li> <li>Open or short circuit in wiring from throttle position sensor terminal A to PCM terminal 2I</li> <li>Short circuit in wiring from throttle position sensor terminal C to PCM terminal 3E</li> </ul>				
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 21 — 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

X5U101:WDN

DTC	P0123	Throttle position circuit high input		
DETECTION CONDITION		<ul style="list-style-type: none"> <li>Input voltage from throttle position sensor is above 4.8 V when ignition switch is turned ON</li> <li>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}</li> <li>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 q/sec {0.0865 oz/sec}</li> </ul>		
POSSIBLE CAUSE		<ul style="list-style-type: none"> <li>Throttle position sensor malfunction</li> <li>Open circuit in wiring from throttle position sensor terminal B to PCM terminal 3F</li> <li>Open circuit in wiring from throttle position sensor terminal C to PCM terminal 3E</li> <li>Mass air flow sensor malfunction</li> </ul>		
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? <input checked="" type="checkbox"/> 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

X5U101WDD

DTC P0125 Excessive fuel control time to enter closed loop					
DETECTION CONDITION	POSSIBLE CAUSE				
	<ul style="list-style-type: none"> <li>Engine coolant temperature will not increase after engine is started and certain period of time is passed</li> </ul>				
	<ul style="list-style-type: none"> <li>Engine coolant temperature sensor malfunction</li> <li>Thermostat malfunction</li> <li>Engine coolant fan system malfunction</li> <li>Water pump malfunction</li> <li>Engine coolant passage clogged or leaks</li> <li>Engine coolant level and protection incorrect</li> </ul>				
STEP	INSPECTION				
1	Have FREEZE FRAME PID DATA been recorded?				
	<table border="0"> <tr> <td>Yes</td><td>Go to next step.</td></tr> <tr> <td>No</td><td>Record FREEZE FRAME PID DATA on repair order, then go to next step.</td></tr> </table>	Yes	Go to next step.	No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
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				
	<table border="0"> <tr> <td>Yes</td><td>Go to next step.</td></tr> <tr> <td>No</td><td>Repair or replace engine coolant fan system.</td></tr> </table>	Yes	Go to next step.	No	Repair or replace engine coolant fan system.
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				
	<table border="0"> <tr> <td>Yes</td><td>Go to next step.</td></tr> <tr> <td>No</td><td>Replace engine coolant temperature sensor.</td></tr> </table>	Yes	Go to next step.	No	Replace engine coolant temperature sensor.
Yes	Go to next step.				
No	Replace engine coolant temperature sensor.				
4	Is cooling system okay?				
	<table border="0"> <tr> <td>Yes</td><td>Go to next step.</td></tr> <tr> <td>No</td><td>Repair or replace.</td></tr> </table>	Yes	Go to next step.	No	Repair or replace.
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"?				
	<table border="0"> <tr> <td>Yes</td><td>Get assistance from Technical Hotline/your distributor, then replace PCM if necessary.</td></tr> <tr> <td>No</td><td>Intermittent poor connection in harness or connector. Repair connector and/or harness, then go to next step.</td></tr> </table>	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.
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"?				
	<table border="0"> <tr> <td>Yes</td><td>Go to applicable DTC inspection.</td></tr> <tr> <td>No</td><td>Troubleshooting completed.</td></tr> </table>	Yes	Go to applicable DTC inspection.	No	Troubleshooting completed.
Yes	Go to applicable DTC inspection.				
No	Troubleshooting completed.				

## TROUBLESHOOTING [ENGINE CONTROL]

<b>DTC P0130</b>		Front heated oxygen sensor circuit malfunction	
<b>DETECTION CONDITION</b>	<p>Heated oxygen sensor (front) signal inveres at intervals of 2.67 sec. (MT), 2.90 sec. (AT) or longer while driving in following conditions:</p> <ul style="list-style-type: none"> <li>• Engine speed 750—3,090 rpm (MT), 810—3,090 rpm (AT)</li> <li>• Vehicle speed over 5.6 km/h (3.5 MPH)</li> <li>• Engine speed variation in 0.51 sec. is less than 670 rpm (MT), 580 rpm (AT)</li> <li>• Charging efficiency variation in 0.51 sec. is less than 50% (MT), 16% (AT)</li> <li>• Input voltage from throttle position sensor variation in 0.51 sec. is less than 0.31 V (MT), 0.16 V (AT)</li> </ul>		
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>• Heated oxygen sensor (front) deterioration</li> <li>• Heated oxygen sensor heater (front) malfunction</li> <li>• Fuel injector malfunction</li> <li>• Pressure regulator malfunction</li> <li>• Pulsation damper malfunction</li> <li>• Fuel pump malfunction</li> <li>• Fuel filter clogged</li> <li>• Fuel delivery hose clogged or leaking</li> <li>• Fuel return hose clogged</li> <li>• Leakage intake-air system</li> <li>• Leakage exhaust system</li> <li>• Positive crankcase ventilation valve malfunction</li> <li>• Purge solenoid valve malfunction</li> <li>• Purge solenoid hoses hooked up incorrectly</li> <li>• Ignition coil malfunction</li> <li>• Ignition control module malfunction</li> <li>• Insufficient compression</li> <li>• Mass air flow sensor malfunction</li> <li>• Engine coolant temperature sensor malfunction</li> <li>• Throttle position sensor malfunction</li> <li>• Vehicle speed sensor malfunction</li> <li>• EGR system malfunction</li> <li>• Open or short circuit in wiring harness</li> <li>• Poor connection of connector</li> <li>• Vacuum hoses damaged or loose</li> </ul>		
<b>Warning</b> The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: <ul style="list-style-type: none"> <li>• Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.</li> <li>• 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.</li> </ul>			
<span style="font-size: small;">⇒ 01-14 BEFORE REPAIR PROCEDURE</span> <span style="font-size: small;">⇒ 01-14 AFTER REPAIR PROCEDURE</span>			
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.
		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.
		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.
		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.
		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.
		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.
		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.
		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: <ul style="list-style-type: none"> <li>● From air cleaner to throttle body</li> <li>● From throttle body to dynamic chamber</li> <li>● From dynamic chamber to intake manifold</li> </ul> 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. <span style="margin-left: 2em;">☞ 01-01A ENGINE SYSTEM INSPECTION, Fuel Line Pressure Inspection</span> Is fuel line pressure okay?	Yes Go to step 27.
		No Go to next step.
21	Inspect fuel pump maximum pressure. <span style="margin-left: 2em;">☞ 01-14 FUEL PUMP INSPECTION, Fuel Pump Maximum Pressure</span> 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. <span style="margin-left: 2em;">☞ 01-18 IGNITION COIL INSPECTION</span> Is it okay?	Yes Go to next step.
		No Replace ignition coil, then go to step 33.
29	Inspect ignition control module. <span style="margin-left: 2em;">☞ 01-18 IGNITION CONTROL MODULE INSPECTION</span> 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. <span style="margin-left: 2em;">☞ 01-01A ENGINE SYSTEM INSPECTION, EGR Control Inspection</span> 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?  <b>Note</b> • 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.  <b>Note</b> <ul style="list-style-type: none"><li>• If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.</li></ul>
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"> <li>• Heated oxygen sensor (front) malfunction</li> <li>• Heated oxygen sensor heater (front) malfunction</li> <li>• Open or short circuit in wiring harness</li> <li>• Poor connection of connector</li> <li>• Fuel injector malfunction</li> <li>• Pressure regulator malfunction</li> <li>• Pulsation damper malfunction</li> <li>• Fuel pump malfunction</li> <li>• Fuel filter clogged</li> <li>• Fuel delivery hose clogged or leaking</li> <li>• Leakage intake-air system</li> <li>• Leakage exhaust system</li> <li>• Ignition coil malfunction</li> <li>• Ignition control module malfunction</li> <li>• Insufficient compression</li> <li>• Mass air flow sensor malfunction</li> <li>• Engine coolant temperature sensor malfunction</li> <li>• Throttle position sensor malfunction</li> <li>• EGR system malfunction</li> <li>• Vacuum hoses damaged or loose</li> </ul> <p><b>Warning</b>  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"> <li>• Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.</li> <li>• 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.</li> </ul> <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)? <ul style="list-style-type: none"><li>• More than 0.45 V when suddenly accelerator pedal: rich condition</li><li>• Less than 0.45 V during fuel cut: lean condition</li></ul>	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): <ul style="list-style-type: none"><li>• From main relay to fuel injector</li><li>• From fuel injector to PCM</li></ul> 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 <ul style="list-style-type: none"><li>• From air cleaner to throttle body</li><li>• From throttle body to dynamic chamber</li><li>• From dynamic chamber to intake manifold</li></ul> 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.

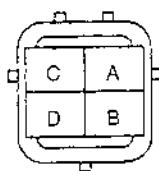
## TROUBLESHOOTING [ENGINE CONTROL]

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?  <b>Note</b> <ul style="list-style-type: none"><li>Large bubbles are normal since they are remaining air coming out from engine coolant passage.</li></ul>	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.  <b>Note</b> <ul style="list-style-type: none"><li>If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.</li></ul>
		No	Troubleshooting completed.

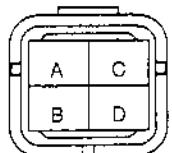
# TROUBLESHOOTING [ENGINE CONTROL]

<b>DTC P0138</b>		Rear heated oxygen sensor circuit high input			
<b>DETECTION CONDITION</b>	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.				
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>• Short circuit in Heated oxygen sensor (rear) wiring harness</li> </ul>				
STEP	INSPECTION		ACTION		
1	Has FREEZE FRAME PID DATA been recorded?		<p>Yes      Go to next step.</p> <p>No      Record FREEZE FRAME PID DATA on repair order, then go to next step.</p>		
	Is DTC P0138 on FREEZE FRAME PID DATA?		<p>Yes      Go to next step.</p> <p>No      Inspect or repair DTC on FREEZE FRAME PID DATA, then go to step 5.</p>		
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?		<p>Yes      Trouble is process. Go to next step.</p> <p>No      Go to "01-01A ENGINE SYSTEM TROUBLESHOOTING, INTERMITTENT CONCERN".</p>		
	4      Disconnect the heated oxygen sensor (rear) and PCM connectors. Check if there is continuity between the following terminals: <ul style="list-style-type: none"> <li>• heated oxygen sensor (rear) terminal A and B</li> <li>• heated oxygen sensor (rear) vehicle harness side connector terminal A and B</li> <li>• heated oxygen sensor (rear) terminal C and D</li> <li>• heated oxygen sensor (rear) vehicle harness side connector terminal C and D</li> </ul> Is it okay?		<p>Yes      Go to next step.</p> <p>No      Repair or replace faulty heated oxygen sensor (rear), harness, connector or terminal, then go to next step.</p>		
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?		<p>Yes      Go to applicable DTC inspection.</p> <p><b>Note</b></p> <ul style="list-style-type: none"> <li>• If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.</li> </ul> <p>No      Troubleshooting completed.</p>		

\*1 (REAR)



\*2 (REAR)



SENSOR SIDE CONNECTOR  
(VIEW FROM TERMINAL CONNECTOR)

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"> <li>• Heated oxygen sensor (rear) malfunction</li> <li>• Heated oxygen sensor heater (rear) malfunction</li> <li>• Fuel injector malfunction</li> <li>• Pressure regulator malfunction</li> <li>• Pulsation damper malfunction</li> <li>• Fuel pump malfunction</li> <li>• Fuel filter clogged</li> <li>• Fuel delivery hose clogged or leaking</li> <li>• Leakage intake-air system</li> <li>• Leakage exhaust system</li> <li>• Ignition coil malfunction</li> <li>• Ignition control module malfunction</li> <li>• Insufficient compression</li> <li>• Mass air flow sensor malfunction</li> <li>• Engine coolant temperature sensor malfunction</li> <li>• Throttle position sensor malfunction</li> <li>• EGR system malfunction</li> <li>• Open or short circuit in wiring harness</li> <li>• Poor connection of connector</li> <li>• Vacuum hoses damaged or loose</li> </ul> <p><b>Warning</b>  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"> <li>• Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.</li> <li>• 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.</li> </ul> <p style="margin-left: 20px;"><input type="checkbox"/> 01-14 BEFORE REPAIR PROCEDURE  <input type="checkbox"/> 01-14 AFTER REPAIR PROCEDURE</p>					
STEP	INSPECTION	ACTION				
1	Has FREEZE FRAME PID DATA been recorded?	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Yes</td><td>Go to next step.</td></tr> <tr> <td>No</td><td>Record FREEZE FRAME PID DATA on repair order, then go to next step.</td></tr> </table>	Yes	Go to next step.	No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
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?	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Yes</td><td>Inspect and repair DTC P0102, P0103, P0117, P0118, P0500, P1102, P1103, P1496, P1497, P1498 or P1499, then go to step 29.</td></tr> <tr> <td>No</td><td>Go to next step.</td></tr> </table>	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.
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?	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Yes</td><td>Go to next step.</td></tr> <tr> <td>No</td><td>Inspect and repair DTC on FREEZE FRAME PID DATA, then go to step 29.</td></tr> </table>	Yes	Go to next step.	No	Inspect and repair DTC on FREEZE FRAME PID DATA, then go to step 29.
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?	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Yes</td><td>Inspect and repair P0134 on DTC, then go to step 29.</td></tr> <tr> <td>No</td><td>Go to next step.</td></tr> </table>	Yes	Inspect and repair P0134 on DTC, then go to step 29.	No	Go to next step.
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?	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Yes</td><td>Trouble is in process. Go to next step.</td></tr> <tr> <td>No</td><td>Go to "01-01A ENGINE SYMPTOM TROUBLESHOOTING, INTERMITTENT CONCERNS".</td></tr> </table>	Yes	Trouble is in process. Go to next step.	No	Go to "01-01A ENGINE SYMPTOM TROUBLESHOOTING, INTERMITTENT CONCERNS".
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?	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Yes</td><td>Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 29.</td></tr> <tr> <td>No</td><td>Go to next step.</td></tr> </table>	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.
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?	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Yes</td><td>Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 29.</td></tr> <tr> <td>No</td><td>Go to next step.</td></tr> </table>	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.
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?  <b>Note</b> <ul style="list-style-type: none"><li>• Large bubbles are normal since they are remaining air coming out from engine coolant passage.</li></ul>	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.  <b>Note</b> <ul style="list-style-type: none"><li>• If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.</li></ul>
		No Troubleshooting completed.

## TROUBLESHOOTING [ENGINE CONTROL]

<b>DTC P0171</b>   Fuel trim system too lean			
<b>DETECTION CONDITION</b>	Fuel injection closed loop correction and learning correction are above the specified value because of system too lean		
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>• Fuel injector malfunction</li> <li>• Fuel pump malfunction</li> <li>• Fuel filter clogged</li> <li>• Fuel delivery hose clogged or leaking</li> <li>• Pressure regulator malfunction</li> <li>• Pulsation damper malfunction</li> <li>• Ignition coil malfunction</li> <li>• Ignition control module malfunction</li> <li>• High-tension lead malfunction</li> <li>• Spark plug malfunction</li> <li>• Leakage in intake-air system</li> <li>• Leakage exhaust system</li> <li>• Insufficient compression</li> <li>• Mass air flow sensor malfunction</li> <li>• Engine coolant temperature sensor malfunction</li> <li>• Throttle position sensor malfunction</li> <li>• Heated oxygen sensor (front) malfunction</li> <li>• Open or short circuit in wiring harness</li> <li>• Poor connection of connector</li> <li>• Vacuum hoses damaged or loose</li> </ul> <p><b>Warning</b> 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"> <li>• Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.</li> <li>• 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.</li> </ul> <p style="margin-left: 20px;"><input checked="" type="checkbox"/> 01-14 BEFORE REPAIR PROCEDURE  <input checked="" type="checkbox"/> 01-14 AFTER REPAIR PROCEDURE</p>		
<b>STEP</b>   <b>INSPECTION</b>   <b>ACTION</b>			
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)? <ul style="list-style-type: none"> <li>● More than 0.45 V when suddenly accelerator pedal: rich condition</li> <li>● Less than 0.45 V during fuel cut: lean condition</li> </ul>	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: <ul style="list-style-type: none"> <li>● From air cleaner to throttle body</li> <li>● From throttle body to dynamic chamber</li> <li>● From dynamic chamber to intake manifold</li> </ul> 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): <ul style="list-style-type: none"> <li>● From main relay to fuel injector</li> <li>● From fuel injector to PCM</li> </ul> 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?  <b>Note</b> <ul style="list-style-type: none"><li>• When it occurs at idle, inspect spark plugs on each cylinders and verify that sparks are stable.</li></ul>	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.  <b>01-18 IGNITION COIL INSPECTION</b> Is it okay?	Yes Go to next step.  No Replace ignition coil, then go to step 27.
24	Inspect ignition control module.  <b>01-18 IGNITION CONTROL MODULE INSPECTION</b> 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?  <b>Note</b> <ul style="list-style-type: none"><li>• Large bubbles are normal since they are remaining air coming out from engine coolant passage.</li></ul>	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.  <b>01-10 COMPRESSION INSPECTION</b> 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.  <b>Note</b> <ul style="list-style-type: none"><li>• If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.</li></ul>
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"> <li>• Fuel injector malfunction</li> <li>• Fuel return hose clogged</li> <li>• Pressure regulator malfunction</li> <li>• Purge solenoid malfunction</li> <li>• Mass air flow sensor malfunction</li> <li>• Engine coolant temperature sensor malfunction</li> <li>• Throttle position sensor malfunction</li> <li>• Heated oxygen sensor (front) malfunction</li> <li>• Open or short circuit in wiring harness</li> <li>• Poor connection of connector</li> </ul> <p><b>Warning</b>  <b>The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:</b></p> <ul style="list-style-type: none"> <li>• Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.</li> <li>• 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.</li> </ul> <p style="margin-left: 20px;"><b>⇒ 01-14 BEFORE REPAIR PROCEDURE</b></p> <p style="margin-left: 20px;"><b>⇒ 01-14 AFTER REPAIR PROCEDURE</b></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"> <li>• More than 0.45 V when suddenly accelerator pedal: rich condition</li> <li>• Less than 0.45 V during fuel cut: lean condition</li> </ul>	Yes Go to next step. No Inspect and repair or replace faulty heated oxygen sensor (front), harness, connector or terminal. <p style="margin-left: 20px;"><b>⇒ 01-40 HEATED OXYGEN SENSOR INSPECTION</b></p> Then go to step 13.
8	Inspect purge control system. <b>⇒ 01-01A ENGINE SYSTEM INSPECTION, Purge Control Inspection</b> 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.  <b>Note</b> <ul style="list-style-type: none"><li>• If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.</li></ul>
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"> <li>• Ignition timing without specification</li> <li>• Air gap of crankshaft position sensor without specification</li> <li>• Ignition coil malfunction</li> <li>• Ignition control module malfunction</li> <li>• High-tension lead malfunction</li> <li>• Spark plug malfunction</li> <li>• Fuel injector malfunction</li> <li>• Fuel pump malfunction</li> <li>• Fuel filter clogged</li> <li>• Fuel delivery hose clogged or leaking</li> <li>• Fuel return hose clogged</li> <li>• Pressure regulator malfunction</li> <li>• Pulsation damper malfunction</li> <li>• Purge solenoid valve malfunction</li> <li>• Positive crankcase ventilation valve malfunction</li> <li>• Leakage in intake-air system</li> <li>• Insufficient compression</li> <li>• EGR system malfunction</li> <li>• Vibration of drive unit</li> <li>• Excessive load of A/C compressor, power steering oil pump, and generator</li> <li>• Mass air flow sensor malfunction</li> <li>• Engine coolant temperature sensor malfunction</li> <li>• Intake air temperature sensor malfunction</li> <li>• Crankshaft position sensor malfunction</li> <li>• Camshaft position sensor malfunction</li> <li>• Throttle position sensor malfunction</li> <li>• Heated oxygen sensor (front) malfunction</li> <li>• Vehicle speed sensor malfunction</li> <li>• Break switch malfunction</li> <li>• Open or short circuit in wiring harness</li> <li>• Poor connection of connector</li> <li>• Vacuum hoses damaged or loose</li> </ul>				
	<p><b>Warning</b>  <b>The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:</b></p> <ul style="list-style-type: none"> <li>• Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.</li> <li>• 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.</li> </ul> <p style="margin-left: 20px;"><input type="checkbox"/> 01-14 BEFORE REPAIR PROCEDURE</p> <p style="margin-left: 20px;"><input type="checkbox"/> 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.		
	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	<p>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, <math>1,000 \times 60 / 2,000 =</math> more than 30 seconds. Is P0300 set on PENDING TROUBLE CODE?</p> <p><b>Note</b></p> <ul style="list-style-type: none"> <li>• Adjust electrical load, A/C load, and AT range or MT gear position to simulate condition reported by customer.</li> </ul>	Yes Trouble is in process. Go to step 6.
		No Go to next step.
5	<p>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?</p>	Yes Trouble is in process. Go to next step.
		No Go to "01-01A ENGINE SYMPTOM TROUBLESHOOTING, INTERMITTENT CONCERNS".
6	<p>Is vehicle vibration due to vehicle speed felt when driving under trouble reiteration condition?</p> <p><b>Note</b></p> <ul style="list-style-type: none"> <li>• When it is vibrating, change AT range or MT gear position to verify whether vibration is caused by vehicle speed or running engine.</li> </ul>	Yes Diagnose and repair for vibration from drive shaft to tire, then go to step 39.
		No Go to next step.
7	<p>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?</p>	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	<p>Continue monitoring items on previous step. Is there any input signal which causes drastic changes when it is set to be in trouble condition?</p>	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	<p>Inspect ignition timing. ☞ 01-10 ENGINE TUNE-UP, Ignition Timing Is it okay?</p>	Yes Go to step 12.
		No Go to next step.
10	<p>Adjust ignition timing. ☞ 01-10 ENGINE TUNE-UP, Ignition Timing Is it adjusted properly?</p>	Yes Go to step 39.
		No Go to next step.
11	<p>Inspect camshaft position sensor. ☞ 01-40 CAMSHAFT POSITION SENSOR INSPECTION Is it okay?</p>	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	<p>Inspect crankshaft pulley for loose or unstable installation, and shape and installation condition of sensor plate. Is it okay?</p>	Yes Go to next step.
		No Repair or replace faulty parts, then go to step 39.
13	<p>Inspect crankshaft position sensor for loose installation and air gap. Is it okay?</p>	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	<p>Inspect spark plug condition. Is it okay?</p>	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?  <b>Note</b> <ul style="list-style-type: none"> <li>When it occurs at idle, inspect spark plugs on each cylinders and verify that sparks are stable.</li> </ul>	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. <input checked="" type="checkbox"/> 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. <input checked="" type="checkbox"/> 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?  <b>Note</b> <ul style="list-style-type: none"> <li>Large bubbles are normal since they are remaining air coming out from engine coolant passage.</li> </ul>	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. <input checked="" type="checkbox"/> 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: <ul style="list-style-type: none"> <li>A/C: refrigerant gas pressure</li> <li>Power steering: hydraulic pressure</li> <li>Generator: drastic changes in output voltage</li> </ul> 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. <input checked="" type="checkbox"/> 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)? <ul style="list-style-type: none"> <li>• More than 0.45 V when suddenly accelerator pedal: rich condition</li> <li>• Less than 0.45 V during fuel cut: lean condition</li> </ul>	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: <ul style="list-style-type: none"> <li>• From air cleaner to throttle body</li> <li>• From throttle body to dynamic chamber</li> <li>• From dynamic chamber to intake manifold</li> </ul> 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.  <b>Note</b> <ul style="list-style-type: none"><li>• If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.</li></ul>
		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"> <li>• Ignition timing without specification</li> <li>• Air gap of crankshaft position sensor without specification</li> <li>• Ignition coil malfunction</li> <li>• Ignition control module malfunction</li> <li>• High-tension lead malfunction</li> <li>• Spark plug malfunction</li> <li>• Fuel injector malfunction</li> <li>• Fuel pump malfunction</li> <li>• Fuel filter clogged</li> <li>• Fuel delivery hose clogged or leaking</li> <li>• Fuel return hose clogged</li> <li>• Pressure regulator malfunction</li> <li>• Pulsation damper malfunction</li> <li>• Purge solenoid valve malfunction</li> <li>• Positive crankcase ventilation valve malfunction</li> <li>• Leakage in intake-air system</li> <li>• Insufficient compression</li> <li>• EGR system malfunction</li> <li>• Vibration of drive unit</li> <li>• Excessive load of A/C compressor, power steering oil pump, and generator</li> <li>• Mass air flow sensor malfunction</li> <li>• Engine coolant temperature sensor malfunction</li> <li>• Intake air temperature sensor malfunction</li> <li>• Crankshaft position sensor malfunction</li> <li>• Camshaft position sensor malfunction</li> <li>• Throttle position sensor malfunction</li> <li>• Heated oxygen sensor (front) malfunction</li> <li>• Vehicle speed sensor malfunction</li> <li>• Break switch malfunction</li> <li>• Open or short circuit in wiring harness</li> <li>• Poor connection of connector</li> <li>• Vacuum hoses damaged or loose</li> </ul> <p><b>Warning</b> 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"> <li>• Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.</li> <li>• 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.</li> </ul> <p style="margin-left: 20px;">□ 01-14 BEFORE REPAIR PROCEDURE</p> <p style="margin-left: 20px;">□ 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?  <b>Note</b> • 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 CONCERN".
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?  <b>Note</b> • 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. <span style="margin-left: 2em;">IF 01-18 IGNITION COIL INSPECTION</span> Is it okay?	Yes	Go to next step.
		No	Replace ignition coil, then go to step 36.

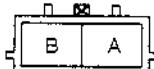
# TROUBLESHOOTING [ENGINE CONTROL]

STEP	INSPECTION	ACTION
12	Inspect ignition control module. <input checked="" type="checkbox"/> 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): <ul style="list-style-type: none"> <li>• From main relay to fuel injector</li> <li>• From fuel injector to PCM</li> </ul> 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. <input checked="" type="checkbox"/> 01-10 ENGINE TUNE-UP, Ignition Timing Is it okay?	Yes Go to step 18.
		No Go to next step.
16	Adjust ignition timing. <input checked="" type="checkbox"/> 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. <input checked="" type="checkbox"/> 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. <input checked="" type="checkbox"/> 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?  <b>Note</b> <ul style="list-style-type: none"> <li>• Large bubbles are normal since they are remaining air coming out from engine coolant passage.</li> </ul>	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. <input checked="" type="checkbox"/> 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. <input checked="" type="checkbox"/> 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)?	Yes Go to next step.
		No Inspect and repair or replace faulty heated oxygen sensor (front), harness, connector or terminal. <input checked="" type="checkbox"/> 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: <ul style="list-style-type: none"><li>● From air cleaner to throttle body</li><li>● From throttle body to dynamic chamber</li><li>● From dynamic chamber to intake manifold</li></ul> 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 for 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.  <b>Note</b> <ul style="list-style-type: none"><li>● If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.</li></ul>
		No Troubleshooting completed.

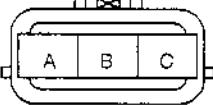
# TROUBLESHOOTING [ENGINE CONTROL]

<b>DTC P0325</b>		Knock sensor circuit malfunction		
<b>DETECTION CONDITION</b>	Input voltage from knock sensor is below 1.25 V or above 3.75 V after engine started			
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>• Knock sensor malfunction</li> <li>• Knock sensor installation incorrect</li> <li>• Open or short circuit in wiring from PCM terminal 2F to knock sensor terminal A</li> </ul>			
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? <input checked="" type="checkbox"/> 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.	
 <b>Harness side connector (view from terminal side)</b>				
X5U:01WDP				

<b>DTC P0335</b>		Crankshaft position sensor circuit malfunction	
<b>DETECTION CONDITION</b>	<ul style="list-style-type: none"> <li>• No NE signal input from crankshaft position sensor while engine is running</li> </ul>		
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>• Crankshaft position sensor malfunction</li> <li>• Crankshaft position sensor air gap incorrect</li> <li>• Open or short circuit in wiring from PCM terminal 2J to crankshaft position sensor terminal B</li> <li>• Open or short circuit in wiring from main relay terminal D to crankshaft position sensor terminal A</li> </ul>		
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?  <b>Specification: 0.5—1.5 mm {0.020—0.059 in}</b>	Yes	Go to next step.
		No	Adjust crankshaft position sensor air gap, then go to step 7.
5	Is crankshaft position sensor okay? <input checked="" type="checkbox"/> 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.



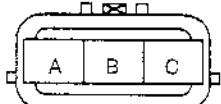
Harness side connector  
(view from terminal connector)

XSU101WDO

DTC P0339 Crankshaft position sensor circuit intermittent		
DETECTION CONDITION	Crankshaft position sensor outputs less than or more than 8 pulses while the crankshaft rotates twice	
<b>POSSIBLE CAUSE</b>		<ul style="list-style-type: none"> <li>• Crankshaft position sensor malfunction</li> <li>• Crankshaft position sensor air gap incorrect</li> <li>• Intermittent open or short circuit in wiring harness from PCM terminal 2J to crankshaft position sensor terminal B</li> <li>• Intermittent open or short circuit in wiring harness from main relay terminal D to crankshaft position sensor terminal A</li> <li>• Damaged crankshaft pulley</li> </ul>
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 connectors 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? <b>Specification: 0.5—1.5 mm (0.020—0.059 in)</b>	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"><li>• PCM connector terminal 2J and crankshaft position sensor connector terminal B</li><li>• Main relay connector and crankshaft position sensor connector terminal A</li></ul> 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"> <li>EGR valve malfunction</li> <li>EGR boost sensor malfunction</li> <li>EGR boost sensor solenoid valve malfunction</li> <li>Clogging or leakage in piping of EGR system</li> <li>Mass air flow sensor malfunction</li> <li>Throttle position sensor malfunction</li> <li>Intake air temperature sensor malfunction</li> <li>Vehicle speed sensor malfunction</li> <li>Open or short circuit in wiring harness</li> <li>Vacuum hoses damaged or loose</li> </ul>				
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.		
	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.		
2	Inspect intake manifold negative pressure at idle. <input checked="" type="checkbox"/> 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.		
	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. <input checked="" type="checkbox"/> 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 CONCERN".		
	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 CONCERN".		
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	<p>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?</p> <p><b>Note</b></p> <ul style="list-style-type: none"> <li>While EGR is diagnosing, it is normal that switches BARO V over from barometric pressure to intake manifold negative pressure, do not misdiagnose it.</li> </ul>	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	<p>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?</p>	Yes Go to next step.
		No Go to step 13.
10	<p>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?</p>	Yes Go to step 14.
		No Go to next step.
11	<p>Inspect for loose connection, miss connection, clogging, cracking or broken on following hoses using vacuum pump:</p> <ul style="list-style-type: none"> <li>From dynamic chamber to EGR boost sensor solenoid valve</li> <li>From EGR boost sensor solenoid valve to EGR boost sensor</li> </ul> <p>Is there any trouble?</p>	Yes Repair or replace faulty parts, then go to step 15.
		No Go to next step.
12	<p>Inspect EGR boost sensor solenoid for valve damage, air leak and air tightness.</p> <p>☞ 01-16 EGR BOOST SENSOR SOLENOID VALVE INSPECTION</p> <p>Is it okay?</p>	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	<p>Inspect for open, poor connection and other problems on following harnesses, connectors and terminals:</p> <ul style="list-style-type: none"> <li>From main relay to EGR boost sensor solenoid valve</li> <li>From EGR boost sensor solenoid valve to PCM</li> </ul> <p>Is there any trouble?</p>	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	<p>Inspect EGR control system.</p> <p>☞ 01-01A ENGINE SYSTEM INSPECTION, EGR Control Inspection</p> <p>Is it okay?</p>	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	<p>Clear DTC.</p> <p>Drive constantly under trouble reiteration condition.</p> <p>☞ DRIVE MODE</p> <p>Is TEST # 10:41:00 out of specification on DIAGNOSTIC MONITORING TEST RESULTS?</p>	Yes Go to next step.
		No Go back to step 2.
16	<p><b>Note</b></p> <ul style="list-style-type: none"> <li>If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.</li> </ul> <p>Verify stored PENDING TROUBLE CODE, DTC and DIAGNOSTIC MONITORING TEST RESULTS.</p> <p>Is there any code stored and/or out of specification?</p>	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"> <li>• EGR valve malfunction</li> <li>• EGR boost sensor malfunction</li> <li>• Mass air flow sensor malfunction</li> <li>• Throttle position sensor malfunction</li> <li>• Intake air temperature sensor malfunction</li> <li>• Vehicle speed sensor malfunction</li> <li>• Open or short circuit in wiring harness</li> <li>• Vacuum hoses damaged or loose</li> </ul>	
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. <input checked="" type="checkbox"/> 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. <input checked="" type="checkbox"/> 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. <input checked="" type="checkbox"/> 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. <input checked="" type="checkbox"/> 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. <b>Note</b> <ul style="list-style-type: none"> <li>• If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.</li> </ul>
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]

<b>DTC P0420*</b>		Warm up catalyst system efficiency below threshold	
<b>DETECTION CONDITION</b>	Number of heated oxygen sensor (rear) inversion becomes closer to that of heated oxygen sensor (front)		
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>• Warm up three way catalytic converter deterioration</li> <li>• Leakage exhaust system</li> <li>• Heated oxygen sensor (front) malfunction</li> <li>• Heated oxygen sensor (rear) malfunction</li> <li>• Mass air flow sensor malfunction</li> <li>• Throttle position sensor malfunction</li> <li>• Vehicle speed sensor malfunction</li> </ul>		
STEP	INSPECTION		ACTION
1	Have FREEZE FRAME PID DATA and DIAGNOSTIC MONITORING TEST RESULTS been recorded?		Yes No
			Go to next step. 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 No
			Inspect and repair DTC P0100, P0120 or P0500, then go to step 11. Go to next step.
3	Is DTC P0420 on FREEZE FRAME PID DATA?		Yes No
			Go to next step. 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 No
			Trouble is in process. Go to next step. 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 No
			Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 11. 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 No
			Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 11. Go to next step.
7	Inspect exhaust system. Is there any gas leak?		Yes No
			Repair or replace faulty exhaust parts, then go to step 11. Go to next step.
8	Inspect installation of heated oxygen sensor (rear). Is it okay?		Yes No
			Go to next step. 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 No
			Go to next step. 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 No
			Replace catalytic converter, then go to next step. 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 No
			Go to next step. Go back to step 2.  <b>Note</b> • 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 <sup>1</sup>		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"> <li>• Warm up three way catalytic converter deterioration</li> <li>• Leakage exhaust system</li> <li>• Heated oxygen sensor (front) malfunction</li> <li>• Heated oxygen sensor (rear) malfunction</li> <li>• Mass air flow sensor malfunction</li> <li>• Throttle position sensor malfunction</li> <li>• Vehicle speed sensor malfunction</li> </ul>	
STEP	INSPECTION	
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?	
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.  <b>Note</b> <ul style="list-style-type: none"> <li>• If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.</li> </ul>
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			
		<ul style="list-style-type: none"> <li>• Purge solenoid valve malfunction</li> <li>• Canister drain cut valve malfunction</li> <li>• Tank pressure control valve malfunction</li> <li>• Vent cut valve malfunction</li> <li>• Loose fuel filler cup</li> <li>• Charcoal canister malfunction</li> <li>• Catch tank malfunction</li> <li>• Rollover valve malfunction</li> <li>• Cracked fuel tank</li> <li>• Fuel tank component parts poorly installed</li> <li>• Evaporative hose damaged or loose</li> <li>• EGR boost sensor malfunction</li> <li>• Fuel tank level sensor malfunction</li> <li>• Fuel tank pressure sensor malfunction</li> <li>• Engine coolant temperature sensor malfunction</li> <li>• Intake air temperature sensor malfunction</li> <li>• Throttle position sensor malfunction</li> <li>• Mass air flow sensor malfunction</li> <li>• Vehicle speed sensor malfunction</li> <li>• Open or short circuit in wiring harness</li> <li>• Poor connection of connector</li> </ul>		
POSSIBLE CAUSE				
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?  <b>Note</b> <ul style="list-style-type: none"><li>• While EGR is diagnosing, it is normal that switched BARO V over from barometric pressure to intake manifold negative pressure, do not misdiagnose it.</li></ul>	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?  <b>Note</b> <ul style="list-style-type: none"><li>• When filler caps other than OEM caps are attached, it is considered malfunction.</li></ul>	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. <input checked="" type="checkbox"/> 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. <input checked="" type="checkbox"/> 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. <input checked="" type="checkbox"/> 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. <input checked="" type="checkbox"/> 01-14 VENT CUT VALVE INSPECTION Is it okay?	Yes Inspect and repair or replace for detached, incorrectly installed or cracked on following hoses: <ul style="list-style-type: none"><li>• From charcoal canister to vent cut valve</li><li>• From vent cut valve to fuel tank</li></ul> 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.

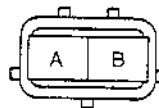
# TROUBLESHOOTING [ENGINE CONTROL]

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. <ul style="list-style-type: none"><li>• BAROV 72.0 kPa (21.3 inHg) or higher</li><li>• ECTV 0—35 °C (32—95 °F)</li><li>• IAT 10—60 °C (50—140 °F)</li></ul> 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. <b>Note</b> <ul style="list-style-type: none"><li>• Readings need to be in the indicated ranges to perform DRIVE MODE.</li></ul>
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. <b>Note</b> <ul style="list-style-type: none"><li>• If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.</li></ul>
		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. <b>Note</b> <ul style="list-style-type: none"><li>• If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.</li></ul>
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.

<b>DTC P0443</b>		Evaporative emission control system purge control valve circuit malfunction (Equip leak check)
<b>DETECTION CONDITION</b>	<ul style="list-style-type: none"> <li>• Voltage when solenoid valve is ON is too low</li> <li>• Voltage when solenoid valve is OFF is too high</li> </ul>	
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>• Purge solenoid valve malfunction</li> <li>• Open or short circuit in wiring from purge solenoid valve terminal A to main relay terminal D</li> <li>• Open or short circuit in wiring from purge solenoid valve terminal B to PCM terminal 3L</li> </ul>	
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	POSSIBLE CAUSE	
<ul style="list-style-type: none"> <li>Difference in fuel tank pressures measured when canister drain cut valve is released and several seconds after it is too small</li> <li>Tank pressure control valve is opened while canister drain cut valve is opening</li> </ul>		<ul style="list-style-type: none"> <li>Canister drain cut valve malfunction</li> <li>Tank pressure control valve malfunction</li> <li>Charcoal canister malfunction</li> <li>Air filter clogged</li> <li>Check valve (two-way) clogging</li> <li>Evaporative hose clogged</li> <li>EGR boost sensor malfunction</li> <li>Fuel tank level sensor malfunction</li> <li>Fuel tank pressure sensor malfunction</li> <li>Engine coolant temperature sensor malfunction</li> <li>Intake air temperature sensor malfunction</li> <li>Throttle position sensor malfunction</li> <li>Mass air flow sensor malfunction</li> <li>Vehicle speed sensor malfunction</li> <li>Open or short circuit in wiring harness</li> <li>Poor connection of connector</li> </ul>

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.
		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.
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.
		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?  <b>Note</b> <ul style="list-style-type: none"> <li>● While EGR is diagnosing, it is normal that switches BAROV over from barometric pressure to intake manifold negative pressure, do not misdiagnose it.</li> </ul>	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.
		Yes Go to step 8.  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.
		Yes Go to next step.  No Replace canister drain cut valve, then go to step 13.
6	Inspect canister drain cut valve for air tightness and closed stuck.  <input checked="" type="checkbox"/> 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.
		Yes Inspect and repair or replace on following harness, connector or terminal: <ul style="list-style-type: none"> <li>● From main relay to canister drain cut valve</li> <li>● From main relay to tank pressure control valve</li> <li>● From canister drain cut valve to PCM</li> <li>● From tank pressure control valve to PCM</li> </ul> Then go to step 13.  No Replace tank pressure control valve, then go to step 13.
7	Inspect tank pressure control valve for air tightness and closed stuck.  <input checked="" type="checkbox"/> 01-16 TANK PRESSURE CONTROL VALVE INSPECTION Is it okay?	Yes Inspect and repair or replace on following harness, connector or terminal: <ul style="list-style-type: none"> <li>● From main relay to canister drain cut valve</li> <li>● From main relay to tank pressure control valve</li> <li>● From canister drain cut valve to PCM</li> <li>● From tank pressure control valve to PCM</li> </ul> Then go to step 13.  No Replace tank pressure control valve, then go to step 13.
		Yes Go to next step.  No Replace charcoal canister, then go to step 13.
8	Remove charcoal canister and inspect for clogging.  <input checked="" type="checkbox"/> 01-16 CHARCOAL CANISTER INSPECTION Is it okay?	Yes Go to next step.  No Replace charcoal canister, then go to step 13.
		Yes Install filler cap, then go to step 11.  No Go to next step.
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.
		Yes Go to the next step.  No Replace fuel tank pressure sensor, then go to step 13.
10	Inspect fuel tank pressure sensor.  <input checked="" type="checkbox"/> 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.
		Yes Go to next step.  No Replace check valve (two-way), then go to step 13.
11	Remove and inspect check valve (two-way) for clogging.  <input checked="" type="checkbox"/> 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.

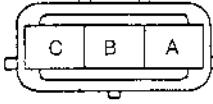
# TROUBLESHOOTING [ENGINE CONTROL]

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"> <li>• From charcoal canister to canister drain cut valve</li> <li>• From canister drain cut valve to air filter</li> <li>• From air filter to two-way check valve</li> </ul> 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"> <li>• BAROV 72.0 kPa {21.3 inHg} or higher</li> <li>• ECTV 0—35 °C {32—95 °F}</li> <li>• IAT 10—60 °C {50—140 °F}</li> </ul> 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.  <b>Note</b> <ul style="list-style-type: none"> <li>• Readings need to be in the indicated ranges to perform DRIVE MODE.</li> </ul>
14	Clear DTC. Run DRIVE MODE. <ul style="list-style-type: none"> <li>▫ 01-01A ENGINE DIAGNOSTIC INSPECTION, Fuel Tank Pressure Graph Recording Procedure</li> </ul> Verify that CDCV and FTP graphs. Is there any problem detected?	Yes	Go back to step 2.  <b>Note</b> <ul style="list-style-type: none"> <li>• If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.</li> </ul>
			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	<ul style="list-style-type: none"> <li>• 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</li> </ul>				
POSSIBLE CAUSE	<ul style="list-style-type: none"> <li>• Fuel tank pressure sensor malfunction</li> <li>• Open circuit in wiring from fuel tank pressure sensor terminal A to PCM terminal 2A</li> <li>• Open or short circuit in wiring from fuel tank pressure sensor terminal C to PCM terminal 2I</li> </ul>				
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? <ul style="list-style-type: none"> <li>▫ 01-40 FUEL TANK PRESSURE SENSOR INSPECTION</li> </ul>		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.



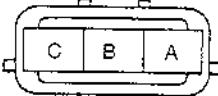
HARNESS SIDE CONNECTOR  
(VIEW FROM TERMINAL CONNECTOR)

X5U-01WDT

DTC P0453 Evaporative emission control system pressure sensor high input		
DETECTION CONDITION	<ul style="list-style-type: none"> <li>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</li> </ul>	
POSSIBLE CAUSE	<ul style="list-style-type: none"> <li>Fuel tank pressure sensor malfunction</li> <li>Short circuit in wiring from fuel tank pressure sensor terminal A to PCM terminal 2A</li> <li>Open circuit in wiring from fuel tank pressure sensor terminal B to PCM terminal 3F</li> <li>Short circuit in wiring from fuel tank pressure sensor terminal C to PCM terminal 21</li> </ul>	
STEP	INSPECTION	
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 21 — 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? <input checked="" type="checkbox"/> 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)

X5U101WDU

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"> <li>• Purge solenoid valve malfunction</li> <li>• Canister drain cut valve malfunction</li> <li>• Tank pressure control valve malfunction</li> <li>• Vent cut valve malfunction</li> <li>• Loose fuel filler cup</li> <li>• Charcoal canister malfunction</li> <li>• Catch tank malfunction</li> <li>• Rollover valve malfunction</li> <li>• Cracked Fuel tank</li> <li>• Fuel tank component parts poorly installed</li> <li>• Evaporative hose damaged or loose</li> <li>• Insufficient manifold absolute pressure</li> <li>• EGR boost sensor malfunction</li> <li>• Fuel tank level sensor malfunction</li> <li>• Fuel tank pressure sensor malfunction</li> <li>• Engine coolant temperature sensor malfunction</li> <li>• Intake air temperature sensor malfunction</li> <li>• Throttle position sensor malfunction</li> <li>• Mass air flow sensor malfunction</li> <li>• Vehicle speed sensor malfunction</li> <li>• Open or short circuit in wiring harness</li> <li>• Poor connection of connector</li> </ul>				
STEP	INSPECTION				
1	Has FREEZE FRAME PID DATA been recorded?				
	<table border="0"> <tr> <td style="vertical-align: top; width: 45%;">Yes</td><td>Go to next step.</td></tr> <tr> <td>No</td><td>Record FREEZE FRAME PID DATA on repair order, then go to next step.</td></tr> </table>	Yes	Go to next step.	No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
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?				
	<table border="0"> <tr> <td style="vertical-align: top; width: 45%;">Yes</td><td>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.</td></tr> <tr> <td>No</td><td>Go to next step.</td></tr> </table>	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.
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. <input checked="" type="checkbox"/> 01-01A ENGINE SYSTEM INSPECTION, Intake Manifold Vacuum Inspection Is intake manifold negative pressure okay?				
	<table border="0"> <tr> <td style="vertical-align: top; width: 45%;">Yes</td><td>Go to next step.</td></tr> <tr> <td>No</td><td>Inspect and repair troubles on intake-air system and engine, then go to step 26.</td></tr> </table>	Yes	Go to next step.	No	Inspect and repair troubles on intake-air system and engine, then go to step 26.
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?				
	<table border="0"> <tr> <td style="vertical-align: top; width: 45%;">Yes</td><td>Implement "01-01A ENGINE DIAGNOSTIC INSPECTION, Input System Investigation Procedure" and repair or replace, then go to step 26.</td></tr> <tr> <td>No</td><td>Go to next step.</td></tr> </table>	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.
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?  <b>Note</b> <ul style="list-style-type: none"><li>• While EGR is diagnosing, it is normal that switches BAROV over from barometric pressure to intake manifold negative pressure, do not misdiagnose it.</li></ul>	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?  <b>Note</b> <ul style="list-style-type: none"><li>• When filler caps other than OEM caps are attached, it is considered malfunction.</li></ul>	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.  <b>⇒ 01-16 CANISTER DRAIN CUT VALVE INSPECTION</b> 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.  <b>⇒ 01-16 TANK PRESSURE CONTROL VALVE INSPECTION</b> Is it okay?	Yes	Inspect and repair or replace on following harness, connector or terminal: <ul style="list-style-type: none"><li>• From main relay to canister drain cut valve</li><li>• From main relay to tank pressure control valve</li><li>• From canister drain cut valve to PCM</li><li>• From tank pressure control valve to PCM</li></ul> Then go to step 26.
		No	Replace tank pressure control valve, then go to step 26.
10	Inspect purge control system.  <b>⇒ 01-01A ENGINE SYSTEM INSPECTION, Purge Control Inspection</b> 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.  <b>⇒ 01-40 FUEL TANK PRESSURE SENSOR INSPECTION</b> 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.  <b>⇒ 01-16 ROLLOVER VALVE INSPECTION</b> 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"><li>• From charcoal canister to vent cut valve</li><li>• From vent cut valve to fuel tank pressure sensor</li></ul> 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"><li>• From charcoal canister to vent cut valve</li><li>• From vent cut valve to fuel tank pressure sensor</li></ul> 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"><li>• From charcoal canister to catch tank</li><li>• From catch tank to purge solenoid valve</li></ul> 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"><li>• From main relay to purge solenoid valve</li><li>• From purge solenoid valve to PCM</li></ul> 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"><li>• BAROV 72.0 kPa (21.3 inHg) or higher</li><li>• ECT V 0—35 °C (32—95 °F)</li><li>• IAT 10—60 °C (50—140 °F)</li></ul> 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. <b>Note</b> <ul style="list-style-type: none"><li>• Readings need to be in the indicated ranges to perform DRIVE MODE.</li></ul>

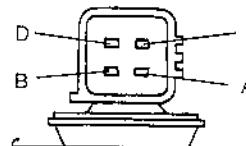
# TROUBLESHOOTING [ENGINE CONTROL]

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.  <b>Note</b> <ul style="list-style-type: none"><li>• If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.</li></ul>
		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.  <b>Note</b> <ul style="list-style-type: none"><li>• If malfunction remains even though all inspections have been performed, get assistance from Technical Hotline/your distributor.</li></ul>
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	<ul style="list-style-type: none"> <li>• Fuel gauge sender unit operation range is narrow when fuel consumption volume is over 16 litres</li> </ul>				
POSSIBLE CAUSE	<ul style="list-style-type: none"> <li>• Fuel gauge sender unit malfunction or substandard performance</li> <li>• Open or short circuit in wiring from fuel pump terminal C to PCM terminal 3K</li> <li>• Open or short circuit in wiring from main relay terminal A to fuel pump terminal C</li> <li>• Open circuit in wiring from fuel pump terminal A to ground</li> <li>• Instrument cluster malfunction</li> </ul>				
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]

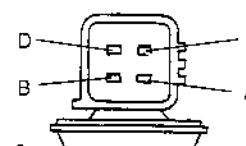
STEP	INSPECTION	ACTION	
7	Clear diagnostic trouble code from memory. Is there any diagnostic trouble code present after performing "After Repair Procedure"?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.



HARNESS SIDE CONNECTOR  
(VIEW FROM TERMINAL CONNECTOR)

X5U101WEB

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

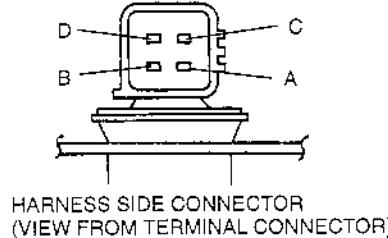


HARNESS SIDE CONNECTOR  
(VIEW FROM TERMINAL CONNECTOR)

X5U101WEA

## TROUBLESHOOTING [ENGINE CONTROL]

<b>DTC P0463</b>		Fuel level sensor circuit low input			
<b>DETECTION CONDITION</b>	<ul style="list-style-type: none"> <li>Input voltage from fuel gauge sender unit is below 0.07 V when battery positive voltage is 11—16 V</li> </ul>				
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>Fuel gauge sender unit malfunction</li> <li>Open or short circuit in wiring from fuel pump terminal C to PCM terminal 3K</li> <li>Open circuit in wiring from main relay terminal A to fuel pump terminal C</li> <li>Instrument cluster malfunction</li> </ul>				
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? <input checked="" type="checkbox"/> 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.		



X5U101WE9

<b>DTC P0500</b>		Vehicle speed sensor malfunction			
<b>DETECTION CONDITION</b>	<ul style="list-style-type: none"> <li>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"> <li>Engine speed is over 2,000 rpm</li> <li>Charging efficiency is over 40%</li> </ul> </li> </ul>				
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>Speedometer sensor malfunction</li> <li>Open or short circuit in wiring from ignition switch to speedometer sensor</li> <li>Open or short circuit in wiring from speedometer sensor to GND</li> <li>Open or short circuit in wiring from speedometer sensor to vehicle speed sensor</li> <li>Open or short circuit in wiring from vehicle speed sensor to PCM terminal 2D</li> </ul>				
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 rpm 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"> <li>• Open circuit in wiring diagram</li> <li>• Damaged or clogged IAC valve</li> <li>• Damaged throttle body</li> <li>• Air leaks</li> <li>• PCV valve malfunction</li> <li>• Engine coolant temperature sensor malfunction</li> <li>• Purge control solenoid valve malfunction</li> <li>• Fuel system malfunction</li> <li>• A/C compressor stays on</li> <li>• Low engine compression</li> <li>• EGR valve malfunction</li> </ul>				
STEP	INSPECTION		ACTION		
1	Has FREEZE FRAME DATA been recorded?		Yes No		
			Go to next step. 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 No		
			Inspect and repair the DTC except the system related areas, then go to step 13. 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 No		
			Go to next step. 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 No		
			Repair or replace if necessary, then go to step 13. 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 No		
			Go to step 7. Go to next step.		
6	Perform the IAC valve inspection. ☛ 01-13 IDLE AIR CONTROL VALVE INSPECTION Is IAC valve okay?		Yes No		
			Go to next step. 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 VALVE 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 rpm 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).		
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. <b>IAC 01-13 IDLE AIR CONTROL VALVE INSPECTION</b> 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	<ul style="list-style-type: none"> <li>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</li> </ul>	
POSSIBLE CAUSE	<ul style="list-style-type: none"> <li>Power steering pressure switch malfunction</li> <li>Short circuit in wiring from PCM terminal 1G to power steering pressure switch</li> <li>Power steering system malfunction</li> </ul>	
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? <b>IAC 06-12 POWER STEERING FLUID INSPECTION</b>	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"> <li>Accelerated/decelerated 0—30 km/h {0—19 mph} repeatedly for more than 10 times</li> </ul>	
POSSIBLE CAUSE	<ul style="list-style-type: none"> <li>Brake switch malfunction</li> <li>Open or short circuit in wiring from PCM terminal 1F to brake switch terminal</li> <li>Open or short circuit in wiring from brake switch terminal to battery terminal</li> </ul>	
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	
		Yes	No
4	Is there continuity between brake switch terminal and PCM terminal 1F?	Check for open or short circuit in wiring harness. (Battery — Brake switch) Check brake switch, then go to step 6.	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"?	Get assistance from Technical Hotline/your distributor, then replace PCM if necessary.	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"?	Go to applicable DTC inspection.	Troubleshooting completed.

DTC P0704 Clutch switch input circuit malfunction					
DETECTION CONDITION	POSSIBLE CAUSE				
<ul style="list-style-type: none"> <li>• 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 times</li> <li>• Clutch switch never turns off when engine speed below 400 rpm</li> </ul>	<ul style="list-style-type: none"> <li>• Clutch switch malfunction</li> <li>• PCM malfunction</li> <li>• Open or short circuit in wiring from clutch switch to PCM terminal 3I</li> </ul>				
STEP	INSPECTION				
1	Has FREEZE FRAME PID DATA been recorded?				
	<table border="1"> <tr> <td>Yes</td><td>Go to next step.</td></tr> <tr> <td>No</td><td>Record FREEZE FRAME PID DATA on repair order, then go to next step.</td></tr> </table>	Yes	Go to next step.	No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
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?				
	<table border="1"> <tr> <td>Yes</td><td>Repair or replace connector, then go to step.</td></tr> <tr> <td>No</td><td>Go to next step.</td></tr> </table>	Yes	Repair or replace connector, then go to step.	No	Go to next step.
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?				
	<table border="1"> <tr> <td>Yes</td><td>Go to step 7.</td></tr> <tr> <td>No</td><td>Go to next step.</td></tr> </table>	Yes	Go to step 7.	No	Go to next step.
Yes	Go to step 7.				
No	Go to next step.				
4	Is there continuity between clutch switch terminal and PCM terminal 3I?				
	<table border="1"> <tr> <td>Yes</td><td>Go to next step.</td></tr> <tr> <td>No</td><td>Repair or replace wiring harness, then go to step 7.</td></tr> </table>	Yes	Go to next step.	No	Repair or replace wiring harness, then go to step 7.
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				
	<table border="1"> <tr> <td>Yes</td><td>Go to next step.</td></tr> <tr> <td>No</td><td>Repair or replace clutch switch, then go to step 7.</td></tr> </table>	Yes	Go to next step.	No	Repair or replace clutch switch, then go to step 7.
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"?				
	<table border="1"> <tr> <td>Yes</td><td>Get assistance from technical Hotline/your distributor, then replace PCM if necessary.</td></tr> <tr> <td>No</td><td>Intermittent poor connection of harness or connector (Repair connector and/or harness), then go to step 7.</td></tr> </table>	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.
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"?				
	<table border="1"> <tr> <td>Yes</td><td>Go to applicable DTC inspection.</td></tr> <tr> <td>No</td><td>Troubleshooting completed.</td></tr> </table>	Yes	Go to applicable DTC inspection.	No	Troubleshooting completed.
Yes	Go to applicable DTC inspection.				
No	Troubleshooting completed.				

DTC P0705 Neutral switch circuit malfunction (MT)					
DETECTION CONDITION	POSSIBLE CAUSE				
<ul style="list-style-type: none"> <li>• 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 times</li> <li>• Neutral switch never turns off when engine speed below 400 rpm</li> </ul>	<ul style="list-style-type: none"> <li>• Neutral switch malfunction</li> <li>• PCM malfunction</li> <li>• Open or short circuit in wiring from neutral switch to PCM terminal</li> </ul>				
STEP	INSPECTION				
1	Has FREEZE FRAME PID DATA been recorded?				
	<table border="1"> <tr> <td>Yes</td><td>Go to next step.</td></tr> <tr> <td>No</td><td>Record FREEZE FRAME PID DATA on repair order, then go to next step.</td></tr> </table>	Yes	Go to next step.	No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
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?				
	<table border="1"> <tr> <td>Yes</td><td>Repair or replace connector, then go to step 7.</td></tr> <tr> <td>No</td><td>Go to next step.</td></tr> </table>	Yes	Repair or replace connector, then go to step 7.	No	Go to next step.
Yes	Repair or replace connector, then go to step 7.				
No	Go to next step.				

# TROUBLESHOOTING [ENGINE CONTROL]

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	INSPECTION		
POSSIBLE CAUSE	ACTION		
1	Has FREEZE FRAME DATA been recorded?		Yes
			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]

<b>DTC P1103</b>		Mass air flow inconsistent with RPM (Greater than expected)	
<b>DETECTION CONDITION</b>	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}		
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>• Open or short circuit in wiring diagram</li> <li>• Mass airflow sensor malfunction</li> <li>• Low battery</li> <li>• Damaged mass airflow sensor</li> <li>• Intake air leaks around mass airflow sensor</li> </ul>		
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.
2			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.
3			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.
4			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.
5			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.
6			No      Troubleshooting completed.