Mazda Workshop Manual 2001

ALPHABETICAL INDEX

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2001 Mazda 626 Workshop Manual

FOREWORD

This manual contains on-vehicle service and diagnosis for Mazda 626.
A thorough familiarization with this manual is important for proper repair and maintenance. It should always be kept in a handy place for quick and easy reference.

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

Mazda Motor Corporation reserves the right to alter the specifications and contents of this manual without obligation or advance notice.

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Mazda Motor Corporation
HIROSHIMA, JAPAN

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

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GENERAL INFORMATION

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HOW TO USE THIS MANUAL

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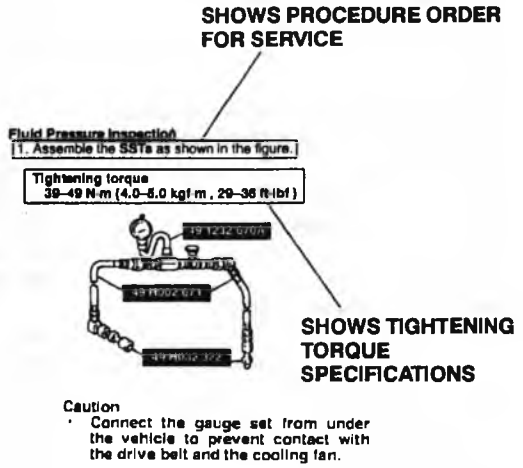
Range of Topics

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

Service Procedure

Inspection, adjustment

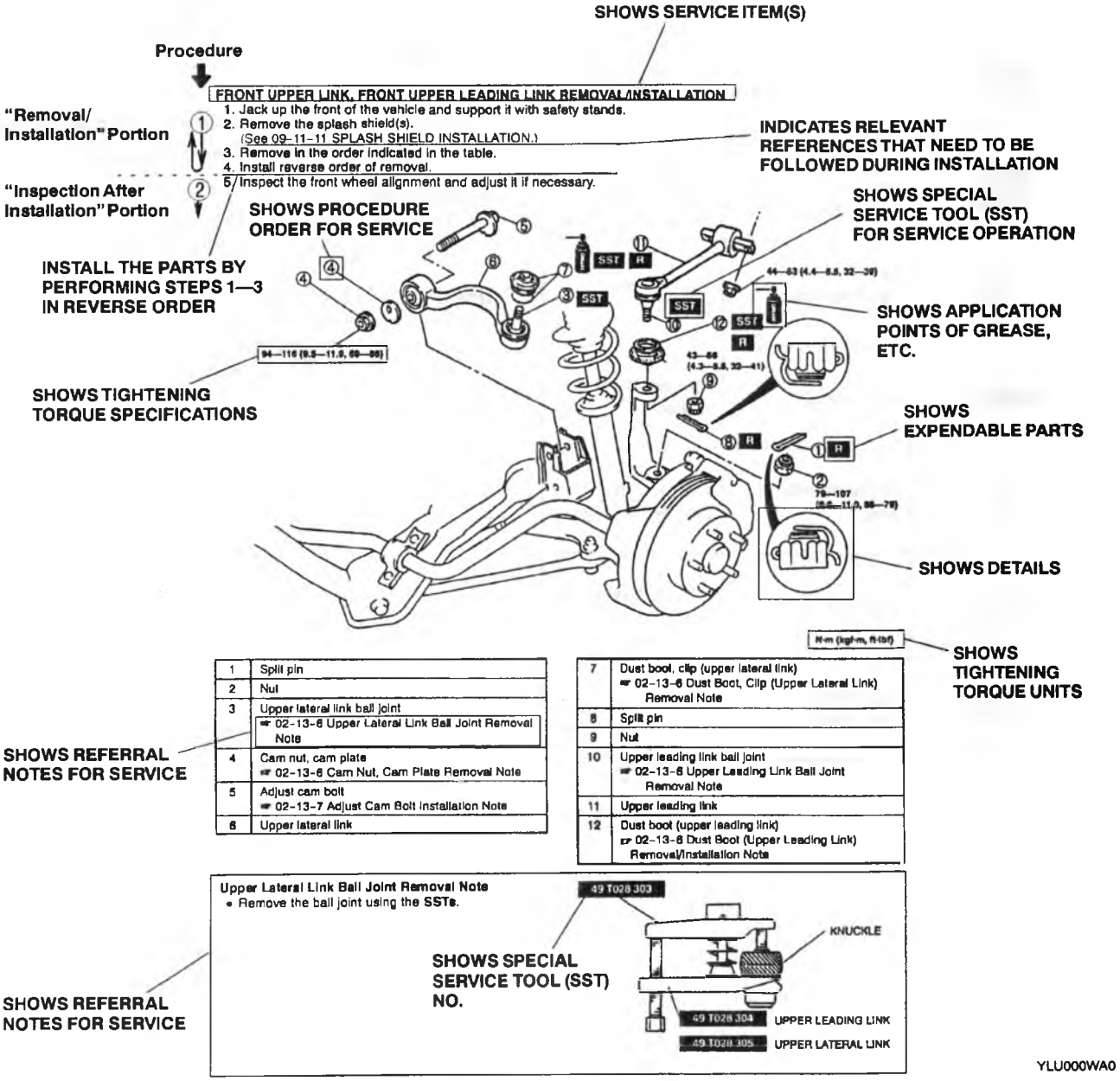
- Inspection and adjustment procedures are divided into steps. Important points regarding the location and contents of the procedures are explained in detail and shown in the illustrations.



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Repair procedure

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



Symbols

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

Symbol	Meaning	Kind
 X3U000WA2	Apply oil	New appropriate engine oil or gear oil
 X3U000WA3	Apply brake fluid	New appropriate brake fluid
 X3U000WA4	Apply automatic transaxle/ transmission fluid	New appropriate automatic transaxle/ transmission fluid
 X3U000WA5	Apply grease	Appropriate grease
 X3U000WA6	Apply sealant	Appropriate sealant
 X3U000WA7	Apply petroleum jelly	Appropriate petroleum jelly
 X3U000WA8	Replace part	O-ring, gasket, etc.
 X3U000WA9	Use SST or equivalent	Appropriate tools

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 or parts could result if the caution is ignored.

Note

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

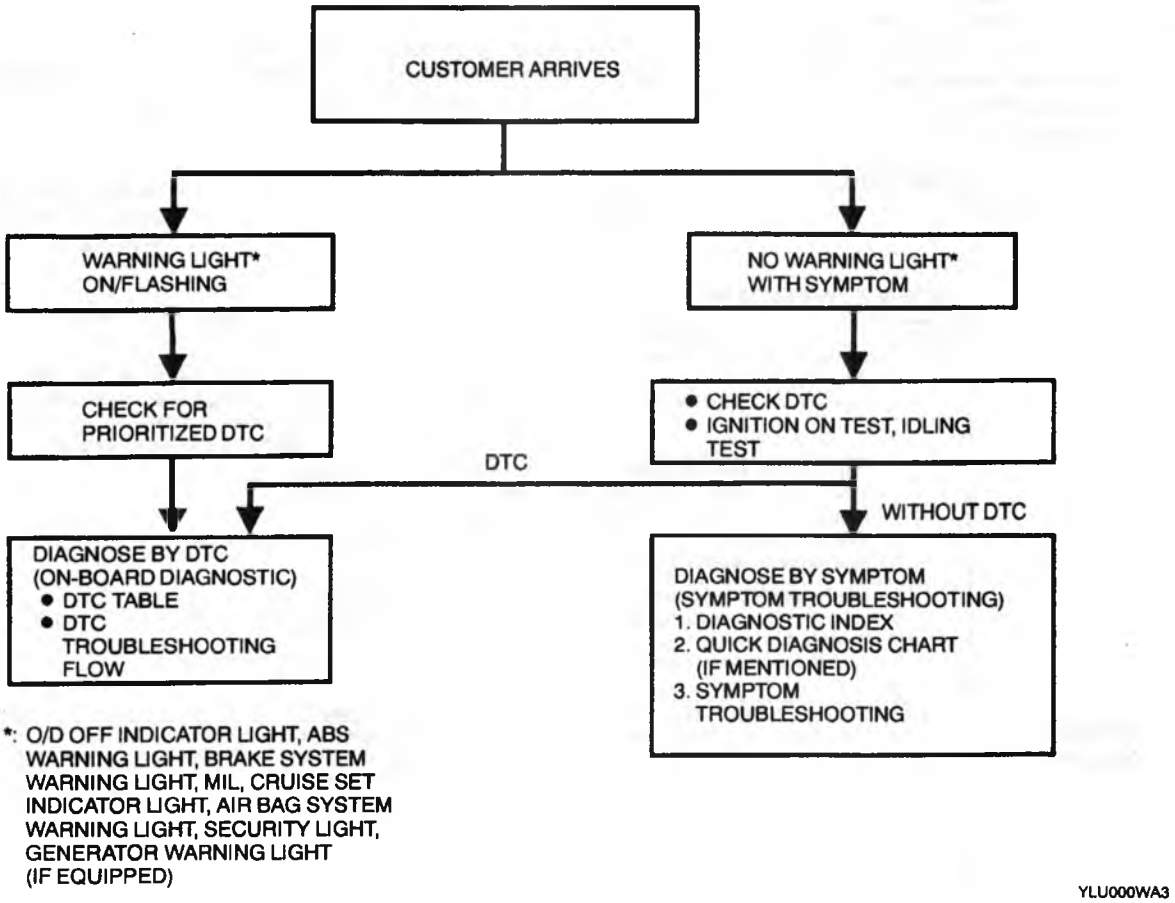
Specification

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

Upper and lower limits

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

Troubleshooting Procedure
Basic flow of troubleshooting



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

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

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

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

Procedures for Use

Using the basic inspection (section 05)

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

SHOWS INSPECTION ORDER

SHOWS ITEM NAMES FOR DETAILED PROCEDURES

SHOW POINTS REQUIRING ATTENTION BASED ON INSPECTION RESULTS

AUTOMATIC TRANSAXLE BASIC INSPECTION

STEP	INSPECTION		ACTION
1	• Turn ignition switch to ON position. • Does O/D OFF indicator light (illuminate/go out) correspond to O/D OFF switch position (on/off)?	Yes	Go to next step.
		No	Perform symptom troubleshooting No.26 "O/D OFF indicator light does not illuminate when O/D OFF switch is turned to on", or No.27 "O/D OFF indicator light illuminates when O/D OFF switch is not turned to on".
2	• Turn ignition switch to ON position. • When selector lever is moved, are selector lever position and indicator aligned? Also, when other ranges are selected from N or P during idling, does vehicle creep within 1 to 2 seconds?	Yes	Go to next step.
		No	Inspect selector lever. Repair or replace defective areas.
3	• Inspect the ATF color condition. (See 05-17-8 Automatic Transaxle Fluid (ATF) Condition Inspection) • Are ATF color and odor normal?	Yes	Go to next step.
		No	Repair or replace any defective parts according to inspection result. Flush ATX and cooler line as necessary.
4	• Perform line pressure test. (See 05-17-2 Line Pressure Test) • Is line pressure okay?	Yes	Go to next step.
		No	Adjust accelerator cable as necessary. Repair or replace any defective parts according to inspection result.
5	• Perform stall test. • Is stall speed is okay?	Yes	Go to next step.
		No	Repair or replace defective parts according to inspection result.

REFERENCE COLUMN

YLU000WA8

Using the DTC troubleshooting flow

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

TROUBLE CONDITION

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

DTC P0103

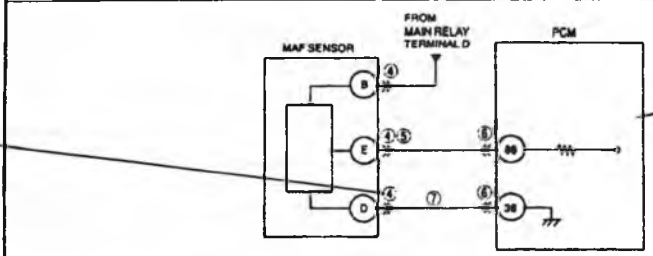
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DTC P0103	MAF circuit high input
DETECTION CONDITION	PCM monitors input voltage from TP sensor after ignition key is turned on. If input voltage at PCM terminal 68 is above 8.25 V, PCM determines that TP circuit has a malfunction. Diagnostic support note • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during first drive cycle. Therefore, PENDING CODE is not available. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• MAF sensor malfunction • Connector or terminal malfunction • Open circuit in wiring between MAF sensor terminal D and PCM terminal 36 • Open circuit in MAF sensor ground circuit

POSSIBLE CAUSE describes possible point(s) of malfunction.

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

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



Indicates the connector related to the inspection



STEP shows the order of troubleshooting

Diagnostic procedure

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

ACTION describes the appropriate action to take according to the result (Yes/No).

Reference item(s) to perform ACTION

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

YLU000WA1

Using the diagnostic index

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

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

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Using the quick diagnosis chart

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

② PARTS WHICH MAY BE THE CAUSE OF PROBLEMS

SYMPTOM QUICK DIAGNOSTIC CHART

PART WHICH MAY BE THE SYMPTOM

① CHOOSE THE ACTUAL SYMPTOM

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

YLU000WAA

Using the symptom troubleshooting

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

DESCRIPTION describes what kind of TROUBLE SYMPTOM.

TROUBLE SYMPTOM

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

POSSIBLE CAUSE describes possible point of malfunction.

STEP shows the order of troubleshooting.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is line pressure okay? ☞05-17-2 Line Pressure Test	Yes	Go to next step.
		No	Repair or replace any defective parts according to inspection results.
2	• Is shift point okay? ☞05-17-5 ROAD TEST	Yes	Go to next step.
		No	Go to symptom troubleshooting No.9 "Abnormal shift".
3	• Stop engine and turn ignition switch on. • Connect NGS tester to DLC-2. • Simulate SHIFT A, SHIFT B and SHIFT C PIDs for ON. • Is operating sound of shift solenoids heard?	Yes	• Overhaul control valve body and repair or replace any defective parts. ☞ATX Workshop Manual GF4A-EL (9999-95-GF4A-00) • If problem remains, replace or overhaul transaxle and repair or replace defective parts. ☞05-17-15 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION ☞ATX Workshop Manual GF4A-EL (9999-95-GF4A-00)
		No	• Inspect for bend, damage, corrosion or loose connection if shift solenoid A, B, or C terminal on ATX. • Inspect for shift solenoid mechanical stuck. ☞05-17-14 Inspection of Operation • If shift solenoids are okay, inspect for open or short circuit between PCM connector terminal A, B or C.
4	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis. — If vehicle is repaired, troubleshooting completed. — If vehicle is not repaired or additional diagnostic information is not available, replace or reprogram PCM.		

Reference item(s) for additional information to perform INSPECTION

INSPECTION describes the method to quickly determine the failed part.

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

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

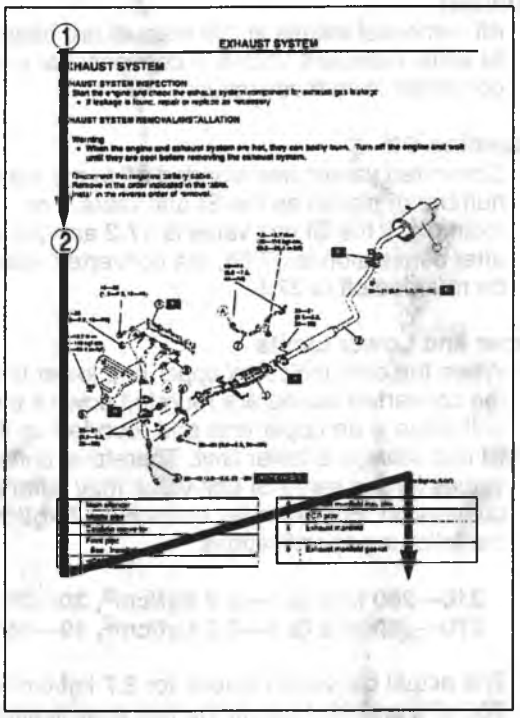
Reference item(s) to perform ACTION

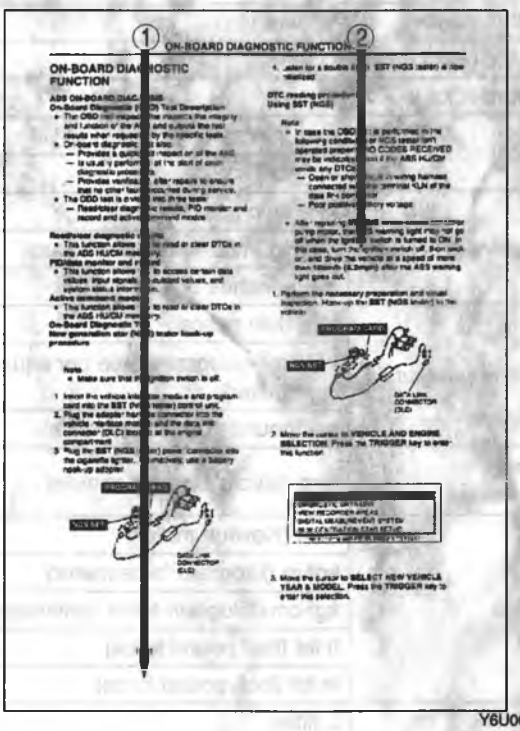
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Text Sequence

- The text sequence is indicated by the arrows shown below

Example:





Y6U000WA0

UNITS

Z6U000000002W01

Electric current	A (ampere)
Electric power	W (watt)
Electric resistance	Ω (ohm)
Electric voltage	V (volt)
Length	mm (millimeter)
	in (inch)
Negative pressure	kPa (kilo pascal)
	mmHg (millimeters of mercury)
	inHg (inches of mercury)
Positive pressure	kPa (kilo pascal)
	kgf/cm^2 (kilogram force per square centimeter)
	psi (pounds per square inch)
Number of revolutions	rpm (revolutions per minute)
Torque	N·m (Newton meter)
	kgf·m (kilogram force meter)
	kgf·cm (kilogram force centimeter)
	ft·lbf (foot pound force)
	in·lbf (inch pound force)
Volume	L (liter)
	US gal (U.S. gallon)
	US qt (U.S. quart)
	Imp gal (Imperial gallon)
	Imp qt (Imperial quart)
	ml (milliliter)
	cc (cubic centimeter)
	cu in (cubic inch)
	fl oz (fluid ounce)
Weight	N (newton)
	g (gram)
	oz (ounce)

Conversion to SI Units (Système International d'Unités)

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

Rounding Off

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

Upper and Lower Limits

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

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

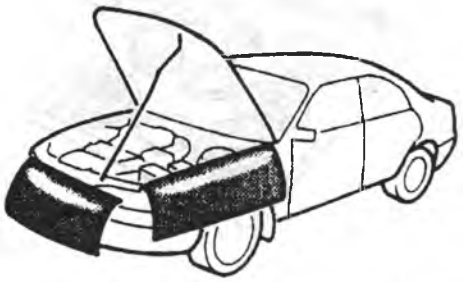
- The actual converted values for 2.7 kgf/cm^2 are 265 kPa and 38.4 psi. In the first specification, 2.7 is used as an upper limit, so the converted values are rounded down to 260 and 38. In the second specification, 2.7 is used as a lower limit, so the converted values are rounded up to 270 and 39.

FUNDAMENTAL PROCEDURES

Z6U000000004W01

Protection of the Vehicle

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



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Preparation of Tools and Measuring Equipment

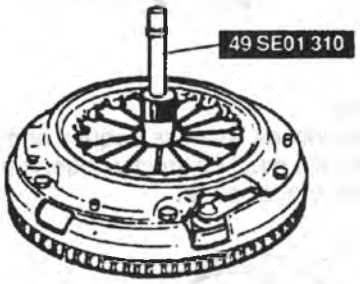
- Be sure that all necessary tools and measuring equipment are available before starting any work.



WGIWXX0023E

Special Service Tools

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



WGIWXX0024E

Oil Leakage Inspection

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

Using UV light (black light)

1. Remove any oil on the engine or transaxle.

Note

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

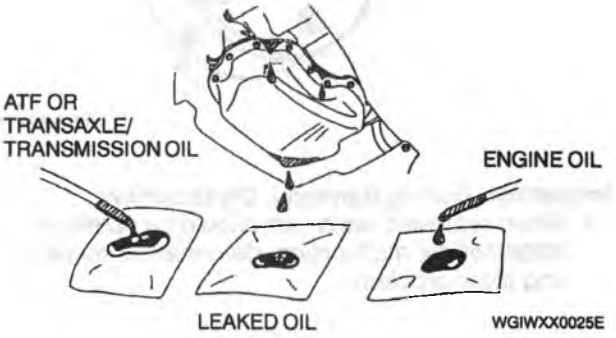
2. Pour the fluorescent dye into the engine oil or ATF (or transaxle oil).
3. Allow the engine to run for 30 min.
4. Inspect for dye leakage by irradiating with UV light (black light), and identify the type of oil that is leaking.
   - If no dye leakage is found, allow the engine to run for another 30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

Note

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

Not using UV light (black light)

1. Gather some of the leaking oil using an absorbent white tissue.
2. Take samples of engine oil and ATF (or transaxle oil), both from the dipstick, and place them next to the leaked oil already gathered on the tissue.
3. Compare the appearance and smell, and identify the type of oil that is leaking.



WGIWXX0025E

4. Remove any oil on the engine or transaxle.
5. Allow the engine to run for 30 min.
6. Check the area where the oil is leaking, then make necessary repairs.

Disconnection of the Negative Battery Cable

- Before beginning any work, turn the ignition switch to the LOCK position, then disconnect the negative battery cable and wait for more than 1 min to allow the backup power supply of the SAS unit to deplete its stored power. Disconnecting the battery cable will delete the memories of the clock, audio, and DTCs, etc. Therefore, it is necessary to verify those memories before disconnecting the cable.

Removal of Parts

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



WGIWXX0026E

Disassembly

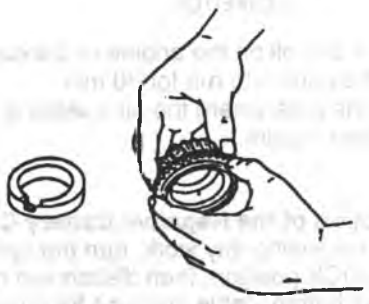
- If the disassembly procedure is complex, requiring many parts to be disassembled, all parts should be marked in a place that will not affect their performance or external appearance and identified so that reassembly can be performed easily and efficiently.



WGIWXX0027E

Inspection During Removal, Disassembly

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



WGIWXX0028E

Arrangement of Parts

- All disassembled parts should be carefully arranged for reassembly.



WGIWXX0029E

- Be sure to separate or otherwise identify the parts to be replaced from those that will be reused.

Cleaning of Parts

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

Warning

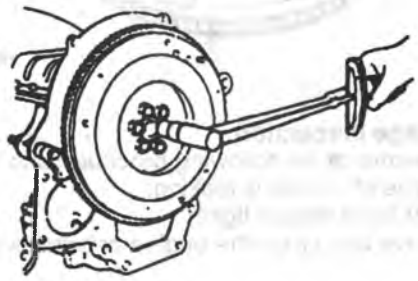
- **Using compressed air can cause dirt and other particles to fly out causing injury to the eyes. Wear protective eye wear whenever using compressed air.**



WGIWXX0030E

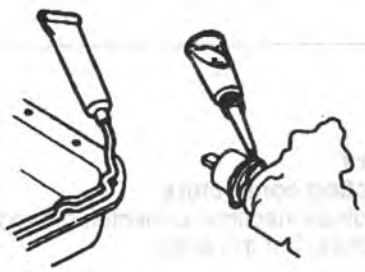
Reassembly

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



WGIWXX0031E

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



WGIWXX0032E

Adjustment

- Use suitable gauges and/or testers when making adjustments.



WGIWXX0033E

Rubber Parts and Tubing

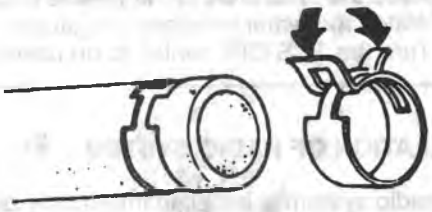
- Prevent gasoline or oil from getting on rubber parts or tubing.



WGIWXX0034E

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.



WGIWXX0035E

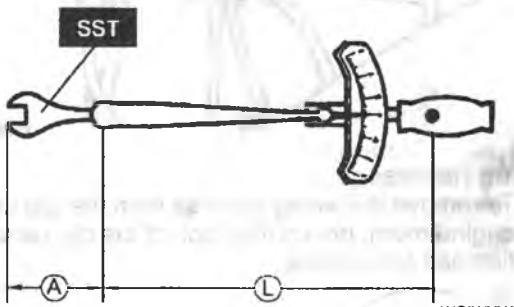
Torque Formulas

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

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

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

L : The length of the torque wrench.



WGIWXX0036E

Vise

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



WGIWXX0037E

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.
  - —Turn the TCS OFF switch to on position.

Note

- When the vehicle is on a chassis roller and only the front wheels rotate, the ABS warning light may illuminate. (See 04-03-4 PRECAUTION to turn off the warning light.)

INSTALLATION OF RADIO SYSTEM

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- 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.
  - —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.

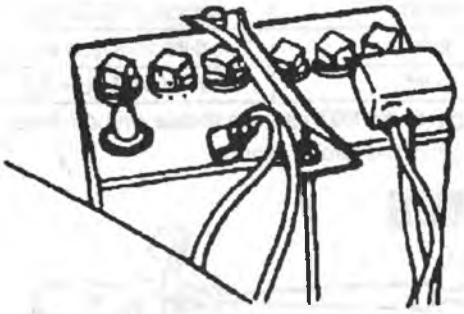
ELECTRICAL SYSTEM

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Electrical Parts

Battery cable

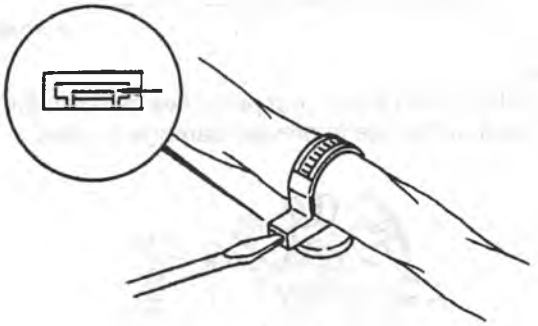
- Before disconnecting connectors or removing electrical parts, disconnect the negative battery cable.



X3U000WAX

Wiring Harness

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

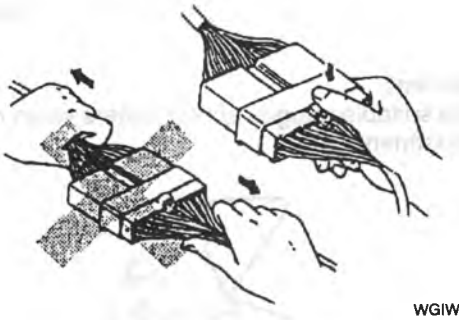


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Connectors

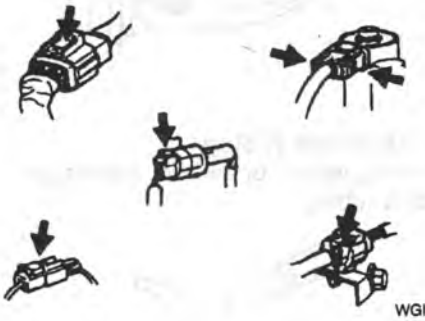
Disconnecting connectors

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



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



WGIWXX0042E

Locking connector

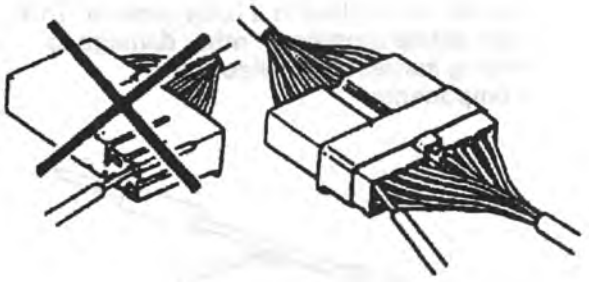
- When locking connectors, listen for a click indicating they are securely locked.



WGIWXX0043E

Inspection

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

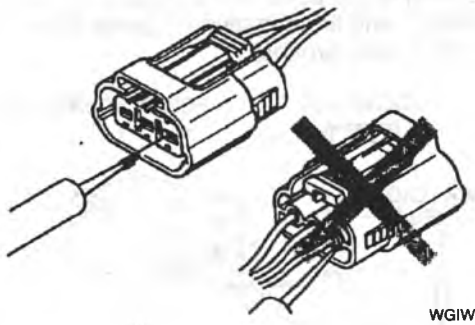


WGIWXX0044E

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

Caution

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

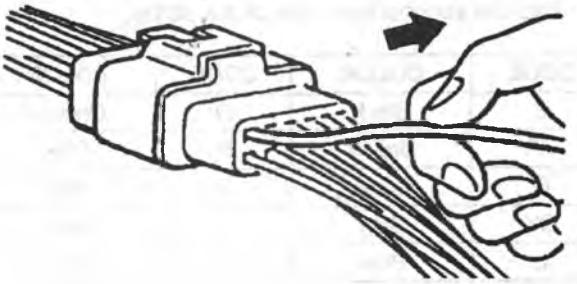


WGIWXX0045E

Terminals

Inspection

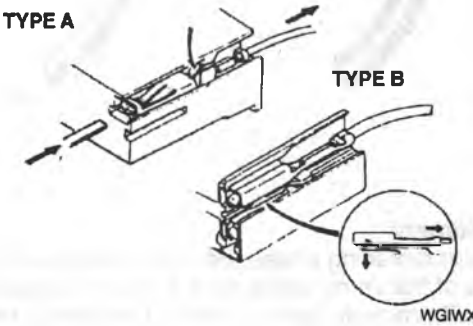
- Pull lightly on individual wires to verify that they are secured in the terminal.



WGIWXX0064E

Replacement

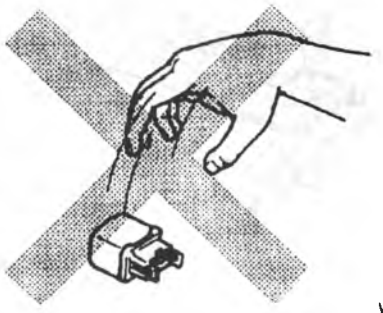
- Use the appropriate tools to remove a terminal as shown. When installing a terminal, be sure to insert it until it locks securely.
- Insert a thin piece of metal from the terminal side of the connector and with the terminal locking tab pressed down, pull the terminal out from the connector.



WGIWXX0046E

Sensors, Switches, and Relays

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



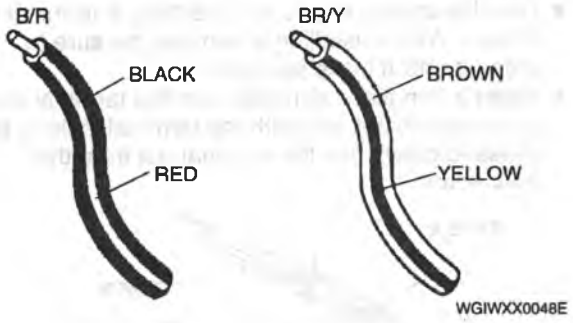
WGIWXX0047E

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	Lamp Blue	Y	Yellow
LG	Lamp Green		

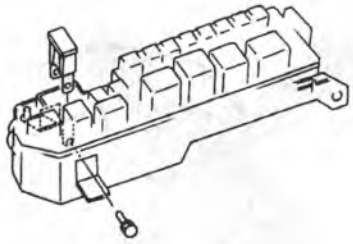


WGIWXX0048E

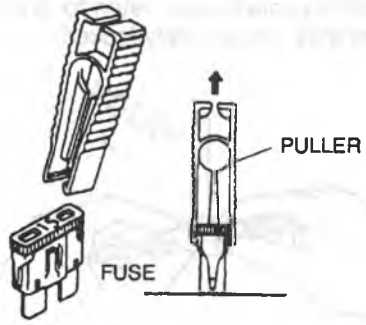
Fuse

Replacement

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


WGIWXX0049E

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



WGIWXX0050E

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.

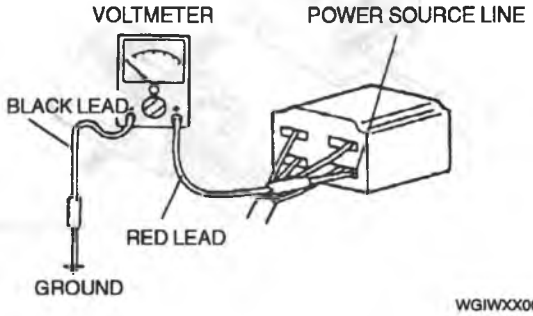
Caution

- **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.**


WGIWXX0067E

Voltmeter

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



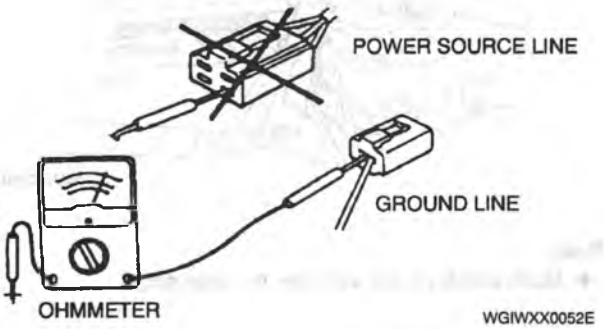
WGIWXX0051E

Ohmmeter

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

Caution

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

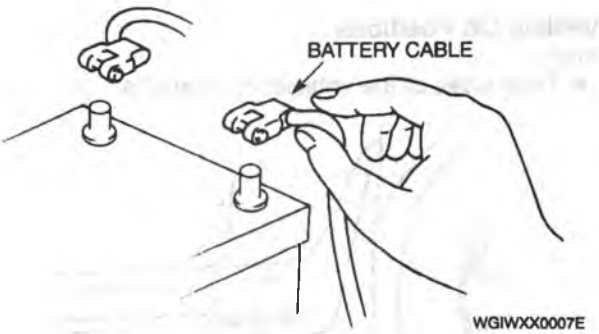


WGIWXX0052E

Precautions Before Welding

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

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



WGIWXX0007E

3. Securely connect the welding machine ground near the welding area.



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4. Cover the peripheral parts of the welding area to protect them from weld spatter.

JACKING POSITIONS

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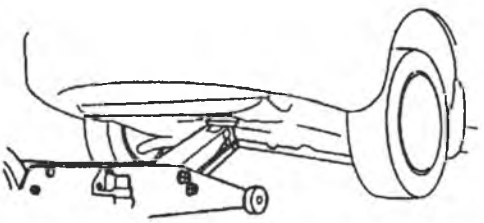
Warning

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

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

Front

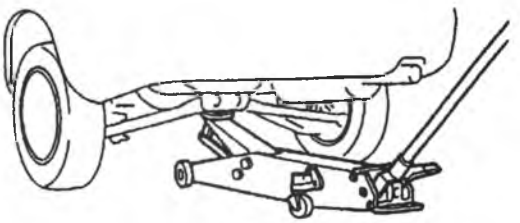
- At the center of the engine mount member.



W6U000WBE

Rear

- At the center of the crossmember.



W6U000WBF

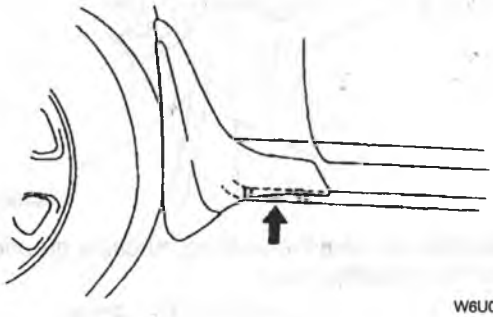
VEHICLE LIFT (2 SUPPORTS) AND SAFETY STAND (RIGID RACK) POSITION

Z6U000000008W01

Vehicle Lift Positions

Front

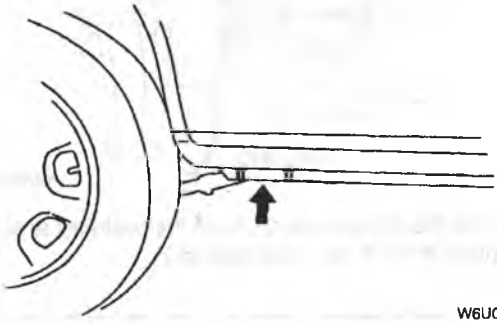
- Both sides of the vehicle, on side sills.



W6U000WBG

Rear

- Both sides of the vehicle, on side sills.

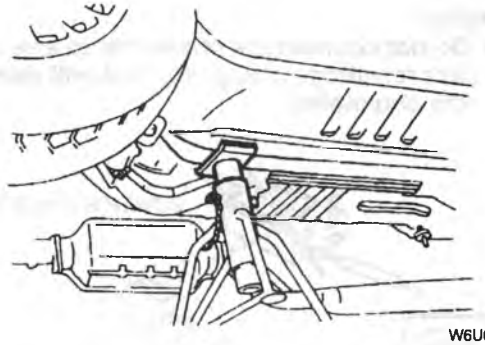


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Safety Stand Positions

Front

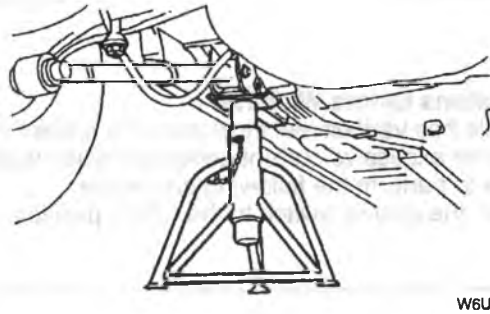
- Both sides of the vehicle, on side sills.



W6U000WBJ

Rear

- Both sides of the vehicle, on side sills.

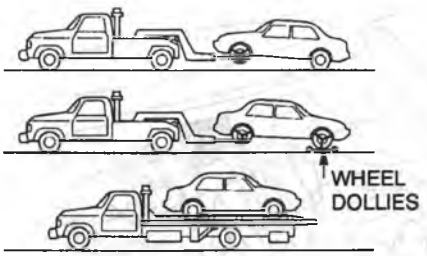


W6U000WBK

TOWING

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

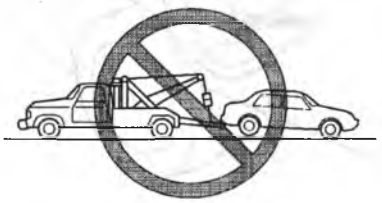


YLU000WA5

- A towed vehicle usually should have its front wheels off the ground. If excessive damage or other conditions prevent this, use wheel dollies.
- When towing with the rear wheels on the ground, release the parking brake.

Caution

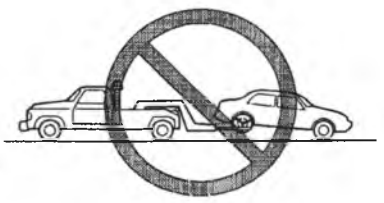
- **Do not tow with sling-type equipment. This could damage your vehicle. Use wheel-lift or flatbed equipment.**



YLU000WA7

Caution

- **Do not tow the vehicle backward with driving wheels on the ground. This may cause internal damage to the transaxle.**



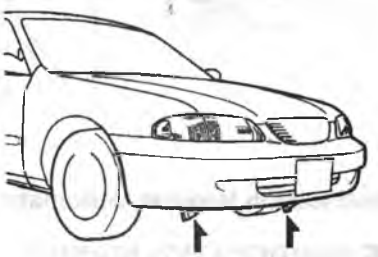
YLU000WA6

Tiedown Hooks

Caution

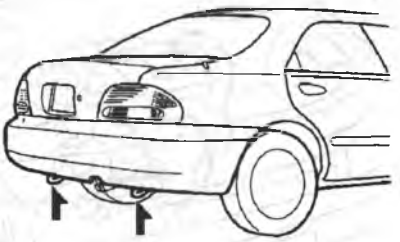
- **Do not use the hook loops under the front and rear bumpers for towing. They are designed ONLY for tying down the vehicle when it is being transported. Using them for towing will damage the bumper.**

Front



W6U000WBP

Rear



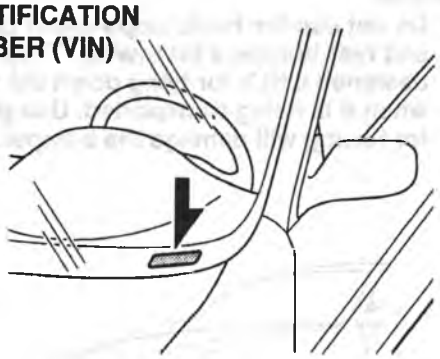
W6U000WBQ

IDENTIFICATION NUMBER LOCATIONS

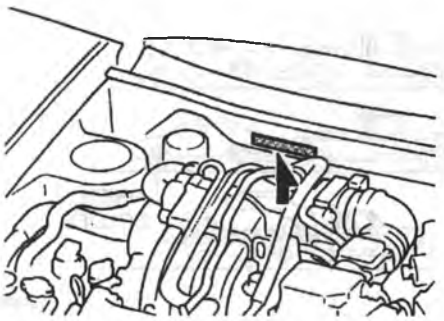
Z6U000000010W01

Vehicle Identification Number (VIN), Chassis Number

VEHICLE IDENTIFICATION NUMBER (VIN)



CHASSIS NUMBER



Z6U0000W105

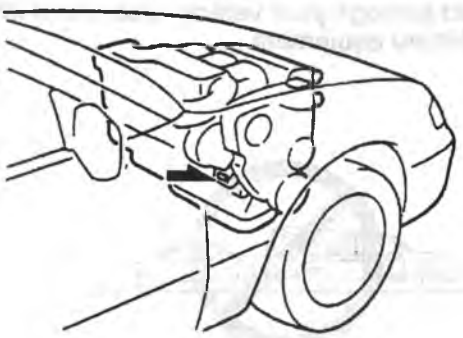
Engine Identification Number, Automatic Transaxle Number

ENGINE IDENTIFICATION NUMBER

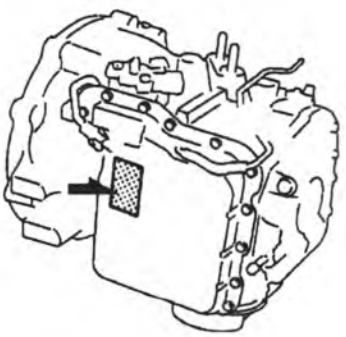
FS ENGINE



KL ENGINE



AUTOMATIC TRANSAXLE NUMBER



Z6U0000W106

SAE STANDARDS

Z6U000000003W01

- 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.

SAE Standard		Remark
Abbreviation	Name	
AP	Acelerator Pedal	
ACL	Air Cleaner	
A/C	Air Conditioning	
BARO	Barometric Pressure	
B+	Battery Positive Voltage	
CMP sensor	Camshaft Position Sensor	
CAC	Charge Air Cooler	
CLS	Closed Loop System	
CTP	Closed Throttle Position	
CPP	Clutch Pedal Position	
CIS	Continuous Fuel Injection System	
CKP sensor	Crankshaft Position Sensor	
DLC	Data Link Connector	
DTM	Diagnostic Test Mode	#1
DTC	Diagnostic Test Code(s)	
DI	Distributor Ignition	
DLI	Distributorless Ignition	
EI	Electronic Ignition	#2
ECT	Engine Coolant Temperature	
EM	Engine Modification	
EVAP	Evaporative Emission	
EGR	Exhaust Gas Recircuilation	
FC	Fan Control	
FF	Flexible Fuel	
4GR	Fourth Gear	
GEN	Generator	
GND	Ground	
HO2S	Heated Oxygen Sensor	With heater
IAC	Idle Air Control	
IAT	Intake Air Temperature	
KS	Knock Sensor	
MIL	Malfunction Indicator Lamp	
MAP	Manifold Absolute Pressure	
MAF sensor	Mass Air Flow Sensor	
MFL	Multiport Fuel Injection	
OBD	On-board Diagnostic System	
OL	Open Loop	
OC	Oxidation Catalytic onverter	
O2S	Throttle body	
PNP	Park/Neutal Position	
PSP	Power Steering Pressure	
PCM	Powertrain Control Module	#3
PAIR	Pulsed Secondary Air Injection	Pulsed injection
AIR	Secondary Air Injection	Injection with air pump
SAPV	Secondary Air Pulse Valve	
SFI	Sequential Multiport Fuel Injection	
3GR	Third Gear	
TWC	Three Way Catalytic Converter	
TB	Throttle Body	
TP sensor,	Throttle Position Sensor	
TCC	Torque Converter Clutch	
TCM	Transmission (Transaxle) Control Module	
TR	Transmission (Transaxle) Range	
TC	Turbocharger	
VSS	Vehicle Speed Sensor	
VR	Voltage Regulator	
VAF sensor	Volume Air Flow Sensor	
WU-TWC	Warm Up Three Way Catalytic Converter	#4
WOP	Wide Open Throttle	

#1 : Diagnostic trouble codes depend on the diagnostic test mode.
#2 : Controlled by the PCM
#3 : Device that controls engine and powertrain
#4 : Directly connected to exhaust manifold

ABBREVIATIONS

Z6U000000011W01

ABS	Antilock brake system
ACC	Accessories
ACCS	A/C switch
ACP V	Refrigerant pressure switch signal voltage
ALR	Automatic locking retractor
ATF	Automatic transaxle fluid
ATFT	Transaxle fluid temperature
ATX	Automatic transaxle
BARO	Barometric pressure
BLWMTR	Fan switch
BOO	Brake on/off
BTDC	Before bottom dead center
BUS +	Diagnostic trouble code input
BUS–	Diagnostic trouble code output
CCS	Pressure of 3–2 timing/coasting clutch
CDCV	Canister drain cut valve
CM	Control module
CPP/PNP	In gear (not in neutral, not in park, clutch pedal not depressed)
CPU	Central processing unit
D range	Drive range
DEF	Defroster
DLI	Distributorless ignition
DRIVECT	Total number of OBD II drive mode completed
DRL	Daytime running lamp
DRLMP	Daytime running lamps
DTC CNT	Total number of diagnostic trouble codes (DTC) stored in PCM (Include pending codes)
ECT V	Engine coolant temperature signal voltage
EGR	Barometric pressure or EGR pressure
EGRBARO	EGR boost solenoid valve
EGRCD1	EGR valve (Coil #1)
EGRCD2	EGR valve (Coil #2)
EGRCD3	EGR valve (Coil #3)
EGRCD4	EGR valve (Coil #4)
E/L	Electrical load
ELR	Emergency locking retractor
EPC	Line pressure
EPC V	Electric pressure control solenoid valve signal voltage
EVAPCPF	Purge control system output circuit failed
EVAPCV	CDCV operation condition
EVAPCVF	CDCV failed detected
EVAPPDC	Purge solenoid valve duty cycle
EX	Exhaust
FERS	Flash EP ROM supply
FLI	Fuel level
FLI V	Fuel gage sender unit signal voltage
FP	Fuel pump operation condition
FPA	Fuel pump relay
FPF	Fuel pump circuit failed
FPRC	PRC solenoid valve
FTP V	Fuel tank pressure sensor signal voltage
FUELPW1	Fuel injector duration time (FS) Fuel injector duration time (RH) (KL)
FUELPW2	Fuel injector duration time (LH)
GEAR	Selector lever position
HDLMP	Headlight switch
HEPC	Pressure control solenoid
HFC	Condenser fan
HFCF	Condenser fan circuit failed
HI	High
HLUP	TCC control
HTR11F	Heated oxygen sensor heater (Front) failed (FS) Heated oxygen sensor heater (Front RH) failed (KL)
HTR12	Heated oxygen sensor heater (Rear) (FS) Heated oxygen sensor heater (Middle) (KL)
HTR12F	Heated oxygen sensor heater (Rear) failed (FS) Heated oxygen sensor heater (Middle) failed (KL)
HTR21	Heated oxygen sensor heater (Front LH)
HTR21F	Heated oxygen sensor heater (Front LH) failed
HTR22	Heated oxygen sensor heater (Rear)
HTR22F	Heated oxygen sensor heater (Rear) failed
HU	ABS hydraulic unit
HVAC	Heater, ventilation and air conditioning
IACF	IAC system failed
IAT V	Intake air temperature sensor signal voltage
IG	Ignition
IN	Intake
INJ1F	Fuel injector #1 circuit failed
INJ2F	Fuel injector #2 circuit failed
INJ3F	Fuel injector #3 circuit failed
INJ4F	Fuel injector #4 circuit failed
INJ5F	Fuel injector #5 circuit failed
INJ6F	Fuel injector #6 circuit failed
INT	Intermittent
IU	Immobilizer unit
KAM	Keep alive memory
KAPWR	Back-up power supply
KOEO	Key on engine off

KOER	Key on engine running
KS	Knocking
LCD	Liquid crystal display
LF	Left front
LFC	Cooling fan
LFCF	Cooling fan circuit failed
LH	Left hand
LO	Low
LOAD	Calculated engine load value
LONGFT1	Long fuel trim (FS) Long fuel trim (RH) (KL)
LONGFT2	Long fuel trim (LH)
LOOP	Feedback control condition
LR	Left rear
MAF V	Mass air flow sensor signal voltage
MAX	Maximum
MILF	MIL circuit failed
MIN	Minimum
MISF	Misfiring
MTX	Manual transaxle
NGS	New generation star
N position	Neutral position
O/D	Overdrive
ODF	O/D OFF indicator lamp
ODS	O/D OFF switch (FS), HOLD switch (KL)
OFF	Switch off
ON	Switch on
O2S11	Heated oxygen sensor (Front) signal voltage (FS) Heated oxygen sensor (Front RH) signal voltage (KL)
O2S12	Heated oxygen sensor (Rear) signal voltage (FS) Heated oxygen sensor (Middle) signal voltage (KL)
O2S21	Heated oxygen sensor (Front LH) signal voltage
O2S22	Heated oxygen sensor (Rear) signal voltage
P position	Park position
PCV	Positive crankcase ventilation
P/S	Power steering
PID	Parameter identification
PIP	IG coil signal
PRC	Pressure regulator control
PSP V	Power steering pressure switch signal voltage
RDEF	Rear window defroster switch
REC	Recirculate
RF	Right front
RH	Right hand
RPM	Engine speed
RR	Right rear

SAS	Sophisticated air bag sensor
SHIFT A	Shift solenoid A
SHIFT B	Shift solenoid B
SHIFT C	Shift solenoid C
SHORTFT1	Short fuel trim (FS) Short fuel trim (RH) (KL)
SHORTFT2	Short fuel trim (LH)
SPRKADV	Spark advance (negative values are retard)
SS1	Shift solenoid 1 (FS) Shift solenoid A (KL)
SS1F	Shift solenoid 1 circuit failed
SS2	Shift solenoid 2 (FS) Shift solenoid B (KL)
SS2F	Shift solenoid 2 circuit failed
SS3	Shift solenoid C
SS3L	3-2 timing/coasting clutch solenoid signal
SST	Special service tool
SW	Switch
TCC	Torque converter clutch solenoid duty value
TCC CON	Torque converter clutch control solenoid valve
TCCF	Torque converter clutch solenoid circuit failed
TCCH	Torque converter clutch solenoid valve signal (FS)
TCCMCMD	Slip value of torque converter
TCIL	O/D OFF indicator lamp
TCILF	O/D OFF indicator lamp circuit failed
TCS	Traction control system
TFT	Transaxle fluid temperature
TFT V	Transaxle fluid temperature sensor signal voltage
TNS	Tail number side lamps
TOT	Transaxle fluid temperature
TP	Throttle position
TP MODE	Throttle position
TPREL	Closed throttle position signal voltage
TP V	Throttle position sensor signal voltage
TRIP	OBD II trip cycle status
TRIPCNT	Total number of OBD II trip cycle completed
TR V	Transaxle range switch signal voltage
TS1	Transaxle range position (1 range)
TS2	Transaxle range position (2 range)
TSD	Transaxle range position (D range)
TSR	Transaxle range position (R position)
TSS	Turbine shaft speed
TSS/ISS	Transaxle input shaft speed
TSS+	Input/turbine speed
TSS-	Ground (Input/turbine speed sensor)

VENT	Ventilation
VIN	Vehicle indication number
VPWR	Battery voltage
VSS	Vehicle speed
VSS+	Vehicle speed

VSS-	Ground
WAC	A/C relay
3-2T/CCS	3-2 timing solenoid valve

PRE-DELIVERY INSPECTION

Z6U000000012W01

Pre-Delivery Inspection Table

Exterior

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

☐Glass, exterior bright metal and paint for damage
☐Wheel lug nuts and locks 89—117 N·m {9—12 kgf·m, 66—86 ft·lbf}
☐All weatherstrips for damage or detachment
☐Operation of hood release and lock
☐Operation of trunk lid and fuel lid opener
☐Door operation and alignment
☐Headlight aim

INSTALL the following parts:

☐Wheel caps

Under hood—engine off

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

☐Fuel, engine coolant, and hydraulic lines, fittings, connections, and components for leaks
☐Engine oil level
☐Power steering fluid level
☐Brake (clutch) fluid level
☐Windshield washer reservoir fluid level
☐Engine coolant level
☐Tightness of battery terminals

Interior

CHECK the operations of the following items:

☐Seat controls (slide and recline) and headrests
☐Folding rear seat
☐Door locks, including childproof door locks (if equipped)
☐Trunk lid internal release
☐Seat belts and warning system
☐Ignition switch and steering lock
☐Air bag system using warning light
☐Cruise control system (if equipped)
☐Shift-lock system (ATX only)
☐Starter interlock
☐All lamps including warning and indicator light
☐Sound warning system
☐Horn, wipers, and washers
☐Audio system (if equipped)
☐Cigarette lighter and clock
☐Power windows (if equipped)
☐Heater, defroster, and air conditioner at various 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 clutch pedal

	Pedal height mm {in}	Free play mm {in}
Clutch pedal	194—202 {7.64—7.95} (with carpet)	1.0—3.0 {0.04—.0.11}

☐Parking brake 6—8 notches/ 98 N {10 kgf, 22 lbf}

Under hood—engine running at operating temperature

CHECK the following items:

☐Automatic transaxle fluid level
☐Operation of idle-up system for electrical load, air conditioner or power steering (if equipped)
☐Ignition timing
☐Idle speed

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 transaxle oil level

Road test

CHECK the following items:

☐Brake operation
☐Clutch operation
☐Steering control
☐Operation of gauges
☐Squeaks, rattles, and unusual noises
☐Emergency locking retractors and Automatic locking retractors
☐Cruise control system (if equipped)

After road test

CHECK for necessary 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 (Specified tire pressure is indicated the door label)
☐Clean outside of vehicle
☐Install fuses for accessories
☐Remove seat and cabin carpet protective covers
☐Vacuum inside of vehicle

SCHEDULED MAINTENANCE

Z6U000000013W01

Scheduled Maintenance Table

Schedule 1 (Normal driving conditions) for U.S.A.

- 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 Miles	7.5	15	22.5	30	37.5	45	52.5	60
	(× 1000 Kilometers)	(12)	(24)	(36)	(48)	(60)	(72)	(84)	(96)
ENGINE									
Engine valve clearance									I
Drive belts (tension)					I				I
Engine timing belt		Inspect at 60,000 miles (96,000km) Replace every 105,000 miles (168,000km)							
Engine oil		R	R	R	R	R	R	R	R
Oil filter		R	R	R	R	R	R	R	R
COOLING SYSTEM									
Cooling system					I				I
Engine coolant		Replace at first 105,000 miles (168,000km) or 60 months; after that, every 30,000 miles (48,000km) or 24 months							
FUEL SYSTEM									
Idle speed					I				I
Air cleaner element					R				R
Fuel lines & hoses	*				I				I
Hoses & tubes for emission	*								I
IGNITION SYSTEM									
Spark plugs	FS engine				R				R
Spark plugs (PLATINUM TIPPED type)	KL engine	Replace every 60,000 miles (96,000 km)							
CHASSIS & BODY									
Brake lines, hoses & connections					I				I
Disc brakes					I				I
Drum brakes					I				I
Steering operation & linkages					I				I
Front suspension ball joints					I				I
Driveshaft dust boots					I				I
Bolts & nuts on chassis & body					I				I
Exhaust system heat shields					I				I
All locks & hinges		L	L	L	L	L	L	L	L
AIR CONDITIONER SYSTEM (IF INSTALLED)									
Refrigerant amount			I		I		I		I
Compressor operation			I		I		I		I

Chart symbols

I : Inspect and repair, clean, adjust, or replace if necessary. (Oil-permeated air cleaner elements cannot be cleaned using the air-blow method.)

R : Replace

L : Lubricate

Remarks

- After the described period, continue to follow the described maintenance at the recommended intervals.
- Refer below for a description of items marked * in the maintenance chart.

*: 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) for U.S.A. and Canada

- 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 Interval	Number of months or miles (kilometers), whichever comes first)												
	Months	4	8	12	16	20	24	28	32	36	40	44	48
Maintenance Item	× 1000 Miles	5	10	15	20	25	30	35	40	45	50	55	60
	(× 1000 km)	(8)	(16)	(24)	(32)	(40)	(48)	(56)	(64)	(72)	(80)	(88)	(96)
ENGINE													
Engine valve clearance													I
Drive belts (tension)							I						I
Engine timing belt	*2	Inspect at 60,000 miles (96,000 km) Replace every 105,000 miles (168,000 km)											
Engine oil		R	R	R	R	R	R	R	R	R	R	R	R
Engine oil (for Puerto Rico)		Replace every 3,000 miles (5,000 km) (or 3 months)											
Oil filter		R	R	R	R	R	R	R	R	R	R	R	R
COOLING SYSTEM													
Cooling system							I						I
Engine coolant		Replace at first 105,000 miles (168,000 km) or 60 months; after that, every 30,000 miles (48,000 km) or 24 months.											
Engine coolant level		I	I	I	I	I	I	I	I	I	I	I	I
FUEL SYSTEM													
Idle speed							I						I
Air cleaner element				I*1			R			I*1			R
Fuel lines and hoses	*1						I						I
Hoses & tubes for emission	*1												I
IGNITION SYSTEM													
Spark plugs	FS engine						R						R
Spark plugs (PLATINUM TIPPED type)	KL engine	Place every 60,000 miles (96,000 km)											
ELECTRICAL SYSTEM													
Function of all light		I	I	I	I	I	I	I	I	I	I	I	I
CHASSIS & BODY													
Brake lines, hoses and connections							I						I
Brake & clutch fluid level		I	I	I	I	I	I	I	I	I	I	I	I
Disc brakes				I			I			I			I
Drum brakes							I						I
Tire inflation pressure & tire wear		I	I	I	I	I	I	I	I	I	I	I	I
Steering operation and linkages							I						I
Power steering fluid level		I	I	I	I	I	I	I	I	I	I	I	I
Front suspension ball joints							I						I
Driveshaft dust boots							I						I
Bolts and nuts on chassis and body				I			I			I			I
Exhaust system heat shields							I						I
All locks & 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
AIR CONDITIONER SYSTEM (IF INSTALLED)													
Refrigerant amount				I			I			I			I
Compressor operation				I			I			I			I

Chart symbols

I : Inspect and repair, clean, adjust, or replace if necessary. (Oil-permeated air cleaner elements cannot be cleaned using the air-blow method.)

R : Replace

L : Lubricate

Remarks

- After the described period, continue to follow the described maintenance at the recommended intervals.
- Refer below for a description of items marked * in the maintenance chart.
  - *1: 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.
  - *2: If the vehicle is operated in cold districts **{below –18 °C (0 °F)}**, replace the timing belt at **60,000 miles (96,000 km)**.

Scheduled Maintenance Service (Specific Work Required)

Maintenance Item	Specific Work Required
ENGINE	
Engine valve clearance	Measure clearance.
Drive belts	Inspect for wear, cracks and fraying, and check tension. Replace drive belt.
Engine timing belt	Replace engine timing belt.
Engine oil	Replace engine oil and inspect for leakage.
Oil filter	Replace oil filter and inspect for leakage.
Oil by-pass filter	Replace oil by-pass filter and inspect for leakage.
COOLING SYSTEM	
Cooling system (including coolant level adjustment)	Check coolant level and quality, and inspect for leakage.
Engine coolant	Replace coolant.
FUEL SYSTEM	
Idle speed	Check engine idle rpm.
Idle mixture (for CIS & carburetor leaded fuel)	Check the CO and HC concentrations (See appropriate section).
Choke system (for carburetor)	Check system operation.
Air cleaner element	Inspect for dirt, oil and damage. Clean air cleaner element (by blowing air). Replace air cleaner element.
Fuel filter	Replace fuel filter.
Fuel lines & hoses	Inspect for cracks, leakage and loose connection.
IGNITION SYSTEM (FOR GASOLINE)	
Initial ignition timing	Check initial ignition timing.
Spark plugs	Inspect for wear, damage, carbon, high-tension lead condition and measure plug gap. Replace spark plugs.
EMISSION CONTROL SYSTEM (FOR GASOLINE)	
Evaporative system	Check system operation (See appropriate section), vapor lines, vacuum fitting hoses and connection.
Throttle positioner system (if equipped)	Check the diaphragm and system operation, vacuum fitting hoses and connection.
Dash pot (for carburetor)	Check system operation.
E.G.R. system	Check system operation (See appropriate section), vacuum fitting hoses and connection.
ELECTRICAL SYSTEM	
Battery electrolyte level & specific gravity	Check level and specific gravity.
Battery condition	Check the battery for corroded or loose connections and cracks in the case (for maintenance free type).

Maintenance Item	Specific Work Required
All electrical system	Check function of lighting system, windshield wiper (including wiper blade condition) and washer and power windows.
Headlight alignment	Check headlight alignment
CHASSIS & BODY	
Brake & clutch pedals	Check pedal height and free play.
Brake fluid	Check fluid level and inspect for leakage. Replace brake fluid.
Clutch fluid	Check fluid level and inspect for leakage.
Brake lines, hoses & connections	Inspect for cracks, damage, chafing, corrosion, scars, swelling and fluid leakage.
Parking brake	Check lever stroke.
Power brake unit & hoses	Check vacuum lines, connections and check valve for improper attachment, air tightness, cracks chafing and deterioration.
Disc brakes	Test for judder and noise. Inspect caliper for correct operation and fluid leakage, brake pads for wear. Check disc plate condition and thickness.
Drum brakes	Test for judder and noise. Inspect brake drum for wear and scratches; brake lining for wear, peeling and cracks; and wheel cylinder for fluid leakage.
Manual steering gear oil	Check gear oil level.
Power steering fluid & lines	Check fluid level and lines for improper attachment, leakage, cracks, damage, loose connections, chafing and deterioration.
Power steering fluid	Check fluid level.
Power steering system & hoses	Check lines for improper attachment, leakage, cracks, damage, loose connections, chafing and deterioration.
Steering & front suspension	Check free play of steering system, inspect shock absorbers for correct damping force, oil leakage, damage and looseness, and inspect coil springs, arms, links and stabilizer for damage and looseness.
Steering operation & gear housing	Check that the steering wheel has the specified play. Be sure to check for changes, such as excessive play, hard steering or strange noises. Check gear housing and boots for looseness, damage and grease/gear oil leakage.
Steering linkages tie rod ends & arms	Check ball joint, dust cover and other components for looseness, wear, damage and grease leakage.
Front & rear suspension ball joints	Inspect for grease leakage, cracks, damage and looseness.
Manual transmission/transaxle oil	Check oil level and inspect for leakage. Replace manual transmission/transaxle oil.
Automatic transaxle oil level	Check oil level.
Automatic transmission/transaxle fluid level	Check fluid level.
Automatic transmission/transaxle fluid	Replace automatic transmission/transaxle fluid.
Front & rear differential oil	Check oil level and inspect for leakage. Replace front & rear differential oil.
Rear differential oil	Check oil level and inspect for leakage. Replace rear differential oil.
Transfer oil (for 4 × 4)	Check oil level and inspect for leakage. Replace transfer oil.
Upper arm shafts (for B-Series)	Lubricate the upper arm shafts for looseness or damage.
Front & rear wheel bearing grease	Remove wheel bearing and replace the grease.
Propeller shaft joints (with grease nipple)	Lubricate propeller shaft joints.
Driveshaft dust boots	Inspect for grease leakage, cracks, damage and looseness.
Wheel nuts	Tighten wheel nuts.
Bolts & nuts on chassis & body	Tighten bolts and nuts fastening suspension components, members and seat frames.
Body condition (for rust, corrosion & perforation)	Inspect body surface for paint damage, rust, corrosion and perforation.
Exhaust system heat shields	Inspect for damage, corrosion, looseness of connections and gas leakage.

Maintenance Item	Specific Work Required
Tires (including spare tire) (with inflation pressure adjustment)	Check air pressure and inspect tires for tread wear, damage and cracks; and wheels for damage and corrosion.
Hinges & catches	Lubricate hinges and catches of doors, trunk lid and hood.
Seat belts	Inspect seat belt webbing for scratches, tears and wear, and check anchor bolt tightness.
Rear suspension uni-ball & sliding rubber bushing (for RX-7)	Inspect for cracks, damage and looseness.
Underside of vehicle	Inspect underside of vehicle (floor pans, frames, fuel lines, around exhaust system, etc.) for damage and corrosion.
Road test	Check brake operation/clutch operation/steering control/operation of meters and gauges/squeaks, rattles or unusual noises/engine general performance/emergency locking retractors.
AIR CONDITIONER SYSTEM (IF EQUIPPED)	
Refrigerant amount	Check refrigerant amount.
Compressor operation	Check compressor operation, and inspect for noise, oil leakage, cracks and refrigerant leakage.
Cabin air filter	Replace cabin air filter.
4WS SYSTEM	
Front & rear power steering system & hoses	Check lines for improper attachment, leaks, cracks, damage, loose connections, chafing and deterioration.
4WS operation & linkages	Inspect for leakage, cracks, damage and looseness.
Rear wheel steering angle	Inspect for rear wheel steering angle.
Rear suspension outer ball joints	Inspect for grease leakage, cracks, damage and looseness.

ENGINE

01
SECTION

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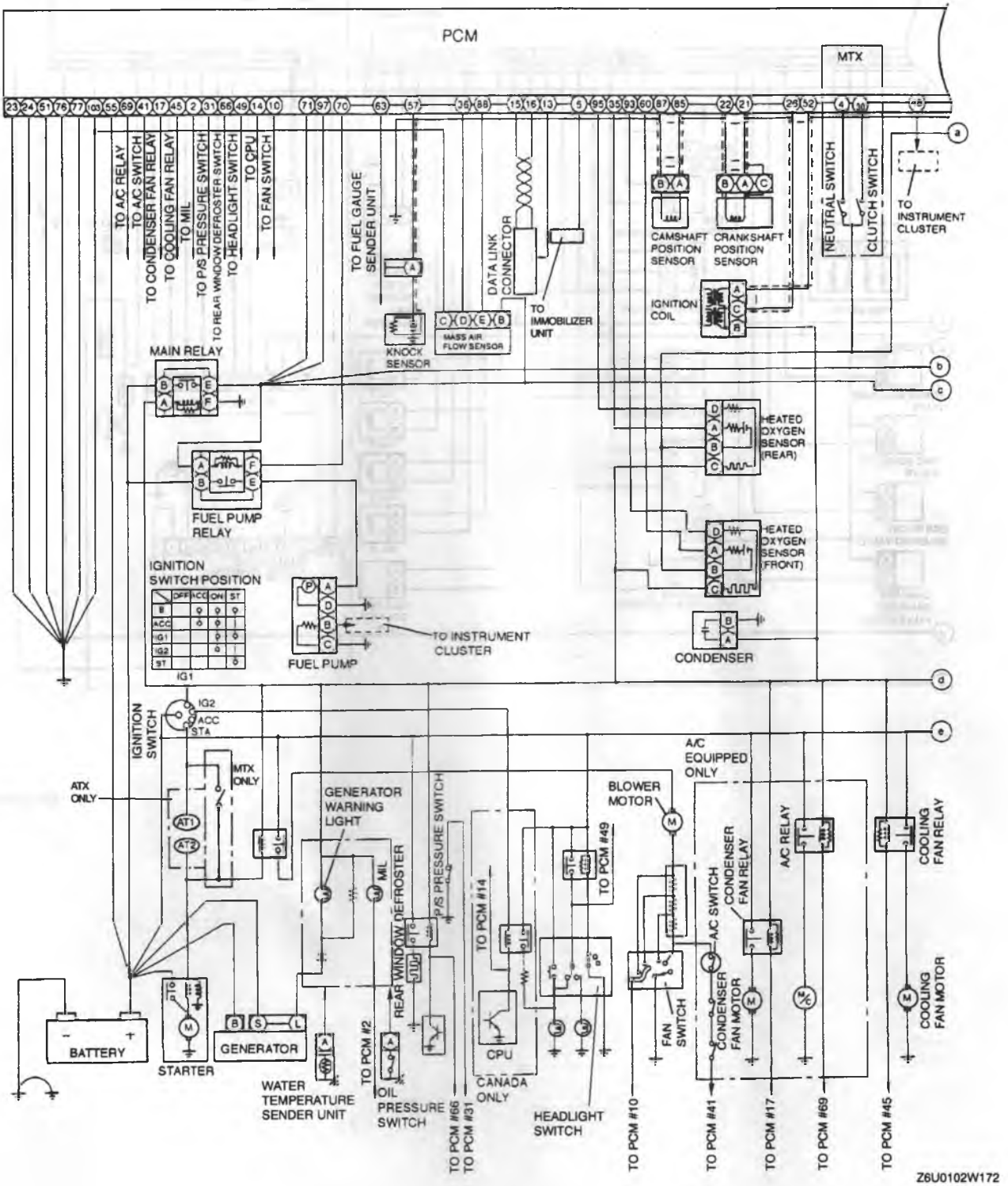
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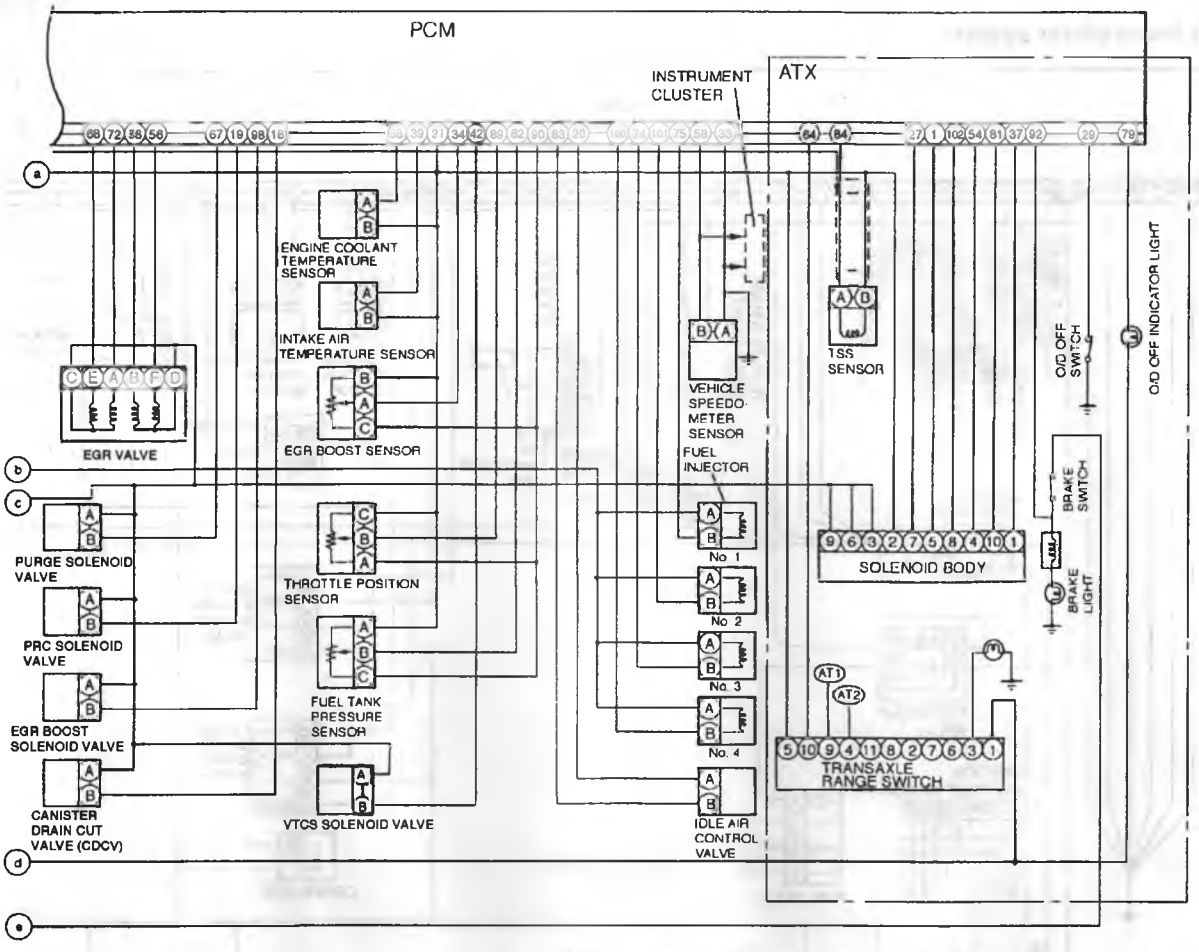
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CONTROL SYSTEM WIRING DIAGRAM [FS]

Z6U010218881W01

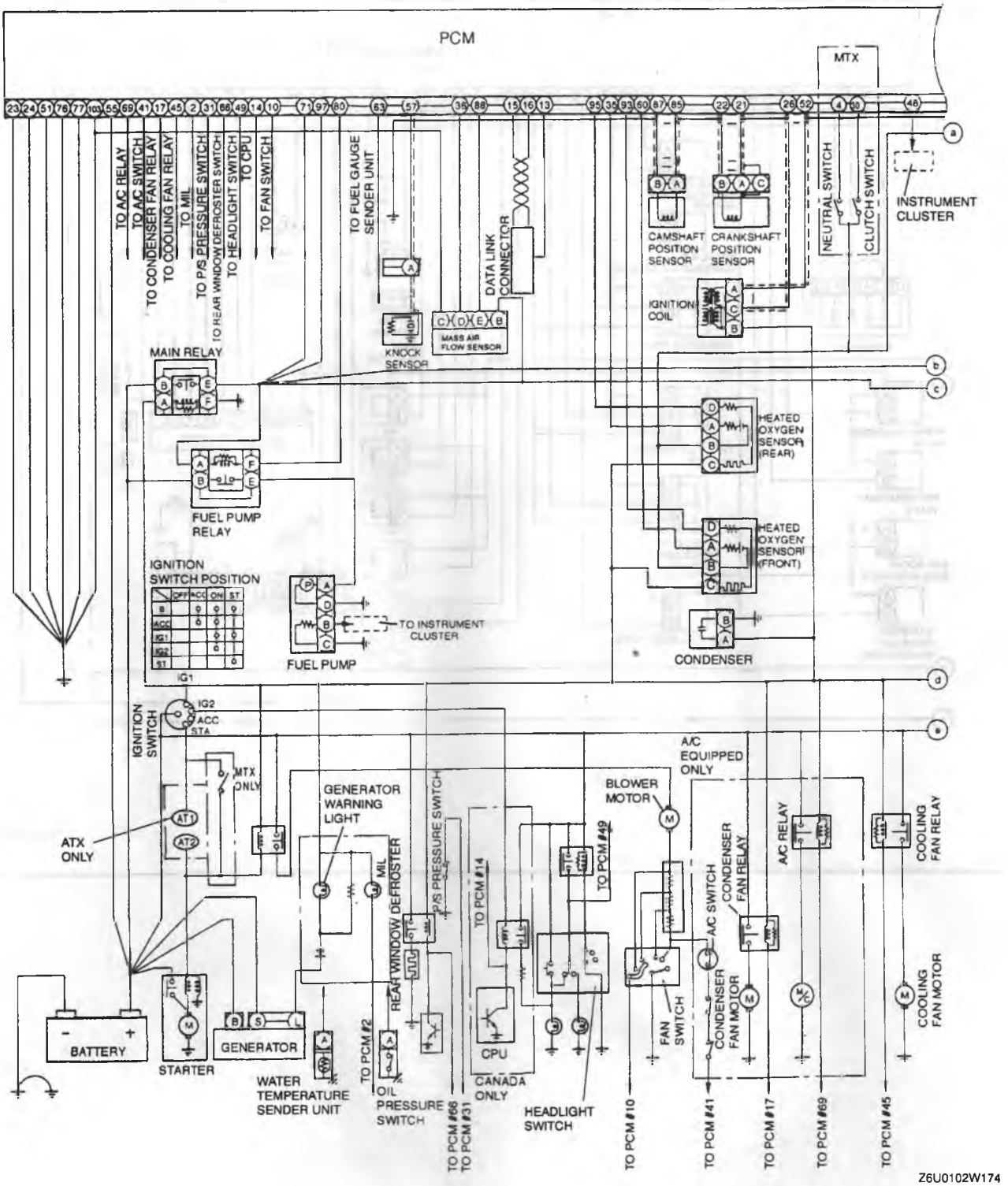
With immobilizer system

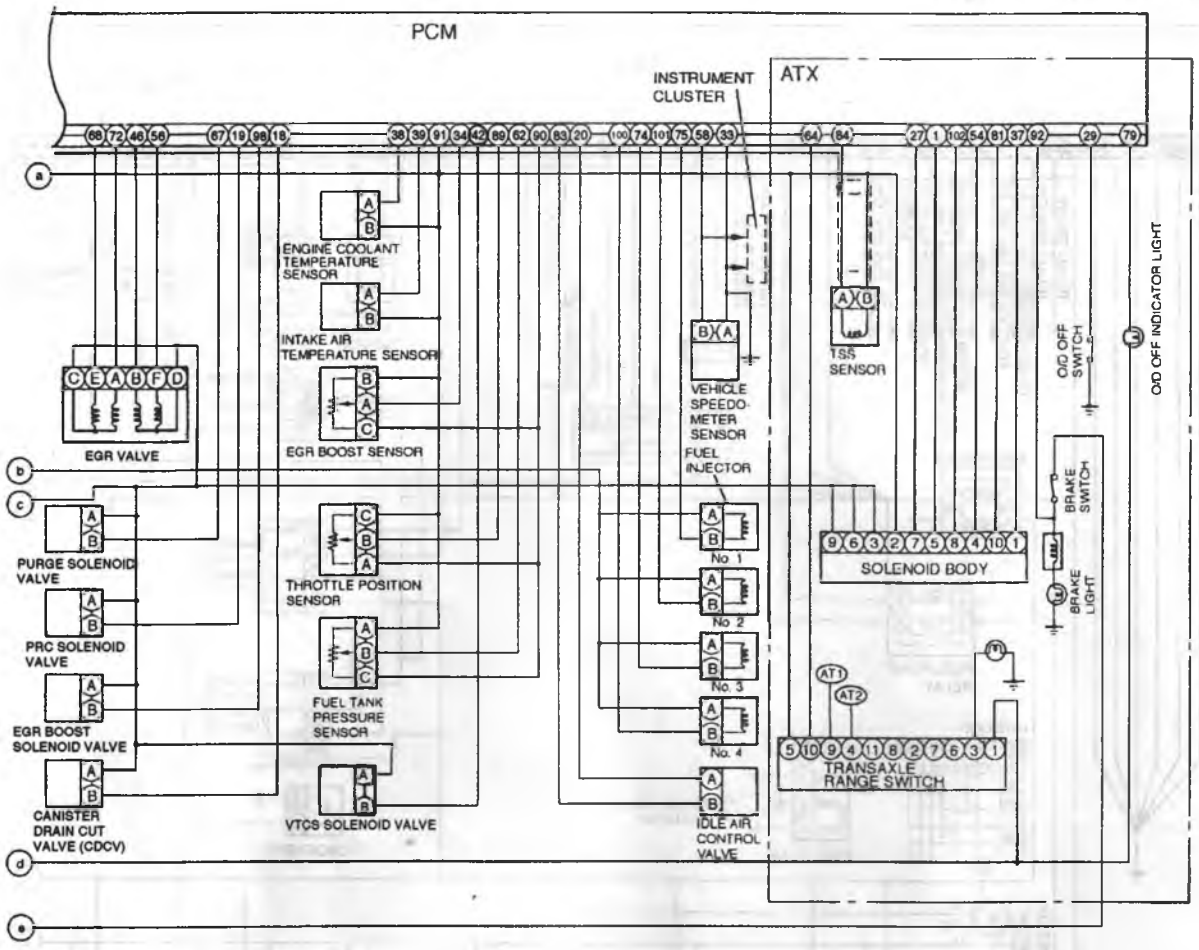




Z6U0102W173

Without immobilizer system





Z6U0102W173

CONTROL SYSTEM DEVICE AND CONTROL RELATIONSHIP CHART [FS]

Z6U010218881W02

× : Applicable

	Component	Item												
		Idle air control	Variable tumble control system (VTCS) control*2	Fuel injection control	Fuel pump control	Pressure regulator control (PRC)	Electronic spark advance (ESA) control	EGR control	Purge control	Heated oxygen sensor (HO2S) heater control	A/C cut-off control	Electrical fan control	Monitoring system	
													Evaporative system monitor	EGR system monitor
Input	Mass air flow sensor	×		×			×	×	×				×	×
	Camshaft position sensor			×*			×*						×*	×*
	Crankshaft position sensor	×	×	×*	×	×	×*	×	×		×	×	×*	×*
	Throttle position sensor	×	×	×		×	×	×	×		×		×	×
	Engine coolant temperature sensor	×	×	×		×	×	×	×		×	×	×	×
	Intake air temperature sensor	×		×		×	×		×	×		×	×	
	Knock sensor			×			×							
	Heated oxygen sensor			×					×					
	Vehicle speed sensor			×				×	×			×	×	×
	EGR boost sensor												×	×
	Fuel gauge sender unit												×	
	Power steering pressure switch	×		×						×				
	Neutral switch (MTX only)	×		×		×	×	×	×					
	Clutch switch (MTX only)	×		×		×	×	×	×					
	Transaxle range switch (ATX only)	×		×		×	×	×	×					
	Brake switch	×		×										
	Ignition switch												×	
	A/C switch, Refrigerant pressure switch (A/C equipped only)	×		×							×	×		
Output	Idle air control valve	×												
	VTCS solenoid valve		×											
	Fuel injector			×										
	Fuel pump relay				×									
	CPU					×								
	Ignition coil						×							
	EGR valve							×						
	Purge solenoid valve								×					
	Heated oxygen sensor heater									×				
	EGR boost sensor solenoid valve													×
	Canister drain cut valve (CDCV)												×	
	A/C relay										×			
	Cooling fan relay											×		
	Condenser fan relay											×		

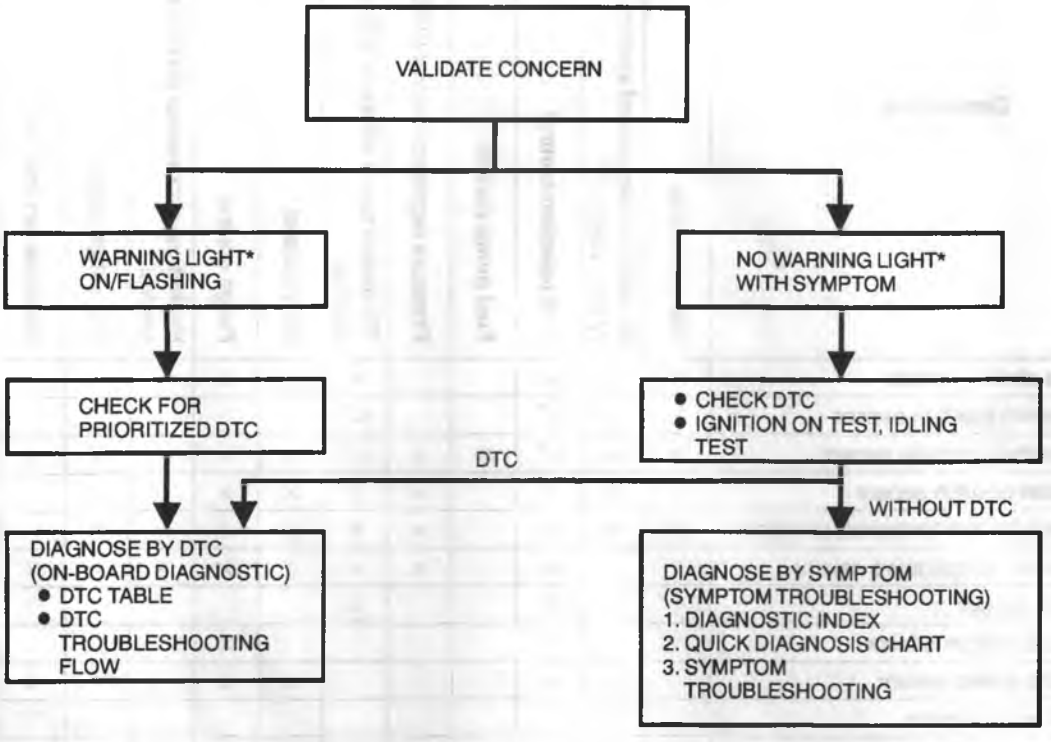
* : The crankshaft position sensor signal has priority in the engine speed detection.

Z6U0102W176

FOREWORD [FS]

Z6U010218881W03

- When the customer reports a vehicle malfunction, check the malfunction indicator lamp (MIL) indication and diagnostic trouble code (DTC), then diagnose the malfunction according to following flowchart.
  - —If the DTC exists, diagnose the applicable DTC inspection. (See 01-02A-24 DTC TABLE [FS].)
  - —If the DTC does not exist and the MIL does not illuminate or flash, diagnose the applicable symptom troubleshooting. (See 01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS].)



Z6U0102W316

* : Malfunction Indicator lamp (MIL), Generator Warning Light, Security Light

OBD-II DESCRIPTIONS [FS]

Z6U010218881W04

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

OBD-II GENERIC FUNCTION [FS]

Z6U010218881W05

- Use these functions by selecting "GENERIC OBD II FUNCTIONS" from the NGS tester menu screen. These functions enable you to monitor on-board diagnostic system data and 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".

OBD-II SPECIFIC FUNCTION [FS]

Z6U010218881W06

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

OBD-II PENDING TROUBLE CODES [FS]

Z6U010218881W07

- 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 stores the DTC.

OBD-II FREEZE FRAME DATA [FS]

Z6U010218881W08

- 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.

OBD-II ON-BOARD SYSTEM READINESS TEST [FS]

Z6U010218881W09

- 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.

OBD-II DIAGNOSTIC MONITORING TEST RESULTS [FS]

Z6U010218881W10

- 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.

OBD-II READ/CLEAR DIAGNOSTIC TEST RESULTS [FS]

Z6U010218881W11

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

OBD-II PARAMETER IDENTIFICATION (PID) ACCESS [FS]

Z6U010218881W12

- 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.

KEY ON ENGINE OFF (KOEO) SELF-TEST [FS]

Z6U010218881W13

- Key On Engine Off (KOEO) Self-Test is a functional test of the powertrain control module performed on demand with the key on and the engine off. This test will perform checks on certain sensor and actuator circuits. A fault must be present at the time of testing for the KOEO Self-Test to detect the fault. When a fault is detected, a Diagnostic Trouble Code (DTC) will be output on the data link at the end of the test when requested by a scan tool.

KEY ON ENGINE RUNNING (KOER) SELF-TEST [FS]

Z6U010218881W14

- Key On Engine Running (KOER) Self-Test is a functional test of the powertrain control module performed on demand with the key on engine running and vehicle stopped. A check of certain inputs and outputs is made during operating conditions and at normal temperature. The brake pedal position, transmission control and power steering switch tests are part of KOER On-Demand Self-Test and MUST be performed during this operation if applicable. These are described below. A fault must be present at the time of testing KOER On-Demand Self-Test to detect the fault. When a fault is detected, a Diagnostic Trouble Code (DTC) will be output on the data link at the end of the test when requested by a scan tool.

Brake On/Off Test

- This tests the ability of the powertrain control system to detect a change of state in the stoplight switch. Brake pedal MUST briefly be applied and released on all vehicles equipped with Brake Pedal Position input. This is done during KOER On-Demand Self-Test.

Transaxle Control Switch Test

- This tests the ability of the powertrain control system to detect a change of state in the O/D OFF switch. Switch MUST briefly be cycled on all vehicles equipped with O/D OFF switch. This is done during KOER On-Demand Self-Test.

Power Steering Pressure (PSP) Switch Test

- This tests the ability of the powertrain control system to detect a change in power steering fluid pressure. The steering wheel MUST briefly be turned at least 1/4 of a revolution on vehicles equipped with a power steering pressure (PSP) switch or sensor. This is done during KOER On-Demand Self-Test.

CONTINUOUS MEMORY SELF-TEST

Z6U010218881W15

- Testing for Continuous Memory DTCs is a functional test of the powertrain control module performed under any condition (engine running or off) with the key on. Unlike the KOEO and KOER self tests, which can only be activated on demand, the Continuous Self Test is always active. A fault does not need to be present at the time of testing for Continuous DTCs and is therefore, especially valuable when diagnosing intermittent faults. This test will detect failures contributing to drivability or emission concerns. The vehicle may need to be driven or the OBD-II Drive Cycle completed to allow the PCM to detect a fault. When a fault is stored in memory, a Diagnostic Trouble Code (DTC) will be output on the data link at the end of the test when requested by a scan tool.
- There are two types of Continuous DTCs. The first type is an emission related malfunction indicator lamp (MIL) code in the instrument cluster. The second is a non emission related non-MIL code which will never illuminate the cluster indicator.
- For emission related MIL codes, the PCM will store the DTC in continuous memory when a fault is detected for the first time. At this point the DTC will not illuminate the MIL and is now considered a pending code. The purpose of pending codes is to assist in repair verification by reporting a pending DTC after one drive cycle. If the same fault is detected after the next ignition start-run cycle, the emission related MIL code will illuminate the MIL. The MIL will remain on even if the fault is intermittent. The MIL will be extinguished if the fault is not present through three consecutive drive cycles or a PCM reset is performed. Also, an emission related pending MIL and non emission related non-MIL code will be erased after approximately 40-80 vehicle warm-up cycles or a PCM reset.
- Any scan tool that meets OBD-II requirements can access Continuous Memory to retrieve emission related MIL DTCs. However, not all scan tools access pending and non emission related non-MIL DTCs in the same way. If using the NGS tester, all MIL (including pending) and non-MIL codes are retrieved together on the same screen.
- During most diagnostic procedures in this manual, it is required that all DTCs be retrieved and cleared. Consult the instruction manual from the tool manufacturer for specific instructions.

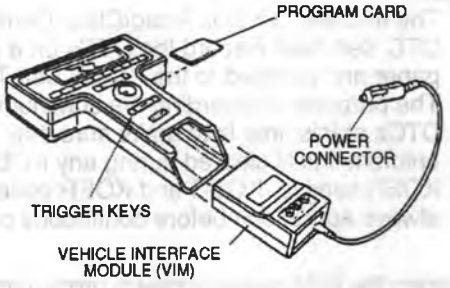
ON-BOARD DIAGNOSTIC TEST [FS]

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NGS Tester Hook-up Procedure

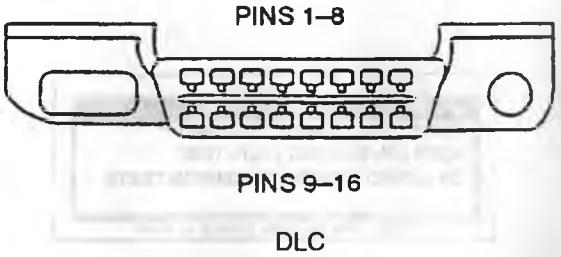
Note
- Make sure the ignition key is OFF.

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



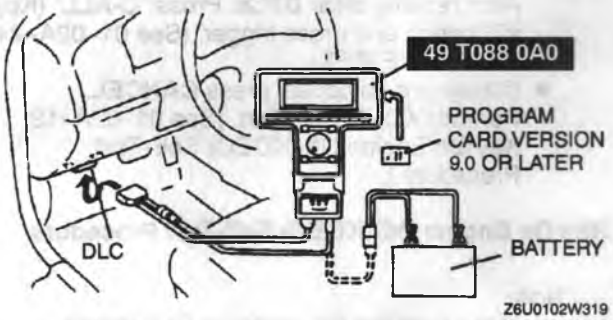
Z6U0102W317

2. Plug the NGS OBD-II adapter into the vehicle interface module and the large 16-pin connector into the vehicle DLC located under the dashboard on the left side of the steering shaft.



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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.

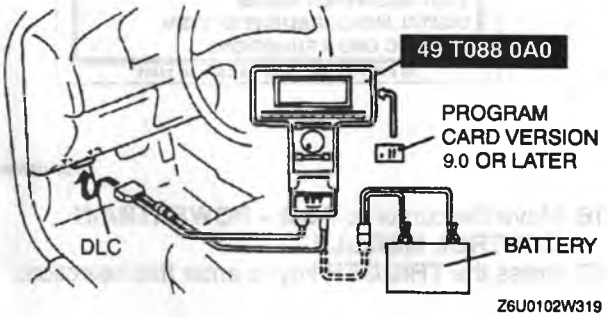


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4. Listen for a double beep. The NGS tester is now initialized. Begin the powertrain control system functional test.

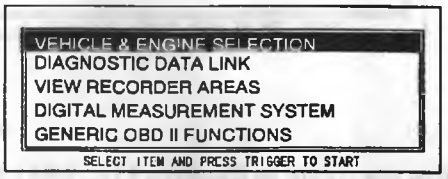
DTCs Reading Procedure

1. Start engine and keep it running.
   - If engine will not start, turn the ignition key to ON (Engine OFF) during the procedure.
2. Perform the necessary vehicle preparation and visual inspection.
3. Hook the NGS tester up to the vehicle.



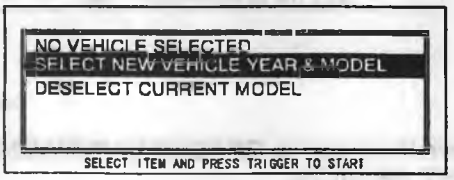
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4. Move the cursor to **VEHICLE & ENGINE SELECTION**.
5. Press the **TRIGGER** key to enter this selection.



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6. Move the cursor to **SELECT NEW VEHICLE YEAR & MODEL**.
7. Press the **TRIGGER** key to enter this selection.



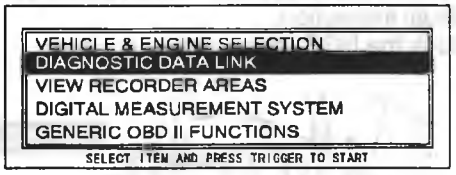
Z6U0102W321

8. Move the cursor to **2001-VIN#10:Z**.
9. Press the **TRIGGER** key to enter this selection.
10. Move the cursor to the appropriate model.
11. Press the **TRIGGER** key to choose the model.

Note
- Make sure the selected vehicle is correct.
- A vehicle selection screen showing the selected vehicle will be displayed.

12. Move the cursor to the vehicle selected.
13. Press the **TRIGGER** key.

14. Move the cursor to **DIAGNOSTIC DATA LINK** on the main menu screen.
15. Press the **TRIGGER** key to enter into menu system diagnostics.



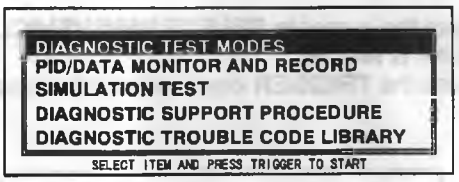
Z6U0102W322

16. Move the cursor to **PCM - POWERTRAIN CONTROL MODULE**.
17. Press the **TRIGGER** key to enter this selection.



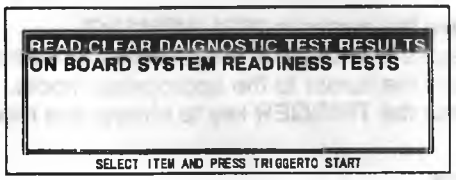
Z6U0102W323

18. Move the cursor to **DIAGNOSTIC TEST MODES**.
19. Press the **TRIGGER** key to enter this selection.



Z6U0102W324

20. Move the cursor to **READ/CLEAR DIAGNOSTIC TEST RESULTS**.
21. Press the **TRIGGER** key to enter this selection.



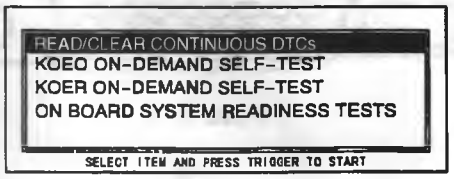
Z6U0102W325

22. Press **START**.
23. Retrieve DTCs as follows:
    (1) Continuos DTCs (See 01-02A-12 Read/Clear Continuous DTCs Self-Test Procedure.)
    (2) KOEO DTCs (See 01-02A-12 Key On Engine Off (KOEO) Self-Test Procedure)
    (3) KOER DTCs (See 01-02A-13 Key On Engine Running (KOER) Self-Test Procedure)

Read/Clear Continuous DTCs Self-Test Procedure

Note
- The first test to run is Read/Clear Continuous DTC Self-Test. Record the DTCs on a piece of paper and proceed to the KOEO Self-Test.
- The purpose of recording the continuous DTCs at this time is to make sure they are not unintentionally cleared during any KOEO or KOER service. KOEO and KOER codes are always addressed before continuous codes.

1. Perform the NGS tester hook-up procedure. (See 01-02A-11 NGS Tester Hook-up Procedure.)
2. Perform the "Reading DTCs Procedure". (See 01-02A-11 DTCs Reading Procedure.)
3. Move the cursor to READ/CLEAR DIAGNOSTIC TEST RESULTS.
4. Press the trigger key to enter this selection.



Z6U0102W326

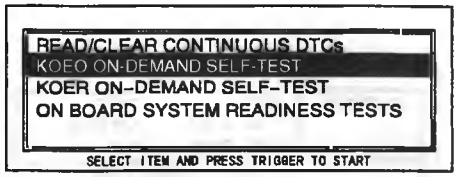
5. Press **START**.
6. Follow operating instruction from the menu.
   - If there are DTC(s), refer to Diagnostic Trouble Code Table for further diagnosis information. After repairs, clear DTCs. Press "**C-ALL**" (Key #7) button and press trigger. (See 01-02A-24 DTC TABLE [FS].)
   - If there are no codes, press **CANCEL**. Perform KOEO Self-Test. (See 01-02A-12 Key On Engine Off (KOEO) Self-Test Procedure.)

Key On Engine Off (KOEO) Self-Test Procedure

Note
- Make sure the A/C switch is OFF during KOEO Self-Test. If the A/C switch is ON during this test, DTC P1464 will be indicated on the NGS tester.

1. Perform the NGS tester hook-up procedure. (See 01-02A-11 NGS Tester Hook-up Procedure.)
2. Perform the "Reading DTCs Procedure". (See 01-02A-11 DTCs Reading Procedure.)

3. Move the cursor to **KOEO ON-DEMAND SELF-TEST**.
4. Press the trigger key to enter this selection.



Z6U0102W327

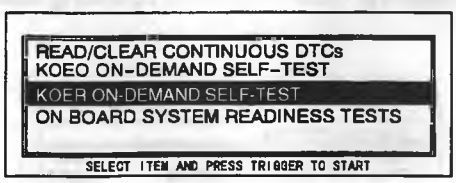
5. Note any KOEO DTCs.
6. Press **CANCEL**. Perform KOER Self-Test.

Key On Engine Running (KOER) Self-Test Procedure

Note

- Make sure the A/C switch is OFF during KOER Self-Test. If the A/C switch is ON during this test, DTC P1464 will be indicated on the NGS tester.
- The brake pedal must be depressed and released after KOER Self-Test is initiated. If not performed, DTC P1703 will be indicated on the NGS tester.
- The steering wheel must be turned to the right and left after KOER Self-Test is initiated. If not performed, DTC P1650 will be indicated on the NGS tester.
- The O/D OFF switch must be pushed and released after KOER Self-Test is initiated. If not performed, DTC P1780 will be indicated on the NGS tester.
- Start the engine and bring up to normal operating temperature before running the KOER Self-Test.

1. Perform the NGS tester hook-up procedure. (See 01-02A-11 NGS Tester Hook-up Procedure.)
2. Perform the "Reading DTCs Procedure". (See 01-02A-11 DTCs Reading Procedure.)
3. Move the cursor to **KOER ON-DEMAND SELF-TEST**.
4. Press the trigger to enter this selection.



Z6U0102W328

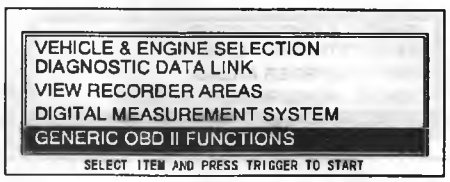
5. Start engine and bring up to normal operating temperature. Press **START**.
6. Follow operating instruction from the menu and perform Brake On/Off (BOO), O/D OFF switch and PSP cycling test, if equipped.
7. Note any KOER DTCs.
8. Press **CANCEL** several times to return to the main menu.

Pending Trouble Code Access Procedure

Note

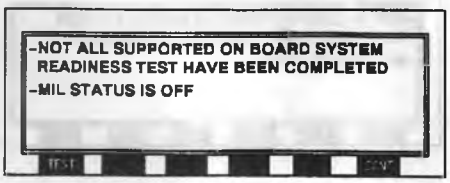
- Start engine and keep it running. If engine will not start, turn the ignition key to ON (Engine OFF) during the procedure.

1. Perform the NGS tester hook-up procedure. (See 01-02A-11 NGS Tester Hook-up Procedure.)
2. Move the cursor to **GENERIC OBD II FUNCTIONS**.
3. Press the **TRIGGER** key to enter this selection.



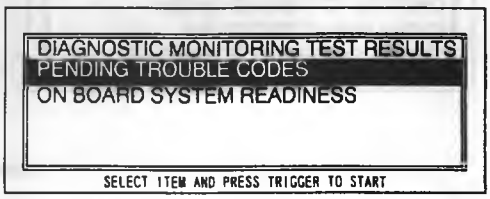
Z6U0102W329

4. Press **CONT**.



Z6U0102W330

5. Turn the menu dial clockwise to scroll the screen.
6. Move the cursor to **PENDING TROUBLE CODES**.
7. Press the **TRIGGER** key to enter this selection.

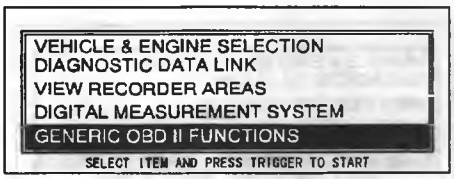


Z6U0102W331

8. Press **START**.
9. Retrieve **PENDING TROUBLE CODES.**

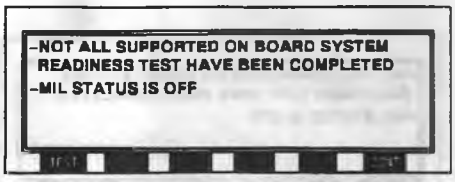
Note
- If the "**NO DTCS AVAILABLE/NO RESPONSE**" message is shown on the screen, be sure to run the **PID/DATA MONITOR** in **GENERIC OBD II FUNCTIONS** and confirm that the "**LINK COMMUNICATION ERROR. MODULE NOT RESPONDING. CHECK IGNITION STATUS AND CABLE CONNECTIONS**" message does not appear.

Freeze Frame PID Data Access Procedure
1. Perform the NGS tester hook-up procedure. (See 01-02A-11 NGS Tester Hook-up Procedure.)
2. Move the cursor to **GENERIC OBD II FUNCTIONS**.
3. Press the **TRIGGER** key to enter this selection.



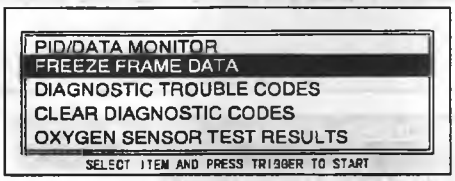
Z6U0102W329

4. Press **CONT**.



Z6U0102W330

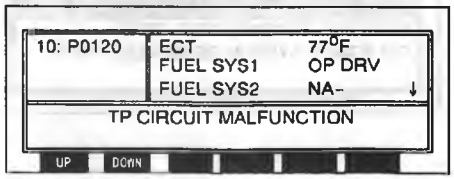
5. Move the cursor to **FREEZE FRAME PID DATA**.
6. Press the **TRIGGER** key to enter this selection.



Z6U0102W332

7. 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**".



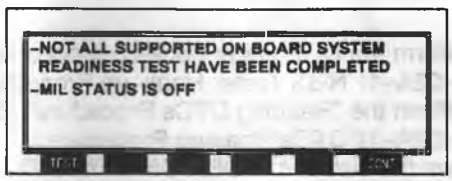
Z6U0102W333

On-Board System Readiness Tests Access Procedure
1. Perform the NGS tester hook-up procedure. (See 01-02A-11 NGS Tester Hook-up Procedure.)
2. Move the cursor to **GENERIC OBD II FUNCTIONS**.
3. Press the **TRIGGER** key to enter this selection.



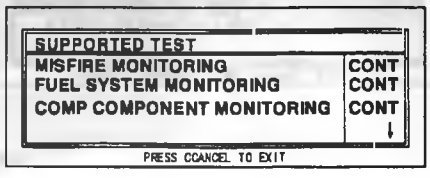
Z6U0102W329

4. Press **TESTS**.



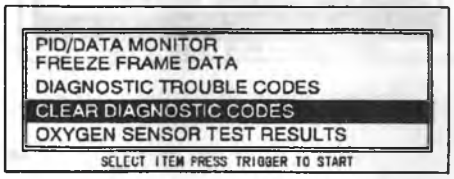
Z6U0102W330

5. Monitor the OBD-II systems operating status.



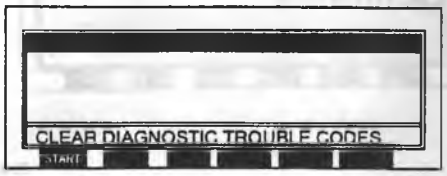
Z6U0102W334

6. 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 OBD II FUNCTIONS**.
   (3) Press the **TRIGGER** key to enter this selection.
   (4) Press **CONT**.
   (5) Move the cursor to **CLEAR DIAGNOSTIC CODES**.
   (6) Press the **TRIGGER** key to enter this selection.



Z6U0102W335

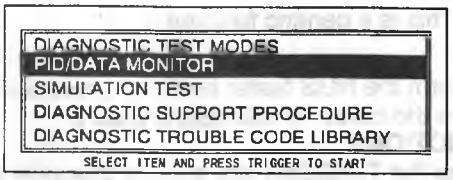
   (7) Press **START**.



Z6U0102W336

PID/DATA Monitor and Record Procedure

1. Perform the NGS tester hook-up procedure. (See 01-02A-11 NGS Tester Hook-up Procedure.)
2. Perform the "Reading DTCs Procedure". (See 01-02A-11 DTCs Reading Procedure.)
3. Turn the ignition key to ON (Engine OFF) or start engine.
4. Move the cursor to **PID/DATA MONITOR AND RECORD**.
5. Press the **TRIGGER** key to enter this selection.

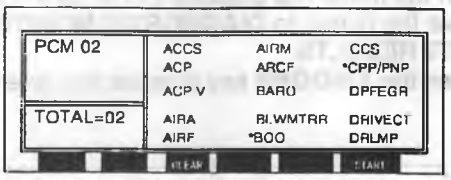


Z6U0102W337

6. Move the cursor to PID values to view.
7. Press the **TRIGGER** key. A star symbol will appear next to the item when it is selected.

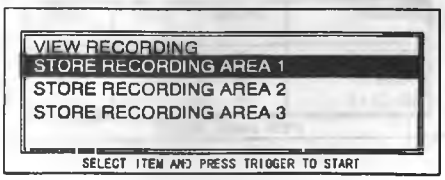
Note

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



Z6U0102W338

8. Press **START** to begin.
9. When ready to capture and store the selected PIDs, press the **TRIGGER** key.
10. Press the **TRIGGER** key again when ready to save information.
11. Move the cursor to **STORE RECORDING AREA 1**.
12. Press the **TRIGGER** key.



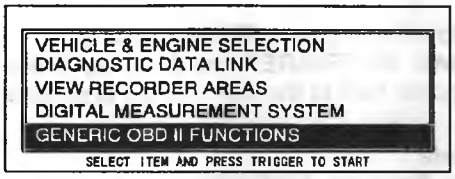
Z6U0102W339

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

Diagnostic Monitoring Test Results Access Procedure

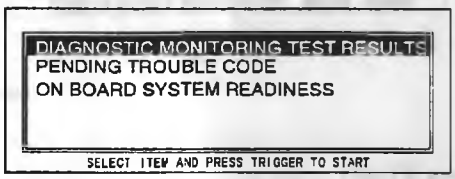
Note
- This is a generic function.

1. Perform the NGS tester hook-up procedure.
2. Move the cursor to **GENERIC OBD II FUNCTIONS**.
3. Press the **TRIGGER** key to enter this selection.



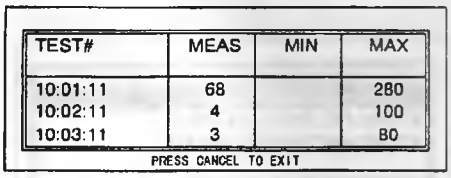
Z6U0102W329

4. Press **CONT**.
5. Turn the menu dial clockwise to scroll the screen.
6. Move the cursor to **DIAGNOSTIC MONITORING TEST RESULTS**.
7. Press the **TRIGGER** key to enter this selection.



Z6U0102W340

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

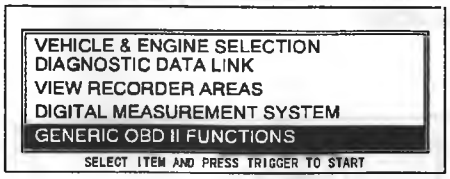


Z6U0102W341

Oxygen Sensor Test Results Access Procedure

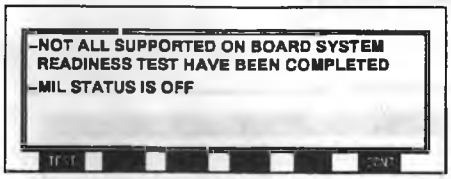
Note
- This is a generic function.

1. Perform the NGS Tester Hook-up Procedure.
2. Move the cursor to **GENERIC OBD II FUNCTIONS**.
3. Press the **TRIGGER** key to enter this selection.



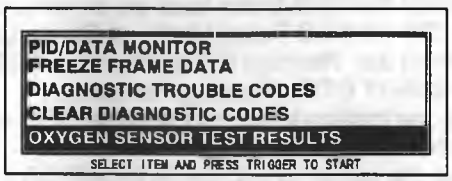
Z6U0102W329

4. Press **CONT**.



Z6U0102W330

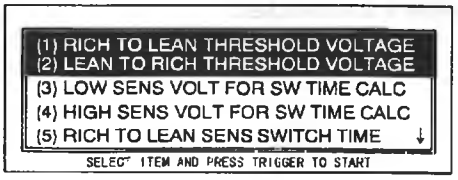
5. Move the cursor to **OXYGEN SENSOR TEST RESULTS**.
6. Press the **TRIGGER** key to enter this selection.



Z6U0102W342

7. Select **RICH TO LEAN THRESHOLD VOLTAGE** or **LEAN TO RICH THRESHOLD VOLTAGE**.

8. Press the **TRIGGER** key.



Z6U0102W343

9. Read voltage.

BAMK	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			

Z6U0102W344

10. Press the cancel key.

DTC CONFIRMATION PROCEDURE [FS]

Z6U010218881W17

STEP	INSPECTION		ACTION
1	**RECORD CONTINUOUS MEMORY DTC AND FREEZE FRAME DATA** • Turn ignition key to ON (Engine OFF). • Connect NGS tester to DLC. • Retrieve all stored DTCs. • Are there any DTCs present?	Yes	Record all stored DTCs (Continuous Memory DTC) and Freeze Frame Data on repair order, then go to next step.
		No	Go to next step.
2	**VERIFY RELATED REPAIR INFORMATION** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
3	**PERFORM KEY ON ENGINE OFF (KOEO) SELF-TEST** • Start engine. • Warm up engine completely. • Turn off all electrical loads. • Perform KOEO SELF-TEST PROCEDURE. (See 01-02A-9 KEY ON ENGINE OFF (KOEO) SELF-TEST [FS]) • Are there any KOEO DTCs present?	Yes	Repair KOEO DTC. (See01-02A-24 DTC TABLE [FS])
		No	Go to next step.
4	**PERFORM KEY ON ENGINE RUNNING (KOER) SELF-TEST** • Start engine. • Perform KOER SELF-TEST PROCEDURE. (See 01-02A-10 KEY ON ENGINE RUNNING (KOER) SELF-TEST [FS]) • Are there any KOER DTCs present?	Yes	Repair KOER DTC. (See01-02A-24 DTC TABLE [FS]
		No	• If Continuous Memory DTC is present at Step 1, return to applicable DTC troubleshooting procedure step. • If Continuous Memory DTC is not present at Step 1, go to symptom troubleshooting.

OBD II DRIVE MODE [FS]

Z6U010218881W18

OBD II Drive Mode Outline

Performing the drive mode checks the OBD II system for proper operation and must be performed to ensure that no additional DTCs are present. During drive mode, the following systems are checked:

- EGR system
- Oxygen sensor (HO2S) and Oxygen sensor heater
- Catalytic converter (TWC)
- Fuel, misfire and evaporative emission (EVAP) control system

You have two options for conducting OBD II drive mode:

- Standard drive mode
- Individual system repair verification drive mode

Caution

- **While performing the drive mode, always operate the vehicle in a safe and lawful manner.**
- **When the NGS tester is used to observe monitor system status while driving, be sure to have another technician with you, or record the data in the NGS tester by using the PID/DATA MONITOR AND RECORD function and check later.**

Note

- Vehicle speed and engine speed detected by the PCM may differ from that indicated by the speedometer and tachometer. Use the NGS tester to monitor vehicle speed.
- Once started, the engine must not be turned "OFF" during the drive mode.
- NGS tester can be used at anytime through the course of drive mode to monitor the completion status. Monitoring can be done by viewing the ON BOARD SYSTEM READINESS menu or TRIP PID.

Drive Mode Implementation Condition

Each OBD II system is monitored (for less than 1 minute) when the specifications below are met.

Note

- HO2S/TWC monitoring will begin **5 minutes** after starting the engine.
- EVAP system monitoring will begin **4 minutes** from engine start, and quit monitoring after **10 minutes**. If monitoring is required after **10 minutes**, the engine must be turned off, then restarted.

PID	Description	EGR	HO2S/TWC	Misfire	Fuel control	EVAP
VSS km/h {mph}	Vehicle speed	77—204 {48—127}	48—204 {30—127}	N/A	N/A	61—104 {38—65}
RPM rpm	Engine speed	AT:1,800—2,500 MT:1,900—2,800	1,400—3,000	500—6,500	1,000—2,500	N/A
LOAD %	Engine load value	28—50	20—40	20	N/A	15—80
IAT °C {°F}	Intake air temperature	Above 10 {50}	Below 76 {170}	N/A	Above -12 {10}	-6.7—37.6 {20—100}
ECT °C {°F}	Engine coolant temperature	Above 74 {165}	80—115 {175—240}	Below 115 {240}	26—110 {78—230}	N/A
FLI %	Fuel level	N/A	above 15	Above 15	N/A	15—85

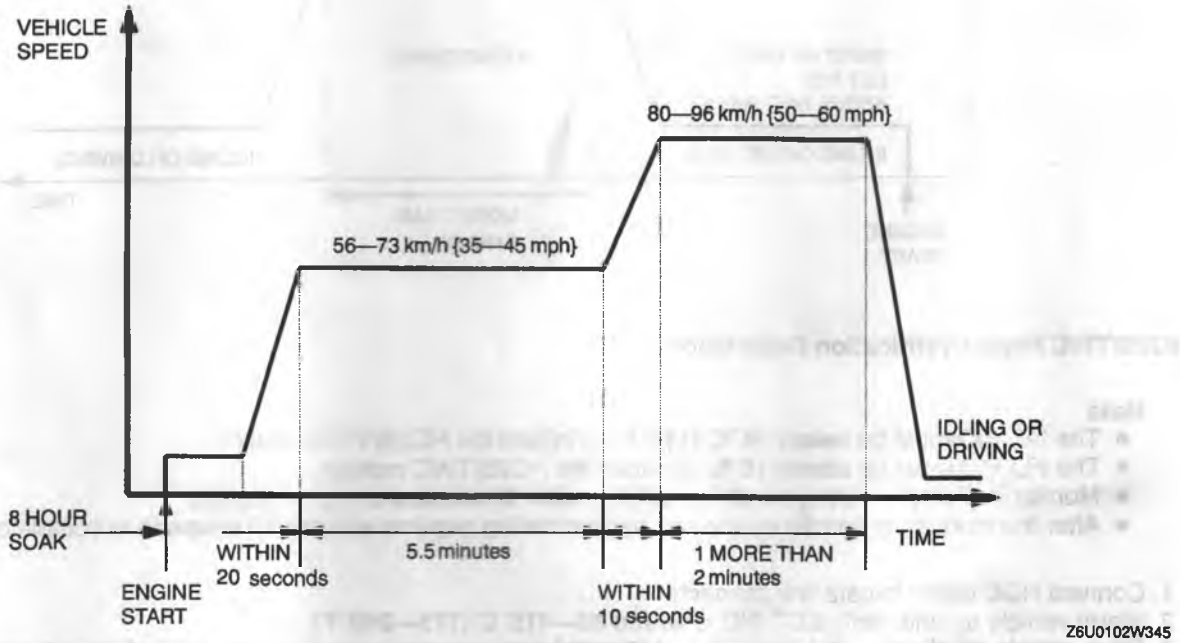
Standard Drive Mode

1. Cold soak the vehicle for at least 8 hours before performing the EVAP test.

Note

- When the 8-hour-timer bypass procedure is performed, the cold soak period can be shorten up to **3 hours** depending on vehicle conditions. If you shorten the soak period, the PCM may detect malfunction by mistake even though the EVAP system has been repaired correctly. This misdiagnosis will happen more often under warm or hot ambient temperature. If you are not sure whether the system still have malfunction, soak **8 hours** and perform the drive mode again. If malfunction is not detected, the repair is completed.

2. Connect NGS tester to data link connector.
3. Turn off all accessory load (A/C, headlights, blower fan, etc.).
4. Start engine.
5. Drive vehicle and accelerate to **65 km/h {40mph} within 20 seconds**.
6. Drive vehicle at **56—73 km/h {35—45mph}** for **5.5 minutes**.
7. Accelerate to **80—96 km/h {50—60 mph} within 10 seconds** and drive vehicle for at least 2 minutes.
8. Return to idle for at **least 20 seconds**.
9. Stop vehicle and access to "ON BOARD SYSTEM READINESS" menu of "GENERIC OBD II FUNCTION" to check the drive mode completion status.
   - If completed, RFC changes from "NO" to "YES".
   - If not completed, turn the ignition key to off then repeat Steps 4 to 9 at least one more time.
10. Access to "DIAGNOSTIC MONITORING TEST RESULTS" menu of "GENERIC OBD II FUNCTIONS" to check the monitor results. If "MEAS" are not within specification, repair has not completed.
11. Verify no DTCs are available.



8-hour Timer Bypass Procedure

Note

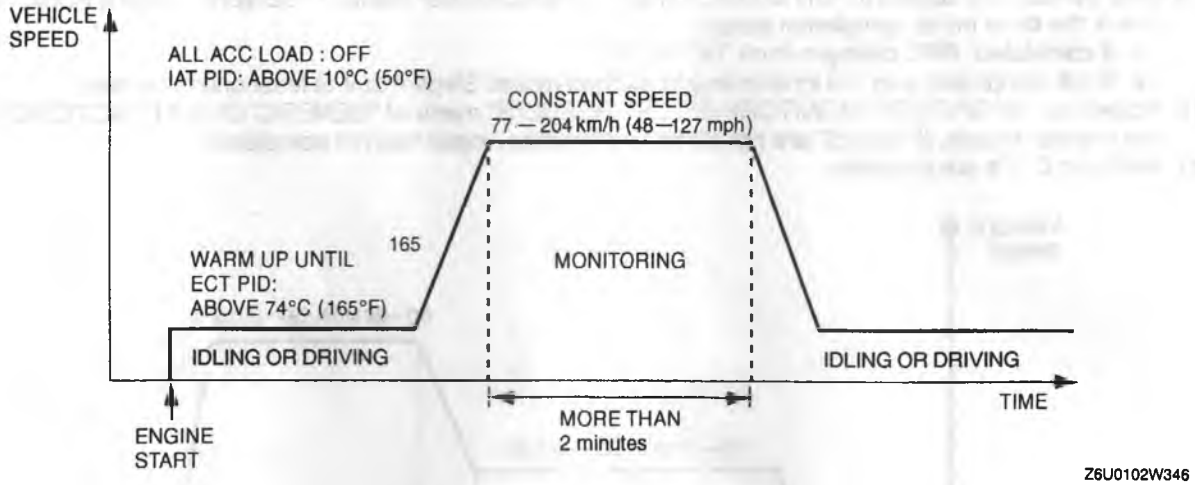
- When 8-hour-timer is bypassed, PCM may misdiagnose the EVAP system if fuel temperature is warm. It is important to cool down the fuel tank as much as possible during the shortened soak period.

1. Connect NGS tester and turn the ignition to ON.
2. Access to "CLEAR DIAGNOSTIC CODES" menu of "GENERIC OBD II FUNCTIONS".
3. Press the "TRIGGER" to reset the 8-hour-timer.
4. Leave the ignition key to ON position.
5. Follow the drive mode procedure.

EGR System Repair Verification Drive Mode

Note
- The IAT PID must be **above 10°C {50°F}** to initiate the EGR monitor.
- After the monitoring conditions are set, system testing requires **at least 30 seconds** to complete.

1. Connect NGS tester to data link connector.
2. Warm vehicle up to at least an engine coolant temperature (ECT PID) of **74°C {165°F}**.
3. Verify all accessory loads (A/C, P/S, headlight, blower fan) are off.
4. Drive vehicle **within 77—204 km/h {48—127 mph}** and maintain a constant speed for **at least 2 minutes**.
5. Return to idle for **at least 20 seconds**.
6. Stop vehicle and access to "ON BOARD SYSTEM READINESS" menu of "GENERIC OBD II FUNCTION" to check the drive mode completion status.
   - If completed, RFC changes from "NO" to "YES".
   - If not completed, turn the ignition key to off then repeat steps 3 to 6 at least one more time.
7. Access to "DIAGNOSTIC MONITORING TEST RESULTS" menu of "GENERIC OBD II FUNCTIONS" to check the monitor results. If "MEAS" are not within specification, repair has not completed.
8. Verify no DTCs are available.

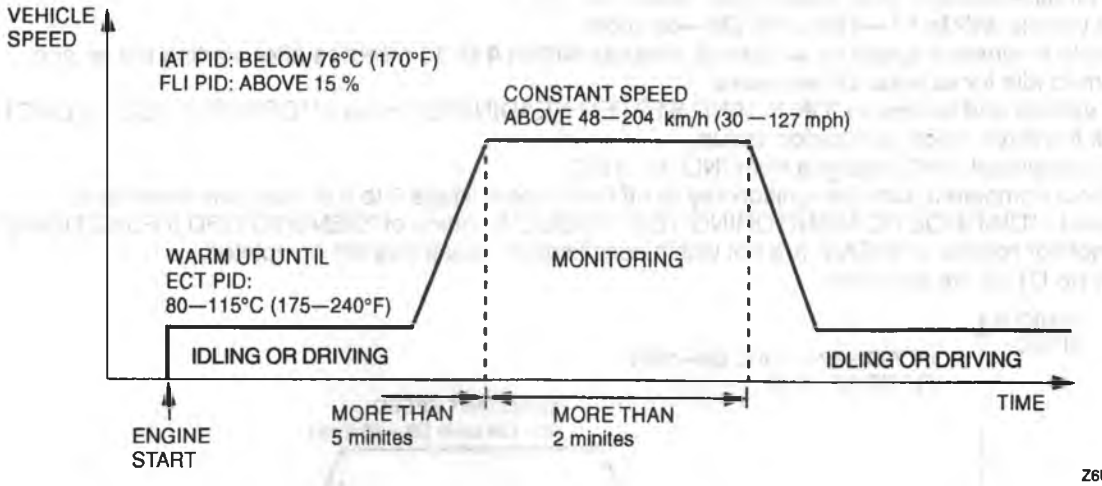


HO2S/TWC Repair Verification Drive Mode

Note
- The IAT PID must be **below 76°C {170°F}** to initiate the HO2S/TWC monitor.
- The FLI PID must be **above 15 %** to initiate the HO2S/TWC monitor.
- Monitor implement waiting condition will start **after 5 minutes** of engine started.
- After the monitoring conditions are set, system testing requires **at least 30 seconds** to complete.

1. Connect NGS tester to data link connector.
2. Warm vehicle up and verify ECT PID is **within 80—115°C {175—240°F}**.
3. Drive vehicle **within 48—204 km/h {30—127 mph}** and maintain a constant speed for **at least 2 minutes**.
4. Return to idle for **at least 20 seconds**.
5. Stop vehicle and access to "ON BOARD SYSTEM READINESS" menu of "GENERIC OBD II FUNCTION" to check the drive mode completion status.
   - If completed, RFC changes from "NO" to "YES".
   - If not completed, turn the ignition key to off then repeat Steps 3 to 5 at least one more time.
6. Access to "DIAGNOSTIC MONITORING TEST RESULTS" menu of "GENERIC OBD II FUNCTIONS" to check the monitor results. If "MEAS" are not within specification, repair has not completed.

7. Verify no DTCs are available.

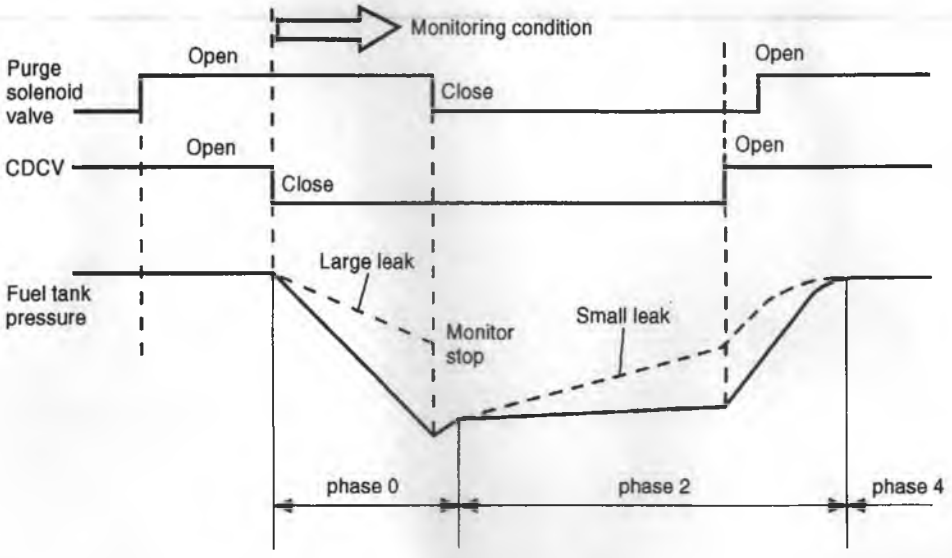


Z6U0102W347

EVAP System Repair Verification Drive Mode

Note

- The IAT PID must be **within -6.7—37.6°C {20—100°F}** to initiate the EVAP system monitor.
- The FLI PID must be **within 15—85 %** to initiate the EVAP system monitor.
- The drive mode conditions (shown in the table) must be met **within 4 to 10 minutes** after starting the engine. If the time exceeds 10 minutes, turn the ignition key "OFF" to reset the timer then restart engine.
- After the monitoring conditions are set, system testing requires **at least 30 seconds** to complete.
- Fuel tank pressure will change as follows during monitoring.



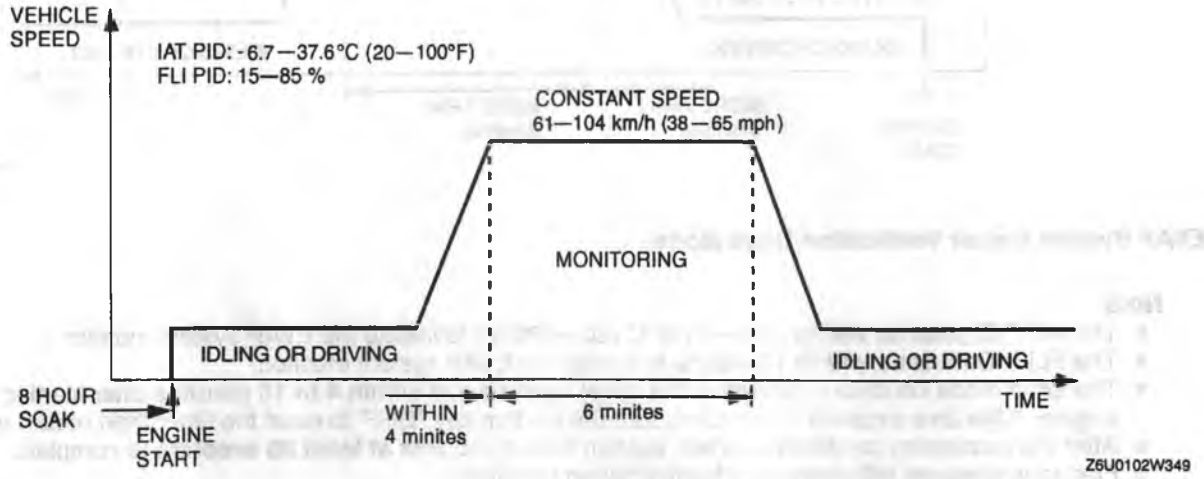
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1. Cold soak the vehicle for **at least 8 hours**.

Note

- The cold soak period can be shorten up to **3 hours** depending on vehicle conditions when the 8-hour-timer bypass procedure is performed. If you shorten the soak period, the PCM may detect malfunction by mistake even though the EVAP system has been repaired correctly. This misdiagnosis will happen more often under warm or hot ambient temperature. If you are not sure whether the system still have malfunction, soak **8 hours** and perform the drive mode again. If malfunction is not detected, the repair is completed.

2. Connect NGS tester to data link connector.
3. Turn off all accessory (A/C, head lights, blower fan, etc.).
4. Drive vehicle **within 61—104 km/h {38—65 mph}**.
5. Maintain a constant speed for **at least 2 minutes within 4 to 10 minutes** after starting the engine.
6. Return to idle for **at least 20 seconds**.
7. Stop vehicle and access to "ON BOARD SYSTEM READINESS" menu of "GENERIC OBD II FUNCTION" to check the drive mode completion status.
   - If completed, RFC changes from "NO" to "YES".
   - If not completed, turn the ignition key to off then repeat Steps 5 to 8 at least one more time.
8. Access to "DIAGNOSTIC MONITORING TEST RESULTS" menu of "GENERIC OBD II FUNCTIONS" to check the monitor results. If "MEAS" are not within specification, repair has not completed.
9. Verify no DTCs are available.



DIAGNOSTIC MONITORING TEST RESULTS [FS]

Z6U010218881W19

- The purpose of this test mode is to confirm the result of OBD-II monitor diagnostic test results. The result values stored when particular monitor is completed are displayed. If the monitor is not completed, initial value is displayed.

TEST ID	Description	Related system	Initial value (MEAS)	Minimum threshold	Maximum threshold	Actual calculation formula	Unit
10:02:11	Voltage amplitude between rich and lean	HO2S	1024	532	–	NGS reading × 0.0009765625	V
10:03:01	HO2S (Front) rich-to-lean response time		461	0	–		ms
10:03:02	HO2S (Rear) rich-to-lean response time		461	0	–		
10:10:11	Front HO2S switching time ratio	TWC	0	–	96	NGS reading × 0.015625	–
10:26:00	Fuel tank vacuum change during phase 0* of monitoring	EVAP	24704	24704	2816 0	NGS reading × 0.0001953	inH_2O
10:27:00	Fuel tank vacuum change during phase 2* of monitoring		32768	–	40960		
10:2A:00	Fuel tank vacuum change during phase 4* of monitoring		32768	–	33280		
10:4C:31	EGR boost sensor reading difference	EGR	3	3	–	NGS reading × 0.125	inHg
10:05:02	EGR boost sensor reading difference		3	–	8		
10:50:00	Total misfire number	Misfire	0	–	1507	NGS reading × 0.00001525879	times
10:53:01	Misfire rate per 200 revs for cylinder 1		0	–	0		%
10:53:02	Misfire rate per 200 revs for cylinder 2		0	–	0		
10:53:03	Misfire rate per 200 revs for cylinder 3		0	–	0		
10:53:04	Misfire rate per 200 revs for cylinder 4		0	–	0		
10:54:00	Highest misfire rate in 200 revs		0	–	0		
10:55:00	Highest misfire rate in 1000 revs		0	–	0		
10:56:00	Total ignition number during monitoring	EVAP	0	–	3000	NGS reading × 1	times

* : Refer to OBD II DRIVE MODE, EVAP System Repair Verification Drive Mode

DTC TABLE [FS]

Z6U010218881W20

×: Applicable

DTC	Condition	MIL	O/D OFF indicator light flashes	DC	*1Monitor item	On-demand self-test		Page
						KOEO	KOER	
P0102	MAF circuit low input	ON	NO	2	CCM	–	–	(See 01-02A-31 DTC P0102 [FS])
P0103	MAF circuit high input	ON	NO	2	CCM	×	–	(See 01-02A-34 DTC P0103 [FS])
P0106	BARO sensor circuit performance problem	ON	NO	2	CCM	–	–	(See 01-02A-36 DTC P0106 [FS])
P0107	BARO sensor circuit low input	ON	NO	2	CCM	–	–	(See 01-02A-38 DTC P0107 [FS])
P0108	BARO sensor circuit high input	ON	NO	2	CCM	–	–	(See 01-02A-40 DTC P0108 [FS])
P0112	IAT circuit low input	ON	NO	2	CCM	×	×	(See 01-02A-43 DTC P0112 [FS])
P0113	IAT circuit high input	ON	NO	2	CCM	×	×	(See 01-02A-45 DTC P0113 [FS])
P0116	ECT sensor performance problem	ON	NO	2	CCM	–	–	(See 01-02A-48 DTC P0116 [FS])
P0117	ECT circuit low input	ON	NO	2	CCM	×	×	(See 01-02A-50 DTC P0117 [FS])
P0118	ECT circuit high input	ON	NO	2	CCM	×	×	(See 01-02A-52 DTC P0118 [FS])
P0122	TP circuit low input	ON	NO	2	CCM	×	×	(See 01-02A-55 DTC P0122 [FS])
P0123	TP circuit high input	ON	NO	2	CCM	×	×	(See 01-02A-58 DTC P0123 [FS])
P0125	Insufficient ECT for CL fuel control	ON	NO	2	CCM	–	–	(See 01-02A-60 DTC P0125 [FS])
P0126	Coolant thermostat stuck open	ON	NO	2	THERMO STAT	–	–	(See 01-02A-61 DTC P0126, P0128 [FS])

DTC	Condition	MIL	O/D OFF indicator light flashes	DC	*1Monitor item	On-demand self-test		Page
						KOEO	KOER	
P0128	Coolant thermostat stuck open	ON	NO	2	THERMO STAT	–	–	(See 01-02A-61 DTC P0126, P0128 [FS])
P0133	HO2S (Front) circuit slow response	ON	NO	2	HO2S	–	–	(See 01-02A-64 DTC P0133 [FS])
P0135	HO2S heater (Front) circuit malfunction	ON	NO	2	HO2S heater	×	×	(See 01-02A-67 DTC P0135 [FS])
P0136	HO2S (Rear) circuit malfunction	ON	NO	2	HO2S	–	–	(See 01-02A-69 DTC P0136, P1137, P1138 [FS])
P0141	HO2S heater (Rear) circuit malfunction	ON	NO	2	HO2S heater	×	×	(See 01-02A-71 DTC P0141 [FS])
P0171	Fuel trim system too lean	ON	NO	2	Fuel	–	–	(See 01-02A-73 DTC P0171, P0172, P1130, P1131, P1132 [FS])
P0172	Fuel trim system too rich	ON	NO	2	Fuel	–	–	
P0230	Fuel pump primary circuit malfunction	–	NO	–	–	×	×	(See 01-02A-84 DTC P0230 [FS])
P0300	Random misfire detected	Flash/ ON	NO	1 or 2	Misfire	–	–	(See 01-02A-88 DTC P0300, P0301, P0302, P0303, P0304 [FS])
P0301	Cylinder 1 misfire detected	Flash/ ON	NO	1 or 2	Misfire	–	–	
P0302	Cylinder 2 misfire detected	Flash/ ON	NO	1 or 2	Misfire	–	–	
P0303	Cylinder 3 misfire detected	Flash/ ON	NO	1 or 2	Misfire	–	–	
P0304	Cylinder 4 misfire detected	Flash/ ON	NO	1 or 2	Misfire	–	–	
P0320	CKP sensor circuit malfunction	ON	NO	2	CCM	–	–	(See 01-02A-92 DTC P0320 [FS])
P0325	Knock sensor circuit malfunction	–	NO	2	CCM	–	×	(See 01-02A-94 DTC P0325 [FS])
P0340	CMP sensor circuit malfunction	ON	NO	2	CCM	–	–	(See 01-02A-96 DTC P0340 [FS])

DTC	Condition	MIL	O/D OFF Indicator light flashes	DC	*1Monitor Item	On-demand self-test		Page
						KOEO	KOER	
P0400	EGR flow malfunction	ON	NO	2	EGR	×	×	(See 01-02A-98 DTC P0400 [FS])
P0421	Warm-up catalyst system efficiency below threshold	ON	NO	2	Catalyst	–	–	(See 01-02A-102 DTC P0421 [FS])
P0442	EVAP control system leak detected (small leak)	ON	NO	2	Evaporative	–	–	(See 01-02A-107 DTC P0442 [FS])
P0443	EVAP control system purge control valve circuit malfunction	ON	NO	2	CCM	×	×	(See 01-02A-110 DTC P0443 [FS])
P0446	EVAP control system vent control malfunction	ON	NO	2	CCM	–	–	(See 01-02A-111 DTC P0446 [FS])
P0452	EVAP control system fuel tank pressure sensor low input	ON	NO	2	CCM	×	×	(See 01-02A-114 DTC P0452 [FS])
P0453	EVAP control system fuel tank pressure sensor high input	ON	NO	2	CCM	×	×	(See 01-02A-117 DTC P0453 [FS])
P0455	EVAP control system leak detected (gross leak)	ON	NO	2	Evaporative	–	–	(See 01-02A-120 DTC P0455 [FS])
P0460	Fuel gauge sender unit circuit malfunction	ON	NO	2	CCM	–	×	(See 01-02A-125 DTC P0460 [FS])
P0461	Fuel gauge sender unit circuit performance problem	ON	NO	2	CCM	–	–	(See 01-02A-128 DTC P0461 [FS])
P0500	VSS circuit malfunction	ON	NO	2	CCM	–	–	(See 01-02A-129 DTC P0500, P0503, P1501 [FS])
P0503	VSS circuit erratic malfunction	–	YES	1	CCM	–	–	
P0505	IAC system malfunction	–	NO	–	–	–	×	(See 01-02A-131 DTC P0505 [FS])
P0603	PCM Keep Alive Memory (KAM) test error	–	NO	–	CCM	×	–	(See 01-02A-133 DTC P0603, P0605 [FS])
P0605	PCM Read Only Memory (ROM) test error	–	NO	–	CCM	×	–	
P0704	Clutch switch circuit malfunction	ON	NO	2	CCM	–	–	(See 01-02A-134 DTC P0704 [FS])
P0707	Transaxle range (TR) switch short circuit malfunction	(See 05-02A-41 DTC P0707, DTC P0708 [LA4A-EL])						
P0708	Transaxle range (TR) switch open circuit malfunction	(See 05-02A-41 DTC P0707, DTC P0708 [LA4A-EL])						

DTC	Condition	MIL	O/D OFF indicator light flashes	DC	*1Monitor item	On-demand self-test		Page
						KOEO	KOER	
P0712	Transaxle fluid temperature (TFT) sensor circuit low voltage malfunction	(See 05-02A-19 DTC P0712, DTC P1713 [LA4A-EL])						
P0713	Transaxle fluid temperature (TFT) sensor circuit high voltage malfunction	(See 05-02A-22 DTC P0713, DTC P1718 [LA4A-EL])						
P0715	Turbine shaft speed (TSS) sensor circuit malfunction	(See 05-02A-47 DTC P0715 [LA4A-EL])						
P0731	Gear 1 incorrect ratio	(See 05-02A-13 DTC P0731, DTC P0732, DTC P0733, DTC P0734, DTC P0750, DTC P0751, DTC P0755, DTC P0756 [LA4A-EL])						
P0732	Gear 2 incorrect ratio	(See 05-02A-13 DTC P0731, DTC P0732, DTC P0733, DTC P0734, DTC P0750, DTC P0751, DTC P0755, DTC P0756 [LA4A-EL])						
P0733	Gear 3 incorrect ratio	(See 05-02A-13 DTC P0731, DTC P0732, DTC P0733, DTC P0734, DTC P0750, DTC P0751, DTC P0755, DTC P0756 [LA4A-EL])						
P0734	Gear 4 incorrect ratio	(See 05-02A-13 DTC P0731, DTC P0732, DTC P0733, DTC P0734, DTC P0750, DTC P0751, DTC P0755, DTC P0756 [LA4A-EL])						
P0743	Torque converter clutch (TCC) solenoid circuit malfunction	(See 05-02A-31 DTC P0743, DTC P1742, DTC P1743, DTC P1744 [LA4A-EL])						
P0750	Shift solenoid No.1 (SS1) circuit malfunction	(See 05-02A-13 DTC P0731, DTC P0732, DTC P0733, DTC P0734, DTC P0750, DTC P0751, DTC P0755, DTC P0756 [LA4A-EL])						
P0751	Shift solenoid No.1 (SS1) performance problem	(See 05-02A-13 DTC P0731, DTC P0732, DTC P0733, DTC P0734, DTC P0750, DTC P0751, DTC P0755, DTC P0756 [LA4A-EL])						
P0755	Shift solenoid No.2 (SS2) circuit malfunction	(See 05-02A-13 DTC P0731, DTC P0732, DTC P0733, DTC P0734, DTC P0750, DTC P0751, DTC P0755, DTC P0756 [LA4A-EL])						
P0756	Shift solenoid No.2 (SS2) performance problem	(See 05-02A-13 DTC P0731, DTC P0732, DTC P0733, DTC P0734, DTC P0750, DTC P0751, DTC P0755, DTC P0756 [LA4A-EL])						
P1001	DLC malfunction	–	NO	–	–	–	×	(See 01-02A-136 DTC P1001 [FS])
P1100	MAF sensor intermittent malfunction	–	NO	2	–	–	–	(See 01-02A-139 DTC P1100 [FS])
P1101	MAF sensor out of self test range	–	NO	–	–	×	×	(See 01-02A-140 DTC P1101 [FS])
P1112	IAT sensor intermittent malfunction	–	NO	2	–	–	–	(See 01-02A-142 DTC P1112 [FS])
P1116	ECT sensor out of self test range	–	NO	–	–	×	–	(See 01-02A-144 DTC P1116 [FS])
P1117	ECT sensor intermittent malfunction	–	NO	2	–	–	–	(See 01-02A-145 DTC P1117 [FS])
P1120	TP sensor out of range low	ON	NO	2	CCM	×	×	(See 01-02A-147 DTC P1120 [FS])
P1121	TP sensor inconsistent with MAF sensor	ON	NO	2	CCM	–	–	(See 01-02A-148 DTC P1121 [FS])

DTC	Condition	MIL	O/D OFF indicator light flashes	DC	*1Monitor item	On-demand self-test		Page
						KOEO	KOER	
P1124	MAF sensor inconsistent with RPM (greater than expected)	ON	NO	2	CCM	×	×	(See 01-02A-150 DTC P1124 [FS])
P1125	TP sensor intermittent problem	–	NO	2	CCM	–	–	(See 01-02A-152 DTC P1125 [FS])
P1127	Exhaust not warm enough	–	NO	–	–	–	×	(See 01-02A-153 DTC P1127 [FS])
P1130	Lack of HO2S (Front) switch, adapted fuel limit	ON	NO	2	HO2S	–	–	(See 01-02A-73 DTC P0171, P0172, P1130, P1131, P1132 [FS])
P1131	Lack of HO2S (Front) switch, Sensor indicates lean	ON	NO	2	HO2S	–	×	
P1132	Lack of HO2S (Front) switch, Sensor indicates rich	ON	NO	2	HO2S	–	×	
P1137	Lack of HO2S (Rear) switch, Sensor indicates lean	–	NO	2	HO2S	–	×	(See 01-02A-69 DTC P0136, P1137, P1138 [FS])
P1138	Lack of HO2S (Rear) switch, Sensor indicates rich	–	NO	2	HO2S	–	×	
P1250	PRC solenoid valve circuit malfunction	OFF	NO	–	–	×	×	(See 01-02A-154 DTC P1250 [FS])
P1409	EGR valve control circuit malfunction	ON	NO	2	CCM	×	×	(See 01-02A-156 DTC P1409 [FS])
P1410	EGR boost sensor solenoid valve stuck	–	NO	2	CCM	–	–	(See 01-02A-158 DTC P1410 [FS])
P1450	EVAP control system malfunction (excessive vacuum)	ON	NO	2	EVAP	–	–	(See 01-02A-160 DTC P1450 [FS])
P1451	CDCV circuit malfunction	ON	NO	2	CCM	×	×	(See 01-02A-162 DTC P1451 [FS])
P1460	WOT A/C control circuit malfunction	OFF	NO	2	–	×	×	(See 01-02A-165 DTC P1460, P1464 [FS])
P1464	A/C demand out of self test range	OFF	NO	–	–	×	×	
P1474	Cooling fan control circuit malfunction	OFF	NO	2	–	×	×	(See 01-02A-168 DTC P1474 [FS])
P1479	Condenser fan control circuit malfunction	OFF	NO	2	–	×	×	(See 01-02A-171 DTC P1479 [FS])
P1487	EGR boost sensor solenoid valve circuit malfunction	OFF	NO	–	–	–	–	(See 01-02A-173 DTC P1487 [FS])

DTC	Condition	MIL	O/D OFF Indicator light flashes	DC	*1Monitor Item	On-demand self-test		Page
						KOEO	KOER	
P1501	VSS out of self test range	OFF	NO	–	–	–	×	(See 01-02A-129 DTC P0500, P0503, P1501 [FS])
P1504	IAC valve circuit malfunction	ON	NO	2	CCM	×	×	(See 01-02A-176 DTC P1504 [FS])
P1506	Idle control system RPM lower than expected	ON	NO	2	CCM	–	–	(See 01-02A-178 DTC P1506 [FS])
P1507	Idle control system RPM higher than expected	ON	NO	2	CCM	–	–	(See 01-02A-180 DTC P1507 [FS])
P1512	VTCS shutter valve stuck	ON	NO	2	CCM	–	–	(See 01-02A-182 DTC P1512 [FS])
P1516	Neutral Switch input circuit malfunction	ON	NO	2	CCM	–	–	(See 01-02A-184 DTC P1516 [FS])
P1569	VTCS solenoid valve circuit malfunction	ON	NO	2	CCM	–	–	(See 01-02A-187 DTC P1569 [FS])
P1602	Immobilizer unit-PCM communication error	OFF	NO	–	–	–	–	(See 01-02A-189 DTC P1602 [FS])
P1603	Code word unregistered in PCM	OFF	NO	–	–	–	–	(See 01-02A-191 DTC P1603 [FS])
P1604	Key ID number unregistered in PCM	OFF	NO	–	–	–	–	(See 01-02A-192 DTC P1604 [FS])
P1621	Code word mismatch after engine cranking	OFF	NO	–	–	–	–	(See 01-02A-192 DTC P1621 [FS])
P1622	Key ID number mismatch	OFF	NO	–	–	–	–	(See 01-02A-193 DTC P1622 [FS])
P1623	Code word or key ID number read/write error in PCM	OFF	NO	–	–	–	–	(See 01-02A-194 DTC P1623 [FS])
P1624	Immobilizer system communication counter = 0	OFF	NO	–	–	–	–	(See 01-02A-194 DTC P1624 [FS])
P1633	PCM KAM voltage low	ON	NO	2	CCM	×	×	(See 01-02A-195 DTC P1633 [FS])

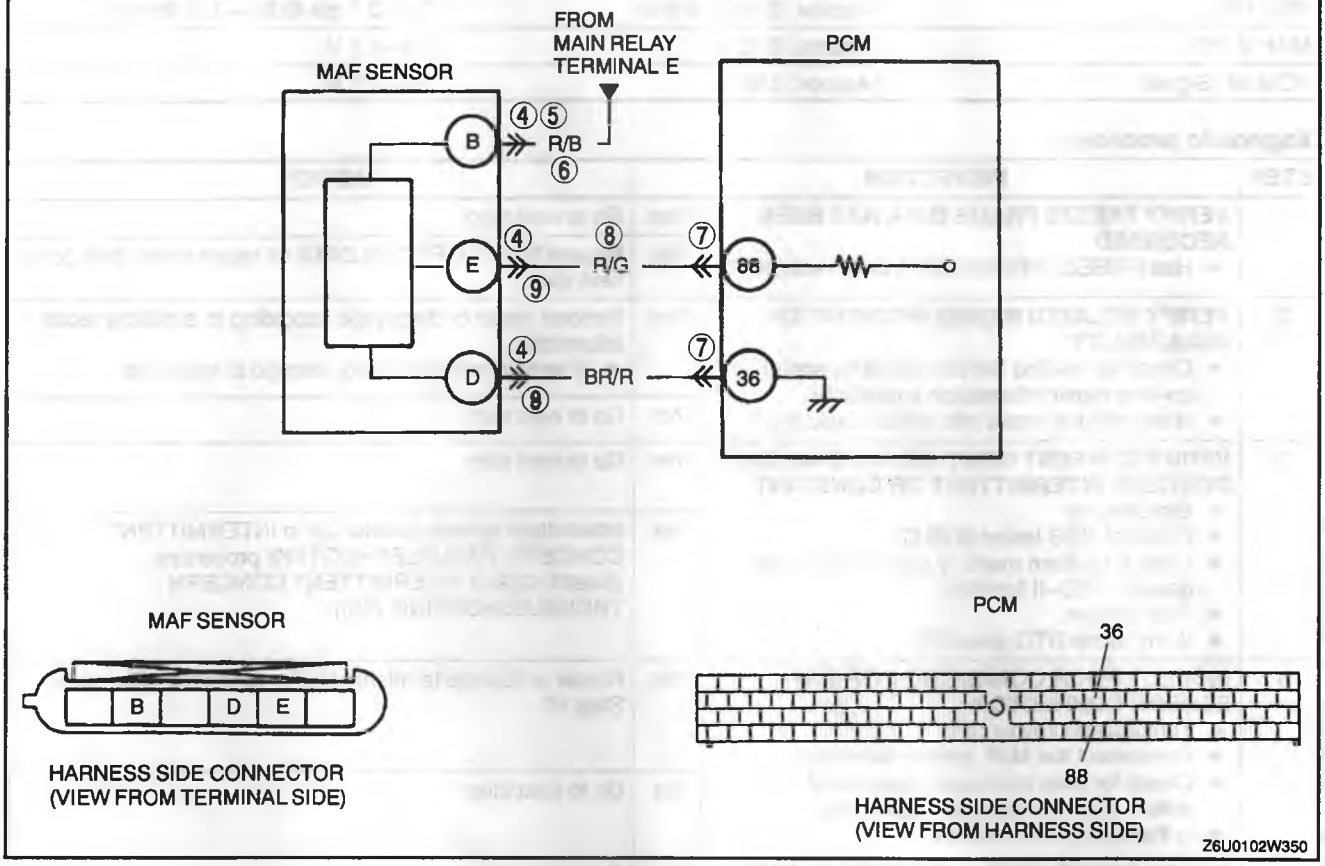
DTC	Condition	MIL	O/D OFF indicator light flashes	DC	*1Monitor item	On-demand self-test		Page
						KOEO	KOER	
P1650	PSP switch out of self test range	OFF	NO	–	Other	×	×	(See 01-02A-197 DTC P1650 [FS])
P1652	PSP switch failed on	ON	NO	2	CCM	–	–	(See 01-02A-199 DTC P1652 [FS])
P1703	Brake switch out of self test range	OFF	NO	–	–	×	×	(See 01-02A-201 DTC P1703 [FS])
P1705	Park/Neutral not indicated during KOEO/KOER self-test	(See 05-02A-37 DTC P1705 [LA4A-EL])						
P1711	Transaxle fluid temperature (TFT) out of self test range	(See 05-02A-25 DTC P1711 [LA4A-EL])						
P1713	Transaxle fluid temperature (TFT) in-range low malfunction	(See 05-02A-19 DTC P0712, DTC P1713 [LA4A-EL])						
P1718	Transaxle fluid temperature (TFT) in-range high malfunction	(See 05-02A-22 DTC P0713, DTC P1718 [LA4A-EL])						
P1742	Torque converter clutch (TCC) solenoid failed on (MIL on)	(See 05-02A-31 DTC P0743, DTC P1742, DTC P1743, DTC P1744 [LA4A-EL])						
P1743	Torque converter clutch (TCC) solenoid failed on (O/D OFF flash)	(See 05-02A-31 DTC P0743, DTC P1742, DTC P1743, DTC P1744 [LA4A-EL])						
P1744	Torque converter clutch (TCC) system malfunction	(See 05-02A-31 DTC P0743, DTC P1742, DTC P1743, DTC P1744 [LA4A-EL])						
P1746	Electronic pressure control (EPC) open	(See 05-02A-44 DTC P1746, DTC P1747 [LA4A-EL])						
P1747	Electronic pressure control (EPC) short	(See 05-02A-44 DTC P1746, DTC P1747 [LA4A-EL])						
P1780	O/D OFF switch circuit malfunction	(See 05-02A-53 DTC P1780 [LA4A-EL])						
P1783	High transaxle fluid temperature (TFT) operating	(See 05-02A-29 DTC P1783 [LA4A-EL])						
P1788	3-2 timing/coasting clutch solenoid (3-2T/CCS) open	(See 05-02A-50 DTC P1788, DTC P1789 [LA4A-EL])						
P1789	3-2 timing/coasting clutch solenoid (3-2T/CCS) short	(See 05-02A-50 DTC P1788, DTC P1789 [LA4A-EL])						

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

DTC P0102 [FS]

Z6U010201082W01

DTC P0102	MAF circuit low input
DETECTION CONDITION	• The PCM monitors input voltage from the MAF sensor while the engine is running. If input voltage at the PCM terminal 88 is **below 0.36 V**, the PCM determines that a MAF circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• MAF sensor malfunction • Connector or terminal malfunction • Short to ground in wiring between MAF sensor terminal E and PCM terminal 88 • Open circuit in wiring between MAF sensor terminal E and PCM terminal 88 • Open circuit in wiring between main relay terminal E and MAF sensor terminal B

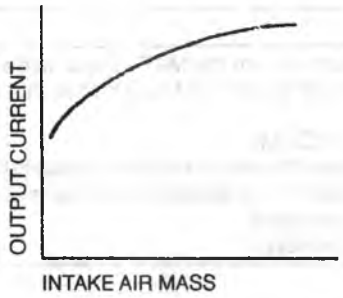


Troubleshooting Hint

MAF sensor description

- A hot wire type mass airflow sensor is used.
- MAF sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —Evaporative system monitor
  - —EGR system monitor
- MAF sensor output voltage present when turn ignition key is ON (Engine OFF).

MAF sensor signal characteristic



Z6U0102W351

MAF sensor specification

Condition	KOEO	KOER
MAF PID	Approx. 0 g/s {0 lb/min}	2.2—3.1 g/s {0.30—0.40 lb/min}
MAF V PID	Approx. 0.02 V	0.6—1.1 V
PCM 88 (Signal)	Approx. 0.02 V	0.6—1.1 V

Diagnostic procedure

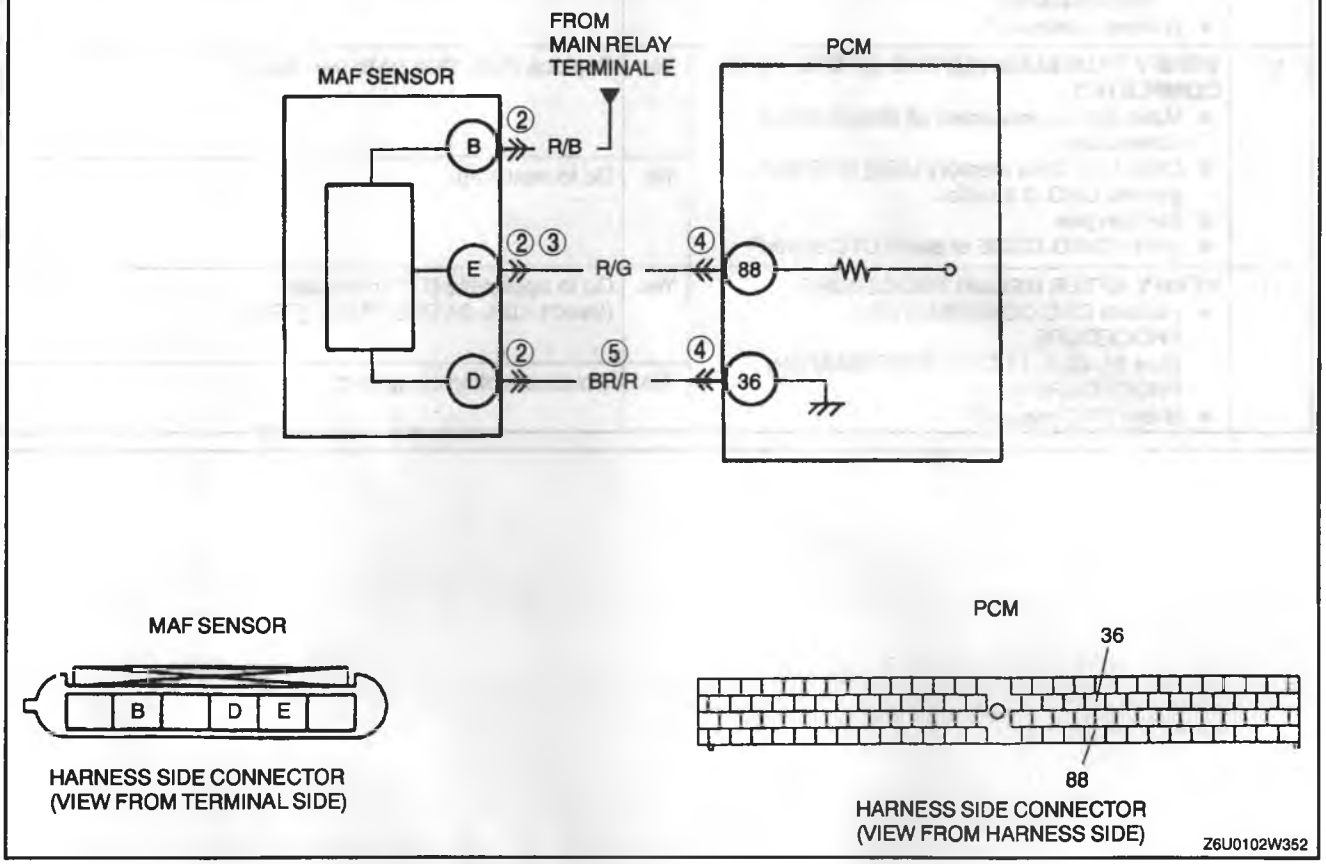
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS-IS CONCERN INTERMITTENT OR CONSTANT** • Start engine. • Connect NGS tester to DLC. • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine. • Is the same DTC present?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
4	**INSPECT POOR CONNECTION OF MAF SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect the MAF sensor connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminals and/or connector, then go to Step 10.
		No	Go to next step.
5	**CHECK POWER SUPPLY CIRCUIT VOLTAGE** • Turn ignition key to ON (Engine OFF). • Check voltage at MAF sensor terminal B (harness-side). • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 10.
6	**CHECK POWER SUPPLY CIRCUIT FOR OPEN** • Check for continuity between MAF sensor terminal B (harness-side) and main relay terminal E (harness-side). • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 10.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 10.
		No	Go to next step.

STEP	INSPECTION		ACTION
8	**INSPECT MAF SENSOR SIGNAL CIRCUIT FOR OPEN** • Connect breakout box with PCM disconnected. • Check for continuity between MAF sensor terminal E (harness-side) and breakout box terminal 88 (harness-side). • Is there continuity?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to Step 10.
9	**INSPECT MAF SENSOR SIGNAL CIRCUIT FOR SHORTS** • Check for continuity between following circuits: — MAF sensor terminal E (harness-side) and body ground — MAF sensor connector terminal D and E (harness-side) • Is there continuity?	Yes	Repair or replace suspected harness, then go to next step.
		No	Replace MAF sensor, then go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P0102 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine. • Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0103 [FS]

Z6U010201082W02

DTC P0103	MAF circuit high input
DETECTION CONDITION	• The PCM monitors input voltage from the MAF sensor while the engine is running. If input voltage at the PCM terminal 88 is above **4.78 V**, the PCM determines that a MAF sensor circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC also detected by KOEO Self-Test.
POSSIBLE CAUSE	• MAF sensor malfunction • Connector or terminal malfunction • Open circuit in wiring between MAF sensor terminal D and PCM terminal 36 • Open circuit in MAF sensor ground circuit

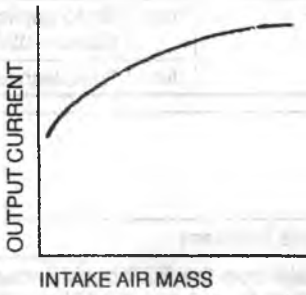


Troubleshooting Hint

MAF sensor description

- A hot wire type mass airflow sensor is used.
- MAF sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —Evaporative system monitor
  - —EGR system monitor
- The MAF signal may also receive an output voltage signal when air flow does not flow through the MAF sensor.

MAF sensor signal characteristic



Z6U0102W351

MAF sensor specification

Condition	KOEO	KOER
MAF PID	Approx. 0 g/s {0 lb/min}	2.2—3.1 g/s {0.30—0.40 lb/min}
MAF V PID	Approx. 0.02 V	0.6—1.1 V
PCM 88 (Signal)	Approx. 0.02 V	0.6—1.1 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** ● Perform DTC CONFIRMATION PROCEDURE. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) ● Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to **INTERMITTENT CONCERN TROUBLESHOOTING** procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS]
2	**INSPECT POOR CONNECTION OF MAF SENSOR CONNECTOR** ● Turn ignition key to OFF. ● Disconnect the MAF sensor connector. ● Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). ● Is there any malfunction?	Yes	Repair or replace terminals and/or connector, then go to Step 6.
		No	Go to next step.
3	**INSPECT MAF SIGNAL CIRCUIT FOR SHORT TO POWER CIRCUIT** ● Turn ignition key to **ON** (Engine OFF). ● Measure voltage between MAF sensor terminal **E** (harness-side) and body ground. ● Is voltage **0 V**?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to Step 6.
4	**INSPECT POOR CONNECTION OF PCM CONNECTOR** ● Turn ignition key to OFF. ● Disconnect PCM connector. ● Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). ● Is there any malfunction?	Yes	Repair terminal, then go to Step 6.
		No	Go to next step.
5	**INSPECT MAF SENSOR GROUND CIRCUIT FOR OPEN** ● Connect breakout box with PCM disconnected. ● Check for continuity between MAF sensor terminal D (harness-side) and breakout box terminal 36 (harness-side). ● Is there continuity?	Yes	Replace MAF sensor, then go to next step.
		No	Repair or replace suspected harness, then go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P0103 COMPLETED** ● Connect NGS tester to DLC. ● Clear DTC from memory using NGS tester generic OBD-II function. ● Perform KOEO Self-Test. ● Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.

STEP	INSPECTION		ACTION
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0106 [FS]

Z6U010201082W03

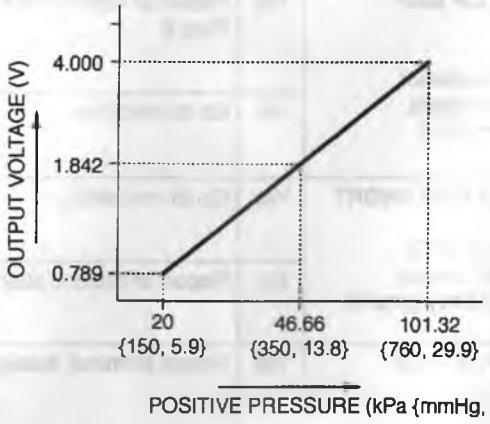
DTC P0106	BARO circuit range/performance problem
DETECTION CONDITION	• The PCM monitors input voltage from the EGR boost sensor while the engine is running. If input voltage at PCM terminal 34 is below **0.22 V** or above **4.79 V**, the PCM determines that an EGR boost circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• BARO sensor malfunction

Troubleshooting Hint

EGR boost sensor description

- The EGR boost sensor uses the piezo-electric effect to convert the intake manifold pressure into voltage values, and outputs the voltage to the PCM.
- The EGR boost sensor signal is used for the following monitors.
  - —Evaporative system monitor
  - —EGR system monitor

EGR boost sensor signal characteristic



Z6U0102W353

EGR boost sensor specification

Condition	KOEO	KOER
EGR	Approx. 14.7 psi	Approx. 14.9 psi
PCM 34 (Signal)	Approx. 4.09 V	Approx. 4.12 V

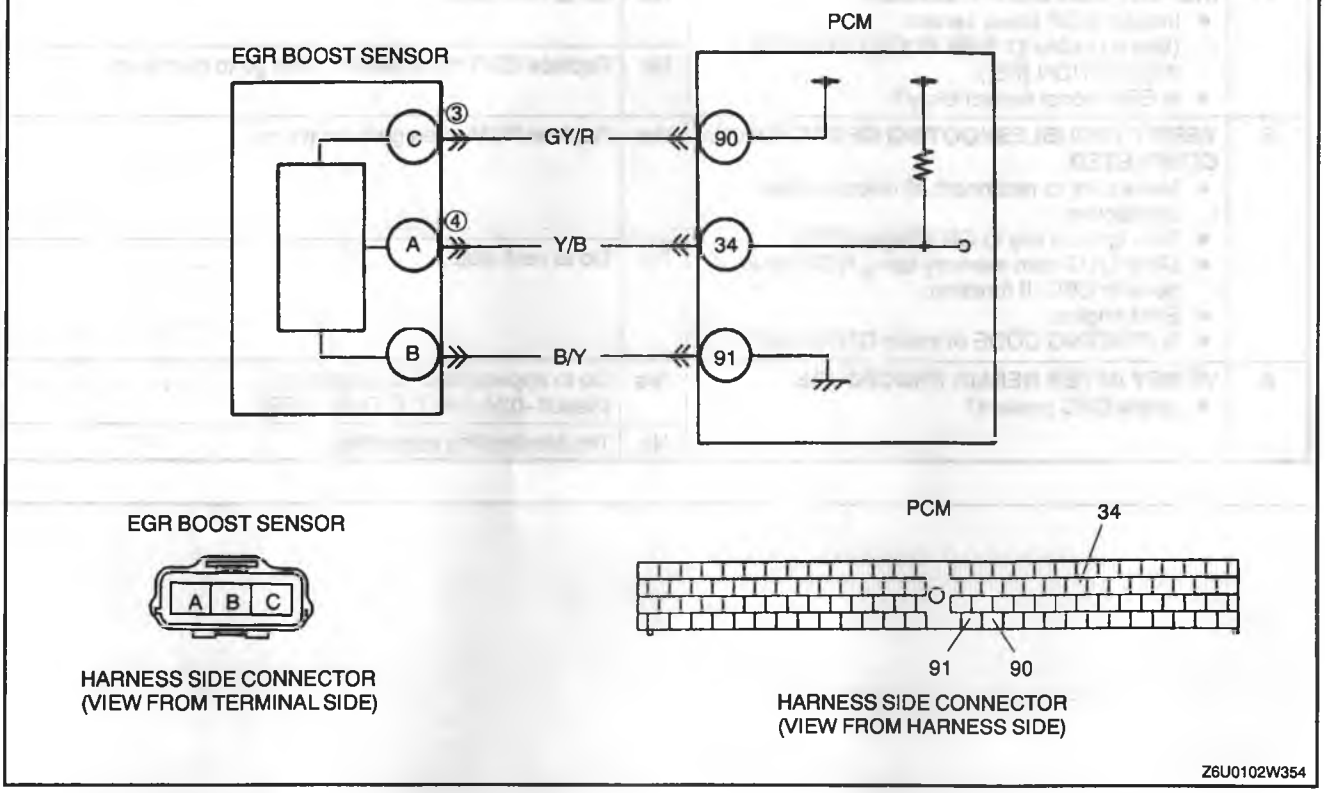
Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY DTC P0107 AND/OR P0108 DETECTED** • Is DTC P0107 and/or P0108 present?	Yes	Go to DTC P0107 and/or P0108. (See01-02A-38 DTC P0107 [FS]) (See01-02A-40 DTC P0108 [FS])
		No	Go to next step.
4	**INSPECT EGR BOOST SENSOR** • Inspect EGR boost sensor. (See 01-40A-37 EGR BOOST SENSOR INSPECTION [FS]) • Is EGR boost sensor okay?	Yes	Go to next step.
		No	Replace EGR boost sensor, then go to next step.
5	**VERIFY TROUBLESHOOTING OF DTC P0107 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine. • Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
6	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0107 [FS]

Z6U010201082W04

DTC P0107	BARO circuit low input
DETECTION CONDITION	• The PCM monitors input voltage from the EGR boost sensor while the engine is running. If input voltage at PCM terminal 34 **is below 0.01 V**, the PCM determines that an EGR boost circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• BARO sensor malfunction • Connector or terminal malfunction • Short to ground in wiring between EGR boost sensor terminal A and PCM terminal 34 • Open circuit in wiring between EGR boost sensor terminal C and PCM terminal 90



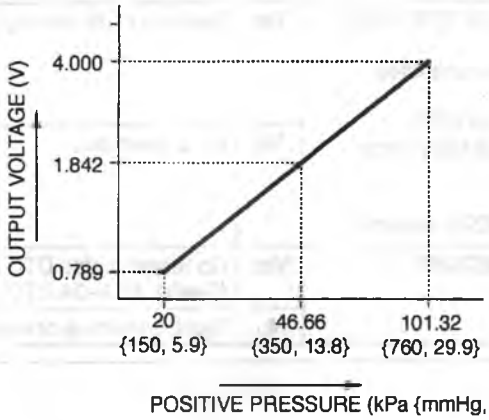
Z6U0102W354

Troubleshooting Hint

EGR boost sensor description

- The EGR boost sensor uses the piezo-electric effect to convert the intake manifold pressure into voltage values, and outputs the voltage to the PCM.
- The EGR boost sensor signal is used for the following monitors.
  - —Evaporative system monitor
  - —EGR system monitor

EGR boost sensor signal characteristic



Z6U0102W353

EGR boost sensor specification

Condition	KOEO	KOER
EGR	Approx. 14.7 psi	Approx. 14.9 psi
PCM 34 (Signal)	Approx. 4.09 V	Approx. 4.12 V

Diagnostic procedure

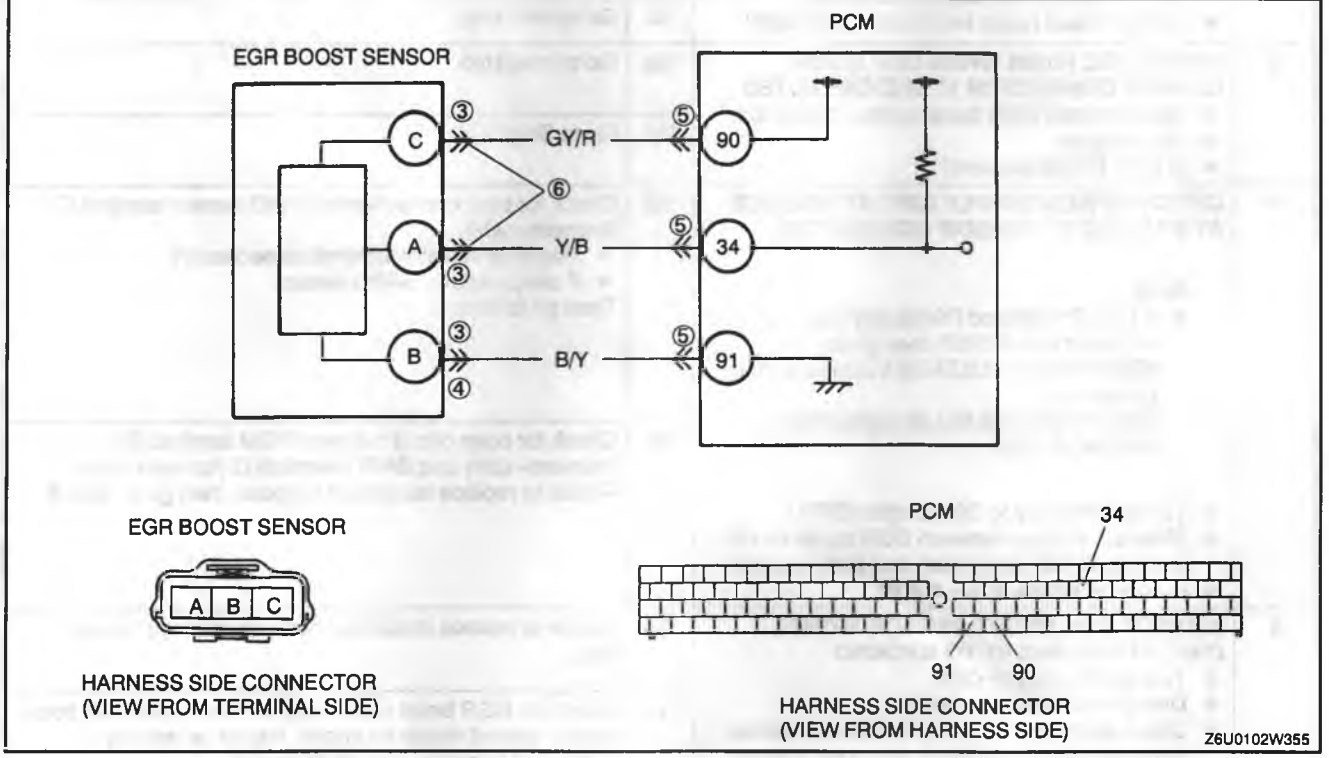
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY DTC P0108 WHEN EGR BOOST SENSOR CONNECTOR IS DISCONNECTED** • Disconnected EGR boost sensor connector. • Start engine. • Is DTC P0108 present?	Yes	Go to next step.
		No	Go to Step 6.
4	**CHECK POWER SUPPLY CIRCUIT VOLTAGE AT EGR BOOST SENSOR CONNECTOR** **Note** • If DTC P0122 and P0452 are also retrieved with P0107, then go to REFERENCE VOLTAGE troubleshooting procedure. (See 01-03A-50 NO.29 CONSTANT VOLTAGE [FS]) • Turn ignition key to ON (Engine OFF). • Measure voltage between EGR boost sensor terminal C (harness-side) and body ground. • Is voltage **within 4.5— 5.5 V?**	Yes	Check for poor connection of BARO sensor terminal C (harness-side). • Repair or replace terminal as necessary. • If okay, replace BARO sensor. Then go to Step 6.
		No	Check for open circuit between PCM terminal 90 (harness-side) and BARO terminal C (harness-side). Repair or replace suspected harness, then go to Step 6.
5	**INSPECT EGR BOOST SENSOR SIGNAL CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Disconnect PCM connector. • Check continuity between EGR boost sensor terminal A (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace suspected harness, then go to next step.
		No	Check for EGR boost sensor signal circuit and EGR boost sensor ground circuit for shorts. Repair or replace suspected harness, then go to next step.

STEP	INSPECTION		ACTION
6	**VERIFY TROUBLESHOOTING OF DTC P0107 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine. • Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0108 [FS]

Z6U010201082W05

DTC P0108	BARO circuit high input
DETECTION CONDITION	• PCM monitors input voltage from EGR boost sensor while the engine is running. If input voltage at PCM terminal 34 is **above 4.99 V**, PCM determines that EGR boost sensor circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• EGR boost sensor malfunction • Connector or terminal malfunction • Open circuit in wiring between EGR boost sensor terminal A and PCM terminal 34 • Open circuit in wiring between EGR boost sensor terminal B and PCM terminal 91 • EGR boost sensor signal circuit shorts to constant voltage supply circuit

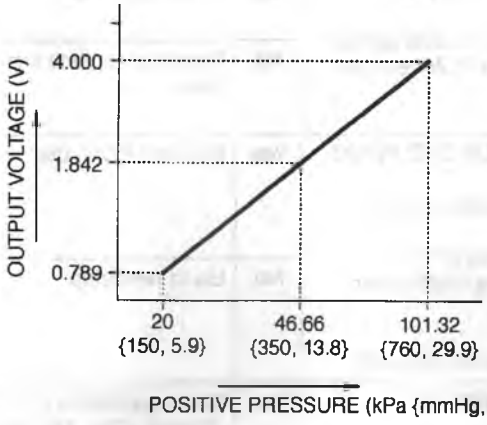


Troubleshooting Hint

EGR boost sensor description

- The EGR boost sensor uses the piezo-electric effect to convert the intake manifold pressure into voltage values, and outputs the voltage to the PCM.
- The EGR boost sensor signal is used for the following monitors.
  - —Evaporative system monitor
  - —EGR system monitor

EGR boost sensor signal characteristic



Z6U0102W353

EGR boost sensor specification

Condition	KOEO	KOER
EGR	Approx. 14.7 psi	Approx. 14.9 psi
PCM 34 (Signal)	Approx. 4.09 V	Approx. 4.12 V

Diagnostic procedure

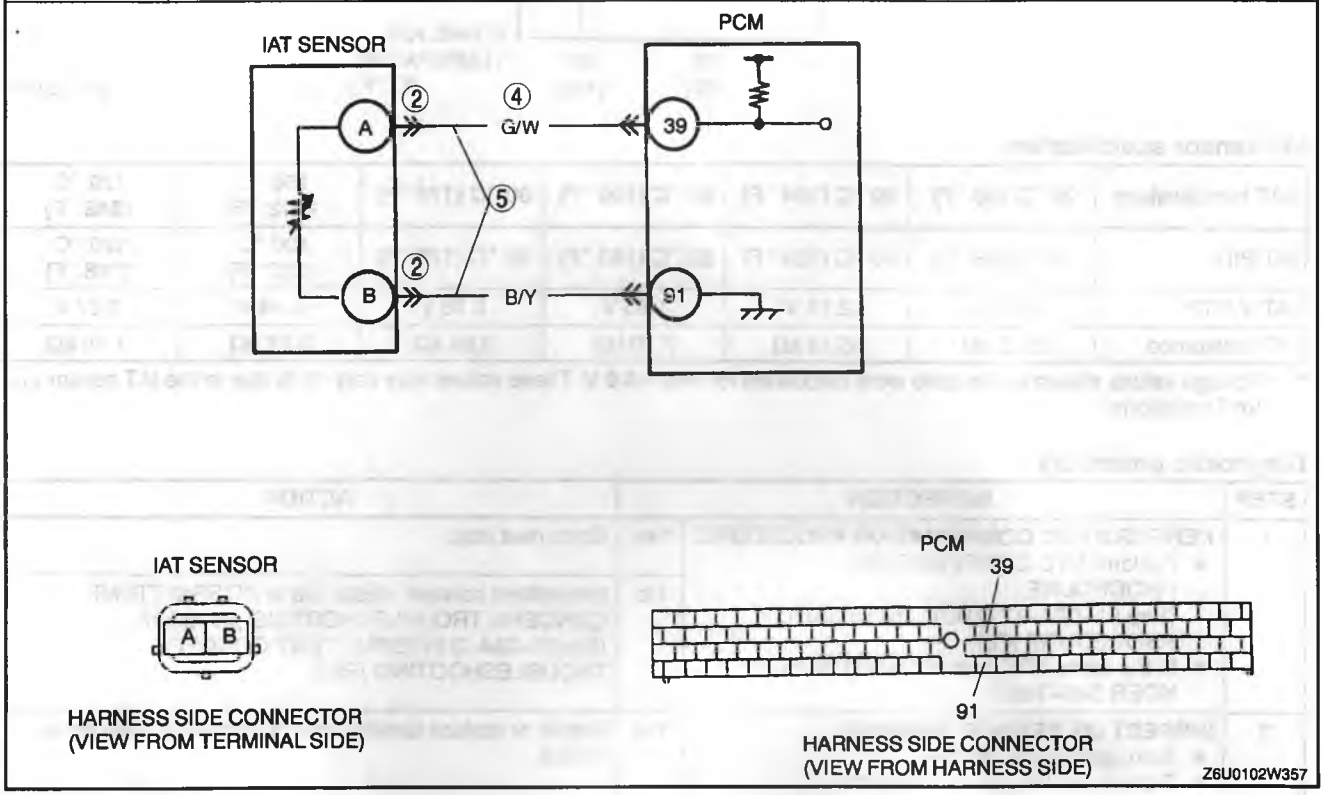
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**INSPECT CONNECTION OF EGR BOOST SENSOR CONNECTOR** • Turn ignition key to OFF. • Verify that the EGR boost sensor connector is connected securely. • Is connection okay?	Yes	Go to next step.
		No	Reconnect the connector, then go to Step 9.
4	**INSPECT POOR CONNECTION OF EGR BOOST SENSOR CONNECTOR** • Disconnect the EGR boost sensor connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace suspected terminal, then go to Step 9.
		No	Go to next step.
5	**VERIFY EGR BOOST SENSOR GROUND CIRCUIT FOR OPEN** • Check continuity between EGR boost sensor terminal B (harness-side) and body ground. • Is there continuity?	Yes	Go to next step.
		No	Check for open circuit between PCM terminal 91 (harness-side) and EGR boost sensor terminal B (harness-side). Repair or replace suspected harness, then go to Step 9.
6	**CHECK PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.

STEP	INSPECTION		ACTION
7	**VERIFY EGR BOOST SENSOR SIGNAL CIRCUIT FOR SHORT TO CONSTANT VOLTAGE CIRCUIT** • Check for continuity between BARO sensor terminal A and C (harness-side). • Is there continuity?	Yes	Repair or replace suspected harness, then go to Step 9.
		No	Go to next step.
8	**VERIFY EGR BOOST SENSOR SIGNAL CIRCUIT FOR OPEN** • Check continuity between EGR boost sensor terminal A (harness-side) and PCM terminal 34 (harness-side). • Is there continuity?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P0108 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine. • Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0112 [FS]

Z6U010201082W06

DTC P0112	IAT circuit low input
DETECTION CONDITION	• The PCM monitors IAT sensor signal at PCM terminal 39. If the PCM detects IAT sensor voltage is below **0.20 V**, the PCM determines that the IAT sensor circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC also detects by KOEO/KOER Self-Test
POSSIBLE CAUSE	• IAT sensor malfunction • Short to ground circuit between IAT sensor terminal A and PCM terminal 39 • Short each harness IAT signal circuit and IAT ground circuit. • PCM malfunction

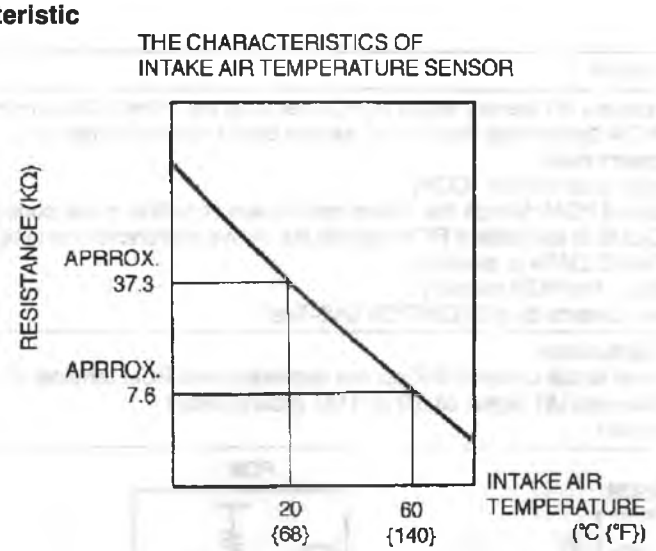


Troubleshooting Hint

IAT sensor description

- The IAT is in inverse proportion to IAT sensor resistance. Therefore IAT is in inverse proportion to IAT output voltage.
- The IAT sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —Purge control
  - —HO2S heater control
  - —Electric cooling fan control
  - —Evaporative system monitor

IAT sensor signal characteristic



IAT sensor specification

IAT temperature	20 °C {68 °F}	40 °C {104 °F}	60 °C {140 °F}	80 °C {176 °F}	100 °C {212 °F}	120 °C {248 °F}
IAT PID	20 °C {68 °F}	40 °C {104 °F}	60 °C {140 °F}	80 °C {176 °F}	100 °C {212 °F}	120 °C {248 °F}
IAT V PID*	3.07 V	2.13 V	1.33 V	0.78 V	0.46 V	0.27 V
IAT resistance	37.3 kΩ	16.15 kΩ	7.70 kΩ	3.84 kΩ	2.07 kΩ	1.18 kΩ

* : Voltage values shown in the table were calculated for Vref = **5.0 V**. These values may vary **15 %** due to the IAT sensor and Vref variations.

Diagnostic procedure

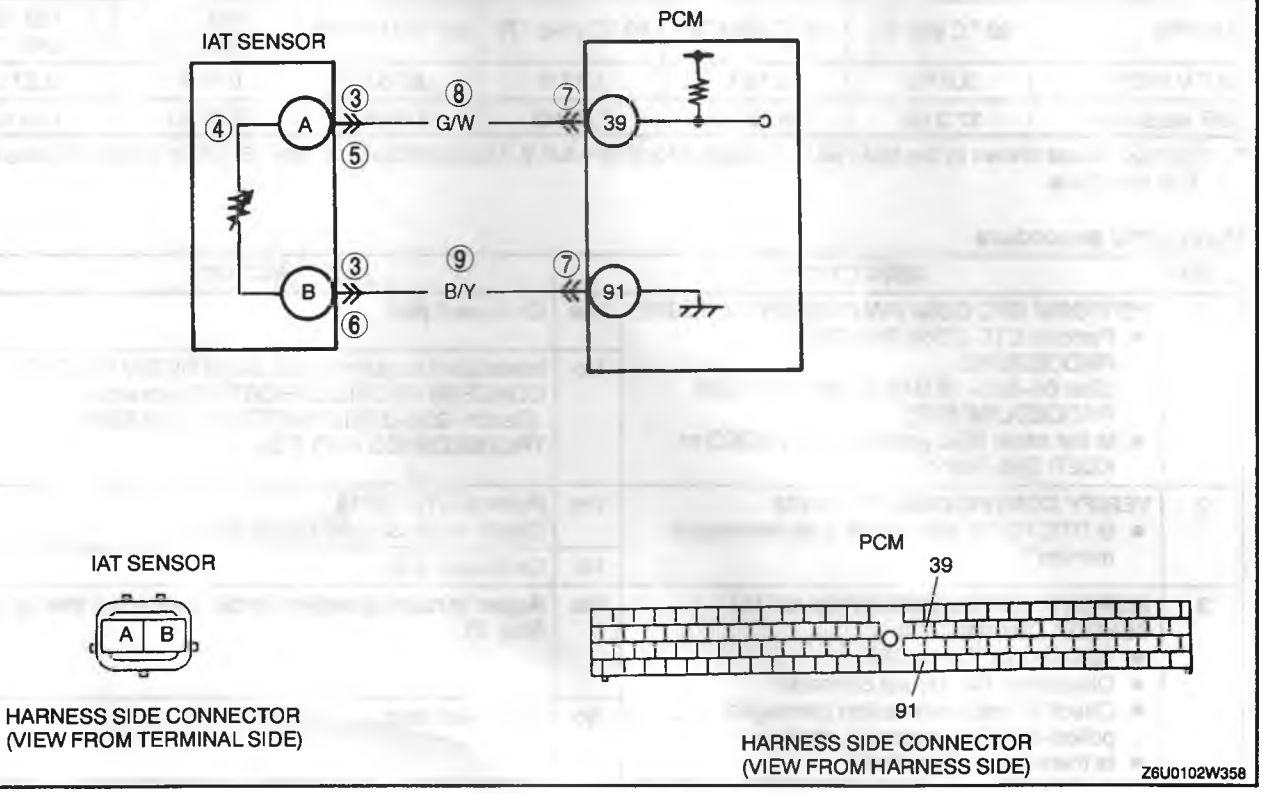
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**INSPECT IAT SENSOR TERMINAL** • Turn ignition key to OFF. • Disconnect IAT sensor connector. • Check for bent terminal of IAT sensor terminal A and B (part-side). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 6.
		No	Go to next step.
3	**CLASSIFY IAT SENSOR MALFUNCTION OR HARNESS MALFUNCTION** • Turn ignition key to ON (Engine OFF). • Access IAT V PID using NGS tester. • Is IAT V PID **below 0.2 V**?	Yes	Go to next step.
		No	Replace IAT sensor, then go to Step 6.
4	**INSPECT IAT SIGNAL CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Disconnect PCM connector. • Check continuity between IAT sensor terminal A (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 6.
		No	Go to next step.
5	**INSPECT IAT CIRCUITS FOR SHORT** • Check continuity between IAT sensor terminal A and B (harness-side). • Is there continuity?	Yes	Repair or replace harness for short, then go to Step 6.
		No	Go to next step.

STEP	INSPECTION		ACTION
6	**VERIFY TROUBLESHOOTING OF DTC P0112 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOEO/KOER Self-Test. • Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0113 [FS]

Z6U010201082W07

DTC P0113	IAT circuit high Input
DETECTION CONDITION	• The PCM monitors IAT sensor signal at PCM terminal 39. If the PCM detects IAT sensor voltage is above **4.80 V**, the PCM determines that the IAT sensor circuit has malfunctioned. • The PCM monitors IAT sensor signal and ECT sensor signal. If the PCM detects the difference in temperature is **above 32.2°C {90°F}**, the PCM determines that IAT sensor circuit has malfunctioned. (ECT is subtracted from IAT) **Diagnostic support note** • This is a continuous monitor CCM. • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is not stored in the PCM memory. • This DTC also detects by KOEO/KOER Self-Test.
POSSIBLE CAUSE	• IAT sensor malfunction • ECT sensor malfunction • Open circuit between IAT sensor terminal A and PCM terminal 39 • Short to power circuit between IAT sensor terminal A and PCM terminal 39 • Open circuit between IAT sensor terminal B and PCM terminal 91 • Poor connection at IAT sensor or PCM connector. • PCM malfunction



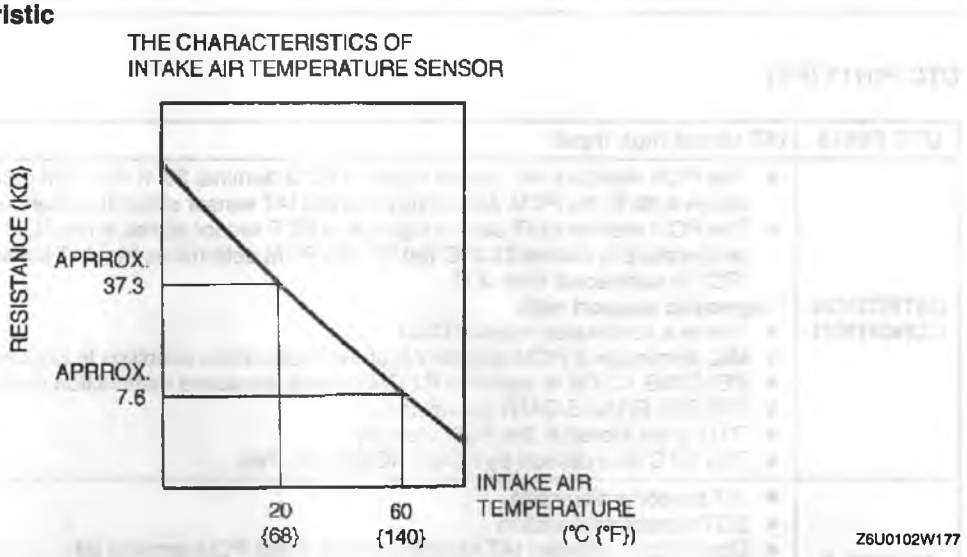
Z6U0102W358

Troubleshooting Hint

IAT sensor description

- The IAT is in inverse proportion to IAT sensor resistance. Therefore IAT is in inverse proportion to IAT output voltage.
- The IAT sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —Purge control
  - —HO2S heater control
  - —Electric cooling fan control
  - —Evaporative system monitor

IAT sensor signal characteristic



IAT sensor specification

IAT temperature	20 °C {68 °F}	40 °C {104 °F}	60 °C {140 °F}	80 °C {176 °F}	100 °C {212 °F}	120 °C {248 °F}
IAT PID	20 °C {68 °F}	40 °C {104 °F}	60 °C {140 °F}	80 °C {176 °F}	100 °C {212 °F}	120 °C {248 °F}
IAT V PID*	3.07 V	2.13 V	1.33 V	0.78 V	0.46 V	0.27 V
IAT resistance	37.3 kΩ	16.15 kΩ	7.70 kΩ	3.84 kΩ	2.07 kΩ	1.18 kΩ

* : Voltage values shown in the table were calculated for Vref = **5.0 V**. These values may vary 15 % due to the IAT sensor and Vref variations.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** ● Perform DTC CONFIRMATION PROCEDURE. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) ● Is the same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**VERIFY CONTINUOUS DTC P0118** ● Is DTC P0118 also detected by continuous monitor?	Yes	Refer to DTC P0118. (See01-02A-52 DTC P0118 [FS])
		No	Go to next step.
3	**INSPECT POOR CONNECTION OF IAT SENSOR CONNECTOR** ● Turn ignition key to OFF. ● Disconnect IAT sensor connector. ● Check for poor connection (damaged, pulled-out pins, corrosion, etc.). ● Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 10.
		No	Go to next step.

STEP	INSPECTION		ACTION
4	**INSPECT IAT SENSOR** • Measure resistance between IAT sensor terminal A and B (part-side). • Is resistance **above 16 kΩ** ?	Yes	Replace IAT sensor, then go to Step 10.
		No	Go to next step.
5	**INSPECT IAT SENSOR SIGNAL CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (Engine OFF). • Measure voltage between IAT sensor terminal A (harness-side) and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to Step 10.
		No	Go to next step.
6	**INSPECT IAT SENSOR GROUND CIRCUIT FOR SHORT TO POWER** • Measure voltage between IAT sensor terminal B (harness-side) and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to Step 10.
		No	Go to next step.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Inspect PCM terminal 39 and 91 (harness-side) for tightness using feeler tool. • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 10.
		No	Go to next step.
8	**INSPECT IAT SENSOR SIGNAL CIRCUIT FOR OPEN** • Connect breakout box with PCM disconnected. • Check continuity between IAT sensor terminal A (harness-side) and breakout box terminal 39. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 10.
9	**INSPECT IAT SENSOR GROUND CIRCUIT FOR OPEN** • Check continuity between IAT sensor terminal B (harness-side) and breakout box terminal 91. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P0113 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOEO/KOER Self-Test. • Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0116 [FS]

Z6U010201082W08

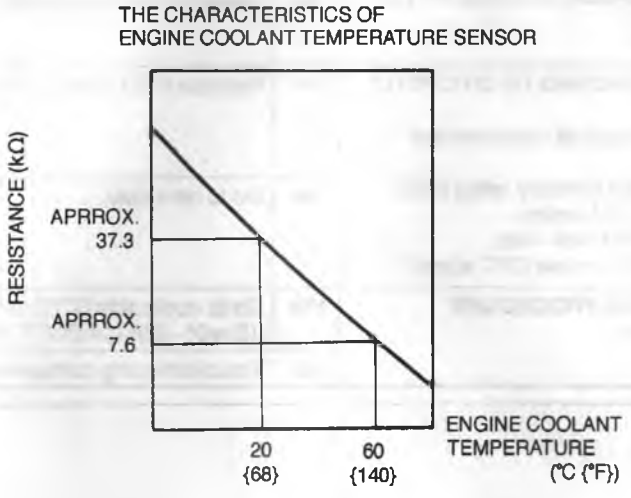
DTC P0116	ECT circuit performance problem
DETECTION CONDITION	• The PCM monitors the ECT when monitoring condition are met. If the ECT is below **10 °C {50 °F}**, the PCM determines that ECT signal circuit has malfunctioned. **MONITORING CONDITION** — Vehicle soak time is above **6 hours** — ECT is **above 110 °C {230 °F}** — Vehicle speed is **above 24 km/h {15 mph}** **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• ECT sensor malfunction • Poor connection at ECT sensor or PCM connector • PCM malfunction

Troubleshooting Hint

ECT sensor description

- The engine coolant temperature is in inverse proportion to ECT sensor resistance. Therefore engine coolant temperature is in inverse proportion to ECT output voltage.
- The ECT sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —A/C cut-off control
  - —Electric cooling fan control
  - —Evaporative system monitor
  - —EGR system monitor

ECT sensor signal characteristic



Z6U0102W181

ECT sensor specification

ECT temperature	20 °C {68 °F}	40 °C {104 °F}	60 °C {140 °F}	80 °C {176 °F}	100 °C {212 °F}	120 °C {248 °F}
ECT	20 °C {68 °F}	40 °C {104 °F}	60 °C {140 °F}	80 °C {176 °F}	100 °C {212 °F}	120 °C {248 °F}
ECT V*	3.07 V	2.13 V	1.33 V	0.78 V	0.46 V	0.27 V.
ECT resistance	37.3 kΩ	16.15 kΩ	7.70 kΩ	3.84 kΩ	2.07 kΩ	1.18 kΩ

* : Voltage values shown in the table were calculated for Vref = **5.0 V**. These values may vary **15 %** due to the ECT sensor and Vref variations.

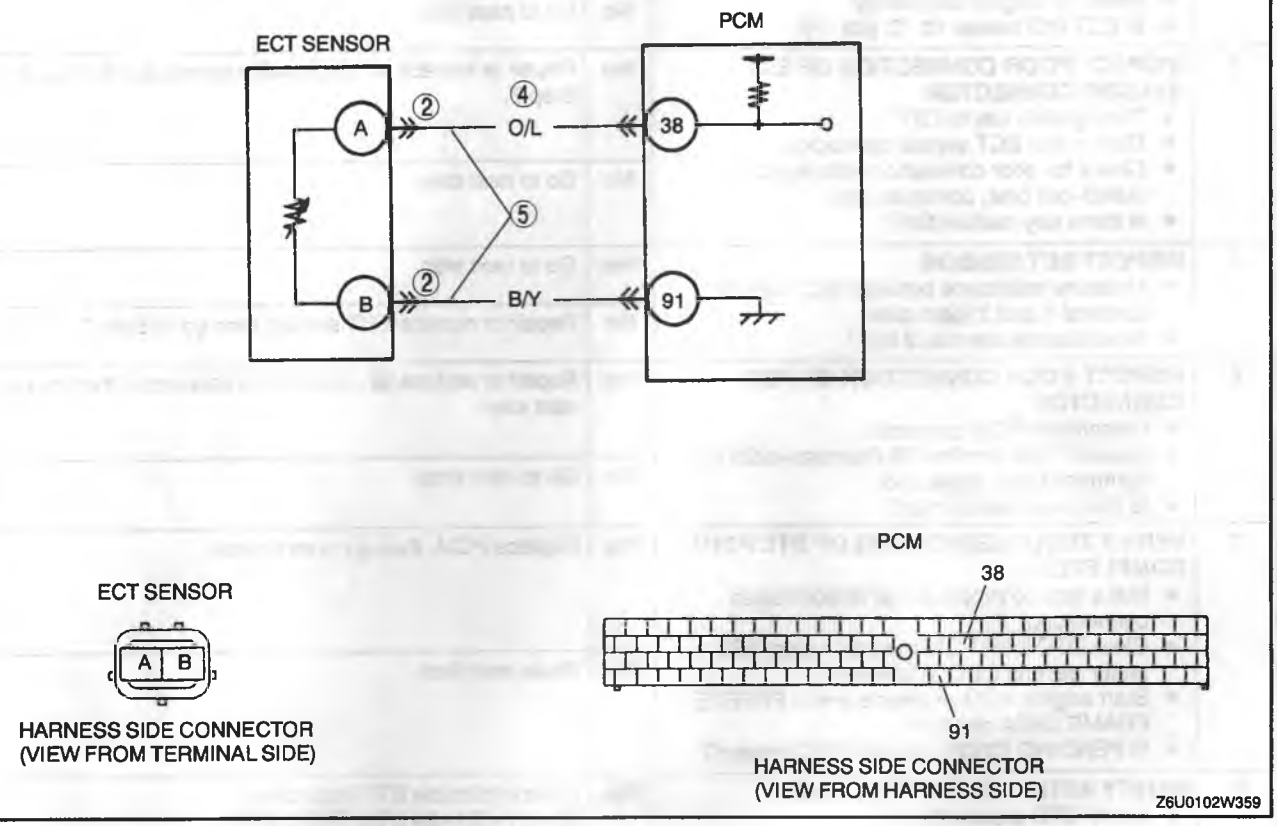
Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS– IS CONCERN INTERMITTENT OR CONSTANT?** • Start engine. • Access ECT PID continuously using NGS tester. • Warm up engine completely. • Is ECT PID **below 10 °C {50 °F}**?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
		No	Go to next step.
4	**INSPECT POOR CONNECTION OF ECT SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect ECT sensor connector. • Check for poor connection (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 7.
		No	Go to next step.
5	**INSPECT ECT SENSOR** • Measure resistance between ECT sensor terminal 1 and 2 (part-side). • Is resistance **approx. 2 kΩ** ?	Yes	Go to next step.
		No	Repair or replace ECT sensor, then go to Step 7.
6	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Disconnect PCM connector. • Inspect PCM terminal 38 (harness-side) for tightness using feeler tool. • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to next step.
		No	Go to next step.
7	**VERIFY TROUBLESHOOTING OF DTC P0116 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Start engine and run engine under FREEZE FRAME DATA condition. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0117 [FS]

Z6U010201082W09

DTC P0117	ECT circuit low input
DETECTION CONDITION	• The PCM monitors ECT sensor signal at PCM terminal 38. If the PCM detects ECT sensor voltage is below **0.20 V** the PCM determines that the ECT sensor circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC also detects by KOEO/KOER Self-Test.
POSSIBLE CAUSE	• ECT sensor malfunction • Short to ground circuit between ECT sensor terminal A and PCM connector terminal 38. • Short each harness ECT signal circuit and ECT ground circuit. • PCM malfunction

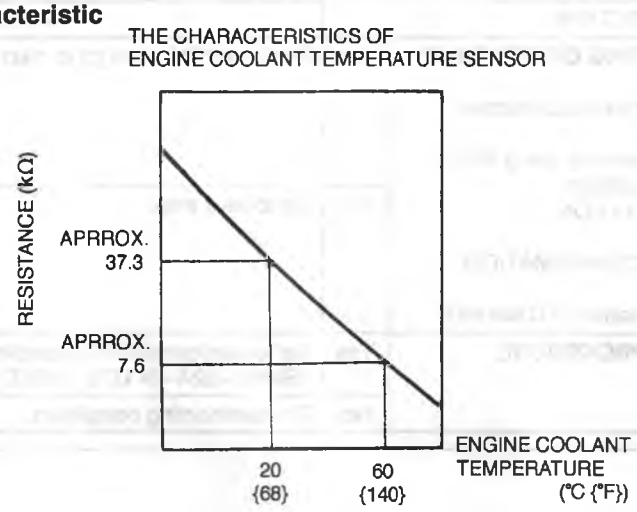


Troubleshooting Hint

ECT sensor description

- The ECT is in inverse proportion to ECT sensor resistance. Therefore ECT is in inverse proportion to ECT output voltage.
- The ECT sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —A/C cut-off control
  - —Electric cooling fan control
  - —Evaporative system monitor
  - —EGR system monitor

ECT sensor signal characteristic



ECT sensor specification

ECT temperature	20 °C {68 °F}	40 °C {104 °F}	60 °C {140 °F}	80 °C {176 °F}	100 °C {212 °F}	120 °C {248 °F}
ECT	20 °C {68 °F}	40 °C {104 °F}	60 °C {140 °F}	80 °C {176 °F}	100 °C {212 °F}	120 °C {248 °F}
ECT V*	3.07 V	2.13 V	1.33 V	0.78 V	0.46 V	0.27 V
ECT resistance	37.3 kΩ	16.15 kΩ	7.70 kΩ	3.84 kΩ	2.07 kΩ	1.18 kΩ

* : Voltage values shown in the table were calculated for Vref = **5.0 V**. These values may vary **15 %** due to the ECT sensor and Vref variations.

Diagnostic procedure

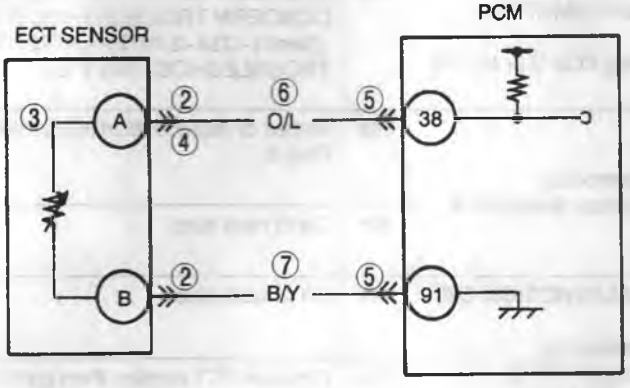
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**INSPECT TERMINAL BENT** • Turn ignition key to OFF. • Disconnect ECT sensor connector. • Check for bends in ECT sensor terminals A and B (part-side). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 6.
		No	Go to next step.
3	**CLASSIFY ECT SENSOR MALFUNCTION OR HARNESS MALFUNCTION** • Disconnect ECT sensor connector. • Turn ignition key to ON (Engine OFF). • Access ECT V PID using NGS tester. • Is ECT V PID **below 0.20 V**?	Yes	Go to next step.
		No	Replace ECT sensor, then go to Step 6.
4	**INSPECT ECT SIGNAL CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Disconnect PCM connector. • Check continuity between ECT sensor terminal A (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 6.
		No	Go to next step.
5	**INSPECT ECT CIRCUIT FOR SHORT HARNESSES** • Check continuity between ECT sensor terminal A and B (harness-side). • Is there continuity?	Yes	Repair or replace harness for short, then go to next step.
		No	Go to next step.

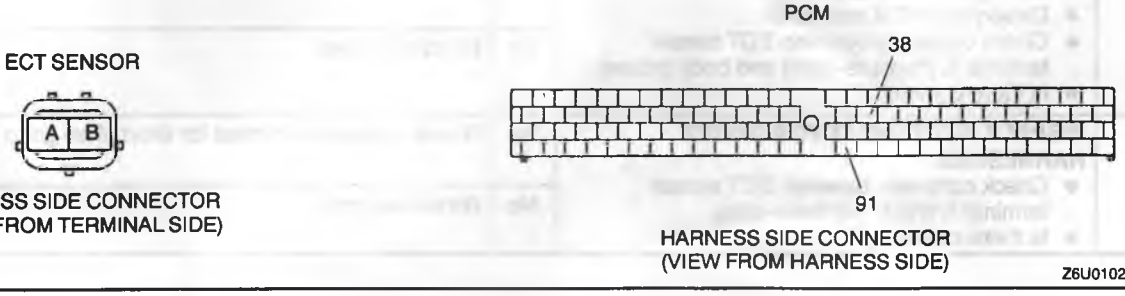
STEP	INSPECTION		ACTION
6	**VERIFY TROUBLESHOOTING OF DTC P0117 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform DTC CONFIRMATION PROCEDURE. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0118 [FS]

Z6U010201082W10

DTC P0118	ECT circuit high input
DETECTION CONDITION	• The PCM monitors ECT sensor signal at PCM terminal 38. If the PCM detects ECT sensor voltage is above **4.80 V**, the PCM determines that the ECT sensor circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC also detects by KOEO/KOER Self-Test.
POSSIBLE CAUSE	• ECT sensor malfunction • Open circuit between ECT sensor terminal A and PCM terminal 38. • Short to power circuit between ECT sensor terminal A and PCM terminal 38. • Open circuit between ECT sensor terminal B and PCM terminal 91. • Poor connection of ECT sensor or PCM connectors. • PCM malfunction





Z6U0102W360

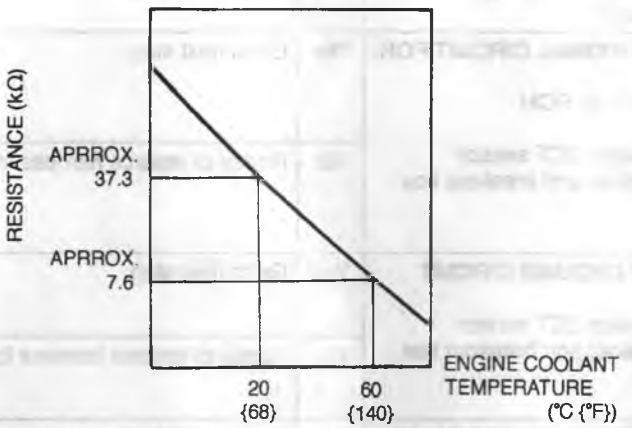
Troubleshooting Hint

ECT sensor description

- The ECT is in inverse proportion to ECT sensor resistance. Therefore ECT is in inverse proportion to ECT output voltage.
- The ECT sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —A/C cut-off control
  - —Electric cooling fan control
  - —Evaporative system monitor
  - —EGR system monitor

ECT sensor signal characteristic

THE CHARACTERISTICS OF
ENGINE COOLANT TEMPERATURE SENSOR



Z6U0102W181

ECT sensor specification

ECT temperature	20 °C {68 °F}	40 °C {104 °F}	60 °C {140 °F}	80 °C {176 °F}	100° C {212° F}	120 °C {248 °F}
ECT PID	20 °C {68 °F}	40 °C {104 °F}	60 °C {140 °F}	80 °C {176 °F}	100 °C {212 °F}	120 °C {248 °F}
ECT V PID*	3.07 V	2.13 V	1.33 V	0.78 V	0.46 V	0.27 V
ECT resistance	37.3 kΩ	16.15 kΩ	7.70 kΩ	3.84 kΩ	2.07 kΩ	1.18 kΩ

* : Voltage values shown in the table were calculated for Vref = **5.0 V**. These values may vary **15 %** due to the ECT sensor and Vref variations.

Diagnostic procedure

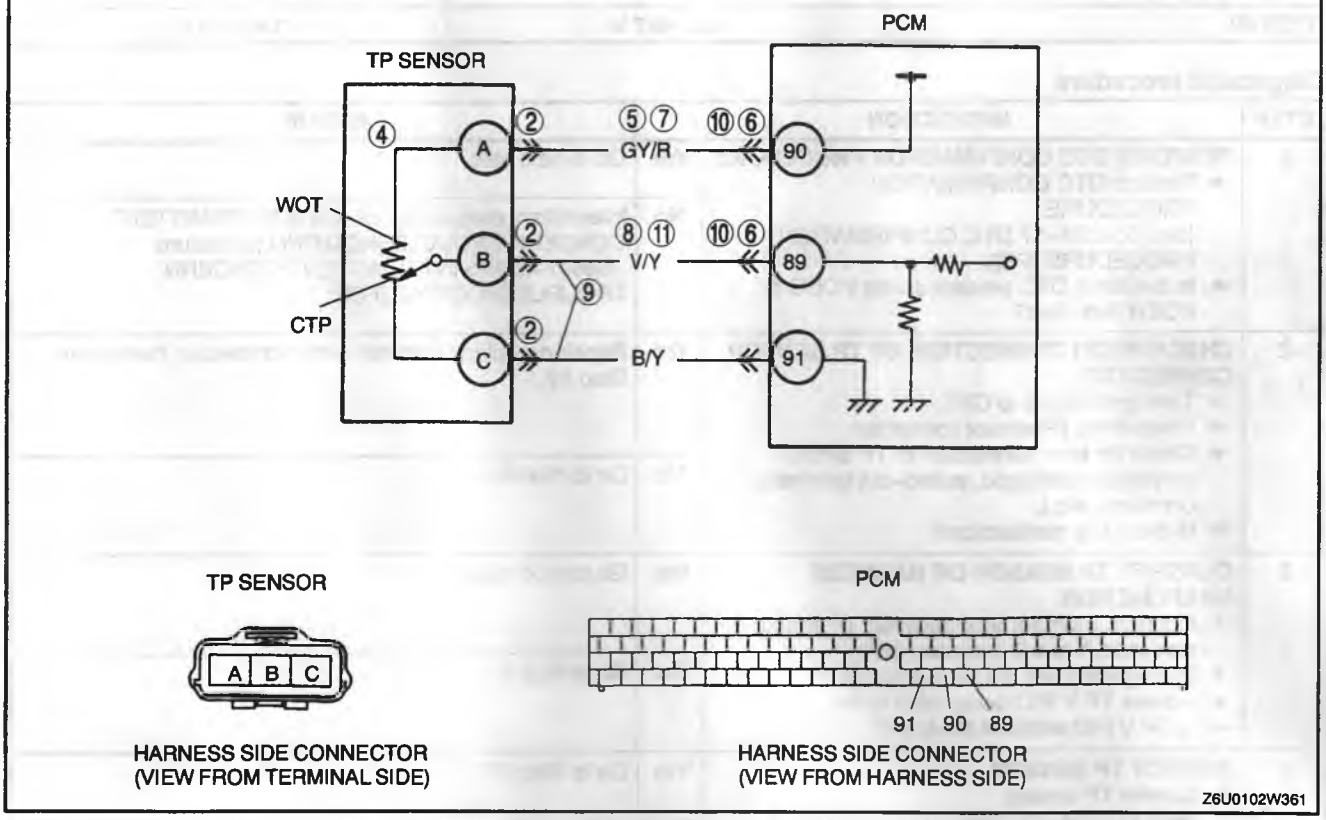
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**INSPECT POOR CONNECTION OF ECT SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect ECT sensor connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 8.
		No	Go to next step.

STEP	INSPECTION		ACTION
3	**CLASSIFY ECT SENSOR OR HARNESS MALFUNCTION** • Connect jumper wire between ECT sensor terminal A and B (harness-side) • Access ECT V PID using NGS tester. • Is ECT V PID **approx. 0 V**?	Yes	Replace ECT sensor, then go to Step 8.
		No	Go to next step.
4	**INSPECT ECT SENSOR SIGNAL CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (Engine OFF). • Measure voltage between ECT sensor terminal A (harness-side) and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to Step 8.
		No	Go to next step.
5	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 8.
		No	Go to next step.
6	**INSPECT ECT SENSOR SIGNAL CIRCUIT FOR OPEN** • Connect breakout box with PCM disconnected. • Check continuity between ECT sensor terminal A (harness-side) and breakout box terminal 38. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 8.
7	**INSPECT ECT SENSOR GROUND CIRCUIT FOR OPEN** • Check continuity between ECT sensor terminal B (harness-side) and breakout box terminal 91. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.
8	**VERIFY TROUBLESHOOTING OF DTC P0118 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOEO/KOER Self-Test. • Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0122 [FS]

Z6U010201082W11

DTC P0122	TP circuit low input
DETECTION CONDITION	• If the PCM detects the TP sensor voltage at PCM terminal 89 is below **0.17 V** after the ignition key is turned ON, the PCM determines that a TP circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC also detects by KOEO/KOER Self-Test
POSSIBLE CAUSE	• TP sensor malfunction • Connector or terminal malfunction • Open circuit between TP sensor terminal B and PCM terminal 89. • Short to ground circuit between TP sensor terminal B and PCM terminal 89. • Open circuit between TP sensor terminal A and PCM terminal 90. • Short to ground circuit between TP sensor terminal A and PCM terminal 90.



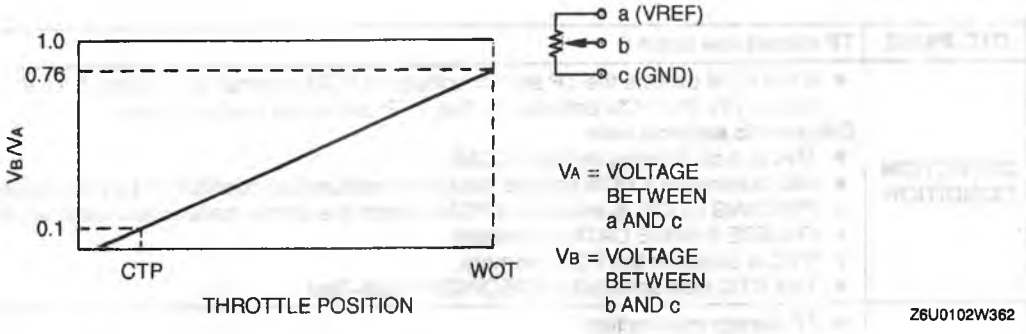
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Troubleshooting Hint

TP sensor description

- A liner type throttle sensor is used.
- The TP sensor resistance between terminal B and C increases while depressing the accelerator pedal.
- The TP sensor resistance between terminal A and B decreases while depressing the accelerator pedal.
- The TP sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —A/C cut-off control
  - —Electric cooling fan control
  - —Evaporative system monitor
  - —EGR system monitor

TP sensor signal characteristic



TP sensor specification

Accelerator pedal position	Closed throttle position	Wide open throttle
TP V PID	0.3—0.7 V	3.4—5.3 V
TP MODE PID	C/T	WOT
PCM 89	0.3—0.7 V	3.4—5.3 V

Diagnostic procedure

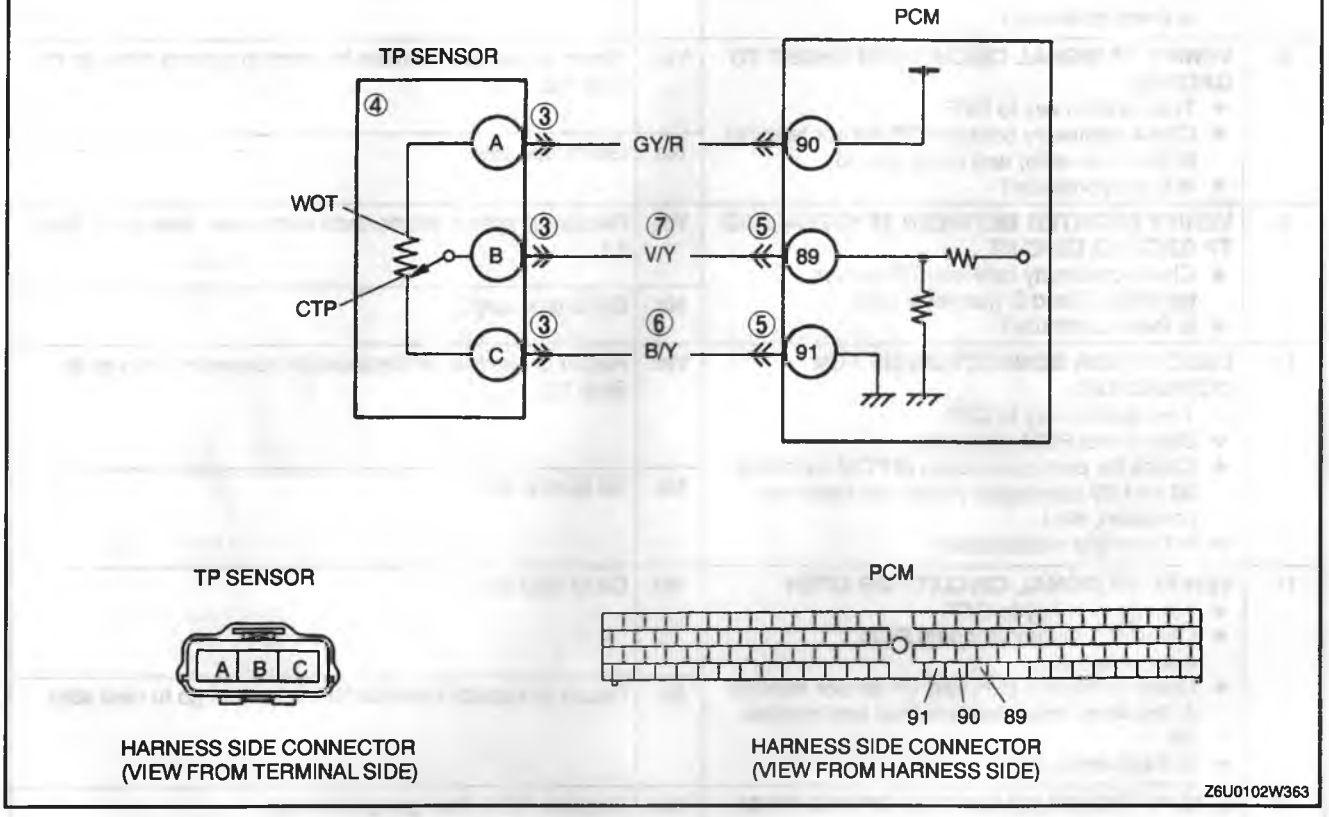
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**CHECK POOR CONNECTION OF TP SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect TP sensor connector. • Check for poor connection of TP sensor connector (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 12.
		No	Go to next step.
3	**CLASSIFY TP SENSOR OR HARNESS MALFUNCTION** • Connect a jumper wire between TP sensor terminals A and B (harness-side). • Turn ignition key to ON (Engine OFF). • Access TP V PID using NGS tester. • Is TP V PID **within 4.5—5.5 V**?	Yes	Go to next step.
		No	Go to step 5.
4	**INSPECT TP SENSOR** • Inspect TP sensor. (See 01-40A-32 THROTTLE POSITION SENSOR INSPECTION [FS]) • Is TP sensor okay?	Yes	Go to Step 12.
		No	Replace TP sensor, then go to Step 12.
5	**CHECK TP SENSOR POWER SUPPLY CIRCUIT** **Note** • If DTC P0107 and P0452 are also retrieved with P0122, then go to REFERENCE VOLTAGE troubleshooting procedure. (See 01-03A-50 NO.29 CONSTANT VOLTAGE [FS]) • Turn ignition key to ON (Engine OFF). • Check voltage at TP sensor terminal A (harness-side). • Is voltage **within 4.5— 5.5 V**?	Yes	Go to step 8.
		No	Go to next step.

STEP	INSPECTION		ACTION
6	**CHECK POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection of PCM terminals 90 and 89 (damaged, pulled-out terminals, corrosion, etc.) • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 12.
		No	Go to next step.
7	**VERIFY TP POWER SUPPLY CIRCUIT FOR OPEN** • Turn ignition key to OFF. • Connect breakout box with PCM disconnected. • Check continuity between TP sensor terminal A (harness-side) and breakout box terminal 90. • Is there continuity?	Yes	Go to Step 12.
		No	Repair or replace harness for open, then go to Step 12.
8	**VERIFY TP SIGNAL CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Check continuity between TP sensor terminal B (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 12.
		No	Go to next step.
9	**VERIFY SHORTED BETWEEN TP SIGNAI AND TP GROUND CIRCUIT** • Check continuity between TP sensor terminals B and C (harness-side). • Is there continuity?	Yes	Repair or replace shorts each harnesses, then go to Step 12.
		No	Go to next step.
10	**CHECK POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection of PCM terminals 90 and 89 (damaged, pulled-out terminals, corrosion, etc.) • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 12.
		No	Go to next step.
11	**VERIFY TP SIGNAL CIRCUIT FOR OPEN** • Turn ignition key to OFF. • Connect breakout box with PCM disconnected. • Check continuity between TP sensor terminal A (harness-side) and breakout box terminal 89. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.
12	**VERIFY TROUBLESHOOTING OF DTC P0122 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform DTC CONFIRMATION PROCEDURE. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Perform KOEO/KOER Self-Test. • Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
13	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0123 [FS]

Z6U010201082W12

DTC P0123	TP circuit high Input
DETECTION CONDITION	• If the PCM detects the TP sensor voltage at the PCM terminal 89 is above **4.79 V** while the engine is running, the PCM determines that a TP circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC also detects by KOEO/KOER Self-Test.
POSSIBLE CAUSE	• TP sensor malfunction • Connector or terminal malfunction • Open circuit between TP sensor terminal C and PCM terminal 91 • Short to reference voltage (Vref) between TP sensor terminal B and PCM terminal 89



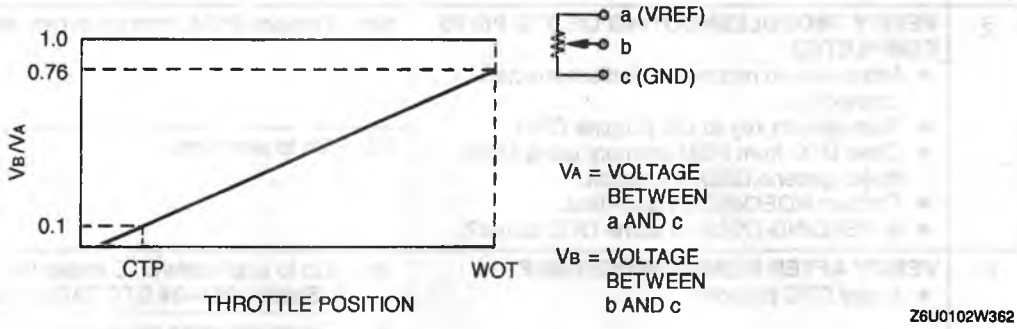
Z6U0102W363

Troubleshooting Hint

TP sensor description

- A liner type throttle sensor is used.
- The TP sensor resistance between terminal B and C increases while depressing the accelerator pedal.
- The TP sensor resistance between terminal A and B decreases while depressing the accelerator pedal.
- The TP sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —A/C cut-off control
  - —Electric cooling fan control
  - —Evaporative system monitor
  - —EGR system monitor

TP sensor signal characteristic



TP sensor specification

Accelerator pedal position	Closed throttle position	Wide open throttle
TP V PID	0.3—0.7 V	3.4—5.3 V
TP MODE PID	C/T	WOT
PCM 89	0.3—0.7 V	3.4—5.3 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**CHECK TP SENSOR CONNECTOR** • Turn ignition key to OFF. • Verify that the TP sensor connector is connected securely. • Is connector okay?	Yes	Go to next step.
		No	Connect the connector securely, then go to Step 8.
3	**INSPECT POOR CONNECTION OF TP SENSOR CONNECTOR** • Disconnect TP sensor connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector , then go to Step 8.
		No	Go to next step.
4	**INSPECT TP SENSOR** • Inspect TP sensor. (See 01-40A-32 THROTTLE POSITION SENSOR INSPECTION [FS]) • Is TP sensor okay?	Yes	Go to next step.
		No	Replace TP sensor, then go to Step 8.
5	**CHECK POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection of PCM terminals 89 and 91 (damaged, pulled-out terminals, corrosion, etc.) • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 8.
		No	Go to next step.
6	**VERIFY TP GROUND CIRCUIT FOR OPEN** • Turn ignition key to OFF. • Connect breakout box with PCM disconnected. • Check continuity between TP sensor terminal C (harness-side) and breakout box terminal 91. • Is there continuity?	Yes	Go to next.
		No	Repair or replace harness for open, then go to Step 8.
7	**VERIFY TP SIGNAL CIRCUIT FOR OPEN** • Measure voltage between TP sensor terminal B (harness-side) and body ground. • Is voltage above **4.79** V?	Yes	Repair or replace harness for short to Vref, then go to Step 8.
		No	Go to next step.

STEP	INSPECTION		ACTION
8	**VERIFY TROUBLESHOOTING OF DTC P0123 COMPLETED** ● Make sure to reconnect all disconnected connectors. ● Turn ignition key to ON (Engine OFF). ● Clear DTC from PCM memory using NGS tester generic OBD-II function. ● Perform KOEO/KOER Self-Test. ● Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** ● Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0125 [FS]

Z6U010201082W13

DTC P0125	Excessive time to enter closed loop fuel control
DETECTION CONDITION	● The PCM monitors ECT sensor signal at PCM terminal 38 after engine is started and the engine is cold. If ECT does not reach **25.5 °C {78 °F}** for a specified period, PCM determines that it has taken an excessive amount of time for the engine coolant temperature to reach the temperature necessary to start closed-loop fuel control. **Diagnostic support note** ● This is a continuous monitor (CCM). ● MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. ● PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. ● FREEZE FRAME DATA is available. ● DTC is stored in PCM memory.
POSSIBLE CAUSE	● ECT sensor malfunction ● Poor connection of connectors ● PCM malfunction

Troubleshooting Hint

Closed loop description

- The closed loop which is feedback zone of fuel injection control, keeps a good air/fuel ratio to improve fuel economy and to reduce exhaust emissions level.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** ● Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** ● Check for related Service Bulletins and/or on-line repair information availability. ● Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. ● If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS-IS CONCERN INTERMITTENT OR CONSTANT** ● Start engine. ● Warm up engine completely. ● Access ECT PID using NGS tester. ● Is ECT PID **above 25.5 °C {78 °F}**?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
		No	Go to next step.
4	**INSPECT POOR CONNECTION OF ECT SENSOR CONNECTOR** ● Turn ignition key to OFF. ● Disconnect ECT sensor connector. ● Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). ● Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 7.
		No	Go to next step.

STEP	INSPECTION		ACTION
5	**INSPECT ECT SENSOR** • Inspect ECT sensor. (See 01-40A-34 ENGINE COOLANT TEMPERATURE SENSOR INSPECTION [FS]) • Is it okay?	Yes	Go to next step.
		No	Replace ECT sensor, then go to Step 7.
6	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 7.
		No	Go to next step.
7	**VERIFY TROUBLESHOOTING OF DTC P0125 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Access ECT PID using NGS tester. • Wait until ECT PID is below **20 °C {68 °F}**. • Start engine and warm it up completely. • Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0126, P0128 [FS]

Z6U010201082W14

DTC P0126 P0128	**Coolant thermostat stuck to open**
DETECTION CONDITION	**(DTC P0126)** • If ECT signal never exceeds **71 °C {160 °F}** after engine start for specified period, PCM determines that the coolant thermostat is stuck open. **MONITORING CONDITIONS** — IAT: **Above -10°C {14°F}** — Difference between ECT at engine start and minimum IAT: **Below 6 °C {43 °F}** — Vehicle speed **over 9.5 km/h {5.9 mph}** **(DTC P0128)** • PCM monitors MAF, IAT, VSS and ECT signals and calculate radiator's heat radiation ratio while following monitoring conditions are met. If calculated value exceeds threshold, PCM determines that the coolant thermostat is stuck open. **MONITORING CONDITIONS** — ECT at engine start: **Below 35 °C {95 °F}** — IAT: **Above -10 °C {14 °F}** — Difference between ECT at engine start and minimum IAT: **Below 6 °C {43 °F}** — Vehicle speed **over 25 km/h {15 mph}** **Diagnostic support note** • This is a intermittent monitor (THERMOSTAT) • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • DIAGNOSTIC MONITORING TEST RESULTS is available. • PENDING CODE is available if PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• Coolant thermostat malfunction • ECT sensor malfunction • PCM malfunction

COOLING FAN RELAY NO. 1



RELAY BOX SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

YMU102WAK

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on–line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**INSPECT FOR OTHER DTCs** • Have other DTCs been stored?	Yes	Repair circuit malfunction for applicable DTCs.
		No	Go to next step.
4	**VERIFY COOLANT THERMOSTAT OPERATION** • Turn off E/L and A/C. • Remove cooling fan relay No.1 located next to main relay box. • Warm up engine until ECT PID reads **99 °C {210 °F}**. • Short cooling fan relay No.1 terminal A and B (harness–side) using a jumper wire. • Monitor ECT PID. • Has ECT PID decreased continuously and stop at **80—84 °C {176—183 °F}** (thermostat closed)?	Yes	Go to step 6.
		No	Go to next step.
5	**INSPECT COOLANT THERMOSTAT FOR STUCK OPEN** • Remove coolant thermostat and inspect for stuck open. (See 01–12–5 THERMOSTAT INSPECTION) • Is thermostat okay?	Yes	Inspect ECT sensor. Replace ECT sensor if necessary, then go to next step.
		No	Replace coolant thermostat, then go to next step.
6	**VERIFY MONITORING CONDITION FOR REPAIR VERIFICATION** • Make sure to reconnect all disconnected connectors. • Cool down engine. **Note** • If workshop interior and outdoor temperature difference is significant, PCM might not operate thermostat monitor. Therefore, it is recommended to cool down engine out of workshop. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD–II function. • Access ECT, IAT PIDs and make sure that each value is within following conditions. — ECT: **below 31 °C {88 °F}** (for P0128 only) — IAT: **above –10 °C {14 °F}** — Difference between ECT and IAT: **below 6 °C {43 °F}** • Is there any PID that is out of specification?	Yes	Take corrective action (e.g. cool down engine), then repeat this step.
		No	Go to next step for DTC P0126 or go to step 8 for DTC P0128.

STEP	INSPECTION		ACTION
7	**VERIFY TROUBLESHOOTING OF DTC P0126 COMPLETED** • Start engine and turn off E/L and A/C. • Access DIAGNOSIS MONITORING TEST RESULTS of generic OBD-II function using NGS tester and monitor TEST #10:32:00. • Drive vehicle from **40—100 km/h {25—62 mph}** until TEST value is changed. **Note** • This test requires actual driving. Chassis roller cannot use for this test. • During test drive, constant speed should be maintained, although 2 or 3 stops during every **5 minuites** of driving time (e.g. for traffic signals) is acceptable. Stop–and–go (e.g. in case of traffic congestion) is not acceptable during the test period. • Test period depends on ECT at engine start. (e.g. If ECT is **–10 °C {14 °F}**, monitoring period is **38 minuites** and if ECT is **30 °C {86 °F}**, monitoring period is **8 minuites**) • Verify TEST #10:32:00 value. • Is value above minimum value?	Yes	Go to step 9.
		No	Replace PCM, then go to step 9.
8	**VERIFY TROUBLESHOOTING OF DTC P0128 COMPLETED** • Start engine and turn off E/L and A/C. • Access DIAGNOSIS MONITORING TEST RESULTS of generic OBD-II function using NGS tester and monitor TEST #10:31:00 or #10:30:00. • Drive vehicle from **40—100 km/h {25—62 mph}** for approximately **5 minuites** until TEST value is changed. **Note** • This test requires actual driving. Chassis roller cannot use for this test. • During test drive, constant speed should be maintained, although 2 or 3 stops (e.g. for traffic signals) is acceptable. Stop–and–go (e.g. in case of traffic congestion) is not acceptable during the test period. • Verify TEST #10:31:00 or #10:30:00 value. • Is value below maximum value?	Yes	Go to next step.
		No	Replace PCM, then go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0133 [FS]

Z6U010201082W15

DTC P0133	Heated oxygen sensor (Front) (O2S 11) circuit slow response
DETECTION CONDITION	• DTC P0133 indicates response rate of heated oxygen sensor is below some calibrated window.
POSSIBLE CAUSE	• Contaminated heated oxygen sensor • Exhaust leaks • Shorted/open wires • Improper fueling • MAF sensor • Air leaks • Deteriorating heated oxygen sensor

Troubleshooting Hint

See 01-40A-12 Heated Oxygen Sensor Description

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**PERFORM KOER SELF TEST** • Key on, engine running and engine at operating temperature. • Perform KOER self-test. • Is DTCs P1127 present during KOER self-test?	Yes	Perform DTC P1127 troubleshooting. (See01-02A-153 DTC P1127 [FS])
		No	Go to next step.
4	**HEATED OXYGEN SENSOR RESPONSE TEST** • Key on, engine off. • Select Generic OBD II function from menu and trigger. • Press Continue. • Select Diagnostic Monitoring Test Results from menu and trigger. • Scroll to Test ID: 10:03:81 trigger and press start. • Does measured value indicate greater than 461?	Yes	Go to Step 9.
		No	Oxygen sensor test results indicate fail. Go to next step.
5	**CHECK FOR SOURCE OF POTENTIAL HEATED OXYGEN SENSOR CONTAMINATION** • Investigate following items as potential source of heated oxygen sensor contamination. • Use of unapproved silicone sealers • Fuel contaminated by silicone additives • Excessive oil burning (i.e. rings, valve seals and oil overfill) • Glycol (antifreeze) leaking internally in engine • Contaminated fuel • Use of unapproved cleaning agents • Are any of above conditions present?	Yes	Replace heated oxygen sensor (Front), then go to Step 9.
		No	Go to next step.

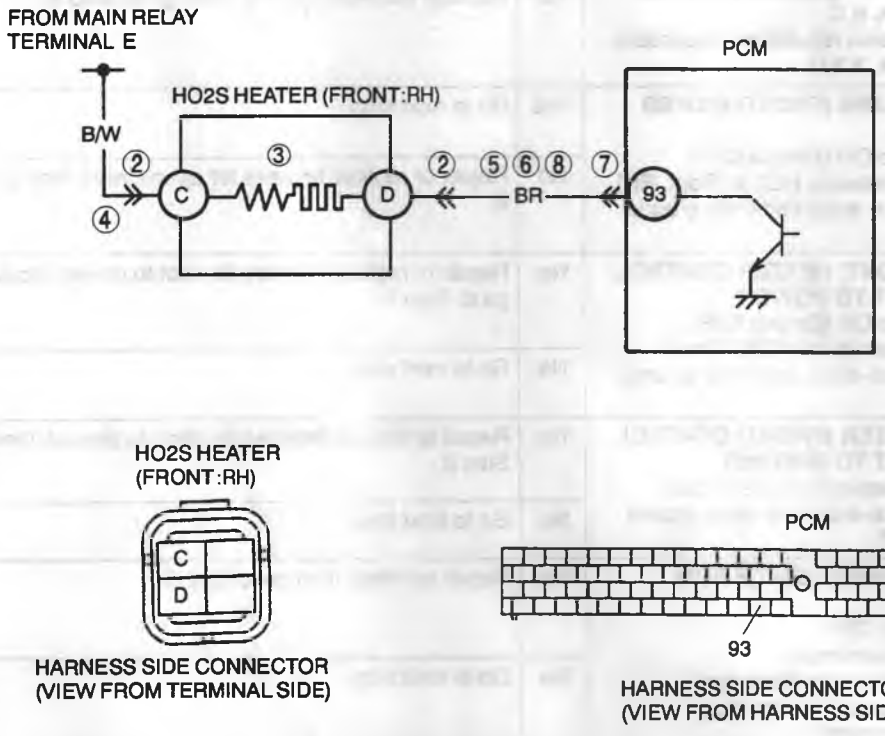
STEP	INSPECTION		ACTION
6	**CHECK FOR UNMETERED AIR LEAKS** Fuel calculations can be affected by unmetered air leaks. ● Carefully inspect following areas for potential air leaks. ● Hoses connecting to MAF sensor ● Hoses connecting to throttle body ● Intake manifold gasket leaks ● Positive crankcase ventilation (PCV) disconnected ● Vacuum lines disconnected ● Improperly seated engine oil dipstick and tube ● Exhaust leaks at flanges and gaskets ● Are there any air leaks?	Yes	Replace damaged parts, then go to Step 9.
		No	Go to next step.
7	**CHECK RESISTANCE OF HEATED OXYGEN SENSOR SIGNAL CIRCUIT** ● Key off. ● Disconnect NGS tester. ● Disconnect PCM. Inspect both ends of connection for bent or pushed out pins, corrosion or other damage. Service as necessary. ● Install breakout box. Leave PCM disconnected. ● Measure resistance between heated oxygen sensor signal Test Pin 60 at breakout box and heated oxygen sensor harness connector terminal A. ● Measure resistance between following Test Pin 35 at breakout box and heated oxygen sensor harness connector terminal A.(except California emission regulation applicable model) ● Measure resistance between heated oxygen sensor body and ground. (for California emission regulation applicable model) ● Is resistance **less than 5.0** Ω?	Yes	Go to next step.
		No	Replace wiring harness, then go to Step 9.
8	**CHECK FOR SHORT IN HEATED OXYGEN SENSOR CIRCUIT** ● Key off. ● Install breakout box and disconnect PCM connector. ● Measure resistance between heated oxygen sensor signal Test Pin at breakout box and power circuit and heated oxygen sensor signal Test Pin and ground circuit at breakout box. ● O2S11 (Front) = Test Pin 60 ● Power circuit = Test Pin 71/97 ● Ground = Test Pin 91 ● Is resistance **greater than 10,000** Ω?	Yes	Go to next step.
		No	Replace wiring harness, then go to next step.

STEP	INSPECTION		ACTION
9	**VERIFY TROUBLESHOOTING OF DTC P0133 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine and perform DRIVE MODE. (See 01-02A-18 OBD II DRIVE MODE [FS]) • Access DIAGNOSTIC MONITORING TEST RESULTS of generic OBD-II function. (See 01-02A-16 Diagnostic Monitoring Test Results Access Procedure) • Verify following TEST ID values: — 10:01:91 (Voltage amplitude between rich and lean (bank 1)) — 10:03:81 (Switching point (front HO2S)) • Is value within specification?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0135 [FS]

Z6U010201082W16

DTC P0135	HO2S heater (Front) circuit malfunction
DETECTION CONDITION	• The PCM monitors the HO2S heater (Front) control signal at the PCM terminal 93. If electric current at PCM terminal 93 is **below 0.14 A** or **above 3.0 A** after the HO2S heater (Front) has been on for **254 seconds**, the PCM determines that the HO2S heater (Front) circuit has malfunctioned. **Diagnostic support note** • This is an intermittent monitor (O_2 sensor heater). • MIL illuminates if PCM detects the above malfunction condition for two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory. • This DTC also detects by KOEO/KOER Self-Test.
POSSIBLE CAUSE	• HO2S (Front) malfunction • Open circuit between the main relay terminal E and HO2S (Front) terminal C • Open circuit between the HO2S (Front) terminal D and PCM terminal 93 • Short to ground circuit between HO2S (Front) terminal D and PCM terminal 93 • Short to power circuit between HO2S (Front) terminal D and PCM terminal 93 • Poor connection at HO2S (Front) or PCM connector • PCM malfunction



Z6U0102W364

Troubleshooting Hint

HO2S heater description

- The main relay circuit supplies battery voltage to the HO2S heater, and the PCM completes the ground when the proper conditions occur.
- The use of HO2S heater requires that the heater control be duty cycled, to prevent damage to the heater.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** ● Perform DTC CONFIRMATION PROCEDURE. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) ● Is the same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**INSPECT POOR CONNECTION OF HO2S (FRONT) CONNECTOR** ● Turn ignition key to OFF. ● Disconnect HO2S (Front) connector. ● Check for poor connection (damaged, pulled-out pins, corrosion, etc.). ● Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
3	**INSPECT HO2S HEATER (FRONT)** ● Measure resistance between HO2S (Front) terminals C and D (part-side). ● Is resistance as follows? — Federal emission regulations applicable models: **approx. 6 Ω** — California emission regulations applicable models: **approx. 3.3 Ω**	Yes	Go to next step.
		No	Replace the HO2S (Front), then go to Step 9.
4	**INSPECT HO2S HEATER (FRONT) POWER CIRCUIT FOR OPEN** ● Turn ignition key to ON (Engine OFF). ● Measure voltage between HO2S (Front, RH) terminal C (harness-side) and body ground. ● Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open circuit, then go to Step 9.
5	**INSPECT HO2S (FRONT) HEATER CONTROL CIRCUIT FOR SHORT TO POWER** ● Turn ignition key to ON (Engine OFF). ● Measure voltage between HO2S (Front) terminal D (harness-side) and body ground. ● Is voltage **B+**?	Yes	Repair or replace harness for shot to power circuit, then go to Step 9.
		No	Go to next step.
6	**INSPECT HO2S HEATER (FRONT) CONTROL CIRCUIT FOR SHORT TO GROUND** ● Check continuity between HO2S (Front) terminal D (harness-side) and body ground. ● Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 9.
		No	Go to next step.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** ● Turn ignition key to OFF. ● Disconnect PCM connector. ● Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). ● Is there any malfunction?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.
8	**INSPECT HO2S HEATER (FRONT) CONTROL CIRCUIT OF FOR OPEN** ● Connect breakout box with PCM connector disconnected. ● Check continuity between HO2S (Front) terminal D (harness-side) and breakout box terminal 93. ● Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open circuit, then go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P0135 COMPLETED** ● Make sure to reconnect all disconnected connectors. ● Clear DTC from PCM memory using NGS tester OBD-II generic function. ● Perform KOEO/KOER Self-Test. ● Is the same DTC present during KOEO or KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.

STEP	INSPECTION		ACTION
10	**VERIFY AFTER REPAIR PROCEDURE** • Is there any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0136, P1137, P1138 [FS]

Z6U010201082W17

DTC P0136 **DTC P1137** **DTC P1138**	**HO2S (Rear) (O2S 12) circuit malfunction** **Lack of HO2S (Rear) (O2S 12) switch sensor indicates lean** **Lack of HO2S (Rear) (O2S 12) switch sensor indicates rich**
DETECTION CONDITION	• DTC P0136 indicate output voltage of rear HO2S is less than PCM pre programmed voltage.(no activity detected) • DTC P1137 and P1138 can only be retrieved during KOER self-test when fuel control is fluctuating between rich and lean, and monitor voltage changes in the rear HO2S.
POSSIBLE CAUSE	• Wiring Concerns • Pinched, shorted, and corroded wiring and pins • Crossed sensor wires • Other Concerns • Exhaust leaks • Contaminated or damaged sensor

Troubleshooting Hint
See 01-40A-12 Heated Oxygen Sensor Description

Diagnostic procedure

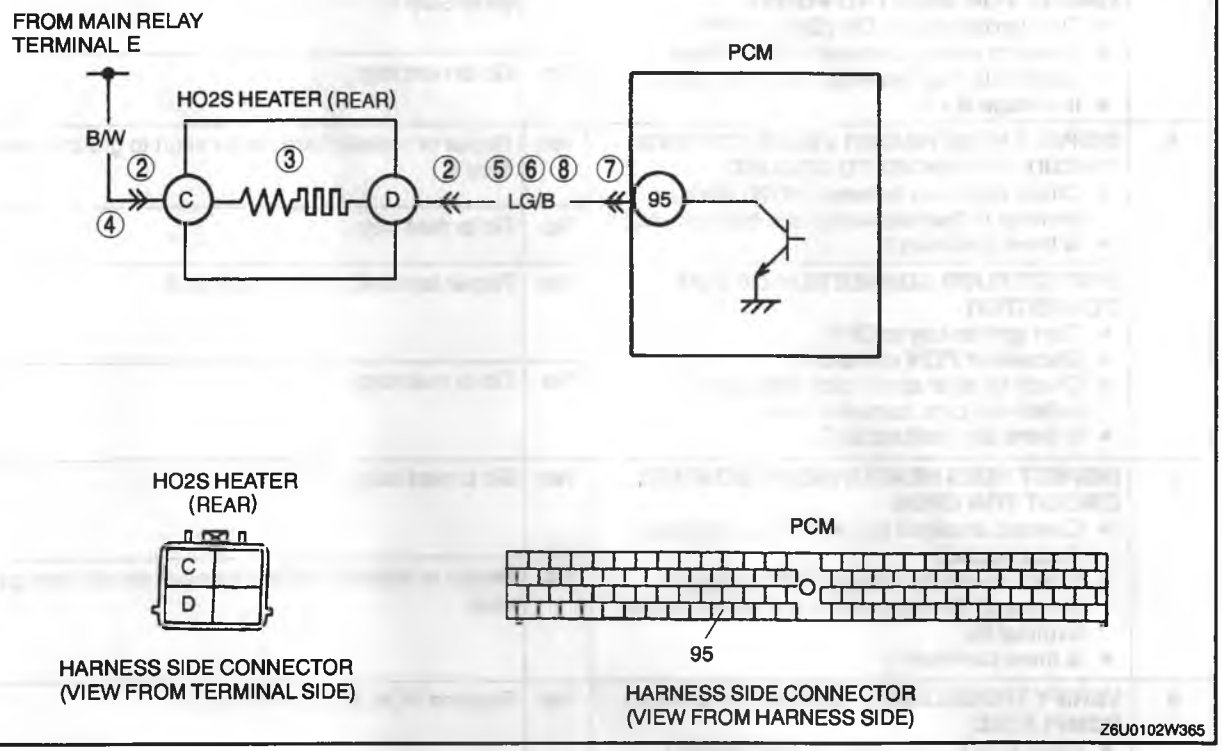
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**CHECK PID STATUS** • Check for broken/loose air hose clamps, cracks/holes in air hose. If it was damaged, service as necessary. • Check exhaust gas leaks from exhaust system. If it was damaged, service as necessary. • Start engine and bring to normal operating temperature. • Access O2S12 with NGS tester. • Is H2OS activated?	Yes	Go to Step 7.
		No	Go to next step.
4	**CHECK CONNECTION OF HO2S CONNECTOR AND PCM CONNECTOR** • Key off. • Verify connection of H2OS connector and PCM connector. • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and pins then go to next step.
5	**CHECK HO2S SIGNAL CIRCUIT SHORTS TO GROUND CIRCUIT** • Key off. • Disconnect H2OS connector. • Disconnect PCM connector. • Install breakout box. • Measure resistance between Test pins 60 and 103. • Is resistance **greater than 10,000 Ω**?	Yes	Repair or replace wiring harness or connector then go to Step 7.
		No	Replace HO2S.
6	**CHECK HO2S GROUND CIRCUIT OPEN** • Key off. • Check continuity between Test pin 60 and 91. • Is there continuity?	Yes	Replace HO2S.
		No	Repair or replace wiring harness or connector then go to next step.

STEP	INSPECTION		ACTION
7	**VERIFY TROUBLESHOOTING OF DTC P0136 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine and perform DRIVE MODE. (See01-02A-18 OBD II DRIVE MODE [FS]) • Access DIAGNOSTIC MONITORING TEST RESULTS of generic OBD-II function. (See 01-02A-16 Diagnostic Monitoring Test Results Access Procedure) • Verify following TEST ID value: — 10:03:82 (Switching point (rear HO2S)) • Is value within specification?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0141 [FS]

Z6U010201082W18

DTC P0141	HO2S heater (Rear) circuit malfunction
DETECTION CONDITION	• The PCM monitors the HO2S heater (Rear) control signal at the PCM terminal 95. If electric current at PCM terminal 95 is **below 0.14 A** or **avobe 3.0 A** after the HO2S heater (Rear) has been on for **254 seconds**, the PCM determines that the HO2S heater (Rear) circuit has malfunctioned. **Diagnostic support note** • This is an intermittent monitor (O_2 sensor heater). • MIL illuminates if PCM detects the above malfunction condition for two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory. • This DTC also detects by KOEO/KOER Self-Test.
POSSIBLE CAUSE	• HO2S (Rear) malfunction • Open circuit between the main relay terminal E and HO2S (Rear) terminal C • Open circuit between the HO2S (Rear) terminal D and PCM terminal 95 • Short to ground circuit between HO2S (Rear) terminal D and PCM terminal 95 • Short to power circuit between HO2S (Rear) terminal D and PCM terminal 95 • Poor connection at HO2S (Rear) or PCM connector • PCM malfunction



Z6U0102W365

Troubleshooting Hint

HO2S heater description

- The main relay circuit supplies battery voltage to the HO2S heater, and the PCM completes the ground when the proper conditions occur.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])

STEP	INSPECTION		ACTION
2	**INSPECT POOR CONNECTION OF HO2S (REAR) CONNECTOR** • Turn ignition key to OFF. • Disconnect HO2S (Rear) connector. • Check for poor connection (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
3	**INSPECT HO2S HEATER (REAR)** • Measure resistance between HO2S (Rear) terminals C and D (part-side). • Is resistance approx. **6** Ω?	Yes	Go to next step.
		No	Replace the HO2S (Rear), then go to Step 9.
4	**INSPECT HO2S HEATER (REAR) POWER CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Measure voltage between HO2S (Rear) terminal C (harness-side) and body ground. • Is voltage **B**+?	Yes	Go to next step.
		No	Repair or replace harness for open circuit, then go to Step 9.
5	**INSPECT HO2S HEATER (REAR) CONTROL CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (Engine OFF). • Measure voltage between HO2S (Rear) terminal D (harness-side) and body ground. • Is voltage **B**+?	Yes	Repair or replace harness for shot to power circuit, then go to Step 9.
		No	Go to next step.
6	**INSPECT HO2S HEATER (REAR) CONTROL CIRCUIT FOR SHORT TO GROUND** • Check continuity between HO2S (Rear) terminal D (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 9.
		No	Go to next step.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunction?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.
8	**INSPECT HO2S HEATER (REAR) CONTROL CIRCUIT FOR OPEN** • Connect breakout box with PCM connector disconnected. • Check continuity between HO2S (Rear) terminal D (harness-side) and breakout box terminal 95. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open circuit, then go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P0141 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester OBD-II generic function. • Perform KOEO/KOER Self-Test. • Is the same DTC present during KOEO or KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0171, P0172, P1130, P1131, P1132 [FS]

Z6U010201082W19

DTC P0171 DTC P0172 DTC P1130 DTC P1131 DTC P1132	**Adaptive fuel control system too lean Adaptive fuel control system to rich Lack of HO2S(Front) (O2S 11) switch adaptive fuel at limit Lack of HO2S (Front) (O2S 11) switch sensor indicates too lean Lack of HO2S (Front) (O2S 11) switch sensor indicates too rich**
DETECTION CONDITION	• DTC P0171 indicates fuel/air ratio is too lean. Fuel trim system is at rich correction limit • DTC P0172 indicates fuel/air ratio is too rich. Fuel trim system is at lean correction limit. • DTC P1130 indicates fuel control system has reached maximum compensation for lean or rich condition and HO2S is not switching. • DTC P1131 indicates fuel/air ratio is correcting rich for an overly lean condition. HO2S voltage is less than **0.45 V.** • DTC P1132 indicates fuel/air ratio is correcting lean for an overly rich condition. HO2S voltage is greater than **0.45 V.**
POSSIBLE CAUSE	Fuel System • Excessive fuel pressure • Leaking fuel injector(s) • Leaking pressure regulator • Low fuel pressure or running out of fuel • Contaminated fuel injector(s) Base Engine • Oil overfill • Cam timing • Cylinder compression • Exhaust leaks before or near HO2S Induction System • Air leaks between the MAF sensor and intake manifold • Vacuum leaks • Restricted air inlet • Positive crankcase ventilation (PCV) system • Fuel purge system • Improperly seated engine oil dipstick EGR System • Leaking gasket • Stuck open EGR valve • Leaking diaphragm **Warning** **Following troubleshooting flow chart contains fuel system diagnostic and repair procedures. Read following warnings before performing fuel system service:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Troubleshooting Hint

See 01-40A-12 Heated Oxygen Sensor Description

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.

STEP	INSPECTION		ACTION
3	**VISUAL CHECKS** • Check intake air system for leaks, obstructions and damage. • Check air cleaner element and air cleaner housing for blockage. • Verify integrity of PCV system. • Check for vacuum leaks. • Are any of the above concerns present?	Yes	Service as necessary, than go to Step 47.
		No	Go to next step.
4	**PERFORM KOER SELF-TEST** • Key off. • NGS tester connected. • Disconnect fuel vapor hose from intake manifold and plug fitting at intake manifold. • Start engine and run at **2,000 rpm** for **5 minutes** and return to idle. • Perform KOER self-test. • Are any HO2S DTCs P1127, P1131 or P1132 present?	Yes	**If DTC(s) P1127 is present:** Perform P1127 troubleshooting. **DTCs P1131 or P1130:** Go to next step. **DTCs P1132 or P1130:** Go to Step 10.
		No	**For Continuous DTCs P1130, P0171, and P0172 Only:** Go to Step 14. **If DTC(s) P1132 is no longer present:** Reconnect fuel vapor line. Check purge solenoid valve DTC (P0443). **All others:** Fault that produced DTC is intermittent. Check for poor connection or component malfunction (Service or replace as necessary).
5	**HO2S CIRCUIT TEST (WITH LEAN DTCS)** • Key off. • NGS tester connected. • Disconnect HO2S. Inspect for damaged or pushed out pins, water, corrosion, loose wires. Service as necessary. • Key on, engine off. • Access 02S11 with NGS tester. • Jumper HO2S signal circuit to HO2S heater power circuit at HO2S vehicle harness connector. **Note** • If spark occurs, remove jumper and go to Step 8 (check fuse in the heater circuit) • Is the voltage **1.30 V or greater**?	Yes	Check HO2S ground circuit. Go to next step.
		No	An open or short to ground exists in vehicle harness or PCM. Go to Step 8.
6	**CHECK SIGNAL RETURN CIRCUIT FOR SHORTS AND OPENS** • Key off. • Install breakout box. PCM connected. • Measure resistance between HO2S ground terminal at HO2S vehicle harness connector and ground Test Pin 91 at breakout box. • Is resistance **less than 5.0 Ω**?	Yes	Go to Step 14.
		No	Go to next step.
7	**CHECK HO2S SIGNAL RETURN CIRCUIT IN VEHICLE HARNESS** • Breakout box installed. PCM disconnected. • Measure resistance between HO2S ground terminal at HO2S vehicle harness connector and ground Test Pin 91 at breakout box. • Is resistance **less than 5.0 Ω**?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to Step 47.

STEP	INSPECTION		ACTION
8	**CHECK RESISTANCE OF HO2S AND HO2S GROUND CIRCUIT** • Key off. • Disconnect PCM. Inspect both ends of connector for bent or pushed out pins, corrosion or other damage. Service as necessary. • Install breakout box. Leave PCM disconnected. • Disconnected suspected HO2S from harness. Inspect both ends of connector for damaged or pushed out pins, moisture, corrosion, loose pins. Service as required. • Measure resistance between suspected HO2S signal Test Pin at breakout box and HO2S vehicle harness connector. Use pin assignment below and record reading: — HO2S ground = Test Pin 91 — HO2S (Front) = Test Pin 60 • Is resistance **less than 5.0 Ω**?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to Step 47.
9	**CHECK HO2S CIRCUIT WIRING HARNESS FOR SHORT TO GROUND** • Key off. • Breakout box installed. PCM disconnected. • HO2S disconnected. • Measure resistance between HO2S signal Test Pin 60 and Test Pins 23, 24, 51, 76, 77, 103 and 91 at breakout box. • Is each resistance greater than **10,000 Ω**?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to Step 47.
10	**CHECK HO2S FOR SHORT TO GROUND OR PCM GROUND (BETWEEN PCM AND HO2S GROUND CIRCUIT)** • Key off. • Breakout box installed. PCM disconnected. • Reconnect HO2S. • Measure resistance between ground and PCM ground Test Pins and HO2S signal Test Pin at breakout box: — HO2S (Front) = Test Pin 60 — Ground = Test Pin 24 and 103 — PCM ground = Test Pin 91 • Is resistance **greater than 10,000 Ω**?	Yes	Go to next step.
		No	Replace HO2S, then go to Step 47.
11	**HO2S CIRCUIT CHECK (FOR RICH DTCs)** • Key off. • Disconnect HO2S. Inspect for damaged or pushed out pins, corrosion and loose wires. Service as necessary. • NGS tester connected. • Access O2S11 PID. • Is the voltage **0.2 V** or less?	Yes	Go to Step 13.
		No	A short to power exists. Go to next step.
12	**CHECK FOR SHORTS TO VOLTAGE SOURCE IN HARNESS CIRCUIT** • Key off. • Disconnect NGS tester from DLC. • Disconnect HO2S. • Disconnect PCM. Inspect for damaged or pushed out pins, corrosion and loose wires. Service as necessary. • Install breakout box. Leave PCM disconnected. • Measure resistance between appropriate test pins at breakout box: • DTC P1130, P1132 = HO2S (Front)Test Pin 60 and Test Pins 71, 93 and 97. • Is resistance **greater than 10,000 Ω**?	Yes	Go to next step.
		No	Replace HO2S, then go to next step.

STEP	INSPECTION		ACTION
13	**CHECK FOR HO2S SIGNAL SHORTED TO HO2S HEATER CIRCUIT** • Key off. • Connect HO2S. • NGS tester connected. • Key on, engine off. • Access O2S11 PID. • Is HO2S voltage **greater than 0.45 V**?	Yes	Replace HO2S, then go to Step 47.
		No	Go to next step.
14	**CHECK FUEL PRESSURE** • Key off. • Install fuel pressure gauge. • Verify vacuum source to fuel pressure regulator. • Connect jumper wire to fuel pump relay socket terminal 30 and 87. • Is fuel pressure **260—310 kPa {2.6—3.2 kgf/cm^2, 37—46 psi}**?	Yes	Fuel system is capable of required fuel pressure. Go to Step 24.
		No	Go to next step.
15	**CHECK PRESSURE REGULATOR CONTROL (PRC) SOLENOID VALVE POWER CIRCUIT** Symptom Charts have indicated lack of power during acceleration and/or cruise drive modes. Possible causes: • Damaged PRC solenoid valve. • Damaged input port or output port vacuum lines. • Damaged PRC solenoid valve harness circuits. • Damaged PCM. • Key off. • PRC solenoid valve disconnected. • Key on, engine off. • Measure voltage between power circuit at PRC solenoid valve vehicle harness connector and battery ground. • Is voltage **greater than 10.5 V**?	Yes	PRC solenoid valve power circuit is okay. Go to next step.
		No	Repair or replace wiring harness, then go to Step 47.
16	**CHECK PRC SOLENOID VALVE HARNESS CIRCUIT RESISTANCE** • Key off. • PRC solenoid valve disconnected. • Disconnect PCM. Inspect for damaged or pushed out pins, corrosion and loose wires. Service as necessary. • Install breakout box. Leave PCM disconnected. • Measure resistance between Test Pin 19 at breakout box and PRC solenoid valve circuit at solenoid vehicle harness connector. • Is resistance **less than 5.0 Ω**?	Yes	PRC solenoid valve circuit is complete. Go to next step.
		No	Repair or replace wiring harness, then go to Step 47.
17	**CHECK PRC SOLENOID VALVE CIRCUIT FOR SHORTS TO POWER AND GROUND** • Key off. • PRC solenoid valve disconnected. • Breakout box installed, PCM disconnected. • Disconnect NGS tester from DLC. • Measure resistance between Test Pin 19 and Test Pin 71 and 97 at breakout box. • Measure resistance between Test Pin 19 and Test Pins 24, 77 and 91 at breakout box. • Is resistance greater than **10,000 Ω**?	Yes	There are no power or ground short circuits to PRC solenoid valve. Go to next step.
		No	Repair or replace wiring harness, then go to Step 47.

STEP	INSPECTION		ACTION
18	**CHECK VACUUM LINE: MANIFOLD VACUUM SOURCE TO PRC SOLENOID VALVE INPUT PORT** • Key off. • Disconnect and inspect vacuum line between manifold vacuum source and PRC solenoid valve input vacuum port for blockage, kinks or cracks. • Is vacuum line free of damage?	Yes	Vacuum line is okay. Reconnect vacuum line to manifold vacuum source, leave other end of line. Go to next step.
		No	Repair or replace vacuum line, then go to Step 47.
19	**CHECK VACUUM SIGNAL: MANIFOLD VACUUM SOURCE TO PRC SOLENOID VALVE INPUT** • Key off. • Connect vacuum gauge at unattached end of vacuum line. • Start engine while observing vacuum gauge display. • Key off. • Was a vacuum signal present?	Yes	PRC solenoid valve normally receives manifold vacuum signal. Go to next step.
		No	Go to Step 40.
20	**CHECK VACUUM LINE: FUEL PRESSURE REGULATOR TO PRC SOLENOID VALVE OUTPUT PORT** • Key off. • Disconnect and inspect vacuum line between fuel pressure regulator and PRC solenoid valve output vacuum port for blockage, kinks or cracks. • Is vacuum line free of damage?	Yes	Vacuum line is okay. Reconnect vacuum line. Go to next step.
		No	Vacuum line is damaged. Repair or replace vacuum line, then go to Step 47.
21	**CHECK FOR PRC SOLENOID VALVE STUCK CLOSED** • Key off. • Breakout box installed. PCM connected. • Disconnect vacuum line from PRC solenoid valve to fuel pressure regulator at fuel pressure regulator. Install vacuum gauge at unattached end of vacuum line. • Disconnect vacuum line from intake manifold vacuum to PRC solenoid valve at manifold vacuum source. **Note** • PRC solenoid valve contains normally open valve. If solenoid is not energized while vacuum is applied at input port, vacuum signal will normally be allowed to pass. • Install vacuum pump at input port of PRC solenoid valve and apply **-27— -33 kPa {-202— -247 mmHg, -8— -10 InHg}** of vacuum to PRC solenoid valve while observing vacuum gauge. • Is vacuum signal indicated by vacuum gauge?	Yes	PRC solenoid valve is not stuck closed. Go to next step.
		No	The PRC solenoid valve is stuck closed. Replace PRC solenoid valve, then go to Step 47.

STEP	INSPECTION		ACTION
22	**CHECK FOR PRC SOLENOID VALVE STUCK OPEN** • Key off. • Breakout box installed. PCM connected. • Install vacuum gauge at output port of PRC solenoid valve. • Vacuum pump installed at input port of PRC solenoid valve. • Apply **–27— –33 kPa {–203— –247 mmHg, –8— –10 inHg}** of vacuum to PRC solenoid valve input port. • Key on. • Momentarily jumper Test Pin 19 to Test Pin 103 at breakout box and observe vacuum gauge. **Note** • PRC solenoid valve contains normally open valve. If solenoid is energized while vacuum is applied at input port, vacuum signal will normally not be allowed to pass because solenoid valve will be closed. • Key off. • Did vacuum gauge reading drop from **–27— –33 kPa {–203— –247 mmHg, –8— –10 inHg}** to **0— –3.3 kPa {0— –25 mmHg, 0— –1 inHg}** when Test Pin 19 was connected to Pin 103 using jumper wire?	Yes	PRC solenoid valve is not stuck open. Go to next step.
		No	PRC solenoid valve is stuck open. Replace PRC solenoid valve, then go to Step **47**.
23	**CHECK PCM CONTROL OF PRC SOLENOID VALVE** • Key off. • Breakout box installed. PCM connected. • Install digital multimeter between Test Pin 19 and Test Pin 71 of breakout box. • Record digital multimeter readings under following conditions: — Key on, engine off. — Engine crank. — Engine running (**more than 10 seconds** after start-up). **Note** • PRC solenoid valve should only be energized during engine crank for previous conditions. • Is voltage between Pin 19 and Pin 71 **10—12 V** during engine crank and **0—2 V** during other conditions?	Yes	PCM is properly controlling the PRC solenoid valve. Replace pressure regulator, then go to next step.
		No	Go to Step **47**.
24	**CHECK SYSTEM ABILITY TO HOLD FUEL PRESSURE** Disconnect battery negative terminal • Install fuel pressure gauge. • Verify there are no external leaks (Service as necessary) • Connect jumper wire to fuel pump relay socket terminal 87 and 30. • Connect battery negative terminal for **10 seconds**. • Disconnect battery negative terminal. • Does fuel pressure remain **within 147 kPa {1.5 kgf/cm^2, 21 psi}** of highest reading after **5 minutes**?	Yes	**For Continuous DTCs P1130, P0171 and P0172:** Go to Step 33. **For No Starts:** Go to Step 34. **For Fuel Control DTCs displayed with Misfire DTCs:** Go to Step 35. **All other DTCs:** Go to Step 36.
		No	Excessive pressure loss. Go to next step.

STEP	INSPECTION		ACTION
25	**CHECK FUEL PRESSURE LEAKDOWN** • Install fuel pressure gauge to fuel filter and plug outlet. • Connect jumper wire to fuel pump relay socket terminal 30 and 87. • Verify fuel pressure remains of maximum pressure for **5 minute** after turning pump off. • Does fuel pressure remain **within 343 kPa {3.50 kgf/cm^2, 49.8 psi}**?	Yes	Go to Step 27.
		No	Go to next step.
26	**CHECK PRESSURE REGULATOR DIAPHRAGM** • Key off. • Install fuel pressure gauge. • Start and run engine for **10 seconds**. • Key off. Wait 10 seconds. • Start and run engine for **10 seconds**. • Key off. Remove vacuum hose from fuel pressure regulator. • Inspect for fuel in vacuum hose or regulator port. • Is vacuum hose and regulator port free of fuel?	Yes	Go to Step 30.
		No	Replace fuel pressure regulator. Go to Step 47.
27	**CHECK FUEL PRESSURE, ENGINE RUNNING** • Key off. • Install fuel pressure gauge. • Disconnect vacuum hose at fuel pressure regulator and plug it. • Drive vehicle with heavy accelerations while observing fuel pressure gauge reading. • Does fuel pressure reading hold steady **within 260—320 kPa {2.6—3.3 kgf/cm^2, 37—46 psi}** during test?	Yes	Go to next step.
		No	Go to Step 30.
28	**CHECK FUEL PRESSURE REGULATOR RESPONSE TO VACUUM** • Key off. • Install fuel pressure tester. • Install vacuum gauge to intake manifold. • Start engine and observe both gauges. • Accelerate and decelerate engine speed to vary vacuum gauge reading. • Does fuel pressure gauge reading increase as vacuum gauge reading decreases, or decrease as vacuum gauge reading increases?	Yes	Remove vacuum gauge and fuel pressure tester. Concern is elsewhere. (See01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS])
		No	Go to next step.
29	**CHECK VACUUM SUPPLY** • Key off. • Install fuel pressure tester. • Disconnect vacuum hose at the fuel pressure regulator and plug it. • Install hand held vacuum pump to fuel pressure regulator. • Start engine and let run at idle. • Observe fuel pressure while applying vacuum. • Does fuel pressure change according to vacuum changes?	Yes	Go to next step.
		No	Replace fuel pressure regulator, then go to Step 47.
30	**CHECK FUEL INJECTOR LEAKAGE AND FLOW** • Verify that flow rate for each fuel injector is within specification using **SST** (49 L018 901). • Is flow rate for each injector within specification?	Yes	Go to next step.
		No	Replace damaged fuel injector, then go to Step 47.

STEP	INSPECTION		ACTION
31	**CHECK VOLTAGE AT FUEL PUMP VEHICLE HARNESS CONNECTOR** • Key off. • Disconnect fuel pump harness connector at fuel pump. Inspect for damaged or pushed out pins, corrosion and loose wires. Service as necessary. • Key on, engine OFF. • Connect a digital multimeter between fuel pump power circuit and fuel pump ground circuit at fuel pump vehicle harness connector. • Enter Output Test Mode and active fuel pump circuit. Record voltage reading. • Is the voltage **greater than 10.5 V**?	Yes	Go to next step.
		No	Go to Step 37.
32	**CHECK SUPPLY FUEL LINE FOR RESTRICTIONS** • Key off. • Observe Warnings, Cautions and Notes at beginning of this Pinpoint Test. • Disconnect supply fuel line at fuel rail and at fuel pump. • Inspect supply line for blockage, kinks or pinching. • Apply **260—310 kPa {2.6—3.2 kgf/cm^2, 7—46 psi}** regulated shop air to supply line at fuel rail side supply line. • Does air flow freely through supply line?	Yes	Replace fuel pump, then go to Step 47.
		No	Go to next step.
33	**CHECK SYSTEM ABILITY TO HOLD FUEL PRESSURE WITH KEY ON** • Install fuel pressure gauge. • Key on then OFF three times. • Turn key on and engine OFF, monitor fuel pressure gauge. • Does the fuel pressure remain **within 147 kPa {1.5 kgf/cm^2, 21 psi}** of the highest reading after **10 seconds**?	Yes	**For Continuous DTCs P1130 and P0171:** Go to Step 35. **For DTCs P0172:** Go to Step 37.
		No	Go to next step.
34	**CHECK ABILITY OF FUEL INJECTOR(S) TO DELIVER FUEL** • Pressure gauge installed. • Cycle key three times. • Monitor pressure gauge while cranking the engine for at least five seconds. • Does pressure drop **greater than 310 kPa {3.2 kgf/cm^2, 46 psi}** while cranking the engine?	Yes	Engine control system is not cause of no start. (See01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS])
		No	Go to next step.

STEP	INSPECTION		ACTION
35	**CHECK RESISTANCE OF FUEL INJECTOR(S) AND HARNESS** • Key off. **Note** • This erases Continuous Memory DTCs. • Disconnect PCM. Inspect for damaged or pushed out pins, corrosion and loose wires. Service as necessary. • Install breakout box. Leave PCM disconnected. **Note** • If misfire DTCs are displayed with fuel control DTCs, use the misfire DTCs to determine fuel injector circuits requiring testing. • Measure resistance between suspect fuel injector Test Pin(s) and Test Pin 71/97 at breakout box using chart below. • Is resistance **12.0—16.0 Ω**?	Yes	Fuel injector and harness resistance is okay. Go to Step 38.
		No	Go to next step.
36	**CHECK RESISTANCE OF FUEL INJECTOR HARNESS** • Key off. • Breakout box installed. PCM disconnected. • Disconnect fuel injector harness connector at suspect fuel injector. • Measure resistance between Test Pin 71/97 at breakout box and power circuit pin at suspected fuel injector harness connector. • Measure resistance between fuel injector Test Pin(s) at breakout box and Fuel Injector Signal Pin at fuel injector connector. (Go to Step 34 for Injector Pin location.) • Is each resistance **less than 5.0 Ω**?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to Step 47.
37	**CHECK FUEL INJECTOR HARNESS CIRCUIT FOR SHORT TO POWER OR GROUND** • Key off. • Breakout box installed. PCM disconnected. • Disconnect suspected fuel injector harness. • Measure resistance between the fuel injector Test Pin(s) (Go to step 34) and Test Pin 71 or 97, 24 and 103 at breakout box. • Measure the resistance between the Fuel injector Test Pin(s) at the breakout box and chassis ground. • Is each resistance **greater than 10,000 Ω**?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to Step 47.

STEP	INSPECTION		ACTION
38	**CHECK INJECTOR DRIVER SIGNAL** **Note** • This test requires standard 12 volt test lamp. • Key off. • Install breakout box. • Connect test lamp between Test Pin 71/97 and suspected fuel injector Test Pin(s). **Note** • At idle properly operating system will cause dim glow on test lamp. • Crank or start engine. • Does test lamp have a dim glow while cranking or running engine?	Yes	Go to next step.
		No	No light and/or continuous bright light. Go to Step 47.
39	**FLOW TEST FUEL INJECTOR(S)** • Is leakage and flow within specification?	Yes	**DTCs P0171, P1130 and P1131:** Go to next step. **DTCs P0172:** The fault that produced the DTC is intermittent. Go to ENGINE SYMPTOM TROUBLESHOOTING No. 27 with following data: SHORTFT1, LONGFT1, PIDs and list of possible causes. (See01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS]) **For DTCs P1132:** Go to Step 43.
		No	Replace fuel injector, then go to Step 47.
40	**INSPECT INDUCTION SYSTEM FOR AIR LEAKS** • Inspect following areas for signs of air leaks: • Inlet tube(s) from air cleaner to throttle body. • Gaskets which seal upper and lower intake manifold. • Vacuum hoses and lines for cranks and proper connections. • PCV system. • Are there any signs of leaks or damage?	Yes	Replace damaged parts, then go to Step 47.
		No	**DTCs P0171 or P1130:** Fault that produced DTC is intermittent. (See01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS]) Go to ENGINE SYMPTOM TROUBLESHOOTING No. 27 with following data: SHORTFT1, LONGFT1, O2S11 PIDs and a list of possible causes. **DTCs P1131 and P1130:** Go to next step.
41	**CHECK CYLINDER COMPRESSION** **Note** • Use Misfire DTC(s) displayed on prior DTC retrieval to determine which cylinder to perform compression. • Check cylinder compression. (See 01-10A-5 COMPRESSION INSPECTION [FS]) • Are cylinder compression readings within specification?	Yes	**For DTCs P1131 and P1130:** Go to next step. **For DTC P1132:** Go to Step 42.
		No	Repair appropriate parts, then go to Step 47.

STEP	INSPECTION		ACTION
42	**CHECK HO2S ABILITY TO GENERATE A VOLTAGE** **Note** • Any vacuum or air leaks can cause DTCs P1131, and P1130. Possible cause: • Leaking vacuum actuators. • Engine sealing (Intake and IAC). • EGR system (valve). • PCV system (hose and valve). • Unmetered air leaks between throttle body and MAF sensor assembly. • Silicone contaminated HO2S. • Key off. • Inspect HO2S harness for chafing, burned out wires or other damage and service as necessary. • Disconnect suspected HO2S from vehicle harness. • Connect digital multimeter to HO2S signal and HO2S ground or HO2S ground at sensor connector. • Run engine at **2,000 rpm** for **3 minutes**. • Monitor HO2S voltage. • Is voltage **greater than 0.5 V**?	Yes	Go to Step 45.
		No	Replace HO2S, then go to Step 47.
43	**ATTEMPT TO GENERATE DTC P1131** • Key off. • Disconnect HO2S. • Jumper HO2S signal at HO2S harness vehicle connector to battery negative post. • Activate Key On Engine Running (KOER) self-test. • **Are DTCs P1131 present?**	Yes	Remove jumper. Go to next step.
		No	Remove jumper, then go to Step 47.
44	**HO2S CHECK** • Key off. • Disconnect suspected HO2S. • Connect digital multimeter to HO2S signal circuit and HO2S ground at sensor connector. • Disconnect vacuum hose from vacuum tree. • Start engine and run at **2,000 rpm**. • Does voltage reading indicate **less than 0.4 V within 30 seconds**?	Yes	Go to next step.
		No	Replace HO2S, then go to Step 47.
45	**MONITOR HO2S (PID) FOR PROPER SWITCHING** • Key on, engine running. • Engine at operating temperature. • Connect NGS tester. **Note** • HO2S PID displayed as O2S on NGS tester. • Access O2S11 with NGS tester. • Monitor PID while wiggling, bending, and shaking small sections of harness from PCM to HO2S. • Did HO2S voltage stay high (**greater than 0.45 V**) or low (**less than 0.45 V**)?	Yes	Go to Step 47.
		No	Go to next step.

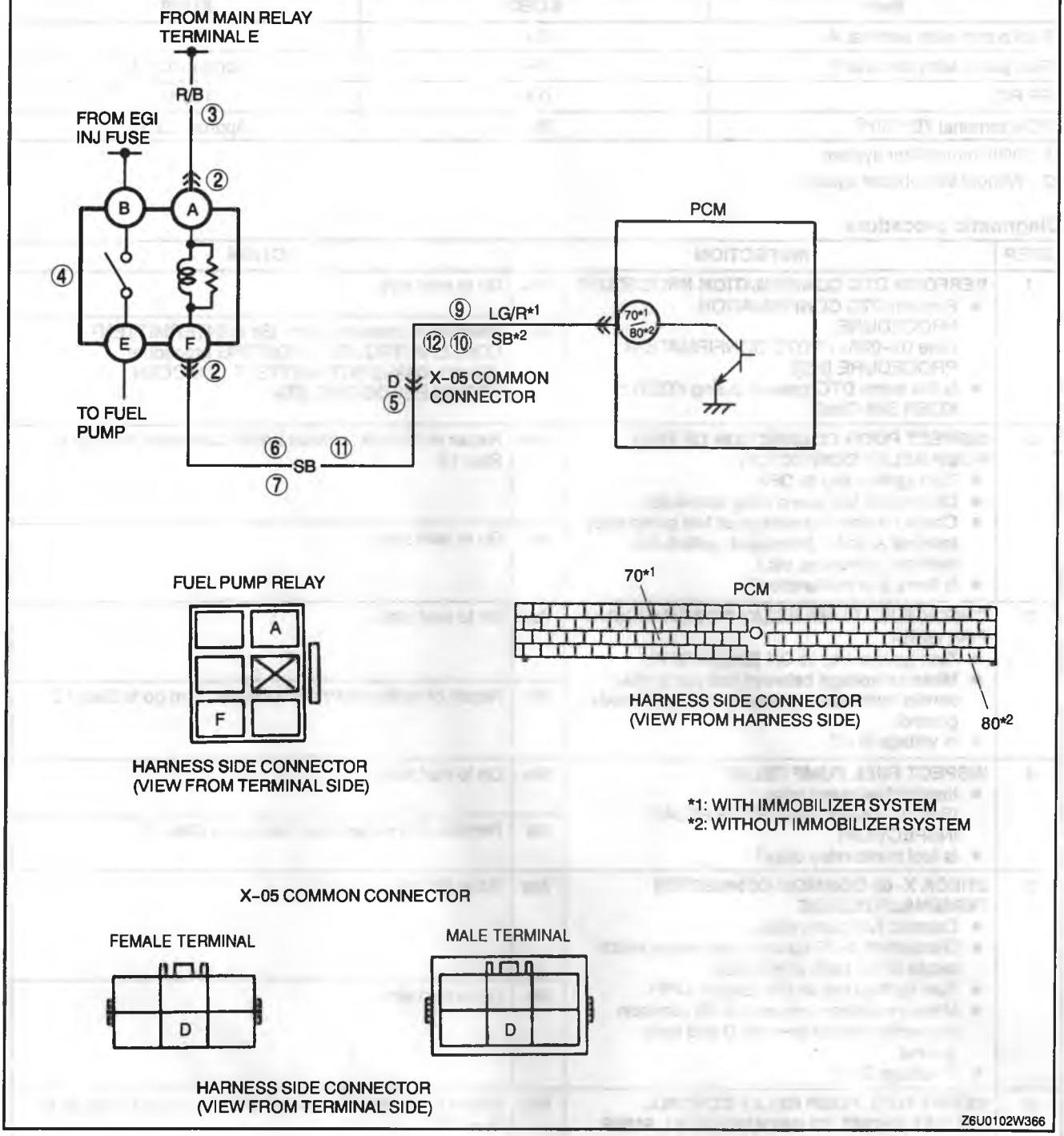
STEP	INSPECTION		ACTION
46	**TEST DRIVE WHILE MONITORING HO2S PID FOR PROPER SWITCHING** **Note** ● This test step requires an observer to monitor PID for proper operation. ● NGS tester connected. ● While observer views HO2S PID, test drive vehicle under different road conditions in attempt to simulate original fault. ● Does HO2S appear to switch properly?	Yes	Go to next step.
		No	Replace HO2S, then go to next step.
47	**VERIFY TROUBLESHOOTING OF DTC P0171, P0172, P1130, P1131, P1132 COMPLETED** [P0171, P0172] ● Is PENDING CODE of same DTC present? [P1130, P1131, P1132] ● Make sure to reconnect all disconnected connectors. ● Turn ignition key to ON (Engine OFF). ● Clear DTC from memory using NGS tester generic OBD-II function. ● Start engine and perform DRIVE MODE. (See 01-02A-18 OBD II DRIVE MODE [FS]) ● Access DIAGNOSTIC MONITORING TEST RESULTS of generic OBD-II function. (See 01-02A-16 Diagnostic Monitoring Test Results Access Procedure) ● Verify following TEST ID values: — 10:01:91 (Voltage amplitude between rich and lean (bank 1)) — 10:03:81 (Switching point (front HO2S)) ● IS value within specification?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
48	**VERIFY AFTER REPAIR PROCEDURE** ● Perform DTC CONFIRMATION PROCEDURE. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) ● Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0230 [FS]

Z6U010201082W20

DTC P0230	Fuel pump primary circuit malfunction
DETECTION CONDITION	● The PCM monitor the fuel pump relay control signal at the PCM terminal 70 (with immobilizer system) or 80 (without immobilizer system) during KOEO KOER Self-Test. If the PCM detects the excessive current draw on fuel pump circuit during the fuel pump control circuit ON or fuel pump control terminal does not receive the voltage from main relay E during the fuel pump control circuit OFF, the PCM determines that fuel pump circuit has malfunctioned.
POSSIBLE CAUSE	● Fuel pump relay malfunction ● Connector or terminal malfunction ● Open circuit between main relay terminal E and fuel pump relay terminal A ● Open circuit between fuel pump relay terminal F and PCM terminal 70/80 (with immobilizer system/without immobilizer system) ● Short to ground circuit between fuel pump relay terminal F and PCM terminal 70/80 (with immobilizer system/without immobilizer system). ● Short to power circuit between fuel pump relay terminal F and PCM terminal 70/80 (with immobilizer system/without immobilizer system). ● PCM malfunction

DTC P0230	Fuel pump primary circuit malfunction



Troubleshooting Hint

Fuel pump relay control description

- The main relay circuit supplies battery voltage to the fuel pump relay and the PCM completes the ground when the cranking or running the engine.

Fuel pump relay specification

Item	KOEO	KOER
Fuel pump relay terminal A	B+	B+
Fuel pump relay terminal F	B+	Approx. 0.20 V
FP PID	0 %	100 %
PCM terminal 70*1/80*2	B+	Approx. 0.20 V

*1 : With immobilizer system

*2 : Without immobilizer system

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**INSPECT POOR CONNECTION OF FUEL PUMP RELAY CONNECTOR** • Turn ignition key to OFF. • Disconnect fuel pump relay connector. • Check for poor connection at fuel pump relay terminal A and F (damaged, pulled-out terminal, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 13.
		No	Go to next step.
3	**CHECK FUEL PUMP RELAY POWER CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Measure voltage between fuel pump relay sensor terminals A (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 13.
4	**INSPECT FUEL PUMP RELAY** • Inspect fuel pump relay. (See 01-14-29 FUEL PUMP RELAY INSPECTION) • Is fuel pump relay okay?	Yes	Go to next step.
		No	Replace fuel pump relay, then go to Step 13.
5	**CHECK X-05 COMMON CONNECTOR TERMINAL VOLTAGE** • Connect fuel pump relay. • Disconnect X-05 common connector which locate at the back of joint box. • Turn ignition key to ON (Engine OFF). • Measure voltage between X-05 common connector female terminal D and body ground. • Is voltage **B+**?	Yes	Go to Step 8.
		No	Go to next step.
6	**VERIFY FUEL PUMP RELAY CONTROL CIRCUIT SHORT TO GROUND (FUEL PUMP RELAY—X-05 COMMON CONNECTOR)** • Turn ignition key to OFF. • Disconnect X-05 common connector. • Turn ignition key to ON (Engine OFF). • Open the fuel filler cap. • Check the fuel pump operation sound from fuel tank. • Does operating sound come out from fuel tank?	Yes	Repair or replace harness for short to ground, then go to Step 13.
		No	Go to next step.

STEP	INSPECTION		ACTION
7	**VERIFY FUEL PUMP RELAY CONTROL CIRCUIT OPEN (FUEL PUMP RELAY—X-05 COMMON CONNECTOR)** • Disconnect fuel pump relay connector. • Check continuity between fuel pump relay terminal F (harness-side) and X-05 common connector female terminal D. • Is there continuity?	Yes	Go to Step 13.
		No	Repair or replace harness for open, then go to Step 13.
8	**CHECK FUEL PUMP RELAY CONNECTOR TERMINAL VOLTAGE** • Turn ignition key to OFF. • Measure voltage between fuel pump relay terminal F (harness-side) and body ground. • Is voltage **B**+?	Yes	Go to Step 11.
		No	Go to next step.
9	**VERIFY FUEL PUMP RELAY CONTROL CIRCUIT SHORT TO GROUND (X-05 COMMON CONNECTOR—PCM)** • Connect X-05 common connector. • Disconnect PCM connector. • Turn ignition key to ON (Engine OFF). • Open the fuel filler cap. • Check the fuel pump operation sound from fuel tank. • Does operating sound come out from fuel tank?	Yes	Repair or replace harness for short to ground, then go to Step 13.
		No	Go to next step.
10	**VERIFY FUEL PUMP RELAY CONTROL CIRCUIT OPEN (X-05 COMMON CONNECTOR—PCM)** • Disconnect X-05 common connector. • Connect Breakout Box with PCM disconnected. • Check continuity between X-05 common connector male terminal D and following Breakout Box terminal. — Terminal 70: with immobilizer system — Terminal 80: without immobilizer system • Is there continuity?	Yes	Go to Step 13.
		No	Repair or replace harness for open, then go to Step 13.
11	**VERIFY FUEL PUMP RELAY CONTROL CIRCUIT FOR SHORT TO POWER (FUEL PUMP RELAY—X-05 COMMON CONNECTOR)** • Disconnect fuel pump relay. • Measure voltage between X-05 common connector female terminal D and body ground. • Is voltage **B**+?	Yes	Repair or replace harness for short to power, then go to Step 13.
		No	Go to next step.
12	**VERIFY FUEL PUMP RELAY CONTROL CIRCUIT FOR SHORT TO POWER (X-05 COMMON CONNECTOR—PCM)** • Measure voltage between X-05 common connector female terminal D and body ground. • Is voltage **B**+?	Yes	Repair or replace harness for short to power, then go to next step.
		No	Go to next step.
13	**VERIFY TROUBLESHOOTING OF DTC P0230 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOEO KOER Self-Test. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
14	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0300, P0301, P0302, P0303, P0304 [FS]

Z6U010201082W21

DTC P0300 **DTC P0301** **DTC P0302** **DTC P0303** **DTC P0304**	**Random misfire detected** **Cylinder No.1 misfire detected** **Cylinder No.2 misfire detected** **Cylinder No.3 misfire detected** **Cylinder No.4 misfire detected**
DETECTION CONDITION	• DTC P0300 indicates multiple cylinders misfiring or Camshaft Position (CMP) sensor failure resulting in cylinder misfire • DTCs P0301, P0302, P0303 or P0304 indicate specific cylinder misfiring
POSSIBLE CAUSE	• Ignition system • Fuel injection • Fuel pressure • Evaporative Emission System • Purge solenoid valve • Base engine • Running out of fuel **Warning** **Following troubleshooting flow chart contains fuel system diagnostic and repair procedures. Read following warnings before performing fuel system service:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Troubleshooting Hint

Misfire Monitor Outline

- Misfire is the incomplete combustion in a cylinder caused by poor ignition, insufficient fuel pressure, or insufficient compression pressure. The misfire monitor monitors this condition which can damage the catalytic converter and afffects emission performance.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosyic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**CHECK POSSIBLE CAUSES TO MISFIRE** **Note** • Running out of fuel may turn on the MIL and possibly store Continuous Misfire DTC. • Has vehicle recently run out of fuel?	Yes	OBD II system okay. Go to Step 16.
		No	Go to next step.
4	**CHECK FOR OTHER NON-MISFIRE CONTINUOUS MEMORY DTCS** Check for other non-misfire Continuous Memory DTCs which could cause the Misfire DTC. Possible causes: • CMP sensor • Ignition coil primary circuit • Knock sensor • Are other non-misfire Continuous Memory DTCs present?	Yes	Perform presented DTC troubleshooting.
		No	Check spark plugs secondary wires. If okay, go to next step.

STEP	INSPECTION		ACTION
5	**CHECK FOR OTHER KEY ON ENGINE RUNNING (KOER) DTCS** **Note** • Check for any KOER DTCs which could cause misfire DTCs. • Are any KOER DTCs displayed on NGS tester?	Yes	**If DTCs P1131 is present:** Go to next step. **All others:** Perform presented DTC troubleshooting.
		No	Go to next step.
6	**CHECK RESISTANCE OF INJECTOR(S) AND HARNESS** • Key off. • Disconnect PCM. Inspect for damaged or pushed out pins, corrosion, loose wires etc. Service as necessary. • Install breakout box. Leave PCM disconnected. • Measure resistance between suspect fuel injector test pin and Test Pin 71 or 97 at the breakout box. • Is the resistance between **12.0—16.0** Ω?	Yes	Fuel injector and harness resistance is okay. Go to next step.
		No	Go to Step 16.
7	**CHECK INJECTOR DRIVER SIGNAL** **Note** • Requires a standard 12 volt test lamp. A properly operating system will slow dim glow on Test Lamp. • Key off. • Breakout box installed. • Connect PCM to breakout box. • Connect Test Lamp between Test Pin 71 or 97 and suspect injector Test Pin. • Start engine. • Does test lamp emit dim glow while engine is running?	Yes	Go to next step.
		No	to Step 16.
8	**CHECK FUEL PRESSURE** • Key off. • Install fuel pressure gauge. • Start and run engine at idle. Record fuel pressure. • Increase engine speed to **2,500 rpm** and maintain for one minute. Note and compare fuel pressure. • Is fuel pressure **260—310 kPa {2.6—3.1 kgf/cm^2, 37—46 psi}**?	Yes	Go to Step 16.
		No	Go to next step.
9	**CHECK ABILITY OF FUEL SYSTEM TO HOLD FUEL PRESSURE** • Start engine at idle. Note fuel pressure. • Increase engine speed to **2,500 rpm** and maintain for one minute. • Visually check for fuel leaking at injector O-ring, fuel pressure regulator and fuel lines to fuel charging assembly. Service as necessary. • Turn engine off. • Key on, engine off. • Does fuel pressure remain at specification **within 147 kPa {1.5 kgf/cm^2, 21 psi}**, for **60 seconds**?	Yes	Go to next step.
		No	Perform "Fuel Leakage Test". (See01-14-21 Fuel Leakage Test [FS])

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td rowspan="2">10</td><td rowspan="2">CHECK FUEL INJECTOR FOR FLOW AND LEAKAGE
● Verify flow rate for each fuel injector is within specification using SST (49 L018 901).
● Is flow rate for each fuel injector within specification?
<table><tr><td>Cylinder Number</td><td>Test pin</td><td>Cylinder Number</td><td>Test pin</td></tr><tr><td>1</td><td>75</td><td>3</td><td>74</td></tr><tr><td>2</td><td>101</td><td>4</td><td>100</td></tr></table>Z6U0102W367</td><td>Yes</td><td>Fuel delivery system is not likely to have caused misfire DTC.
Go to next step.</td></tr>
<tr><td>No</td><td>Replace or Clean inoperative fuel injector(s) as required, then go to Step 16.</td></tr>
<tr><td rowspan="2">11</td><td rowspan="2">CHECK VACUUM SYSTEM
● Inspect all vacuum lines for damage, or pinched lines, cracks, proper routing and assembly.
● Is the vehicle vacuum system okay?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair or replace, then go to step 15. vacuum system.</td></tr>
<tr><td rowspan="2">12</td><td rowspan="2">CHECK EVAPORATIVE EMISSION SYSTEM
● Check charcoal canister for fuel saturation.
● Is there excess amount of liquid fuel present in charcoal canister.</td><td>Yes</td><td>Replace charcoal canister, then go to Step 16.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">13</td><td rowspan="2">CHECK VACUUM IN EVAPORATIVE EMISSION SYSTEM
● Check for blockage/restriction or cut hoses between engine vacuum port and charcoal canister.
● Check for blockage in fuel tank vent system.
● Is there fault indicated?</td><td>Yes</td><td>Replace damaged vacuum hoses or remove blockage/restrictions, then go to Step 16.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">14</td><td rowspan="2">CHECK PURGE SOLENOID VALVE
This step will verify the mechanical integrity of purge solenoid valve. Solenoid and circuit have been checked electrically and reported during KOEO self-test.
● Key off.
● Disconnect purge solenoid valve.
● Connect 12 V DC power source to solenoid.

Caution
● Must be observed for proper pin orientation.

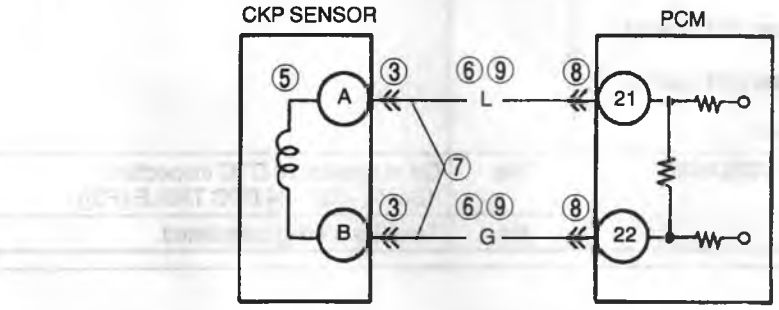
● Connect positive power source to power circuit and negative lead to purge solenoid valve circuit at purge solenoid valve harness connector.
● Apply 53 kPa {407 mmHg, 16 inHg} of vacuum to manifold side of purge solenoid valve. Apply power source.
● Does solenoid open and pass air freely?</td><td>Yes</td><td>Evaporative system is functioning properly.
Go to next step.</td></tr>
<tr><td>No</td><td>Replace purge solenoid valve, then go to Step 16.</td></tr>
<tr><td rowspan="2">15</td><td rowspan="2">CHECK FOR BASE ENGINE CONCERNS
The purpose of this step is to determine if there are any base engine concerns that may have caused the misfire DTC or drive concern. Perform the following tests in order to evaluate base engine integrity.
● Perform engine compression test. (See 01-10A-5 COMPRESSION INSPECTION [FS])
● Check positive crankcase ventilation system.
● Check possible leakage points.
● Is any service required?</td><td>Yes</td><td>Repair or replace appropriate damaged parts, then go to next step.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
</table>

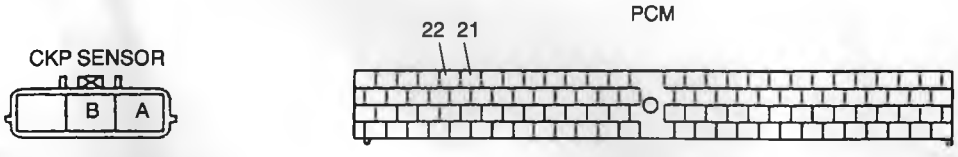
STEP	INSPECTION		ACTION
16	**VERIFY TROUBLESHOOTING OF DTC P0300, P0301, P0302, P0303, P0304 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine and perform DRIVE MODE. (See 01-02A-18 OBD II DRIVE MODE [FS]) • Access DIAGNOSTIC MONITORING TEST RESULTS of generic OBD-II function. (See 01-02A-16 Diagnostic Monitoring Test Results Access Procedure) • Verify following TEST ID values: — 10:53:01 (Misfire rate par 200 revs for cylinder1) — 10:53:02 (Misfire rate par 200 revs for cylinder2) — 10:53:03 (Misfire rate par 200 revs for cylinder3) — 10:53:04 (Misfire rate par 200 revs for cylinder4) • Is value within specification?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
17	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0320 [FS]

Z6U010201082W22

DTC P0320	CKP sensor circuit malfunction
DETECTION CONDITION	• The PCM monitors input signal from CKP sensor. If the PCM receive the CKP signal which indicates that two successive erratic signals have occurred, the PCM determines that the CKP sensor circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• CKP sensor malfunction • Connector or terminal malfunction • CKP sensor is dirty. • Short to ground between CKP sensor terminal A to PCM terminal 21 • Short to ground between CKP sensor terminal B to PCM terminal 22 • Open circuit between CKP sensor terminal A to PCM terminal 21 • Open circuit between CKP sensor terminal B to PCM terminal 22 • CKP sensor pulse wheel malfunction





HARNESS SIDE CONNECTOR (VIEW FROM TERMINAL SIDE)

HARNESS SIDE CONNECTOR (VIEW FROM HARNESS SIDE)

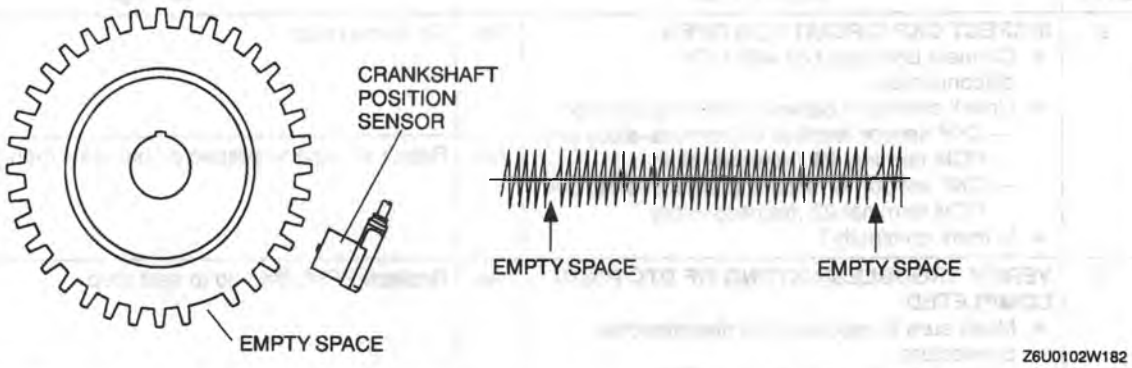
Z6U0102W368

Troubleshooting Hint

CKP sensor description

- A pick-up coil type of the CKP sensor is used.
- CKP sensor signal is used for the following controls and monitors
  - —Idle air control
  - —Fuel injector control
  - —Fuel pump control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —A/C cut-off control
  - —Electric cooling fun control
  - —Evaporative system monitor
  - —EGR system monitor

CKP sensor signal characteristic



Diagnostic procedure

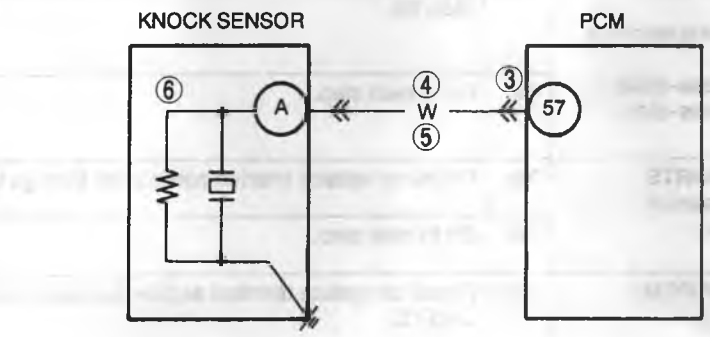
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CKP SENSOR VOLTAGE** • Disconnect CKP connector. • Check the voltage in AC range while cranking the engine. • Is voltage read?	Yes	Go to Step 9.
		No	Go to next step.
4	**INSPECT CKP SENSOR AIR GAP** • Check air gap between CKP sensor and crankshaft pulley. • Is air gap **within 0.5—1.5 mm {0.020—0.059 in}** ?	Yes	Go to next step.
		No	Adjust air gap between CKP sensor and crankshaft pulley, then go to Step 10. (See01-40A-31 Inspection of Air Gap)
5	**INSPECT CKP SENSOR** • Turn ignition key to OFF. • Check resistance CKP sensor terminals A and B (part-side). • Is resistance **approx. 560 Ω** ?	Yes	Check crankshaft pulley for damage. Replace pulley and go to Step 10. (See01-40A-31 CRANKSHAFT POSITION SENSOR REPLACEMENT [FS])
		No	Go to next step.
6	**CHECK CKP CIRCUIT FOR SHORT TO GROUND** • Check continuity between following terminal and body ground: — CKP sensor terminal A (harness-side) — CKP sensor terminal B (harness-side) • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 10.
		No	Go to next step.
7	**INSPECT CKP CIRCUITS FOR SHORTS** • Check continuity between CKP sensor terminals A and B (harness-side). • Is there continuity?	Yes	Repair or replace shorted harnesses, then go to Step 10.
		No	Go to nest step.
8	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection of PCM terminals 21 and 22 (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 10.
		No	Go to next step.

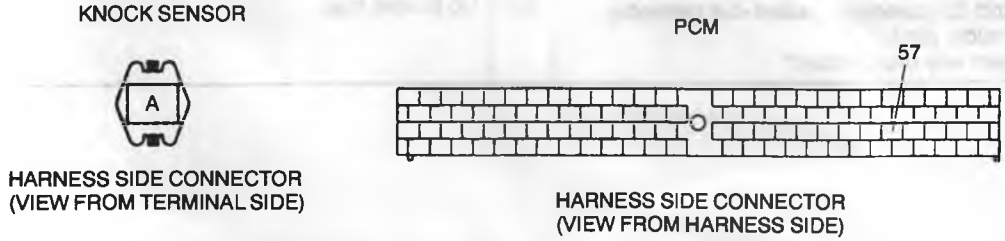
STEP	INSPECTION		ACTION
9	**INSPECT CKP CIRCUIT FOR OPEN** • Connect breakout box with PCM disconnected. • Check continuity between following circuits: — CKP sensor terminal A (harness-side) and PCM terminal 21 (harness-side) — CKP sensor terminal B (harness-side) and PCM terminal 22 (harness-side) • Is there continuity?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to Step 10.
10	**VERIFY TROUBLESHOOTING OF DTC P0320 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine. • Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0325 [FS]

Z6U010201082W23

DTC P0325	Knock sensor circuit malfunction
DETECTION CONDITION	• The PCM monitors the input signal from the knock sensor when the engine is running. If the PCM does not receive the input signal from a knock sensor for **5 seconds**, PCM determines that the knock sensor circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • PCM detects the above malfunction condition in two consecutive drive cycles.. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC also detects by KOEO/KOER Self-Test.
POSSIBLE CAUSE	• Knock sensor malfunction • Connector or terminal malfunction • Open or short to ground circuit between knock sensor connector terminal and PCM terminal 57 • PCM malfunction





Z6U0102W369

Troubleshooting Hint
Knock sensor description

- A piezo-electrical type knock sensor (which utilizes the piezo electric effect) is used.
- The knock sensor signal is used for the following controls
  - —Fuel injector control
  - —Electric spark control

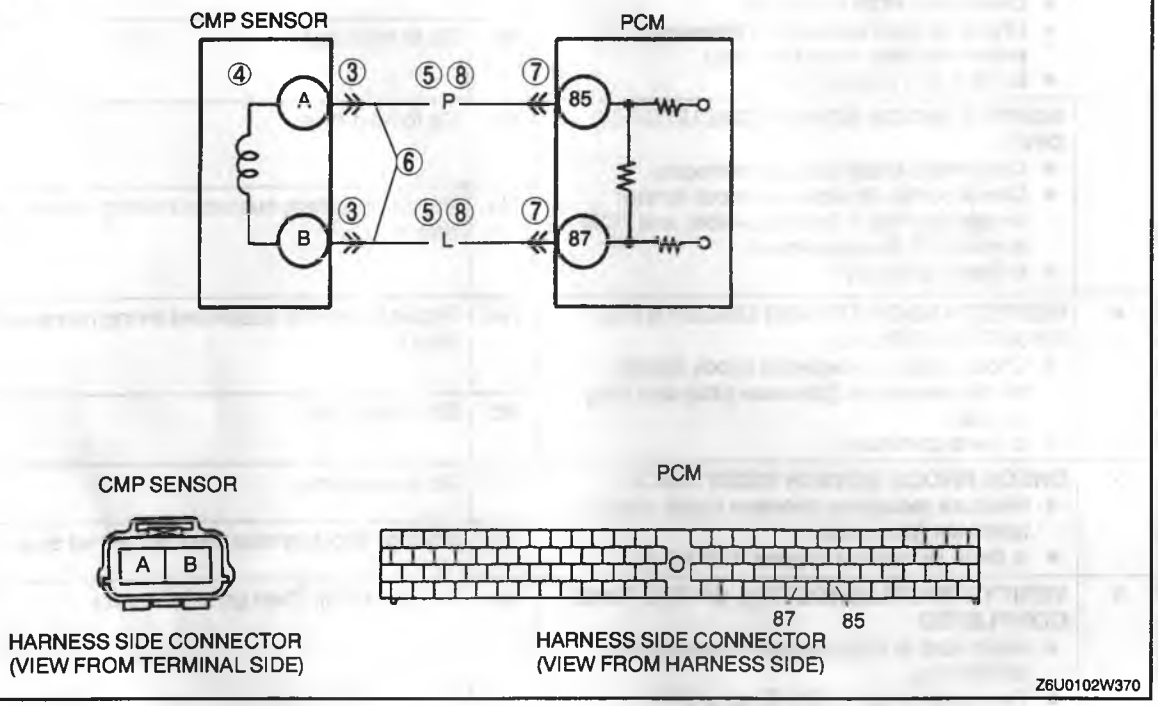
Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**INSPECT PCM CONNECTOR TERMINAL** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunction?	Yes	Repair terminal, then go to Step 6.
		No	Go to next step.
3	**INSPECT KNOCK SENSOR CIRCUITS FOR OPEN** • Disconnect knock sensor connector. • Check continuity between knock sensor female terminal A (harness-side) and PCM terminal 57 (harness-side) • Is there continuity?	Yes	Go to next step.
		No	Repair or replace suspected wiring harness, then go to Step 6.
4	**INSPECT KNOCK SENSOR CIRCUITS FOR SHORT TO GROUND** • Check continuity between knock sensor female terminal A (harness-side) and body ground • Is there continuity?	Yes	Repair or replace suspected wiring harness, then go to Step 6.
		No	Go to next step.
5	**CHECK KNOCK SENSOR RESISTANCE** • Measure resistance between knock sensor terminals (part-side). • Is there resistance **approx. 560 kΩ** ?	Yes	Go to next step.
		No	Replace knock sensor, then go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P0325 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Perform KOER Self-Test. • Is the same DTC present? • Is the same DTC present during KOER Self-Test?	Yes	Replace PCM, Then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0340 [FS]

Z6U010201082W24

DTC P0340	Camshaft position (CMP) sensor circuit malfunction
DETECTION CONDITION	• The PCM monitors input signal from CMP sensor. If the PCM can no longer detect the signal from the CMP sensor, the PCM determines that the CMP sensor circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• CMP sensor malfunction • Connector or terminal malfunction • CMP sensor is dirty • Short to ground circuit between CMP sensor terminal A and PCM terminal 85 • Short to ground circuit between CMP sensor terminal B and PCM terminal 87 • Open circuit between CMP sensor terminal A and PCM terminal 85 • Open circuit between CMP sensor terminal B and PCM terminal 87



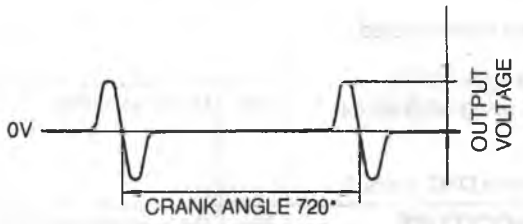
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Troubleshooting Hint

CMP sensor description

- A pick-up coil type of the CMP sensor is used.
- The CMP sensor signal is used for the following controls and monitors.
  - —Fuel injector control
  - —Electric spark control
  - —Evaporative system monitor
  - —EGR system monitor

CMP sensor signal characteristic



Z6U0102W371

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CMP SENSOR VOLTAGE** • Disconnect CMP sensor connector. • Check the voltage in AC range while cranking the engine. • Is voltage read?	Yes	Go to Step 9.
		No	Go to next step.
4	**INSPECT CMP SENSOR** • Turn ignition key to OFF. • Check resistance CMP sensor terminals A and B (part-side). • Is resistance **approx. 550 Ω** ?	Yes	Check camshaft pulley for damage. Replace pulley and go to Step 9.
		No	Go to next step.
5	**CHECK CMP CIRCUIT FOR SHORT TO GROUND** • Check continuity between the following terminal and body ground: — CMP sensor terminal A (harness-side) — CMP sensor terminal B (harness-side) • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 9.
		No	Go to next step.
6	**INSPECT CMP CIRCUITS FOR SHORTS** • Check continuity between CMP sensor terminals A and B (harness-side). • Is there continuity?	Yes	Repair or replace shorted harnesses, then go to Step 9.
		No	Go to nest step.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection of PCM terminals 85 and 87 (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
8	**INSPECT CMP CIRCUIT FOR OPEN** • Connect breakout box with PCM disconnected. • Check continuity between following circuits: — CMP sensor terminal A (harness-side) and PCM terminal 85 (harness-side) — CMP sensor terminal B (harness-side) and PCM terminal 87 (harness-side) • Is there continuity?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to Step 9.

STEP	INSPECTION		ACTION
9	**VERIFY TROUBLESHOOTING OF DTC P0340 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine. • Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0400 [FS]

Z6U010201082W25

DTC P0400	EGR flow malfunction
DETECTION CONDITION	• DTC P0400 indicates difference in intake manifold pressure when EGR is operated and when it is stopped is too large or too small.
POSSIBLE CAUSE	• Damaged EGR valve • Damaged EGR boost sensor • Damaged EGR boost solenoid valve • Restriction in exhaust system • Damaged PCM • Damaged harness connector • Damaged harness

Troubleshooting Hint
See 01-16-14 EGR System Monitor Outline

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**OUTPUT ALL DTCS** • Verify EGR boost solenoid valve connection and repair as necessary. • Check all continuous memory, KOEO and KOER self-test DTCs. • Are any other DTCs displayed on NGS tester?	Yes	Perform appropriate DTC troubleshooting.
		No	Go to next step.
3	**CHECK FOR UNMETERED AIR LEAKS** • Carefully inspect following areas for potential air leaks: • Hoses connecting to MAF sensor assembly. • Hoses connecting to throttle body. • Intake manifold gasket leaks. • Positive crankcase ventilation (PCV) disconnected. • Vacuum lines disconnected. • Improperly seated engine oil dipstick and tube. • Exhaust leaks at flanges and gaskets. • Are there any air leaks?	Yes	Repair or replace damaged parts, then go to Step 15.
		No	Go to next step.

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td rowspan="2">4</td><td rowspan="2">CHECK CYLINDER COMPRESSION
• Check cylinder compression. (See 01-10A-5 COMPRESSION INSPECTION [FS])
• Are cylinder compression readings within specification?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair appropriate parts, then go to Step 15.</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">CHECK OPERATION OF EGR VALVE
• Turn ignition switch on and listen for initialization noise (clicks) of EGR valve with screwdriver or soundscope.

Note
• EGR valve initialization is closing action of valve observed before and after engine is started, and when engine is stopped.

• Does EGR valve initialization noise heard?</td><td>Yes</td><td>Go to Step 10.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">CHECK POWER CIRCUIT TO EGR VALVE
• Key off.
• EGR valve disconnected.
• Key on, engine off.
• Measure voltage between power circuit and chassis ground at EGR valve vehicle harness connector.
• Is EGR valve power voltage greater than 10.5 V?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair or replace wiring harness, then go to Step 15.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">CHECK RESISTANCE OF EGR VALVE
• Key off.
• EGR valve disconnected.
• Measure resistance of EGR valve coils.
• Is each resistance approx. 22 Ω?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Replace EGR valve, then go to Step 15.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">CHECK EGR VALVE CIRCUIT CONTINUITY
• Key off.
• Disconnect PCM connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary.
• Install breakout box. Leave PCM disconnected.
• Measure resistance between EGR valve Test Pin at the breakout box and EGR valve vehicle harness connector. Record readings.
<table><tr><th>Test pin</th><th>EGR valve terminal</th></tr><tr><td>68</td><td>E</td></tr><tr><td>72</td><td>A</td></tr><tr><td>46</td><td>B</td></tr><tr><td>56</td><td>F</td></tr></table>Z6U0102W372
• Is each resistance less than 5.0 Ω?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Repair or replace wiring harness, then go to Step 15.</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">CHECK EGR VALVE CIRCUIT FOR SHORT TO POWER AND SHORT TO GROUND
• Key off.
• EGR valve disconnected.
• Breakout box installed.
• Measure resistance between Test Pins 46, 56, 68, 72 and Test Pins 71, 97 and 90 at breakout box.
• Measure resistance between Test Pins 46, 56, 68, 72 and Test Pins 51,103 and 91 at breakout box.
• Is each resistance greater than 10,000 Ω?</td><td>Yes</td><td>Replace EGR valve, then go to Step 15.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
</table>

STEP	INSPECTION		ACTION
10	**CHECK POWER CIRCUIT TO EGR BOOST SOLENOID VALVE** • Key off. • EGR boost solenoid valve disconnected. • Key on, engine off. • Measure voltage between power circuit and chassis ground at EGR boost solenoid valve vehicle harness connector. • Is EGR boost solenoid valve power circuit voltage **greater than 10.5 V**?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to Step 15.
11	**CHECK RESISTANCE OF EGR BOOST SOLENOID VALVE** • Key off. • EGR boost solenoid valve disconnected. • Measure EGR boost solenoid valve resistance. • Is resistance **between 30 and 70 Ω**?	Yes	Go to next step.
		No	Replace EGR boost solenoid valve, then go to Step 15.
12	**CHECK EGR BOOST SOLENOID VALVE CIRCUIT CONTINUITY** • Key off. • EGR boost solenoid valve disconnected. • Disconnect PCM. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box. • Measure resistance between Test Pin 98 at breakout box and EGR boost solenoid valve circuit at vehicle harness connector. • Is resistance **less than 5.0 Ω**?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to Step 15.
13	**CHECK EGR BOOST SOLENOID VALVE CIRCUIT FOR SHORT TO POWER AND SHORT TO GROUND** • EGR boost solenoid valve disconnected. • Breakout box installed. • Measure resistance between Test Pin 98 and Test Pins 71, 97 and 90 at breakout box. • Measure the resistance between Test Pin 98 and Test Pins 51, 103 and 91 at breakout box. • Is each resistance **greater than 10,000 Ω**?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to Step 15.

STEP	INSPECTION		ACTION
14	**CHECK OPERATION OF EGR BOOST SOLENOID VALVE** • Key off. • Breakout box installed. PCM connected. • Disconnect vacuum line from EGR boost sensor solenoid valve to intake manifold vacuum at solenoid valve. • Install vacuum pump at input port of EGR boost solenoid valve and apply **-27— -30 kPa {-203— -247 mmHg, -8— -10 inHg}** of vacuum. • Disconnect vacuum line from EGR boost solenoid valve to EGR boost sensor at sensor. Inspect vacuum line for damage, service as necessary. • Install vacuum gauge at unattached end of vacuum line. • Key on. • Jumper Test Pin 98 to ground at breakout box and observe vacuum gauge. Remove jumper. • Apply **-27— -30 kPa {-203— -247 mmHg, -8— -10 inHg}** of vacuum to EGR boost sensor solenoid valve once again. • Again jumper Test Pin 98 to ground at breakout box and observe vacuum gauge. Remove jumper. • Key off. • Was vacuum signal indicated at any time by vacuum gauge?	Yes	The fault that produced DTC P0400 is intermittent, and cannot be identified at this time. Go to ENGINE SYMPTOM TROUBLESHOOTING No. 27. (See 01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS])
		No	Replace damaged EGR boost solenoid valve, then go to next step.
15	**VERIFY TROUBLESHOOTING OF DTC P0400 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine and perform DRIVE MODE. (See 01-02A-18 OBD II DRIVE MODE [FS]) • Access DIAGNOSTIC MONITORING TEST RESULTS of generic OBD-II function. (See 01-02A-16 Diagnostic Monitoring Test Results Access Procedure) • Verify following TEST ID 1 values: — 10:4C:31 (EGR boost sensor reading deference) — 10:4C:B1 (EGR boost sensor reading deference) • Is value within specification?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
16	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0421 [FS]

Z6U010201082W26

DTC P0421	Catalyst efficiency below threshold
DETECTION CONDITION	• DTCs P0421 indicate catalyst system efficiency is below acceptable threshold
POSSIBLE CAUSE	• Use of leaded fuel • Oil contamination • Cylinder misfiring • Damaged heated oxygen sensor • Damaged ECT sensor • Downstream heated oxygen sensor wires improperly connected • Fuel pressure too high • Damaged exhaust system pipe • Damaged exhaust manifold • Damaged silencer/tailpipe component • Damaged catalytic converter **Warning** **Following troubleshooting flow chart contains fuel system diagnostic and repair procedures. Read following warnings before performing fuel system service:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual. See 01-14-3 BEFORE REPAIR PROCEDURE See 01-14-4 AFTER REPAIR PROCEDURE**

Troubleshooting Hint

Catalyst system monitor outline

- The catalyst monitors the deterioration of the catalytic converter in which the exhaust gas is purged. The catalyst monitor judges the deterioration of the catalytic convertor based on the oxygen concentration downstream side of the catalytic convertor each, are required.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.

STEP	INSPECTION		ACTION
3	**CHECK FOR MISFIRE MONITOR DTC** **Note** • Complete the spark timing check in OBD Test before proceeding with this step. Spark timing retarded below specification may increase exhaust gas temperature and decrease catalyst efficiency overtime. **Note** Be sure customer has not: • Refueled vehicle with leaded gasoline. • Experienced excessive oil consumption. **Note** • Internal deterioration of catalytic converter is usually caused by abnormal engine operation upstream of catalyst. Events that may produce higher than normal temperature in catalyst are particularly suspect. For example, misfiring can cause higher than normal catalyst operating temperature higher than normal. • Key on, engine off. • Retrieve and record all Continuous Memory DTCs. • Were any of following misfire monitor DTCs recorded: P0300, P0301, P0302, P0303 and P0304?	Yes	Perform detected DTCs troubleshooting.
		No	Go to next step.
4	**CHECK FOR ECT SENSOR DTCS** **Note** • ECT sensor DTCs can indicate that thermostat is not operating correctly or that engine coolant level is not filled to specifications. Resulting in above normal operating temperatures. • Were any of following ECT sensor DTCs recorded: P0117, P0118, P0125 and P1117?	Yes	Perform appropriate DTC troubleshooting.
		No	Go to next step.
5	**CHECK FOR ANY OTHER DTCS** • Were any other DTCs recorded in step 2?	Yes	Perform appropriate DTC troubleshooting.
		No	Go to next step.
6	**CHECK CATALYST MONITOR OPERATION** • Key off. • NGS tester connected. • Key on, engine on. • Select PID/DATA MONITOR AND RECORD and monitor O2S11 and O2S12 PIDs. • Drive the vehicle for **approx. 10 min.** at **64—96 km/h {40—60 mph}**. • Allow vehicle to idle in Neutral or Park. • Maintain idle engine speed. • Record PID/DATA and count inversion times of O2S11 and O2S12. • Calculate divides O2S11 by O2S12. • Is ratio of O2S11 and O2S12 greater than 2.0?	Yes	Go to Step 14.
		No	If ratio of O2S11 and O2S12 is below 2.0 after three attempts, go to next step.

STEP	INSPECTION		ACTION
7	**CHECK FUEL PRESSURE** **Note** • Fuel pressures above specification may produce abnormally rich air/fuel mixture. Rich air/fuel mixture may cause higher than normal catalyst operating temperatures. • Key off. • Inspection vacuum hose going to fuel pressure regulator for proper installation, cracks, etc. Service as necessary. • Install fuel pressure gauge. • Verify vacuum source to fuel pressure regulator. • Start and run engine at idle. Record fuel pressure. • Increase engine speed to **2,500 rpm** and maintain for one minute. Record fuel pressure. • Is fuel pressure **210—310 kPa {2.2—3.1 kgf/cm², 31—46 psi}**?	Yes	Fuel pressure is okay. Go to next step.
		No	Fuel pressure is out of specification. (See 01-14-21 Fuel Leakage Test [FS])
8	**CHECK FOR OBVIOUS LEAK SOURCES IN EXHAUST SYSTEM** **Note** • Catalyst in series with leaking exhaust system, it can cause Catalyst Efficiency Monitor Test to fail. • Key off. • Inspect following for leaks, cracks, loose connections or punctures: • Exhaust manifold • Front exhaust pipe • Rear exhaust pipe • Silencer/tailpipe component • Are above components free of cracks and punctures, etc.?	Yes	Check that exhaust manifold to catalyst inlet pipe joint is tight. Go to next step.
		No	Repair or replace damaged parts, then go to Step 14.
9	**CHECK FOR OBVIOUS RESTRICTIONS IN EXHAUST SYSTEM** • Inspect following for dents, areas of collapsed material and unusual bending: • Front exhaust pipe • Rear exhaust pipe • Silencer/tailpipe component • Are above components free of dents and areas of collapsed material or unusual bending, etc.?	Yes	Go to next step.
		No	Repair or replace damaged parts, then go to Step 14.

STEP	INSPECTION		ACTION
10	**CHECK MANIFOLD VACUUM FOR INDICATION OF EXCESSIVE EXHAUST SYSTEM RESTRICTION** • Attach vacuum gauge to intake manifold vacuum source. • Install tachometer. • Observe vacuum gauge needle while performing following: **Note** • Vacuum gauge reading may be normal when engine is first started and idling. However, excessive restriction in exhaust system will cause vacuum. Gauge needle to drop to low point even while engine is idling. • Start engine and gradually increase rpm to 2,000 with transaxle in neutral position. • Decrease engine speed to idle rpm. • Key off. • Did manifold vacuum rise **above 54 kPa {407 mmHg, 16 InHg}** with engine rpm at **2,000**?	Yes	Go to next step.
		No	Manifold vacuum did not reach an acceptable level. Excessive restriction may be present. Go to Step 12.
11	**CHECK MANIFOLD VACUUM FOR INDICATION OF MODERATE EXHAUST SYSTEM RESTRICTION** • Vacuum gauge installed. • Tachometer installed. • Key on, engine idling. • Increase engine speed gradually from base idle rpm to **2,000 rpm** with transaxle in neutral position. • Observe vacuum gauge needle rises while maintaining increased engine rpm. **Note** • On a non-restricted exhaust system, vacuum gauge needle will rise quickly to normal range as increased rpm is maintained. • On a restricted exhaust system, vacuum gauge needle will rise slowly to normal range as the increased rpm is maintained. **Note** • As increased rpm is maintained, rate of speed of vacuum gauge needle rising to normal range is slower on restricted system than on non-restricted system. • Decrease engine speed to base idle rpm. • Key off. • Is the rate of speed that vacuum gauge needle rises back to normal range (**above 54 kPa {407 mmHg, 16 InHg}** much slower than non-restricted system?	Yes	Moderate restriction may be present. Go to next step.
		No	No indications of restrictions or leaks have been detected in exhaust system. If DTCs P0420 and P0421 are presenting catalytic converter is chemically inactive. Perform appropriate symptom troubleshooting (e.g. Lack of power, Loss of Power, or No Start). (See 01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS])

STEP	INSPECTION		ACTION
12	**CHECK MANIFOLD VACUUM WITH EXHAUST MANIFOLD DISCONNECTED FOR INDICATION OF RESTRICTION** • Key off. • Disconnect exhaust system immediately after catalytic converter. • Repeat vacuum measurement from step 11. • Did vacuum needle quickly rise **above 54 kPa {407 mmHg, 16inHg}** with engine rpm at **2,000**? **Note** • Intake manifold gasket leak can also cause vacuum gauge needle to remain well below normal range.	Yes	The exhaust system restriction is downstream of exhaust manifold. Go to next step.
		No	A restriction is present in exhaust manifold. Remove vacuum gauge and tachometer. Inspect each exhaust port for casting flash/restrictions by dropping a length of chain into it. **Note** • Do not use wire or lamp to check ports. Restriction can be small enough for both to pass through but large enough to cause excessive back pressure at high engine rpm. Replace exhaust manifold if unable to remove casting flash/restriction, then go to Step 14.
13	**CHECK MANIFOLD VACUUM WITH SILENCER/TAILPIPE ASSEMBLY DISCONNECTED FOR INDICATION OF RESTRICTION** • Key off. • Disconnect silencer/tailpipe component located after the catalytic converter. • Repeat vacuum measurement found in test step 11. • Did vacuum needle quickly rise **above 54 kPa {407 mmHg, 16 InHg}** with engine rpm at **2,000**?	Yes	There is restriction in the silencer/tail pipe assembly. Replace silencer/tail pipe assembly, then go to next step.
		No	There is restriction in three way catalytic converter. Go to next step.
14	**VERIFY TROUBLESHOOTING OF DTC P0421 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine and perform DRIVE MODE. (See 01-02A-18 OBD II DRIVE MODE [FS]) • Access DIAGNOSTIC MONITORING TEST RESULTS of generic OBD-II function. (See 01-02A-16 Diagnostic Monitoring Test Results Access Procedure) • Verify following TEST ID value: — 10:10:11 (Ratio of Rear HEGO switches (BANK1)) • Is value within specification?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
15	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0442 [FS]

Z6U010201082W27

DTC P0442	Evaporative emission control system leak detected (Small leak)
DETECTION CONDITION	• DTC P0442 indicates leak has been detected **[as small as 1 mm {0.040 inch}]** in Evaporative Emission System.
POSSIBLE CAUSE	• Purge solenoid valve malfunction • Canister Drain Cut Valve (CDCV) malfunction • Loose fuel filler cup • Charcoal canister malfunction • Catch tank malfunction • Pressure control valve malfunction • Cracked fuel tank • Fuel tank component parts poorly installed • Evaporative hose damaged or loose • Fuel tank level sensor malfunction • Fuel tank pressure sensor malfunction • Engine coolant temperature sensor malfunction • Intake air temperature sensor malfunction • Throttle position sensor malfunction • Mass air flow sensor malfunction • Vehicle speed sensor malfunction • Poor connection of connector **Warning** **Following troubleshooting flow chart contains fuel system diagnostic and repair procedures. Read following warnings before performing fuel system service:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Troubleshooting Hint

See 01-16-8 EVAP Control System Monitor Outline

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**CHECK FOR OTHER CONTINUOUS MEMORY DTC** Check for other Continuous Memory DTCs which could cause Evaporative Emission Monitor DTC. • Key off. • NGS tester connected. • Key on, engine off. • Retrieve and record any Continuous Memory DTCs. • Are there any other continuous Memory DTCs present?	Yes	Perform appropriate DTC troubleshooting.
		No	Go to next step.

STEP	INSPECTION		ACTION
4	**INSPECTION OF FUEL-FILLER CAP** ● Key off. ● Disconnect NGS tester. ● Confirm filler cap is not either disconnected, loose or damaged. **Note** ● When filler caps other than order entry system (OES parts) caps are attached, it is considered abnormal. ● Is fault detected?	Yes	Replace or properly attach the filler cap, then go to Step 15.
		No	Go to next step.
5	**INSPECTION OF VACUUM HOSES** ● Pull slightly on vacuum hoses at purge solenoid, catch tank and charcoal canister. ● Check for loose connections. ● Visually inspect for improperly connected and cracked hoses between dynamic chamber and purge solenoid, purge solenoid and catch tank and catch tank and charcoal canister. ● Confirm air-tightness of vacuum hose by using vacuum pump. ● Is fault detected?	Yes	Repair or replace damaged parts, then go to Step 15.
		No	Go to next step.
6	**CHECK FOR PURGE SOLENOID VALVE STUCK CLOSED OR STUCK OPEN** ● Remove the purge solenoid valve. ● Confirm the purge solenoid valve air vents properly when ON and is air tight when OFF. ● Is fault detected?	Yes	Replace purge solenoid valve, then go to Step 15.
		No	Go to next step.
7	**INSPECTION OF CATCH TANK** ● Remove catch tank. ● Visually inspect for cracked catch tank. ● Inspect catch tank for plugging by using vacuum pump. ● Is fault detected?	Yes	Replace catch tank, then go to Step 15.
		No	Reconnect all components. Go to next step.
8	**INSPECTION OF CHARCOAL CANISTER** ● Remove charcoal canister. ● Visually inspect for cracked charcoal canister. ● Inspect charcoal canister for plugging by using vacuum pump. ● Is fault detected?	Yes	Replace charcoal canister, then go to Step 15.
		No	Go to next step.
9	**CHECK FOR EVAPORATIVE EMISSION MONITOR SYSTEM** ● Key off. ● Disconnect vacuum hose from charcoal canister at fuel tank side. ● Attach the vacuum pump to vacuum hose. ● Connect NGS tester. ● Key on, engine off. ● Access FTP V PID with NGS tester. ● Apply **17 kPa {13 mmHg, 0.5 inHg}** vacuum by using vacuum pump, then leave it for one minute. ● Did FTP V PID value maintain negative pressure?	Yes	Go to Step 14.
		No	Go to next step.

STEP	INSPECTION		ACTION
10	**INSPECTION OF VACUUM HOSES** • Key off. • Pull slightly on vacuum hoses at pressure control valve, FTP sensor, fuel filler pipe and fuel tank. • Check for loose connections. • Visually inspect for wrongly connected and cracked hoses between fuel tank and FTP sensor, fuel tank and pressure control valve, fuel filler pipe and pressure control valve and pressure control valve and charcoal canister. • Confirm air tightness of vacuum hose using vacuum pump. • Is fault detected?	Yes	Repair or replace damaged parts, then go to Step 15.
		No	Go to next step.
11	**CHECK FOR PRESSURE CONTROL VALVE** • Remove and inspect pressure control valve. • Is fault detected?	Yes	Replace pressure control valve, then go to Step 15.
		No	Go to next step.
12	**INSPECTION FUEL-FILLER PIPE** • Remove fuel-filler pipe. • Visually inspect fuel-filler pipe for damage. • Is fault detected?	Yes	Replace fuel filler pipe, then go to Step 15.
		No	Go to next step.
13	**INSPECTION OF FUEL TANK** • Remove fuel tank and visually inspect for damage. • Visually inspect for insufficient sealing or poorly attached accessories on fuel tank. (i.e. fuel gauge.) • Is fault detected?	Yes	Replace fuel tank or sealing, then go to Step 15.
		No	Go to next step.
14	**CHECK FOR CANISTER DRAIN CUT VALVE (CDCV)** • Key off. • Remove CDCV. • Confirm CDCV is not damaged, and that air vents is tight when at ON. • Is fault detected?	Yes	Replace CDCV, then go to next step.
		No	Inspect hoses between charcoal canister to CDCV, and repair if detached, incorrectly installed or cracked, then go to next step.
15	**VERIFY TROUBLESHOOTING OF DTC P0442 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine and perform DRIVE MODE. (See 01-02A-18 OBD II DRIVE MODE [FS]) • Access DIAGNOSTIC MONITORING TEST RESULTS of generic OBD-II function. (See 01-02A-16 Diagnostic Monitoring Test Results Access Procedure) • Verify following TEST ID values: — 10:26:80 (EVAP phase 0 (PGM_P0_PRSK)) — 10:26:00 (EVAP phase 0 (PGM_P0_PRSK)) — 10:27:00 (EVAP phase 2 (PGM_P2_DELPK)) — 10:2A:80 (EVAP vapor gen (PGM_P4_DELPK)) • Is value within specification?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
16	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0443 [FS]

Z6U010201082W28

DTC P0443	Evaporative emission control system purge solenoid valve circuit malfunction
DETECTION CONDITION	• DTC P0443 indicates failure in purge solenoid valve circuit
POSSIBLE CAUSE	• Power circuit open • Purge solenoid valve signal open in harness • Purge solenoid valve signal circuit short to power ground • Damaged purge solenoid valve • Damaged PCM

Troubleshooting Hint
See 01-16-8 EVAP Control System Monitor Outline

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**CHECK CONNECTION OF PURGE SOLENOID VALVE CONNECTOR** • Key off. • Verify connection of knock sensor connector. • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and terminals then go to next step.
4	**CHECK PURGE SOLENOID VALVE** • Remove purge solenoid valve. (See 01-16-12 PURGE SOLENOID VALVE INSPECTION) • Is purge solenoid valve okay?	Yes	Go to next step.
		No	Replace knock sensor, then go to Step 9.
5	**CHECK VOLTAGE OF PURGE SOLENOID VALVE POWER CIRCUIT** • Key on, engine off. • Disconnect purge solenoid valve connector. • Measure voltage at the purge solenoid valve connector terminal A. • Is voltage **greater than 10.5 V**?	Yes	Power harness circuit to purge solenoid valve is okay. Go to next step.
		No	Repair or replace wiring harness, then go to Step 9.
6	**CHECK PURGE SOLENOID VALVE CIRCUIT SHORTS TO GROUND CIRCUIT** • Key off. • Disconnect purge solenoid valve connector. • Check continuity between purge solenoid valve connector terminal B and 103 battery negative terminal. • Is there continuity?	Yes	Repair or replace wiring harness or connector then go to next step.
		No	Go to Step 9.
7	**CHECK CONNECTION OF PCM CONNECTOR** • Key off. • Verify connection of PCM connector. • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and pins then go to next step.
8	**CHECK CONTINUITY OF KNOCK SENSOR SIGNAL CIRCUIT OPEN** • Key off. • Disconnect purge solenoid valve connector. • Disconnect PCM connector. • Install breakout box. • Check continuity between Test pin 67 at breakout box and purge solenoid valve connector terminal B. • Is their continuity?	Yes	Go to next step.
		No	Repair or replace wiring harness or connector then go to next step.

STEP	INSPECTION		ACTION
9	**VERIFY TROUBLESHOOTING OF DTC P0443 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine and perform DRIVE MODE. (See 01-02A-18 OBD II DRIVE MODE [FS]) • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0446 [FS]

Z6U010201082W29

DTC P0446	Evaporative emission control system vent control malfunction
DETECTION CONDITION	• DTC P0446 indicates an excessive fuel tank pressure (FTP) or vent control malfunction in Evaporative Emission Control System (Canister drain cut valve (CDCV) is stuck)
POSSIBLE CAUSE	• Damaged FTP sensor • Kinks or blockage in fuel vapor hose/tube • Constant voltage circuit to FTP sensor open • Fuel vapor storage canister vent restriction • Damaged Canister Vent side filter • Damaged Canister Drain Cut Valve (CDCV) • Damaged PCM **Warning** **Following troubleshooting flow chart contains fuel system diagnostic and repair procedures. Read following warnings before performing fuel system service:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**CHECK FTP SENSOR** • Key on, engine off. • Access FTP V PID. • Key on, engine running. • Idle engine for 3 minutes. • Loosen fuel filler cap. • Again, access FTP V PID with NGS tester. • Is FTP V PID voltage **2.42— 2.58 V**?	Yes	Install fuel filler cap only 1/8 turn so that cap initially clicks by sound or touch. Go to Step 5.
		No	Install fuel filler cap only 1/8 turn so cap initially clicks by sound or touch. Go to next step.

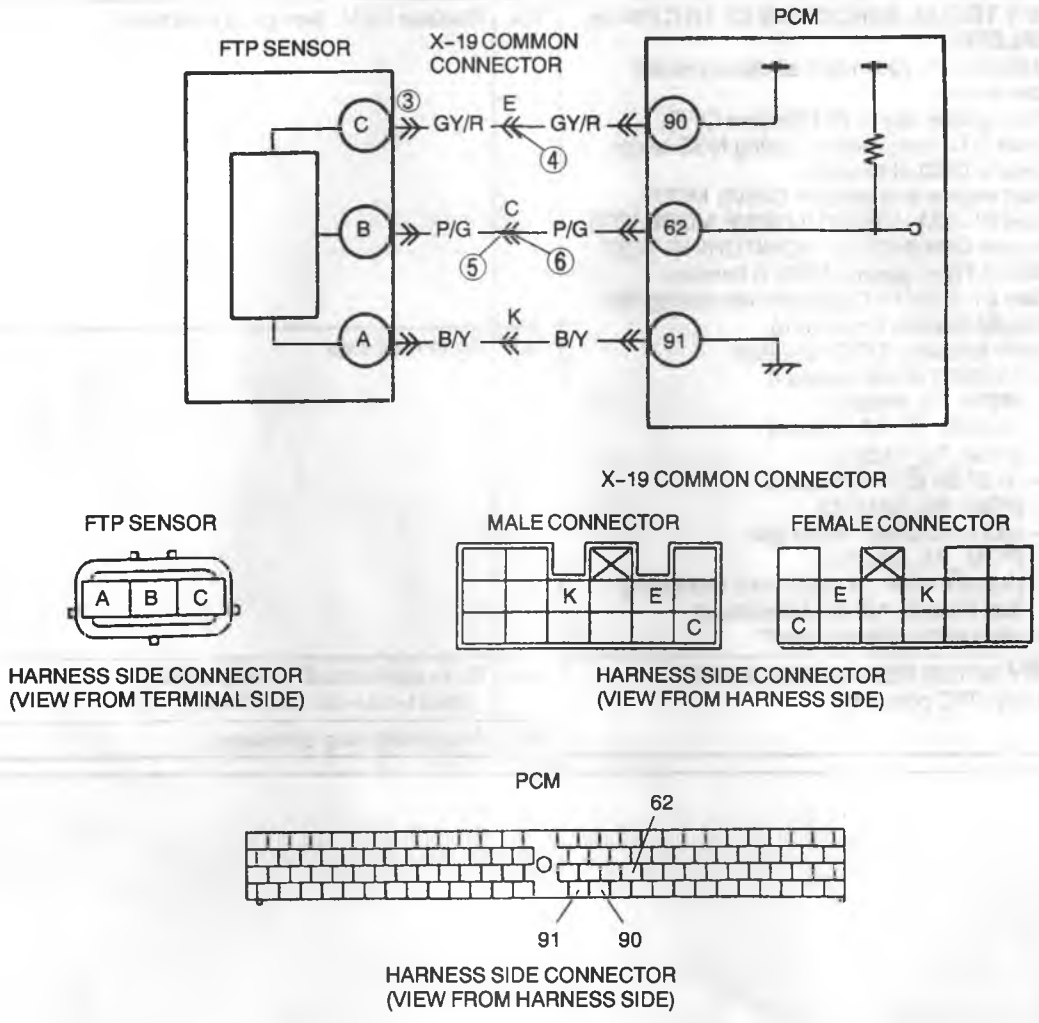
STEP	INSPECTION		ACTION
4	**CHECK CONSTANT VOLTAGE AT FTP SENSOR VEHICLE HARNESS CONNECTOR** • Key off. • Disconnect FTP sensor vehicle harness connector. • Key on, engine off. • Measure voltage between the constant voltage circuit and FTP sensor ground circuit at the FTP sensor harness connector. • Is constant voltage **4.5— 5.5 V**?	Yes	Constant voltage is open in FTP sensor. Replace FTP sensor, then go to Step 13.
		No	Repair or replace wiring harness, then go to Step 13.
5	**CHECK FOR RESTRICTION AT CHARCOAL CANISTER AND CDCV** • Check for kinks or bends in fuel vapor hoses from fuel tank to the in-line tee and from tee to both purge solenoid valve and charcoal canister. • Disconnect both ends of fuel vapor hose between charcoal canister and pressure control valve. • Check for vacuum bleed on disconnected fuel vapor hose with vacuum pump. Fuel vapor hose must not hold vacuum. • Check for excessive debris in charcoal canister or restrictions at charcoal canister atmosphere venting port to canister drain cut valve (CDCV). • Check for kinks or bends in purge air inlet tube between CDCV and atmosphere. • Is obstruction indicated?	Yes	Repair or replace damaged parts, then go to Step 13.
		No	Go to next step.
6	**CHECK HOSE FROM CANISTER DRAIN CUT VALVE (CDCV) FILTER PORT TO ATMOSPHERE** • Disconnect vacuum hose to atmosphere at CDCV. • Install hand-held vacuum pump to CDCV side of vacuum hose. • Apply vacuum to vacuum hose. • Does air flow?	Yes	Go to Step 9.
		No	Go to next step.
7	**INSPECTION OF CHECK VALVE** • Remove and inspect check valve for plugging. • Is fault detected?	Yes	Replace check valve, then go to Step 13.
		No	Go to next step.
8	**INSPECTION OF AIR FILTER** • Remove and inspect air filter for plugging. • Is fault detected?	Yes	Replace air filter, then go to Step 13.
		No	Replace vacuum hose, then go to Step 13.
9	**CHECK CDCV MECHANICAL OPERATION OPEN VACUUM POSITION** • Key off. • Disconnect vacuum hose at both ends of CDCV. • If CDCV is directly attached to charcoal canister, disconnect fuel vapor hose from purge solenoid valve to charcoal canister at charcoal canister. • Install hand-held vacuum pump vent to atmosphere side of CDCV. • CDCV electrically connected. • Apply **53 kPa {0.53 kgf/cm^2, 16 inHg}** of vacuum to CDCV. • Does CDCV hold vacuum for one minute?	Yes	Replace CDCV, then go to Step 13.
		No	Go to next step.
10	**CHECK CDCV OPERATION** • Key off. • Remove CDCV. • Perform CDCV inspection. (See 01-16-11 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION) • Is CDCV okay?	Yes	Go to next step.
		No	Replace CDCV, then go to Step 13.

STEP	INSPECTION		ACTION
11	**CHECK CDCV CIRCUIT FOR SHORT TO GROUND CIRCUIT** • Key off. • CDCV disconnected. • Disconnect PCM connector. Inspect for damaged or pushed out pins, corrosion and loose wires. Service as necessary. • Install breakout box. Leave PCM disconnected. • Disconnect NGS tester from DLC. • Measure resistance between Test Pin 67 and Test Pins 51 and 103 at breakout box. • Is each resistance greater than **10,000** Ω?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to Step 13.
12	**INSPECTION OF FUEL TANK** • Remove and inspect fuel tank. • Is fault detected?	Yes	Replace fuel tank or sealing, then go to next step.
		No	Go to ENGINE SYMPTOM TROUBLESHOOTING No.28. (See 01-03A-49 NO.28 FUEL FILLING SHUT OFF ISSUES [FS])
13	**VERIFY TROUBLESHOOTING OF DTC P0446 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine and perform DRIVE MODE. (See 01-02A-18 OBD II DRIVE MODE [FS]) • Access DIAGNOSTIC MONITORING TEST RESULTS of generic OBD-II function. (See 01-02A-16 Diagnostic Monitoring Test Results Access Procedure) • Verify following TEST ID value: — 10:26:80 (EVAP phase 0 (PGM_P0_PRSK)) — 10:26:00 (EVAP phase 0 (PGM_P0_PRSK)) — 10:27:00 (EVAP phase 2 (PGM_P2_DELPK)) — 10:2A:80 (EVAP vapor gen (PGM_P4_DELPK)) (See 01-02A-16 Diagnostic Monitoring Test Results Access Procedure) • Is value within specification?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
14	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0452 [FS]

Z6U010201082W30

DTC P0452	Fuel tank pressure sensor circuit low input
DETECTION CONDITION	• PCM monitors input voltage from fuel tank pressure sensor while the engine is running. If PCM terminal 62 voltage is **below 0.22 V** after engine is started, PCM determines that fuel tank pressure sensor circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC also detects by KOEO/KOER Self-Test
POSSIBLE CAUSE	• FTP sensor malfunction • Connector or terminal malfunction • Short to ground in wiring harness between fuel tank pressure sensor terminal B and PCM terminal 62 • Open circuit in wiring harness between fuel tank pressure sensor terminal C to PCM terminal 90 • PCM malfunction



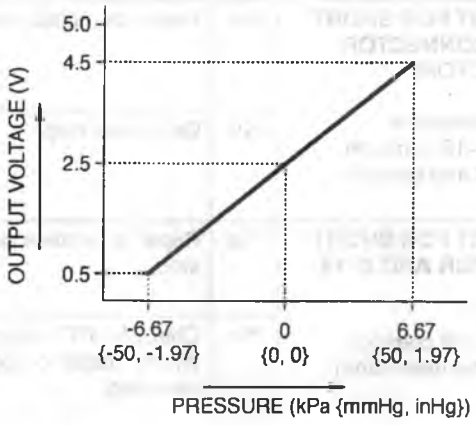
Z6U0102W373

Troubleshooting Hint

FTP sensor description

- The FTP sensor converts the fuel tank pressure into electric signals by using piezo-electric effect of the semi-conductor.
- The FTP sensor signal is used for the evaporative system monitor.

FTP sensor signal characteristic



Z6U0102W374

FTP sensor specification

Pressure (kPa {mmHg, inHg})	-6.67 {-50, -1.97}	0 {0, 0}	6.67 {50, 1.97}
FTP	-0.97 psi	0 psi	0.97 psi
FTP V	Approx. 0.5 V	Approx. 2.5 V	Approx. 4.5 V
PCM 62 (Signal)	Approx. 0.5 V	Approx. 2.5 V	Approx. 4.5 V

Diagnostic procedure

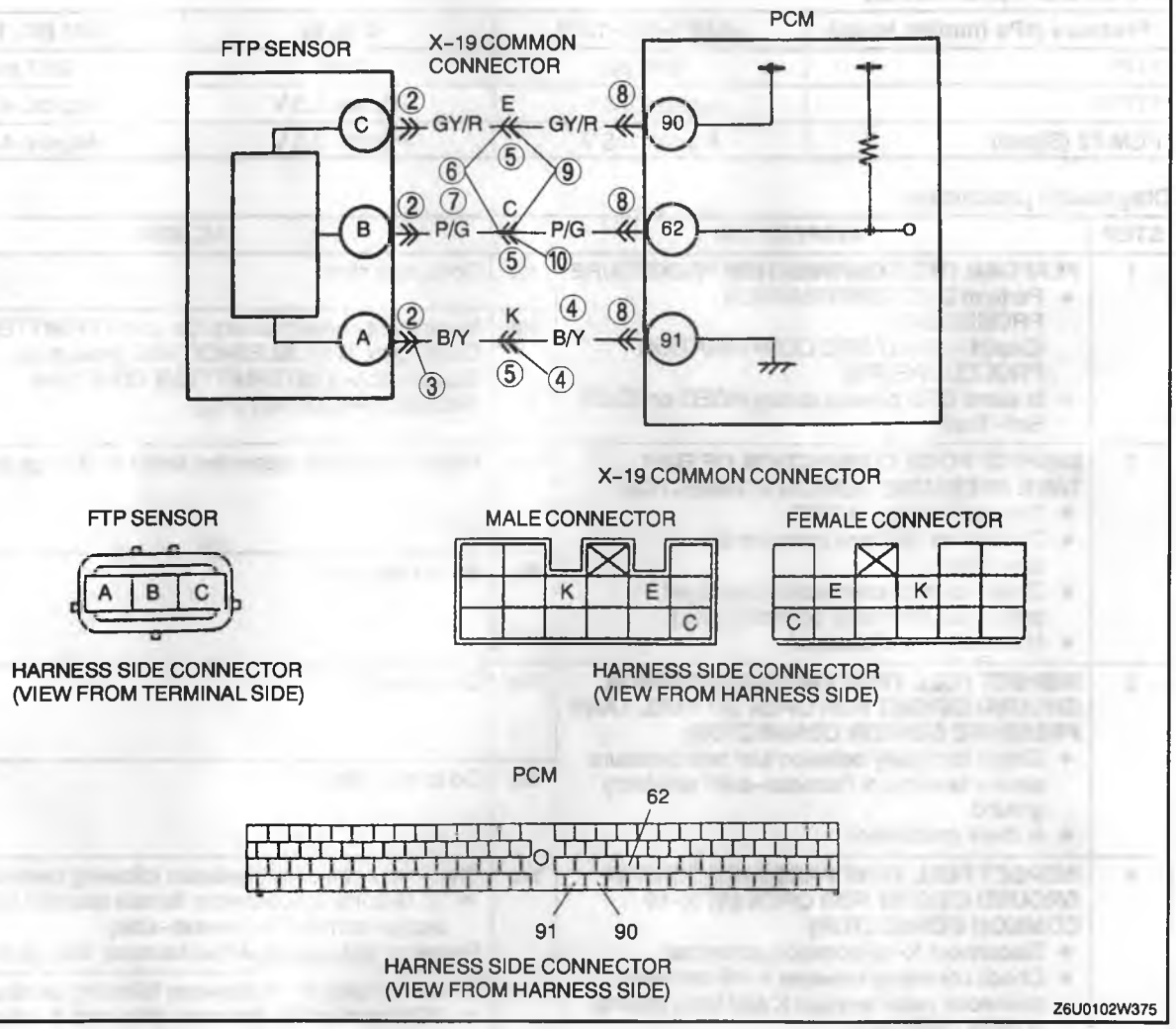
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**CLASSIFY FUEL TANK PRESSURE SENSOR OR HARNESS MALFUNCTION** • Disconnect FTP sensor connector. • Is FTP V PID **above 4.8 V**?	Yes	Go to next step.
		No	Go to step 5.
3	**CHECK POWER SUPPLY CIRCUIT VOLTAGE AT FTP SENSOR CONNECTOR** **Note** • If DTC P0107 and P0122 are also retrieved with P0452, then go to CONSTANT VOLTAGE troubleshooting procedure. • Turn ignition key to OFF. • Disconnect fuel tank pressure sensor connector. • Turn ignition key to ON (Engine OFF). • Check voltage between fuel tank pressure sensor terminal C (harness-side) and body ground. • Is voltage **within 4.5— 5.5 V**?	Yes	Check for poor fuel tank pressure sensor terminal C connection. Repair or replace as necessary. • If okay, replace fuel tank pressure sensor. Then go to Step 7.
		No	Go to next step.
4	**CHECK POWER SUPPLY CIRCUIT VOLTAGE AT X-19 COMMON CONNECTOR** • Disconnect X-19 common connector. • Measure voltage at X-19 common connector male terminal E (PCM-side). • Is voltage **within 4.5— 5.5 V**?	Yes	Check for open circuit between following terminals: • X-19 common connector female terminal E and fuel tank pressure sensor terminal C (harness-side) — Repair or replace suspected harness, then go to Step 7.
		No	Check for open circuit between following terminals: • PCM terminal 90 (harness-side) and X-19 common connector male terminal E. — Repair or replace suspected harness, then go to Step 7.

STEP	INSPECTION		ACTION
5	**INSPECT FTP SIGNAL CIRCUIT FOR SHORT TO GROUND (FTP SENSOR CONNECTOR AND X-19 COMMON CONNECTOR)** • Turn ignition key to off. • Disconnect X-19 common connector. • Check continuity between X-19 common connector female terminal C and ground. • Is there continuity?	Yes	Repair or replace suspected harness, then go to Step 7.
		No	Go to next step.
6	**INSPECT FTP SIGNAL CIRCUIT FOR SHORT TO GROUND (PCM CONNECTOR AND X-19 COMMON CONNECTOR)** • Disconnect PCM connector. • Check continuity between X-19 common connector male terminal C (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace suspected harness, then go to next step.
		No	Check for FTP signal circuit and FTP ground circuit for shorts. Repair or replace suspected harness, then go to next step.
7	**VERIFY TROUBLESHOOTING OF DTC P0452 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Perform DTC CONFIRMATION PROCEDURE. (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS]
		No	Troubleshooting completed.

DTC P0453 [FS]

Z6U010201082W31

DTC P0453	Fuel tank pressure sensor circuit high input
DETECTION CONDITION	• PCM monitors input voltage from the fuel tank pressure sensor while the engine is running. If PCM terminal voltage is above **4.5 V** after engine is started, PCM determines that the fuel tank pressure circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC also detects by KOEO/KOER Self-Test
POSSIBLE CAUSE	• Fuel tank pressure sensor malfunction • Connector or terminal malfunction • Open circuit in wiring between fuel tank pressure sensor terminal B and PCM terminal 62 • Open circuit in wiring between fuel tank pressure sensor terminal A and PCM terminal 91 • FTP sensor signal circuit shorts to constant voltage supply circuit



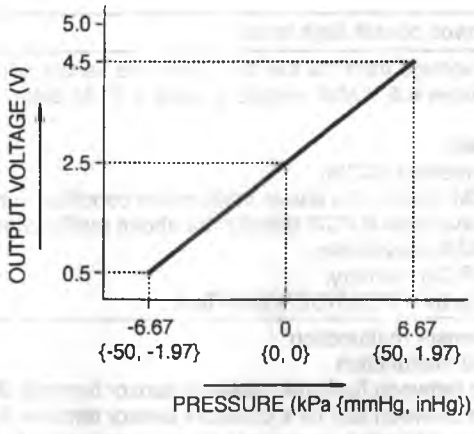
Z6U0102W375

Troubleshooting Hint

FTP sensor description

- The FTP sensor converts the fuel tank pressure into an electric signal by using piezo-electric effect of the semi-conductor.
- The FTP sensor signal is used for the evaporative system monitor.

FTP sensor signal characteristic



Z6U0102W374

FTP sensor specification

Pressure (kPa {mmHg, inHg})	-6.67 {-50, -1.97}	0 {0, 0}	6.67 {50, 1.97}
FTP	-0.97 psi	0 psi	0.97 psi
FTP V	Approx. 0.5 V	Approx. 2.5 V	Approx. 4.5 V
PCM 62 (Signal)	Approx. 0.5 V	Approx. 2.5 V	Approx. 4.5 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**INSPECT POOR CONNECTION OF FUEL TANK PRESSURE SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect fuel tank pressure sensor connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace suspected terminal, then go to Step 11.
		No	Go to next step.
3	**INSPECT FUEL TANK PRESSURE SENSOR GROUND CIRCUIT FOR OPEN (AT FUEL TANK PRESSURE SENSOR CONNECTOR)** • Check continuity between fuel tank pressure sensor terminal A (harness-side) and body ground. • Is there continuity?	Yes	Go to step 5.
		No	Go to next step.
4	**INSPECT FUEL TANK PRESSURE SENSOR GROUND CIRCUIT FOR OPEN (AT X-19 COMMON CONNECTOR)** • Disconnect X-19 common connector. • Check continuity between X-19 common connector male terminal K and body ground. • Is there continuity?	Yes	Check for open circuit between following terminals: • X-19 common connector female terminal K and FTP sensor terminal A (harness-side) Repair or replace suspected harness, then go to Step 11.
		No	Check for open circuit between following terminals: • PCM terminal 91 (harness-side) and X-19 common connector male terminal K Repair or replace suspected harness, then go to Step 11.
5	**CHECK X-19 COMMON CONNECTOR** • Disconnect X-19 common connector. • Check for poor connection (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace suspected terminal, then go to Step 11.
		No	Go to next step.

STEP	INSPECTION		ACTION
6	**INSPECT FUEL TANK PRESSURE SIGNAL CIRCUIT FOR SHORT TO CONSTANT VOLTAGE CIRCUIT (FUEL TANK PRESSURE SENSOR CONNECTOR AND X-19 COMMON CONNECTOR)** • Check continuity between X-19 common connector female terminals C and E. • Is there continuity?	Yes	Repair or replace suspected harness, then go to Step 11.
		No	Go to next step.
7	**INSPECT FUEL TANK PRESSURE SIGNAL CIRCUIT FOR OPEN (FUEL TANK PRESSURE SENSOR CONNECTOR AND X-19 COMMON CONNECTOR)** • Check continuity between fuel tank pressure sensor terminal B (harness-side) and X-19 common connector female terminal C. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to Step 11.
8	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair terminal, then go to Step 11.
		No	Go to next step.
9	**INSPECT FUEL TANK PRESSURE SIGNAL CIRCUIT FOR SHORT TO CONSTANT VOLTAGE CIRCUIT (X-19 COMMON CONNECTOR AND PCM CONNECTOR)** • Check continuity between X-19 common connector male terminals C and E (PCM-side). • Is there continuity?	Yes	Repair or replace suspected harness, then go to Step 11.
		No	Go to next step.
10	**INSPECT FUEL TANK PRESSURE SIGNAL CIRCUIT FOR OPEN (X-19 COMMON CONNECTOR AND PCM CONNECTOR)** • Connect breakout box with PCM disconnected. • Check continuity between X-19 common connector male terminal C (PCM-side) and breakout box terminal 62. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P0453 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Perform DTC CONFIRMATION PROCEDURE. (See01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0455 [FS]

Z6U010201082W32

DTC P0455	Evaporative emission control system leak detected (Gross leak)
DETECTION CONDITION	• DTC P0455 indicates substantial leak has been detected in Evaporative Emission System.
POSSIBLE CAUSE	• Purge solenoid valve malfunction • CDCV malfunction • Loose fuel filler cap • Charcoal canister malfunction • Catch tank malfunction • Pressure control valve malfunction • Cracked fuel tank • Fuel tank component parts poorly installed • Evaporative hose damaged or loose • Insufficient manifold absolute pressure • Fuel tank level sensor malfunction • Fuel tank pressure sensor malfunction • Engine coolant temperature sensor malfunction • Intake air temperature sensor malfunction • Throttle position sensor malfunction • Mass air flow sensor malfunction • Vehicle speed sensor malfunction • Poor connection of connector **Warning** **Following troubleshooting flow chart contains fuel system diagnostic and repair procedures. Read following warnings before performing fuel system service:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Troubleshooting Hint
See 01-16-8 EVAP Control System Monitor Outline

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**CHECK FOR OTHER CONTINUOUS MEMORY DTC** Check for other Continuous Memory DTCs which could cause this DTC. • Key off. • NGS tester connected. • Key on, engine off. • Retrieve and record any Continuous Memory DTCs. • Are there any other continuous Memory DTCs present?	Yes	Perform appropriate DTC troubleshooting.
		No	Go to next step.
4	**CHECK FOR KOEO SELF-TEST** • Key on, engine off. • Perform KOEO self test. • Are any KOEO DTCs displayed?	Yes	Perform appropriate DTC troubleshooting.
		No	Go to next step.

STEP	INSPECTION		ACTION
5	**CHECK FOR KOER SELF-TEST** • Key on, engine running. • Warm up engine to normal operating temperature. • Key on, engine running (KOER) self test. • Perform KOEO self test. • Are any KOER DTCs displayed?	Yes	Perform appropriate DTC troubleshooting.
		No	Go to next step.
6	**CHECK FOR INTAKE MANIFOLD VACUUM** • Key off. • Attach vacuum gauge to intake manifold vacuum source beside purge control system. • Key on, engine running. • Warm up engine to normal operating temperature. • Measure intake manifold vacuum. • Does manifold vacuum rise above **60 kPa {450 mmHg, 18 InHg}**.	Yes	Go to next step.
		No	Check for broken/loose air hose clamps, cracks/holes in air hose. If they are damaged, repair or replace them, then go to Step 28.
7	**INSPECTION OF FUEL-FILLER CAP** • Key off. • Disconnect NGS tester. • Confirm the filler cap is not either disconnected, loose or damaged. **Note** • It is considered abnormal when filler caps other than order entry system (OES) caps are attached. • Is fault detected?	Yes	Replace or properly attach filler cap, then go to Step 28.
		No	Go to next step.
8	**INSPECTION OF VACUUM HOSES** • Pull slightly on vacuum hoses at purge solenoid valve, catch tank and charcoal canister. • Check for loose connections. • Visually inspect for improperly connection and cracked hoses between dynamic chamber and purge solenoid valve, catch tank and charcoal canister. • Confirm air tightness of vacuum hose by using vacuum pump. • Is fault detected?	Yes	Repair or replace damaged/loosed parts, then go to Step 28.
		No	Go to next step.
9	**CHECK FOR PURGE SOLENOID VALVE - VALVE STUCK CLOSED OR STUCK OPEN** • Remove purge solenoid valve. (See 01-16-12 PURGE SOLENOID VALVE INSPECTION) • Is fault detected?	Yes	Replace purge solenoid valve, then go to Step 28.
		No	Go to next step.
10	**INSPECTION OF CATCH TANK** • Remove catch tank. • Visually inspect for cracked catch tank. • Inspect catch tank for plugging by using vacuum pump. • Is fault detected?	Yes	Replace catch tank, then go to Step 28.
		No	Go to next step.
11	**CHECK FOR INTAKE MANIFOLD VACUUM TO PURGE CONTROL SYSTEM** • Key off. • Attach vacuum gauge to intake manifold vacuum source for purge control system. • Key on, engine running. • Warm-up engine to normal operating temperature. • Measure intake manifold vacuum. • Did manifold vacuum rise **above 60 kPa {450 mmHg, 18 InHg}**.	Yes	Go to next step.
		No	Repair or replace damaged/loosed parts, then go to Step 28.

STEP	INSPECTION		ACTION
12	**INSPECTION OF CHARCOAL CANISTER** • Remove charcoal canister. • Visually inspect for cracked charcoal canister. • Inspect charcoal canister for plugging by using vacuum pump. • Is fault detected?	Yes	Replace charcoal canister, then go to Step 28.
		No	Go to next step.
13	**VERIFY FTP SIGNAL VOLTAGE** • Clamp on hose on tank side of the charcoal canister. • Remove filler cap. • Connect NGS tester. • Key on, engine off. • Access FTP V PID with NGS tester. • Are FTP V PID values same as atmospheric pressure (**2.42—2.58 V**)?	Yes	Install filler cap. Go to Step 17.
		No	Install filler cap. Go to next step.
14	**INDUCE OPPOSITE FTP SIGNAL** • Key off. • Disconnect FTP sensor vehicle harness connector. • Connect jumper wire at constant voltage circuit between FTP sensor terminal C and sensor vehicle harness connector terminal B. • Key on, engine off. • If NGS tester communication concern exists, remove jumper immediately and go directly to next step. • Access FTP V PID. • Is FTP V PID value **4.5— 5.5V**?	Yes	Replace FTP sensor, then go to Step 28.
		No	Go to next step.
15	**CHECK VREF AT FTP SENSOR VEHICLE HARNESS CONNECTOR** • FTP sensor disconnected. • Key on, engine off. • Measure voltage between terminal C of constant voltage circuit and terminal A of FTP sensor ground circuit at FTP sensor vehicle harness connector. • Is constant voltage **4.5— 5.5V**?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to Step 28.
16	**CHECK FTP SIGNAL CIRCUIT FOR SHORTS TO FTP SENSOR GROUND AND GROUND CIRCUIT** • Key off. • Disconnect FTP sensor. • Disconnect PCM. Inspect for damaged or pushed out pins, corrosion and loose wires. Service as necessary. • Install breakout box. Leave PCM disconnected. • Disconnect NGS tester from DLC. • Measure resistance between Test Pin 62 and Test Pin 91 at breakout box. • Measure resistance between Test Pin 62 and Test Pins 51 and 103 at breakout box. • Is each resistance **greater than 10,000 Ω**?	Yes	Repair or replace wiring harness, then go to Step 28.
		No	Repair or replace wiring harness, then go to Step 28.

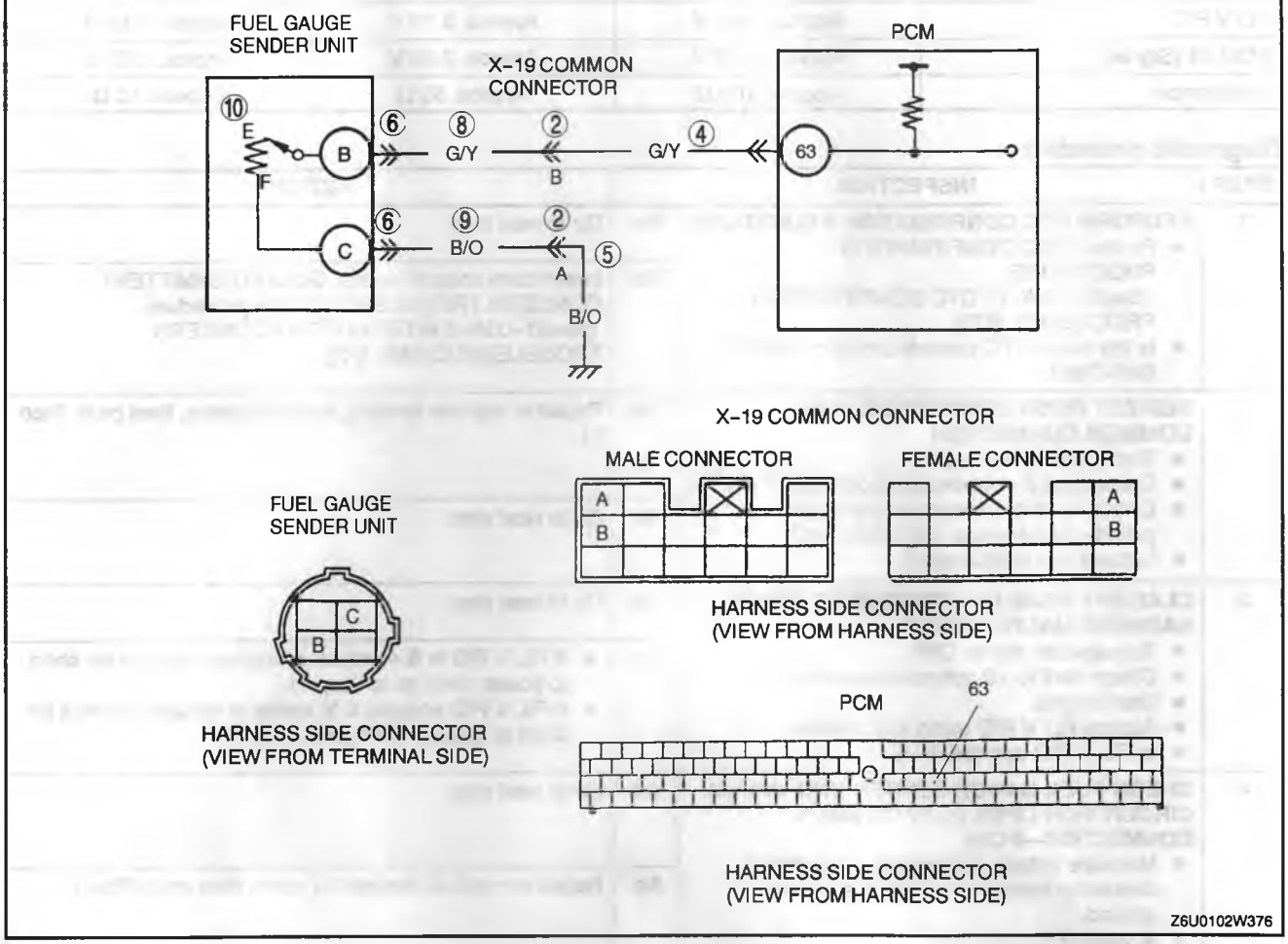
STEP	INSPECTION		ACTION
17	**CHECK FOR EVAPORATIVE EMISSION MONITOR SYSTEM** • Key off. • Disconnect vacuum hose from charcoal canister at fuel tank side. • Attach vacuum pump to vacuum hose. • Connect NGS tester. • Key on, engine off. • Access FTP V PID. • Apply vacuum by using vacuum pump. • Does FTP V PID value change on negative pressure side? . (See 01-40A-38 FUEL TANK PRESSURE SENSOR INSPECTION [FS])	Yes	Go to Step 22.
		No	Go to next step.
18	**INSPECTION OF VACUUM HOSES** • Key off. • Pull slightly on vacuum hoses at pressure control valve, FTP sensor, fuel filler pipe and fuel tank. • Check for loose connections. • Visually inspect for improperly connections and cracked hoses between fuel tank and FTP sensor, fuel tank and pressure control valve, fuel filler pipe and pressure control valve and pressure control valve and charcoal canister. • Confirm air tightness of vacuum hose using vacuum pump. • Is fault detected?	Yes	Repair or replace damaged parts, then go to Step 28.
		No	Go to next step.
19	**CHECK FOR PRESSURE CONTROL VALVE** • Remove and inspect pressure control valve. • Is fault detected?	Yes	Replace pressure control valve, then go to Step 28.
		No	Go to next step.
20	**INSPECTION FUEL-FILLER PIPE** • Remove fuel-filler pipe. • Visually inspect for fuel filler pipe damage. • Is fault detected?	Yes	Replace fuel filler pipe, then go to Step 28.
		No	Go to next step.
21	**INSPECTION OF FUEL TANK** • Remove fuel tank. • Visually inspect for fuel tank damage. • Visually inspect for insufficient sealing or poorly attached accessories on fuel tank: i.e., fuel gauge. • Is fault detected?	Yes	Replace fuel tank or sealing, then go to Step 28.
		No	Go to next step.
22	**CHECK FOR EVAPORATIVE EMISSION MONITOR SYSTEM** • Key off. • Disconnect vacuum hose from charcoal canister at fuel tank side. • Attach the vacuum pump to vacuum hose. • Connect NGS tester. • Key on, engine off. • Access FTP V PID. • Apply **6.66 kPa {50 mmHg, 1.97 inHg}** vacuum by using vacuum pump, then leave it for one minute. • Does FTP V PID value maintained **within 0.38—0.62 V**?	Yes	Go to Step 27.
		No	Go to next step.

STEP	INSPECTION		ACTION
23	**INSPECTION OF VACUUM HOSES** ● Key off. ● Pull slightly on vacuum hoses at pressure control valve, FTP sensor, fuel filler pipe and fuel tank. ● Check for loose connections. ● Visually inspect for improper connections and cracked hoses between fuel tank and FTP sensor, fuel tank and pressure control valve, fuel filler pipe and pressure control valve and pressure control valve and charcoal canister. ● Confirm the air tightness of vacuum hose using vacuum pump. ● Is fault detected?	Yes	Repair or replace damaged parts, then go to Step 28.
		No	Go to next step.
24	**CHECK FOR PRESSURE CONTROL VALVE** ● Remove and inspect pressure control valve. ● Is fault detected?	Yes	Replace pressure control valve, then go to Step 28.
		No	Go to next step.
25	**INSPECTION FUEL-FILLER PIPE** ● Remove fuel-filler pipe. ● Visually inspect for fuel filler pipe damage. ● Is fault detected?	Yes	Replace fuel filler pipe, then go to Step 28.
		No	Go to next step.
26	**INSPECTION OF FUEL TANK** ● Remove fuel tank. ● Visually inspect for fuel tank damage. ● Visually inspect for insufficient sealing or poorly attached accessories on fuel tank: i.e., fuel gauge. ● Is fault detected?	Yes	Replace fuel tank or sealing, then go to Step 28.
		No	Go to next step.
27	**CHECK CANISTER DRAIN CUT VALVE (CDCV)** ● Key off. ● Remove CDCV. ● Confirm CDCV is not damaged, and that air vents are tight when at ON. ● Is fault detected?	Yes	Replace CDCV, then go to next step.
		No	Inspect hoses between the charcoal canister and CDCV, and repair if detached, incorrectly installed or cracked. Go to next step.
28	**VERIFY TROUBLESHOOTING OF DTC P0455 COMPLETED** ● Make sure to reconnect all disconnected connectors. ● Turn ignition key to ON (Engine OFF). ● Clear DTC from memory using NGS tester generic OBD-II function. ● Start engine and perform DRIVE MODE. (See01-02A-18 OBD II DRIVE MODE [FS]) ● Access DIAGNOSTIC MONITORING TEST RESULTS of generic OBD-II function. (See 01-02A-16 Diagnostic Monitoring Test Results Access Procedure) ● Verify following TEST ID values: — 10:26:80 (EVAP phase 0 (PGM_P0_PRSK)) — 10:26:00 (EVAP phase 0 (PGM_P0_PRSK)) — 10:27:00 (EVAP phase 2 (PGM_P2_DELPK)) — 10:2A:80 (EVAP vapor gen (PGM_P4_DELPK)) ● Is value within specification?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
29	**VERIFY AFTER REPAIR PROCEDURE** ● Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0460 [FS]

Z6U010201082W33

DTC P0460	Fuel gauge sender unit circuit malfunction
DETECTION CONDITION	• If the PCM detects the fuel gauge sender unit input voltage at PCM terminal 63 is below **0.00 V** or above **3.48 V**, the PCM determines that a fuel gauge sender unit circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory. • This DTC also detects by KOER Self-Test.
POSSIBLE CAUSE	• Fuel gauge sender unit malfunction • Short to ground circuit between fuel gauge sender unit terminal A and PCM terminal 63 • Short circuit between fuel level signal circuit and fuel gauge sender unit ground circuit • Open circuit between fuel gauge sender unit terminal A and PCM terminal 63. • Open circuit between fuel gauge sender unit terminal C and body ground. • Poor connection of fuel gauge sender unit and/or PCM connector



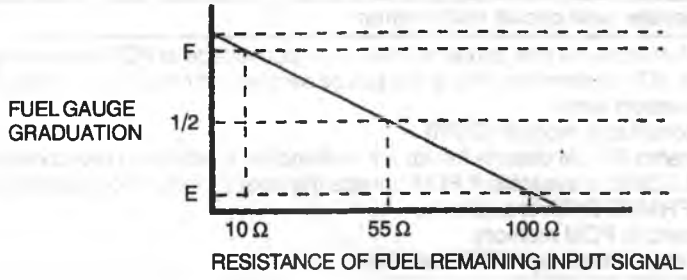
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Troubleshooting Hint

Fuel gauge sender unit description

- The fuel gauge sender unit converts the fuel level into electric signals by using variable resister.
- The fuel gauge sender unit signal is used for the evaporative system monitor.

Fuel gauge sender unit signal characteristic



Z6U0102W377

Fuel gauge sender unit specification

Fuel level	Empty	Half	Full
FLI PID	7 %	50 %	92 %
FLI V PID	Approx. 2.83 V	Approx. 2.10 V	Approx. 0.62 V
PCM 63 (Signal)	Approx. 2.83 V	Approx. 2.10 V	Approx. 0.62 V
Resistance	Approx. 100 Ω	Approx. 55 Ω	Approx. 10 Ω

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**INSPECT POOR CONNECTION X-19 COMMON CONNECTOR** • Turn ignition key to OFF. • Disconnect X-19 common connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or harness, then go to Step 11.
		No	Go to next step.
3	**CLASSIFY REAR OR INSTRUMENT PANEL HARNESS MALFUNCTION** • Turn ignition key to OFF. • Disconnect X-19 common connector. • Start engine. • Access FLI V PID using NGS tester. • Is FIL V PID **approx. 5 V**?	Yes	Go to next step.
		No	• If FIL V PID is **B+**, repair or replace harness for short to power, then go to Step 11. • If FIL V PID **approx. 0 V**, repair or replace harness for short to ground, then go to Step 11.
4	**CHECK FUEL GAUGE SENDER UNIT SIGNAL CIRCUIT FOR OPEN (X-19 COMMON CONNECTOR—PCM)** • Measure voltage between X-19 common connector female terminals A and body ground. • Is voltage approx. **5 V**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 11.
5	**CHECK FUEL GAUGE SENDER UNIT GROUND CIRCUIT FOR OPEN (X-19 COMMON CONNECTOR—BODY GROUND)** • Turn ignition key to OFF. • Connect jumper wire between X-19 common connector female terminals A and B. • Access FLI V PID using NGS tester. • Is FLI V PID **approx. 0 V**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 11.

STEP	INSPECTION		ACTION
6	**INSPECT POOR CONNECTION FUEL GAUGE SENDER UNIT CONNECTOR** • Turn ignition key to OFF. • Disconnect fuel gauge sender unit connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or harness, then go to Step 11.
		No	Go to next step.
7	**CHECK REAR HARNESS MALFUNCTION** • Connect X-19 common connector. • Start engine. • Access FLI V PID using NGS tester. • Is FIL V PID **approx. 5 V**?	Yes	Go to next step.
		No	• If FIL V PID is **B+**, repair or replace harness for short to power, then go to Step 11. • If FIL V PID **approx. 0 V**, repair or replace harness for short to ground, then go to Step 11.
8	**CHECK FUEL GAUGE SENDER UNIT SIGNAL CIRCUIT FOR OPEN (FUEL GAUGE SENDER UNIT—X-19 COMMON CONNECTOR)** • Measure voltage between fuel gauge sender unit terminal B (harness-side) and body ground. • Is voltage **approx. 5 V**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 11.
9	**CHECK FUEL GAUGE SENDER UNIT GROUND CIRCUIT FOR OPEN (FUEL GAUGE SENDER UNIT—X-19 COMMON CONNECTOR)** • Turn ignition key to OFF. • Connect jumper wire between fuel gauge sender unit terminal B and C (harness-side). • Access FLI V PID using NGS tester. • Is FLI V PID **approx. 0 V**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 11.
10	**INSPECT FUEL GAUGE SENDER UNIT** • Inspect fuel gauge sender unit. (See09-22-9 FUEL GAUGE SENDER UNIT INSPECTION) • Is fuel gauge sender unit okay?	Yes	Go to next step.
		No	Replace fuel gauge sender unit, then go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P0460 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOER Self-Test. • Is the same DTC present during KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0461 [FS]

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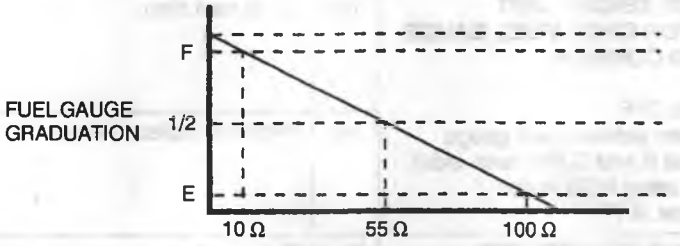
DTC P0461	Fuel gauge sender unit circuit range/performance
DETECTION CONDITION	• The PCM monitors the fuel gauge sender unit input voltage difference once per a second. If input voltage difference is above **0.8 V/s** for **25 seconds**, the PCM determines that the fuel gauge sender unit circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Fuel gauge sender unit malfunction or substandard performance

Troubleshooting Hint

Fuel gauge sender unit description

- The fuel gauge sending unit converts the fuel level into a electric signal by using variable resister.
- The fuel gauge sender unit signal is used for the evaporative system monitor.

Fuel gauge sender unit signal characteristic



Z6U0102W377

Fuel gauge sender unit specification

Fuel level	Empty	Half	Full
FLI PID	7 %	50 %	92 %
FLI V PID	Approx. 2.83 V	Approx. 2.10 V	Approx. 0.62 V
PCM 63 (Signal)	Approx. 2.83 V	Approx. 2.10 V	Approx. 0.62 V
Resistance	Approx. 100 Ω	Approx. 55 Ω	Approx. 10 Ω

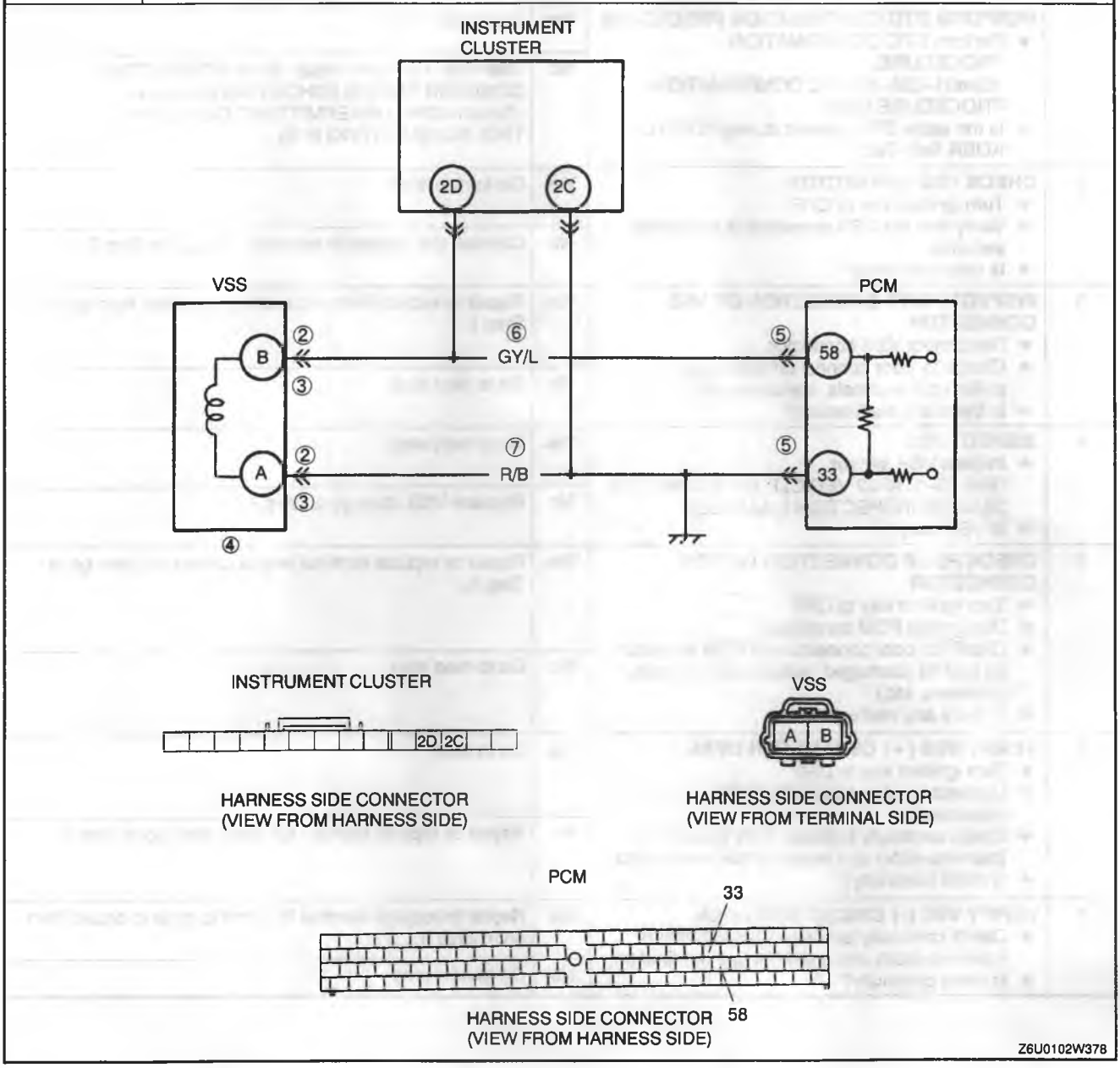
Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**INSPECT FUEL GAUGE SENDER UNIT** • Turn ignition key to OFF. • Inspect fuel gauge sender unit. (See09-22-9 FUEL GAUGE SENDER UNIT INSPECTION) • Is fuel gauge sender unit okay?	Yes	Replace PCM, then go to next step.
		No	Repair or replace fuel gauge sender unit, then go to next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0500, P0503, P1501 [FS]

Z6U010201082W35

DTC P0500 **DTC P0503** **DTC P1501**	**Vehicle speed sensor (VSS) circuit malfunction** **Vehicle speed sensor (VSS) erratic malfunction** **Vehicle speed sensor (VSS) input signal out of Self-Test range**
DETECTION CONDITION	• Vehicle speed signal is out of preprogrammed range when vehicle speed exceeds **8 km/h {5 mph}**. • If the PCM recieve the VSS signal while KOER Self-Test, the PCM determines that VSS circuit has malfunctioned.
POSSIBLE CAUSE	• VSS malfunction • Connector or terminal malfunction • Intermittent signal inputs from other sources (Ignition harness) • Open circuit between VSS sensor terminal A and PCM terminal 33 • Short to ground circuit between VSS sensor terminal A and PCM terminal 33 • Open circuit between VSS sensor terminal Band PCM terminal 58 • Short to ground circuit between VSS sensor terminal B and PCM terminal 58

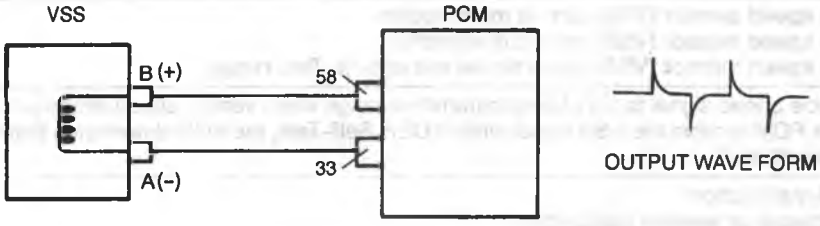


Z6U0102W378

Troubleshooting Hint

VSS description

- The VSS generates signals per turn of the sensor rotor and input to the PCM.
- The PCM performs each control based on the VSS signal and throttle position sensor signal.



Z6U0102W379

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**CHECK VSS CONNECTOR** • Turn ignition key to OFF. • Verify that the VSS connector is connected securely. • Is connector okay?	Yes	Go to next step.
		No	Connect the connector securely, then go to Step 8.
3	**INSPECT POOR CONNECTION OF VSS CONNECTOR** • Disconnect VSS connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 8.
		No	Go to next step.
4	**INSPECT VSS** • Inspect VSS sensor. (See 05-17A-32 VEHICLE SPEEDOMETER SENSOR INSPECTION [LA4A-EL]) • Is VSS okay?	Yes	Go to next step.
		No	Replace VSS, then go to Step 8.
5	**CHECK POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection of PCM terminals 58 and 33 (damaged, pulled-out terminals, corrosion, etc.) • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 8.
		No	Go to next step.
6	**VERIFY VSS (+) CIRCUIT FOR OPEN** • Turn ignition key to OFF. • Connect breakout box with PCM disconnected. • Check continuity between VSS terminal A (harness-side) and breakout box terminal 33. • Is there continuity?	Yes	Go to next.
		No	Repair or replace harness for open, then go to Step 8.
7	**VERIFY VSS (-) CIRCUIT FOR OPEN** • Check continuity between VSS terminal B (harness-side) and breakout box terminal 58. • Is there continuity?	Yes	Repair or replace harness for short to ground circuit, then go to Step 8.
		No	Go to next step.

STEP	INSPECTION		ACTION
8	**VERIFY TROUBLESHOOTING OF DTC P0500, P1501 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform DTC CONFIRMATION PROCEDURE. • Is the same DTC present during KOEO or KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0505 [FS]

Z6U010201082W36

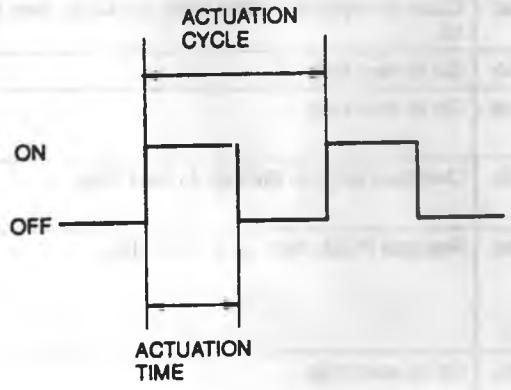
DTC P0505	Idle air control (IAC) system malfunction
DETECTION CONDITION	• PCM cannot control idle speed toward target idle speed while KOER Self-test.
POSSIBLE CAUSE	• IAC valve malfunction • Air cleaner element clogged • Air intake passage clogged • A/C relay control circuit malfunction • Generator control circuit malfunction • Low engine compression (Over capacity of blow-by gas) • PCM malfunction

Troubleshooting Hint

IAC description

- For the optimum idle speed control, the PCM selects one of several target airflows preset in the PCM according to the engine conditions, and converts the target airflow into the IAC valve actuation time and controls the valve opening position.

IAC duty control



$$\text{DUTY VALUE} = \frac{\text{ACTUATION TIME}}{\text{ACTUATION CYCLE}} \times 100\ (\%)$$

Z6U0102W380

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY RELATED PENDING OR STORED DTCS** • Turn ignition key to OFF, then ON (Engine OFF). • Verify pending code or stored DTCs using NGS tester. • Is other DTC present?	Yes	Repair applicable DTCs. (See01-02A-24 DTC TABLE [FS])
		No	Go to next step.
4	**INSPECT IAC VALVE MALFUNCTION** • Start engine. • Simulate IACV PID for **100 %** using NGS tester. • Is engine speed increased?	Yes	Go to next step.
		No	Replace IAC valve, then go to Step 10.
5	**INSPECT A/C MAGNET CLUTCH OPERATION** • Turn blower motor switch off. • Is magnet clutch still on?	Yes	Refer to "A/C is always on or A/C compressor runs continuously." of ENGINE SYMPTOM TROUBLESHOOTING, then go to Step 10. (See01-03A-46 NO.24 A/C ALWAYS ON/A/C COMPRESSOR RUNS CONTINUOUSLY [FS])
		No	Go to next step.
6	**INSPECT GENERATOR CONTROL CIRCUIT MALFUNCTION** • Simulate ALTF PID for **0 %** using NGS tester. • Is engine speed increased?	Yes	Go to next step.
		No	Repair short to power circuit in generator control circuit, then go to Step 10.
7	**INSPECT AIR CLEANER ELEMENT** • Remove air cleaner element with engine running. • Is engine speed increased?	Yes	Replace air cleaner element, then go to Step 10.
		No	Go to next step.
8	**INSPECT THROTTLE BODY PASSAGE** • Is throttle body clogged?	Yes	Clean or replace throttle body passage, then go to Step 10.
		No	Go to next step.
9	**INSPECT ENGINE COMPRESSION** • Inspect engine compression. (See01-10A-5 COMPRESSION INSPECTION [FS]) • Is engine compression okay?	Yes	Go to next step.
		No	Overhaul engine, then go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P0505 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOER Self-test. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0603, P0605 [FS]

Z6U010201082W37

DTC P0603 **DTC P0605**	**Internal control module keep alive memory (KAM) error** **Internal control module read only memory (ROM) error**
DETECTION CONDITION	• PCM internal KAM or ROM damaged.
POSSIBLE CAUSE	• PCM internal KAM or ROM damaged.

Troubleshooting Hint

Keep alive memory description

- The PCM stores information in keep alive memory (a memory integrated circuit chip) about vehicle operating conditions, and then uses this information to compensate for component variability. The keep alive memory remains powered when the ignition switch is off so that this information is not lost.

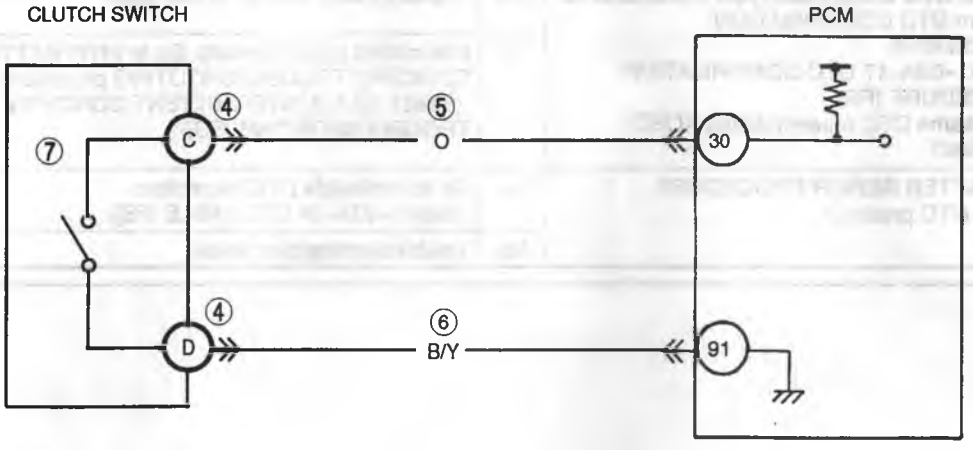
Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during KOEO Self-Test?	Yes	Replace PCM, then go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P0704 [FS]

Z6U010201082W38

DTC P0704	Clutch switch circuit malfunction
DETECTION CONDITION	• If the PCM detects the clutch switch voltage at PCM terminal 30 has not been changed during drive the vehicle is **above 26 km/h {16 mph}**, the PCM determines that a clutch switch circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• Clutch switch malfunction • Connector or terminal malfunction • Open circuit between clutch switch terminal C and PCM terminal 30 • Short to ground circuit between clutch switch terminal C and PCM terminal 30 • Open circuit between clutch switch terminal D and PCM terminal 91 • Short to ground circuit between clutch switch terminal D and PCM terminal 91





Z6U0102W381

Troubleshooting Hint

Clutch switch description

- A normally open type clutch switch is used. Therefore when depress the clutch pedal, the clutch switch become ON (continuity), and release the clutch pedal, the clutch switch become OFF (no continuity).
- The brake switch signal is used for the following controls.
  - —Idle air control
  - —Fuel injector control

Clutch switch specification

Clutch pedal condition (With KOEO/KOER)	Depressed	Released
Clutch switch	ON	OFF
Clutch switch terminal C	0 V	approx. 5 V
CLT V PID	0 V	approx. 5 V
PCM terminal 30	0 V	approx. 5 V

Diagnostic procedure

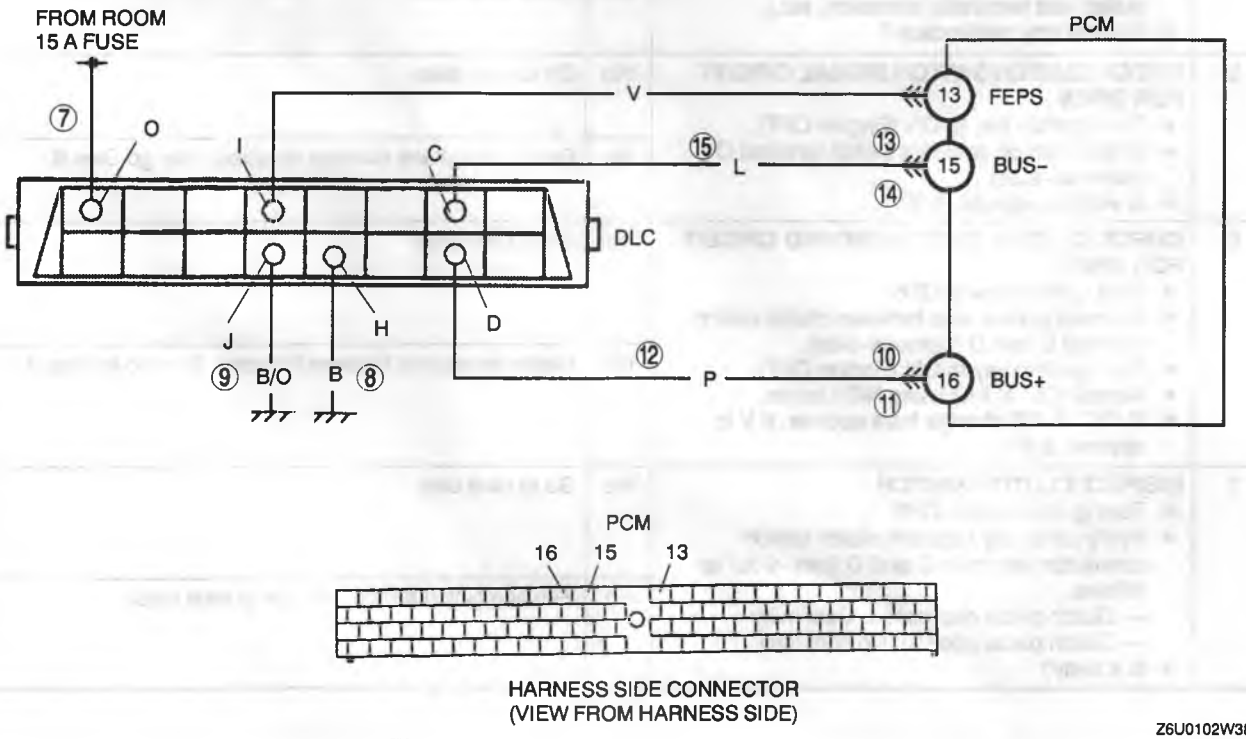
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS-IS CONCERN INTERMITTENT OR CONSTANT** • Connect NGS tester to DLC. • Start engine. • Access CLT V PID using NGS tester. • Verify CLT V PID as follows — Clutch pedal depressed: **approx. 0 V** — Clutch pedal released: **approx. 5 V** • Is CLT V PID as follows?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
		No	• If CLT V PID stays **approx. 5 V**, go to next step • If CLT V PID stays **approx. 0 V**, go to Step 6.
4	**INSPECT POOR CONNECTION OF CLUTCH SWITCH CONNECTOR** • Turn ignition key to OFF. • Disconnect the clutch switch connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminals and/or connector, then go to Step 8.
		No	Go to next step.
5	**CHECK CLUTCH SWITCH SIGNAL CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Check voltage at clutch switch terminal C (harness-side). • Is voltage **approx. 5 V**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go Step 8.
6	**CHECK CLUTCH SWITCH GROUND CIRCUIT FOR OPEN** • Turn ignition key to OFF. • Connect jumper wire between clutch switch terminal C and D (harness-side). • Turn ignition key to ON (Engine OFF). • Access CLT V PID using NGS tester. • Is CLT V PID change from **approx. 0 V** to **approx. 5 V**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 8.
7	**INSPECT CLUTCH SWITCH** • Turn ignition key to OFF. • Verify continuity between clutch switch connector terminals C and D (part-side) as follows. — Clutch pedal depressed: Continuity — Clutch pedal release: No continuity • Is it okay?	Yes	Go to next step.
		No	Replace clutch switch, then go to next step.

STEP	INSPECTION		ACTION
8	**VERIFY TROUBLESHOOTING OF DTC P0704 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from memory using NGS tester generic OBD-II function. • Drive the vehicle **above 26 km/h {16 mph}**. • Depress and release clutch pedal. • Is any pending code of DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1001 [FS]

Z6U010201083W01

DTC P1001	DATA LINK CONNECTOR (DLC) MALFUNCTION
DETECTION CONDITION	• Unable to access Continuity Memory DTCs. • Unable to activate KOEO or KOER Self-Test. • NGS tester communication problem • DTC displayed by NGS tester not listed. • DTC P1001 KOEO Self-Test cannot be completed.
POSSIBLE CAUSE	• Damaged DLC • Incorrect Self-Test procedure • VREF is not within specification. • Idle RPM is out of specification. • Open in DLC harness circuit • Short in DLC circuit or associated modules • Damaged PCM power relay circuit • Damaged PCM



Z6U0102W382

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY SELF-TEST PROCEDURE** • Key OFF • Disconnect NGS tester from DLC. • Inspect DLC for damage. • Verify that the correct procedure was used to activate Continuous Memory, KOEO or KOER Self-Tests for NGS tester. • Was correct Self-Test procedure used?	Yes	Go to Step 2.
		No	Complete Self-Test using correct procedure. (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS])
2	**CHECK FOR VREF AT TP SENSOR** • Key OFF • Throttle position sensor disconnected • Key On Engine Off (KOEO) • Measure voltage between VREF (GY/R) wire and SIG RTN (B/Y) wire at throttle position sensor connector. • Key OFF • Was the voltage **between 4.0—6.0 V**.	Yes	Voltage is within specification. Reconnect sensor. Go to Step 3.
		No	Voltage is not within specification. Reconnect TP sensor. (See01-02A-55 DTC P0122 [FS])
3	**ABILITY TO ACCESS CONTINUOUS MEMORY DTCS** • Can Continuous Memory DTCs be accessed?	Yes	Go to Step 4.
		No	Unable to access Continuous Memory DTCs. Go to Step 7.
4	**ABILITY TO ACTIVATE KOEO SELF-TEST** • Can KOEO Self-Test be activated?	Yes	Go to Step 5.
		No	Unable to activate KOEO Self-Test. Go to Step 6.
5	**ABILITY TO ACTIVATE KOER SELF-TEST** • Can KOER Self-Test be activated?	Yes	If here for P1001 and other KOER DTCs are present, repair other DTC first. Begin diagnostic with the first KOER DTC outputted. If the DTC is not listed in the DTC TABLE, CHECK that the correct PCM is installed on the vehicle.
		No	Go to Step 6.
6	**RETRIEVE ANY CONTINUOUS MEMORY DTCS** **Note** • If failures are present in the following components or systems, the EEC strategy can be prevented from completing the KOER Self-Test or cause the PCM to generate a NGS tester communication error message: • Idle speed control • EGR system • Fuel control system • Vehicle speed signal circuits • Mass air flow sensor circuits • Transmission range circuits • Connect NGS tester to DLC. • Key On Engine Off (KOEO) • Retrieve and record Continuous Memory DTCs (MIL and non-MIL). • Key OFF • Were any Continuous Memory DTCs present?	Yes	Continuous Memory DTCs are present. (See01-02A-24 DTC TABLE [FS])
		No	Unable to retrieve any continuous DTCs. Go to Step 7.
7	**CHECK B+ AT DLC** • Inspect DLC for damage. • Repair as necessary. • Measure the voltage between B+ circuit (terminal O) at DLC and engine block ground. • Was voltage **greater than 10.5 V**?	Yes	Go to Step 8.
		No	Repair open in DLC B+ circuit. Go to Step 18.

STEP	INSPECTION		ACTION
8	**CHECK DLC CHASSIS GROUND RESISTANCE** • Measure the resistance between chassis ground circuit (terminal H) at DLC and chassis ground. • Is resistance **less than 5.0 Ω**?	Yes	Go to Step 9.
		No	Repair open in DLC chassis ground circuit. Go to Step 18.
9	**CHECK DLC POWER GROUND CIRCUIT FOR OPEN** • Measure resistance between PWR GND (terminal J) circuit at the DLC and battery negative post. • Is resistance **less than 5.0 Ω**?	Yes	Data link passed. Go to Step 10.
		No	Repair open circuit. Go to Step 18.
10	**CHECK BUS + FOR SHORT TO GROUND** • Disconnect PCM connector. • Measure resistance of BUS + circuit between PCM test pin 16 and chassis ground. • Is resistance **greater than 5.0 Ω**?	Yes	Go to Step 11.
		No	Repair short circuit. **Note** • Short circuit can exist in harness or associated modules.
11	**CHECK BUS + CIRCUIT FOR SHORT TO B +** • Key On Engine Off (KOEO) • Measure voltage between BUS + circuit at the PCM test pin 16 and chassis ground. • Is the voltage **greater than 1.0 V**?	Yes	Repair short circuit. **Note** • Short circuit can exist in harness or associated modules.
		No	Go to Step12.
12	**CHECK DLC BUS + CIRCUIT FOR OPEN** • Key OFF • Disconnect PCM connector. • Measure resistance of BUS + circuit between PCM test pin 16 and DLC terminal D. • Is resistance **greater than 5.0 Ω**?	Yes	Repair open circuit. Go to Step 18.
		No	Go to Step 13.
13	**CHECK BUS– FOR SHORT TO GROUND** • Disconnect PCM connector. • Measure resistance of BUS– circuit between PCM pin 15 and chassis ground. • Is resistance **greater than 5.0 Ω**?	Yes	Go to Step 14.
		No	Repair short circuit. **Note** • Short circuit can exist in harness or associated modules.
14	**CHECK BUS– CIRCUIT FOR SHORT TO B +** • Key On Engine Off (KOEO) • Measure voltage between BUS– circuit at the PCM harness connector pin 15 and chassis ground. • Is the voltage **greater than 6.0 V**?	Yes	Repair short circuit. **Note** • Short circuit can exist in harness or associated modules.
		No	Go to Step 15.
15	**CHECK DLC BUS– CIRCUIT FOR OPEN** • Key OFF • Disconnect PCM connector. • Measure resistance of BUS– circuit between PCM test pin 15 and DLC terminal C. • Is resistance **less than 5.0 Ω**?	Yes	Replace PCM. (See01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS])
		No	Go to next step.
16	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1100 [FS]

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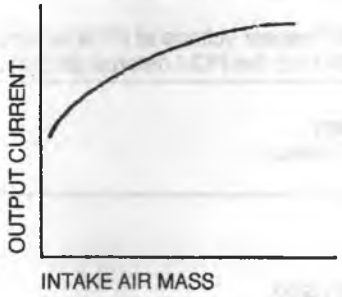
DTC P1100	MAF sensor Intermittent
DETECTION CONDITION	• If the PCM detects the MAF sensor voltage at PCM terminal 88 is **below 0.23 V** or **above 4.60 V** while the engine is running, the PCM determines that a MAF circuit has malfunctioned. **Diagnostic support note** • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• MAF sensor malfunction

Troubleshooting Hints

MAF sensor description

- A hot wire type mass airflow sensor is used.
- MAF sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —Evaporative system monitor
  - —EGR system monitor
- MAF sensor output voltage comes out when the ignition key is turned to ON (Engine OFF).

MAF sensor signal characteristic



Z6U0102W351

MAF sensor specification

Condition	KOEO	KOER
MAF PID	Approx. 0 g/s {0 lb/min}	2.2—3.1 g/s {0.30—0.40 lb/min}
MAF V PID	Approx. 0.02 V	0.6—1.1 V
PCM 88 (Signal)	Approx. 0.02 V	0.6—1.1 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS-IS CONCERN INTERMITTENT OR CONSTANT** • Start engine. • Connect NGS tester to DLC. • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine. • Is the same DTC present?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
		No	Go to next step.

STEP	INSPECTION		ACTION
4	**VERIFY CONTINUAS DTC P0102 DETECTED** • Is DTC P0102 present?	Yes	Refer to DTC P0102. (See01-02A-31 DTC P0102 [FS])
		No	Go to next step.
5	**VERIFY TROUBLESHOOTING OF DTC P1100 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Connect NGS tester to DLC. • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine. • Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
6	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1101 [FS]

Z6U010201083W03

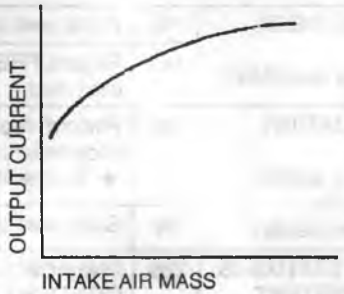
DTC P1101	MAF sensor out of Self-Test range
DETECTION CONDITION	**KOEO Self-Test** • If the PCM detects the MAF sensor voltage at PCM terminal 88 is above **above 0.27 V** while performing the KOEO Self-Test, the PCM determines that a MAF circuit has malfunctioned. **KOER Self-Test** • If the PCM detects the MAF sensor voltage at PCM terminal 88 is **below 0.46 V** or **above 2.44 V** while performing the KOER Self-Test, the PCM determines that a MAF circuit has malfunctioned.
POSSIBLE CAUSE	• MAF sensor malfunction • Blocked MAF sensor screen • Intake air leak (near MAF sensor) • PCM malfunction

Troubleshooting Hints

MAF sensor description

- A hot wire type mass airflow sensor is used.
- MAF sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —Evaporative system monitor
  - —EGR system monitor
- MAF sensor output voltage comes out when the ignition key is turned to ON (Engine OFF).

MAF sensor signal characteristic



Z6U0102W351

MAF sensor specification

Condition	KOEO	KOER
MAF PID	Approx. 0 g/s {0 lb/min}	2.2—3.1 g/s {0.30—0.40 lb/min}
MAF V PID	Approx. 0.02 V	0.6—1.1 V
PCM 88 (Signal)	Approx. 0.02 V	0.6—1.1 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**VERIFY CONTINUOUS DTC P0103 DETECTED** • Is DTC P0103 present?	Yes	Refer to DTC P0103. (See01-02A-34 DTC P0103 [FS])
		No	Go to next step.
3	**VERIFY CONTINUOUS DTC P0102 DETECTED** • Is DTC P0102 present?	Yes	Refer to DTC P0102. (See01-02A-31 DTC P0102 [FS])
		No	Go to next step.
4	**VERIFY KOEO DTC P1101 DETECTED** **Note** • KOEO DTC P1101 can be detected by the garage exhaust ventilation system. Remove the ventilation system while performing the KOEO Self-Test. • Perform KOEO Self-Test. • Is DTC P1101 present while performing KOEO Self-Test?	Yes	Go to Step 6.
		No	Go to next step.
5	**CHECK PHYSICAL MALFUNCTION** • Start engine. • Access MAF V PID using NGS tester. • Is MAF V PID **within 0.23—4.60 V?**	Yes	Go to next step.
		No	Check for broken/loose air intake pipe/hose clamps, cracks/holes in air intake pipe/hose. Repair or replace as necessary. Then go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P1101 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from memory using NGS tester generic OBD-II function. • Perform KOEO/KOER Self-Test. • Is the same DTC present during KOEO or KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1112 [FS]

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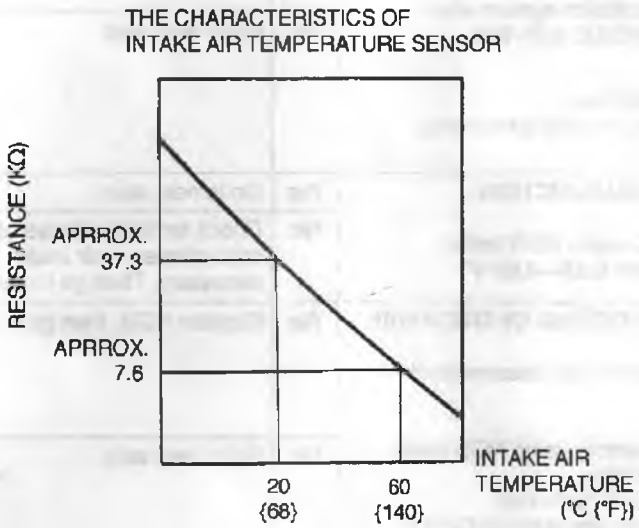
DTC P1112	IAT circuit intermittent malfunction
DETECTION CONDITION	• The PCM monitors IAT sensor signal at PCM terminal 39. If the PCM detected intermittent signal from IAT sensor, the PCM determines that the IAT sensor circuit has malfunctioned. **Diagnostic support note** • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• IAT sensor malfunction • Connectors or terminals malfunction • Harness malfunction between the IAT sensor and the PCM • PCM malfunction

Troubleshooting Hint

IAT sensor description

- The IAT is in inverse proportion to IAT sensor resistance. Therefore IAT is in inverse proportion to IAT output voltage.
- The IAT sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —Purge control
  - —HO2S heater control
  - —Electric cooling fan control
  - —Evaporative system monitor

IAT sensor signal characteristic



Z6U0102W177

IAT sensor specification

IAT temperature	20 °C {68 °F}	40 °C {104 °F}	60 °C {140 °F}	80 °C {176 °F}	100 °C {212 °F}	120 °C {248 °F}
IAT PID	20 °C {68 °F}	40 °C {104 °F}	60 °C {140 °F}	80 °C {176 °F}	100 °C {212 °F}	120 °C {248 °F}
IAT V PID*	3.07 V	2.13 V	1.33 V	0.78 V	0.46 V	0.27 V
IAT resistance	37.3 kΩ	16.15 kΩ	7.70 kΩ	3.84 kΩ	2.07 kΩ	1.18 kΩ

* : Voltage values shown in the table were calculated for Vref = **5.0 V**. These values may vary **15 %** due to the IAT sensor and Vref variations.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CONTINUOUS DTC P0113 DETECTED** • Is DTC P0113 present?	Yes	Refer to DTC P0113. (See01-02A-45 DTC P0113 [FS])
		No	Go to next step.
4	**VERIFY CONTINUOUS DTC P0112 DETECTED** • Is DTC P0112 present?	Yes	Refer to DTC P0112. (See01-02A-43 DTC P0112 [FS])
		No	Go to next step.
5	**INSPECT IAT SENSOR CONNECTOR** • Turn ignition key to ON (Engine OFF). • Access IAT V PID using NGS tester. • Does IAT V PID sudden change while wiggled or tapped IAT sensor connector?	Yes	Go to next step.
		No	Go to Step 8.
6	**INSPECT POOR CONNECTION OF IAT SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect the IAT sensor connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunctions?	Yes	Repair or replace terminals and/or connector, then go to Step 8.
		No	Go to next step.
7	**INSPECT IAT SENSOR** • Connect IAT sensor connector. • Turn ignition key to ON (Engine OFF). • Access IAT V PID using NGS tester. • Does IAT V PID sudden change while tapped IAT sensor?	Yes	Replace IAT sensor, then go to next step.
		No	Go to next step.
8	**VERIFY TROUBLESHOOTING OF DTC P1112 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Start engine. • Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1116 [FS]

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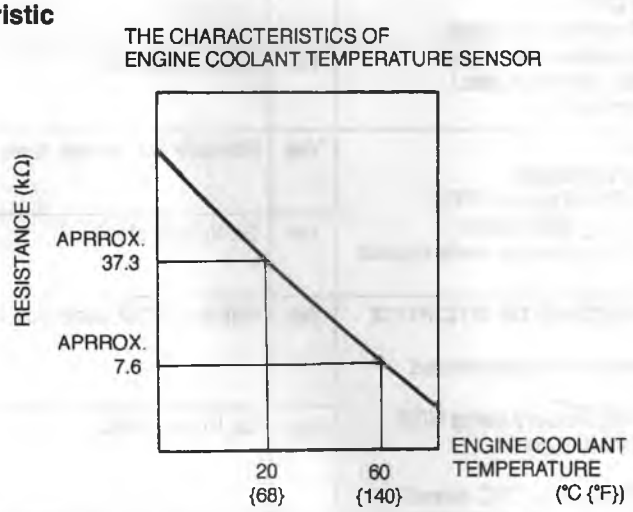
DTC P1116	ECT circuit out of Self-Test range
DETECTION CONDITION	• The PCM monitors the ECT sensor signal at the PCM terminal 38 while performing the KOEO/KOER Self-Test. If the PCM sensor signal voltage is below **0.3 V** or above **3.7 V**, the PCM determines that ECT signal circuit has malfunctioned.
POSSIBLE CAUSE	• ECT sensor malfunction • Poor connection at ECT sensor or PCM connector • PCM malfunction

Troubleshooting Hint

ECT sensor description

- The ECT is in inverse proportion to ECT sensor resistance. Therefore ECT is in inverse proportion to ECT output voltage.
- The ECT sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —A/C cut-off control
  - —Electric cooling fan control
  - —Evaporative system monitor
  - —EGR system monitor

ECT sensor signal characteristic



Z6U0102W181

ECT sensor specification

ECT temperature	20 °C {68 °F}	40 °C {104 °F}	60 °C {140 °F}	80 °C {176 °F}	100 °C {212 °F}	120 °C {248 °F}
ECT PID	20 °C {68 °F}	40 °C {104 °F}	60 °C {140 °F}	80 °C {176 °F}	100 °C {212 °F}	120 °C {248 °F}
ECT V PID*	3.07 V	2.13 V	1.33 V	0.78 V	0.46 V	0.27 V
ECT resistance	37.3 kΩ	16.15 kΩ	7.70 kΩ	3.84 kΩ	2.07 kΩ	1.18 kΩ

* : Voltage values shown in the table were calculated for Vref = **5.0 V**. These values may vary **15 %** due to the ECT sensor and Vref variations.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present during KOEO Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**VERIFY CONTINUOUS DTC P0118 DETECTED** • Is DTC P0118 present?	Yes	Refer to DTC P0118. (See01-02A-52 DTC P0118 [FS])
		No	Go to next step.
3	**VERIFY CONTINUOUS DTC P0102 DETECTED** • Is DTC P0117 present?	Yes	Refer to DTC P0117. (See01-02A-50 DTC P0117 [FS])
		No	Go to next step.
4	**CHECK PHYSICAL MALFUNCTION** • Start engine. • Access ECT V PID using NGS tester. • Is ECT V PID **within 0.3—3.7 V**?	Yes	Go to next step.
		No	Check for overheating condition and low engine coolant. Repair or replace as necessary. Then go to next step.
5	**VERIFY TROUBLESHOOTING OF DTC P1116 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from memory using NGS tester generic OBD-II function. • Perform KOEO Self-Test. • Is same DTC present during KOEO Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
6	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1117 [FS]

Z6U010201083W06

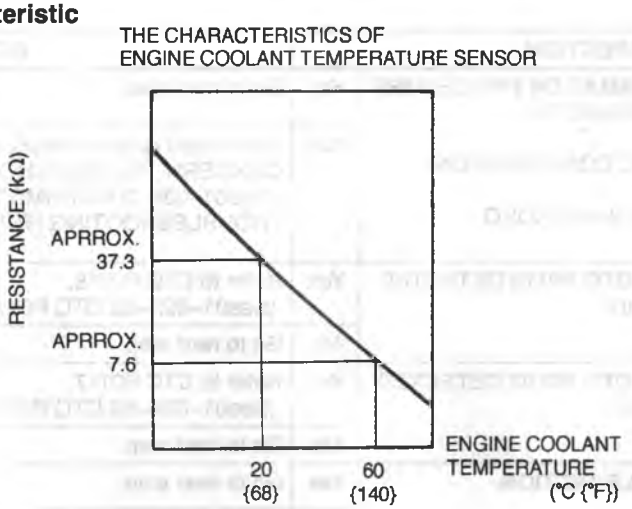
DTC P1117	ECT circuit intermittent malfunction
DETECTION CONDITION	• The PCM monitors ECT sensor signal at PCM terminal 38. If the PCM detected intermittent signal from ECT sensor, the PCM determines that the ECT sensor circuit has malfunctioned. **Diagnostic support note** • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• ECT sensor malfunction • Connectors or terminals malfunction • Harness malfunction between the ECT sensor and the PCM • PCM malfunction

Troubleshooting Hint

ECT sensor description

- The ECT is in inverse proportion to ECT sensor resistance. Therefore ECT is in inverse proportion to ECT output voltage.
- The ECT sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —Purge control
  - —HO2S heater control
  - —Electric cooling fan control
  - —Evaporative system monitor

ECT sensor signal characteristic



ECT sensor specification

ECT temperature	20 °C {68 °F}	40 °C {104 °F}	60 °C {140 °F}	80 °C {176 °F}	100 °C {212 °F}	120 °C {248 °F}
ECT PID	20 °C {68 °F}	40 °C {104 °F}	60 °C {140 °F}	80 °C {176 °F}	100 °C {212 °F}	120 °C {248 °F}
ECT V PID*	3.07 V	2.13 V	1.33 V	0.78 V	0.46 V	0.27 V
ECT resistance	37.3 kΩ	16.15 kΩ	7.70 kΩ	3.84 kΩ	2.07 kΩ	1.18 kΩ

* : Voltage values shown in the table were calculated for Vref = **5.0 V**. These values may vary **15 %** due to the ECT sensor and Vref variations.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CONTINUOUS DTC P0118 DETECTED** • Is continuous DTC P0118 present?	Yes	Refer to DTC P0118. (See01-02A-52 DTC P0118 [FS])
		No	Go to next step.
4	**VERIFY CONTINUOUS DTC P0117 DETECTED** • Is continuous DTC P0117 present?	Yes	Refer to DTC P0117. (See01-02A-50 DTC P0117 [FS])
		No	Go to next step.
5	**INSPECT ECT SENSOR CONNECTOR** • Turn ignition key to ON (Engine OFF). • Access ECT V PID using NGS tester. • Does ECT V PID sudden change while wiggled or tapped ECT sensor connector?	Yes	Go to next step.
		No	Go to Step 8.
6	**INSPECT POOR CONNECTION OF ECT SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect the ECT sensor connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminals and/or connector, then go to Step 8.
		No	Go to next step.
7	**INSPECT ECT SENSOR** • Connect ECT sensor connector. • Turn ignition key to ON (Engine OFF). • Access ECT V PID using NGS tester. • Does ECT V PID sudden change while tapped ECT sensor?	Yes	Replace ECT sensor, then go to next step.
		No	Go to next step.

STEP	INSPECTION		ACTION
8	**VERIFY TROUBLESHOOTING OF DTC P1117 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Start engine. • Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1120 [FS]

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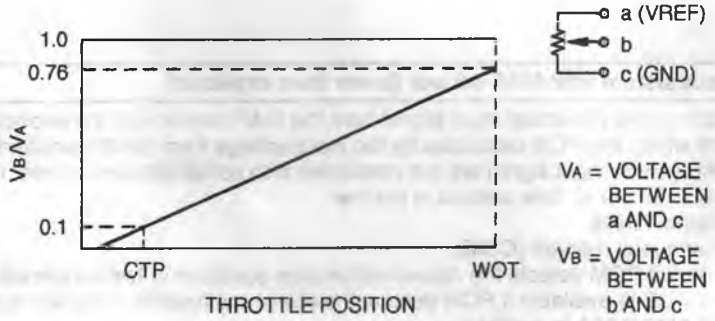
DTC P1120	TP sensor out of range low
DETECTION CONDITION	• If the PCM detects the TP sensor voltage at PCM terminal 89 is below **0.17 V** or above **0.49 V** while the engine is running or ignition key ON, the PCM determines that a TP circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC also detects by KOEO/KOER Self-Test.
POSSIBLE CAUSE	• TP sensor malfunction • Connector or terminal malfunction • TP sensor misadjustment

Troubleshooting Hint

TP sensor description

- A liner type throttle sensor is used.
- The TP sensor resistance between terminal B and C increases while depressing the accelerator pedal.
- The TP sensor resistance between terminal A and B decreases while depressing the accelerator pedal.
- The TP sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —A/C cut-off control
  - —Electric cooling fan control
  - —Evaporative system monitor
  - —EGR system monitor

TP sensor signal characteristic



Z6U0102W362

TP sensor specification

Accelerator pedal position	Closed throttle position	Wide open throttle
TP V PID	0.3—0.7 V	3.4—5.3 V
TP MODE PID	C/T	WOT
PCM 89	0.3—0.7 V	3.4—5.3 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**VERIFY KOEO/KOER DTC P0122 DETECTED** • Is KOEO/KOER DTC P0122 also detected?	Yes	Refer to DTC P0122. (See01-02A-55 DTC P0122 [FS])
		No	Go to step next step.
3	**VERIFY KOEO/KOER DTC P0123 DETECTED** • Is KOEO/KOER DTC P0123 also detected?	Yes	Refer to DTC P0123. (See01-02A-58 DTC P0123 [FS])
		No	Go to step next step.
4	**VERIFY TP V PID WITHIN SPECIFICATION** • Turn ignition key to ON (Engine OFF). • Access TP V PID using NGS tester. • Is TP V PID **within 0.17— 0.49 V**?	Yes	Go to step 6.
		No	Perform throttle position sensor adjustment, then go to next step. (See01-40A-33 THROTTLE POSITION SENSOR ADJUSTMENT [FS])
5	**VERIFY TP V PID WITHIN SPECIFICATION** • Turn ignition key to ON (Engine OFF). • Access TP V PID using NGS tester. • Is TP V PID **within 0.17— 0.49 V**?	Yes	Go to next step.
		No	Replace throttle position sensor, then go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P1120 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOEO/KOER Self-Test. • Is PENDING CODE of same DTC present during KOEO/KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1121 [FS]

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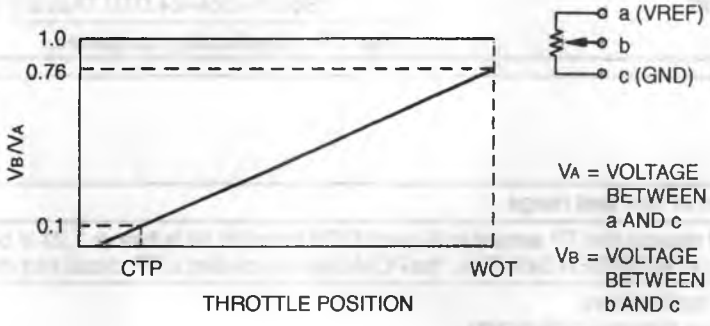
DTC P1121	TP sensor inconsistent with MAF sensor (lower than expected)
DETECTION CONDITION	• The PCM compares the actual input signal from the MAF sensor with the expected input signal from the MAF sensor which the PCM calculates by the input voltage from throttle position sensor. If the TP sensor and the MAF sensor input signal are not consistent with calibrated load values, the PCM determines that detected mass intake air flow amount is too low. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• MAF sensor malfunction • TP sensor malfunction • Electrical corrosion in MAF signal circuit • Voltage drops in MAF signal circuit

Troubleshooting Hint

TP sensor description

- A liner type throttle sensor is use
- The TP sensor resistance between terminal B and C increases while depressing the accelerator pedal.
- The TP sensor resistance between terminal A and B decreases while depressing the accelerator pedal.
- The TP sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —A/C cut-off control
  - —Electric cooling fan control
  - —Evaporative system monitor
  - —EGR system monitor

TP sensor signal characteristic



TP sensor specification

Accelerator pedal position	Closed throttle position	Wide open throttle
TP V PID	0.3—0.7 V	3.4—5.3 V
TP MODE PID	C/T	WOT
PCM 89	0.3—0.7 V	3.4—5.3 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS-IS CONCERN INTERMITTENT OR CONSTANT** • Connect NGS tester to DLC. • Start the engine. • Access ECT, TP and MAF PIDs. • Warm up the engine until ECT PID is above **80 °C {176 °F}**. • Start engine. • Read TP PID while MAF PID is **above 55 %**. • Is TP PID reading **below 4.82 %**?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
		No	Make sure that throttle position sensor resistance changes smoothly while gradually opens throttle valve. • If not, replace throttle position sensor and go to Step 6. • For others, then go to next step.
4	**INSPECT POOR CONNECTION OF MAF SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect MAF sensor connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace suspected terminal or MAF sensor, then go to Step 6
		No	Go to next step.

STEP	INSPECTION		ACTION
5	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there any malfunction?	Yes	Repair terminal, then go to next step.
		No	Replace MAF sensor, then go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P1121 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start the engine. • Warm up the engine. • Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1124 [FS]

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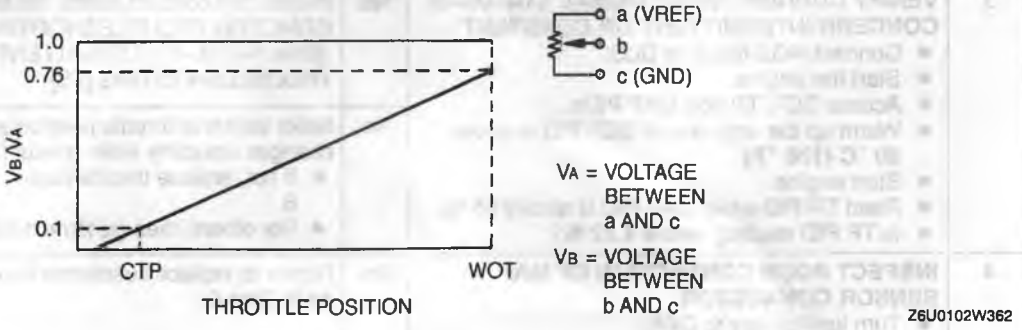
DTC P1124	TP sensor out of self test range
DETECTION CONDITION	• If the PCM detects the TP sensor voltage at PCM terminal 89 is **below 1.27 V** or **above 4.78 V** while performing KOEO/KOER Self-Test, the PCM determines that a TP circuit has malfunctioned.
POSSIBLE CAUSE	• TP sensor malfunction • Connector or terminal malfunction • PCM malfunction

Troubleshooting Hint

TP sensor description

- A liner type throttle sensor is used.
- The TP sensor resistance between terminal B and C increases while depressing the accelerator pedal.
- The TP sensor resistance between terminal A and B decreases while depressing the accelerator pedal.
- The TP sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —A/C cut-off control
  - —Electric cooling fan control
  - —Evaporative system monitor
  - —EGR system monitor

TP sensor signal characteristic



Z6U0102W362

TP sensor specification

Accelerator pedal position	Closed throttle position	Wide open throttle
TP V PID	0.3—0.7 V	3.4—5.3 V
TP MODE PID	C/T	WOT
PCM 89	0.3—0.7 V	3.4—5.3 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**VERIFY KOEO/KOER DTC P0122 DETECTED** • Is KOEO/KOER DTC P0122 also detected?	Yes	Refer to DTC P0122. (See01-02A-55 DTC P0122 [FS])
		No	Go to step next step.
3	**VERIFY KOEO/KOER DTC P0123 DETECTED** • Is KOEO/KOER DTC P0123 also detected?	Yes	Refer to DTC P0123. (See01-02A-58 DTC P0123 [FS])
		No	Go to step next step.
4	**VERIFY TP V PID WITHIN SPECIFICATION** • Turn ignition key to ON (Engine OFF). • Access TP V PID using NGS tester. • Is TP V PID **within 1.27— 4.28 V**?	Yes	Go to step 6.
		No	Perform throttle position sensor adjustment, then go to next step. (See01-40A-33 THROTTLE POSITION SENSOR ADJUSTMENT [FS])
5	**VERIFY TP V PID WITHIN SPECIFICATION** • Access TP V PID using NGS tester. • Is TP V PID **within 1.27— 4.28 V**?	Yes	Go to next step.
		No	Replace throttle position sensor, then go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P1124 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOEO/KOER Self-Test. • Is PENDING CODE of same DTC stored during KOEO/KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1125 [FS]

Z6U010201083W10

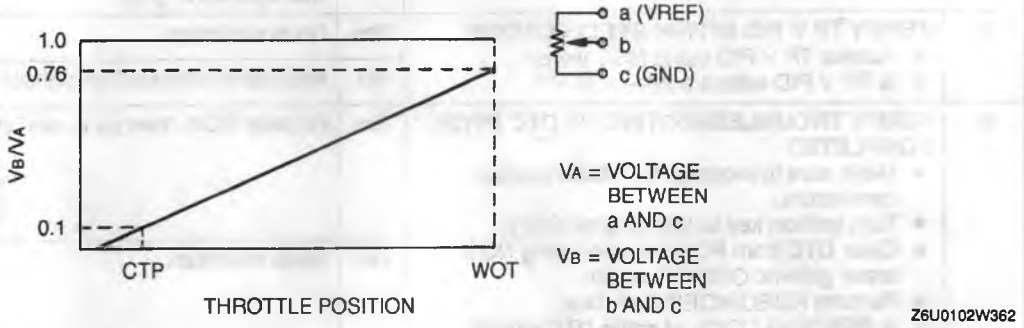
DTC P1125	TP circuit intermittent malfunction
DETECTION CONDITION	• The PCM monitors TP sensor signal at PCM terminal 89. If the PCM detected the intermittent signal from TP sensor, the PCM determines that a TP circuit has malfunctioned.
POSSIBLE CAUSE	• TP sensor malfunction • Connector or terminal malfunction • Harness malfunction between TP sensor and PCM. • PCM malfunction

Troubleshooting Hint

TP sensor description

- A liner type throttle sensor is used.
- The TP sensor resistance between terminal B and C increases while depressing the accelerator pedal.
- The TP sensor resistance between terminal A and B decreases while depressing the accelerator pedal.
- The TP sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —A/C cut-off control
  - —Electric cooling fan control
  - —Evaporative system monitor
  - —EGR system monitor

TP sensor signal characteristic



Z6U0102W362

TP sensor specification

Accelerator pedal position	Closed throttle position	Wide open throttle
TP V PID	0.3—0.7 V	3.4—5.3 V
TP MODE PID	C/T	WOT
PCM 89	0.3—0.7 V	3.4—5.3 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CONTINUOUS DTC P0122 DETECTED** • Is continuous DTC P0122 present?	Yes	Refer to DTC P0122. (See01-02A-55 DTC P0122 [FS])
		No	Go to next step.
4	**VERIFY CONTINUOUS DTC P0123 DETECTED** • Is continuous DTC P0123 present?	Yes	Refer to DTC P0123. (See01-02A-58 DTC P0123 [FS])
		No	Go to next step.

STEP	INSPECTION		ACTION
5	**INSPECT TP SENSOR CONNECTOR** • Turn ignition key to ON (Engine OFF). • Access TP V PID using NGS tester. • Does TP V PID sudden change while wiggled or tapped TP sensor connector?	Yes	Go to next step.
		No	Go to Step 8.
6	**INSPECT POOR CONNECTION OF TP SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect the TP sensor connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminals and/or connector, then go to Step 8.
		No	Go to next step.
7	**INSPECT TP SENSOR** • Connect TP sensor connector. • Turn ignition key to ON (Engine OFF). • Access TP V PID using NGS tester. • Does TP V PID sudden change while tapped ECT sensor?	Yes	Replace TP sensor, then go to next step.
		No	Go to next step.
8	**VERIFY TROUBLESHOOTING OF DTC P1125 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Start engine. • Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1127 [FS]

Z6U010201083W11

DTC P1127	Exhaust not warm enough
DETECTION CONDITION	• If the PCM detects the inferred exhaust temperature is below the minimum calibrated vale during KOER Self-Test, the PCM determines that not enough exhaust temperature for testing the HO2S (rear).
POSSIBLE CAUSE	• Engine not warming enough to perform KOER Self-Test • Exhaust system too cool

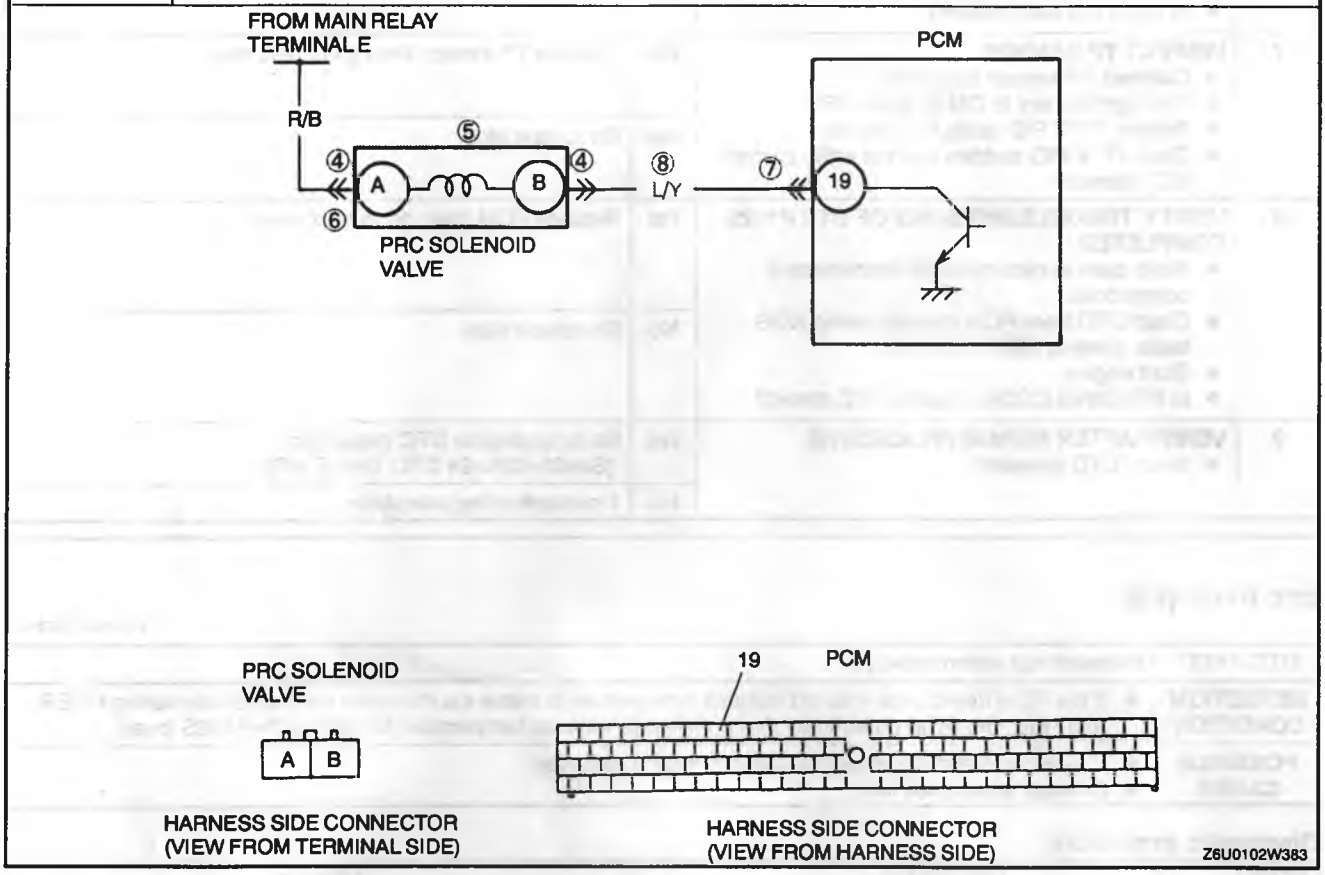
Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Troubleshooting completed.
2	**CHECK HTR11 PID** • Start engine. • Access HTR11 PID using NGS tester. • Is HTR11 PID ON?	Yes	With engine still running, perform KOER Self-Test to verify P1127 is no longer present.
		No	Operate engine until all PIDs indicate ON. Perform KOER Self-Test.

DTC P1250 [FS]

Z6U010201083W12

DTC P1250	Pressure regulator control (PRC) valve circuit malfunction
DETECTION CONDITION	• The PCM monitors the input voltages from PRC solenoid valve control signal. If voltage of PRC solenoid valve control signal does not changed while KOEO/KOER Self-Test performing, PCM determines that the PRC solenoid valve circuit has malfunctioned.
POSSIBLE CAUSE	• PRC solenoid valve malfunction • Connector or terminal malfunction • Short to ground in wiring between PRC solenoid valve terminal B and PCM terminal 19 • Open circuit in wiring between main relay terminal E and PRC solenoid valve terminal A • Open circuit in wiring between PRC solenoid valve terminal B and PCM terminal 19 • PCM malfunction



Troubleshooting Hint

PRC solenoid valve control description

- The main relay circuit supplies battery voltage to the PRC solenoid valve and the PCM completes the ground when ignition key turned to ON or engine at idle (Hot start).

PRC solenoid valve specification

Item	KOEO	KOER (COLD START)	KOER (HOT START)
PRC solenoid valve terminal B	B+	Approx. 0V	B+
FPRC	ON	OFF	ON
PCM terminal 19	B+	Approx. 0V	B+

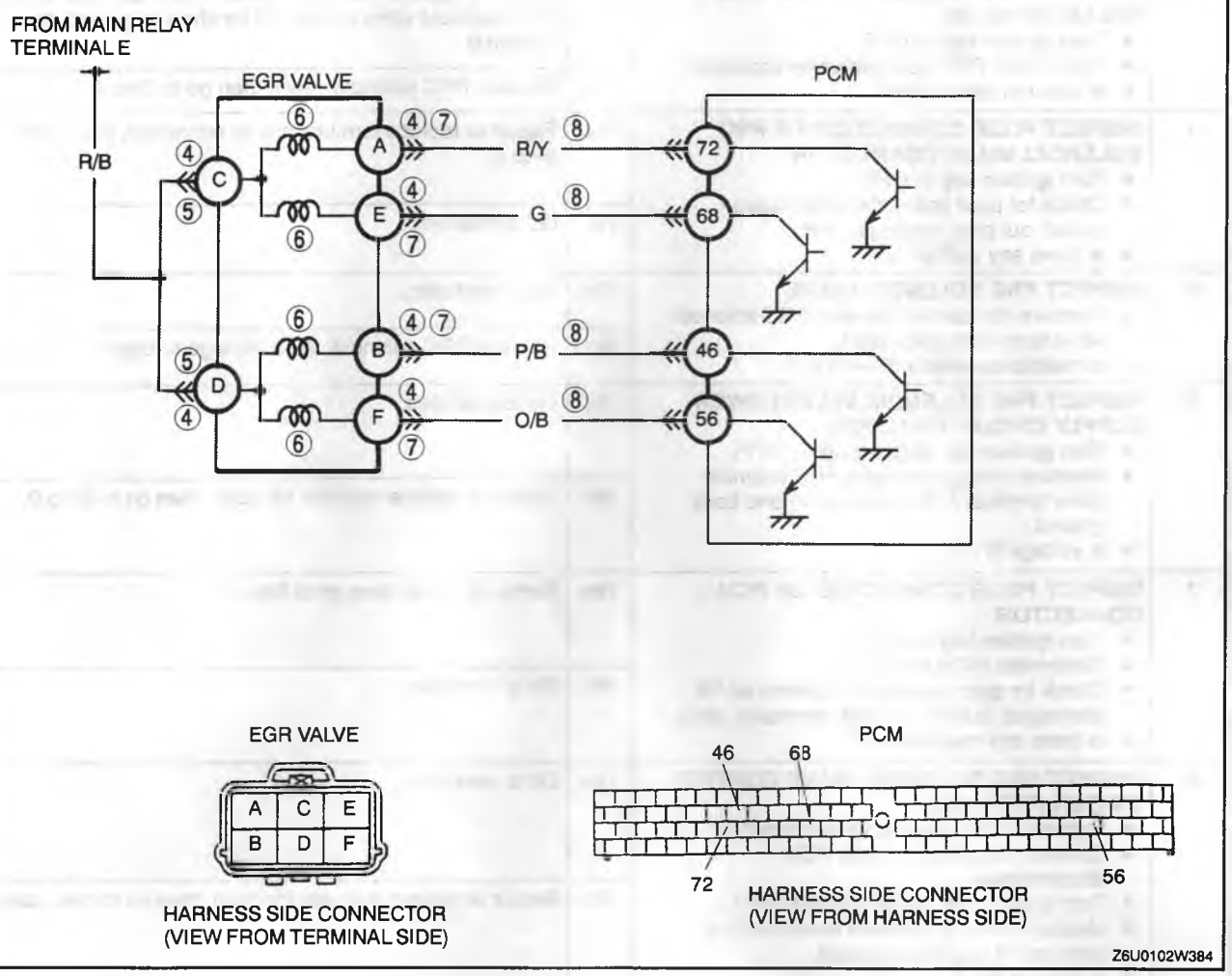
Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**CLASSIFY OPEN CIRCUIT OR SHORT TO GROUND MALFUNCTION** • Disconnect PRC solenoid valve tube that connects to intake manifold. • Connect vacuum pump to PRC solenoid valve. • Apply vacuum and wait **5 seconds**. • Is vacuum maintained?	Yes	Go to Step 5.
		No	Go to next step.
3	**INSPECT PASSAGE CONTROL OF PRC SOLENOID VALVE** • Turn ignition key to OFF. • Disconnect PRC solenoid valve connector. • Is vacuum maintained?	Yes	Repair or replace harness between PCM terminal 19 and PRC solenoid valve terminal B for short to ground, then go to Step 9.
		No	Replace PRC solenoid valve, then go to Step 9.
4	**INSPECT POOR CONNECTION OF PRC SOLENOID VALVE CONNECTOR** • Turn ignition key to OFF. • Check for poor connection (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
5	**INSPECT PRC SOLENOID VALVE** • Measure resistance between PRC solenoid valve terminals (part-side). • Is resistance **within 37—43 Ω** ?	Yes	Go to next step.
		No	Replace PRC solenoid valve, then go to Step 9.
6	**INSPECT PRC SOLENOID VALVE POWER SUPPLY CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Measure voltage between PRC solenoid valve terminal A (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 9.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 19. (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunction?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.
8	**INSPECT PRC SOLENOID VALVE CONTROL CIRCUIT FOR OPEN** • Connect PRC solenoid valve connector. • Connect breakout box with PCM disconnected. • Turn ignition key to ON (Engine OFF). • Measure voltage between brake out box terminal 19 and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P1250 COMPLETED** • Make sure to reconnect all disconnected connectors. • Perform KOEO/KOER Self-Test. • Is the same DTC present during KOEO/KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1409 [FS]

Z6U010201083W13

DTC P1409	EGR valve (stepper motor) circuit malfunction
DETECTION CONDITION	• The PCM monitors the input voltages from EGR valve control signals. If voltage is below or above specified during KOEO/KOER Self-test, PCM determines that the EGR valve circuit has malfunctioned.
POSSIBLE CAUSE	• EGR valve malfunction • Connector or terminal malfunction • Short to ground circuit in wiring between EGR valve terminal E and PCM terminal 68 • Short to ground circuit in wiring between EGR valve terminal A and PCM terminal 72 • Short to ground circuit in wiring between EGR valve terminal B and PCM terminal 46 • Short to ground circuit in wiring between EGR valve terminal F and PCM terminal 56 • Open circuit in wiring between EGR valve terminal E and PCM terminal 68 • Open circuit in wiring between EGR valve terminal A and PCM terminal 72 • Open circuit in wiring between EGR valve terminal B and PCM terminal 46 • Open circuit in wiring between EGR valve terminal F and PCM terminal 56 • Open circuit in wiring between main relay terminal E and EGR valve terminal C • Open circuit in wiring between main relay terminal E and EGR valve terminal D • PCM malfunction



Z6U0102W384

Troubleshooting Hint
EGR system
See 01-16-13 EGR SYSTEM

EGR valve specification

Item	KOEO	KOER
EGR valve terminal E	B+	B+
EGR valve terminal A	B+	Approx. 0 V
EGR valve terminal B	B+	B+
EGR valve terminal F	B+	Approx. 0 V
EGRCD1	OFF	OFF
EGRCD2	OFF	ON
EGRCD3	OFF	OFF
EGRCD4	OFF	ON
PCM terminal 68	B+	B+
PCM terminal 72	B+	0 V
PCM terminal 46	B+	B+
PCM terminal 56	B+	0 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** ● Perform DTC CONFIRMATION PROCEDURE. (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS] ● Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**INSPECT POOR CONNECTION OF EGR VALVE** ● Turn ignition key to OFF. ● Disconnect EGR valve connector. ● Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). ● Is there any malfunctions?	Yes	Repair or replace terminals and/or connector, then go to Step 7.
		No	Go to next step.
3	**INSPECT POWER CIRCUIT FOR OPEN CIRCUIT** ● Turn ignition key to ON (Engine OFF). ● Measure following EGR valve power circuit terminal voltage. — EGR valve terminal C and body ground — EGR valve terminal D and body ground ● Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open circuit then go to Step 7.
4	**INSPECT EGR VALVE** ● Measure resistance between following EGR valve terminals (part-side). — C and E — C and A — D and B — D and F ● Is resistance **appprox. 22 Ω**?	Yes	Go to next step.
		No	Replace EGR valve, then go to Step 7.
5	**INSPECT FOR CONTROL CIRCUIT FOR SHORT TO GROUND** ● Check continuity following EGR valve control circuit. — EGR valve terminal E and body ground — EGR valve terminal A and body ground — EGR valve terminal B and body ground — EGR valve terminal F and body ground ● Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 7.
		No	Go to next step.

STEP	INSPECTION		ACTION
6	**INSPECT CONTROL CIRCUIT FOR OPEN CIRCUIT** • Connect breakout box with PCM disconnected. • Check continuity following EGR control circuit. — EGR valve terminal E and breakout box terminal 68 — EGR valve terminal A and breakout box terminal 72 — EGR valve terminal B and breakout box terminal 46 — EGR valve terminal F and breakout box terminal 56 • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open circuit then go to Step 7.
7	**VERIFY TROUBLESHOOTING OF DTC P1409 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1410 [FS]

Z6U010201083W14

DTC P1410	EGR boost solenoid valve malfunction (stuck)
DETECTION CONDITION	• PCM detects solenoid valve stuck if detected EGR pressure is still barometric pressure during EGR system testing.
POSSIBLE CAUSE	• EGR boost solenoid valve malfunction • Loose of vacuum hose between EGR boost sensor and EGR boost solenoid valve • Loose of vacuum hose between EGR boost sensor and intake manifold • EGR boost sensor malfunction • Vacuum hose misconnection • PCM malfunction

Troubleshooting Hint

EGR boost sensor solenoid control description

- The main relay circuit supplies battery voltage to EGR boost sensor solenoid valve and the PCM completes the ground when EGR monitoring condition are met.

EGR boost sensor solenoid valve specification

Item	Normal	EGR monitor testing
EGR boost sensor solenoid valve terminal B	Approx. 0 V	B+
EGRBARO	ON	OFF
PCM terminal 98	Approx. 0 V	B+

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS-IS CONCERN INTERMITTENT OR CONSTANT** • Start engine. • Access EGR PID using NGS tester. • Run drive mode. • Does EGR PID change while running drive mode?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
		No	Go to next step.
4	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
5	**INSPECT VACUUM HOSE CONNECTION** • Inspect following hose connections. — Between EGR boost sensor and EGR boost solenoid valve — Between EGR boost sensor and intake manifold • Are connections or damages okay?	Yes	Go to next step.
		No	Repair or reconnect vacuum hose, then go to Step 9.
6	**INSPECT EGR BOOST SOLENOID VALVE MALFUNCTION** • Inspect EGR boost solenoid valve. • Is EGR boost solenoid valve okay? (See01-16-17 EGR BOOST SOLENOID VALVE INSPECTION)	Yes	Go to next step.
		No	Replace EGR boost solenoid valve, then go to Step 9.
7	**INSPECT EGR BOOST SENSOR MALFUNCTION** • Inspect EGR boost sensor solenoid valve. • Is EGR boost sensor okay? (See01-40A-37 EGR BOOST SENSOR INSPECTION [FS])	Yes	Go to next step.
		No	Replace EGR boost sensor, then go to Step 9.
8	**VERIFY TROUBLESHOOTING OF DTC P1507 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Depress brake pedal for **14.1 seconds** or more. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1450 [FS]

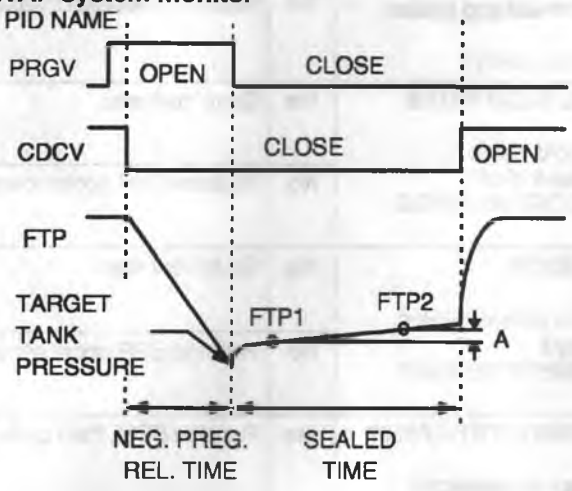
Z6U010201083W15

DTC P1450	Evaporative emission control system malfunction (excessive vacuum)
DETECTION CONDITION	• PCM monitors fuel tank pressure when monitoring conditions are met. If pressure is **below −3.91 kPa {−29.3 mmHg, 1.14 inHg}** for **35 seconds**, PCM determines there is excessive vacuum. **MONITORING CONDITION** — Intake air temperature is **below 38.9 °C {1.02 °F}**. — Fuel tank pressure is **−1.9—10.0 kPa {−14—74 mmHg, −0.55—2.9 inHg}**. — Calculated load is **15—80 %** — Vehicle speed is **40—120 km/h {25—75 mph}**. — Fuel tank level is **15—85 %**. — Atmospheric pressure is **above 76.2 kPa {571 mmHg, 22.5 inHg}**. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Canister drain cut valve malfunction • Air filter clogged • Charcoal canister malfunction • Evaporative drain passage clogged • Fuel tank pressure sensor malfunction • Purge solenoid valve malfunction

Troubleshooting Hint

See 01-16-8 EVAP Control System Monitor Outline

Fuel tank pressure value at EVAP system monitor



Z6U0102W385

Diagnostic procedure

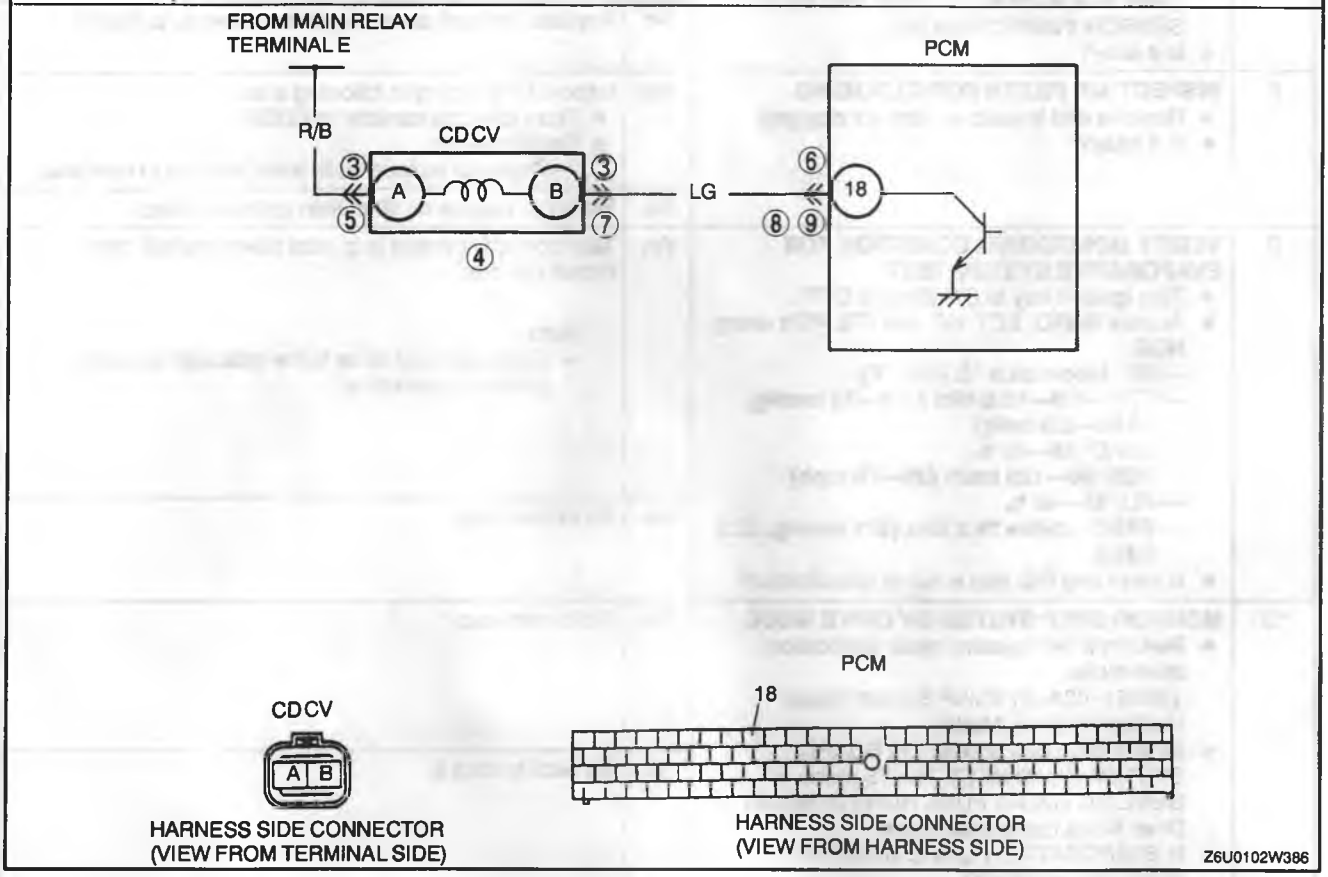
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY RELATED STORED DTCS** • Turn ignition key to OFF then ON (Engine OFF). • Verify stored DTC. • Is DTCs P0443 and/or P1449 present?	Yes	Go to appropriate DTC inspection.
		No	Go to next step.
4	**INSPECT FOR OPERATION SOUND OF CDCV** • Is CDCV operation sound heard when simulating for ON using NGS tester?	Yes	Go to next step.
		No	Inspect CDCV and replace it if necessary. Then, go to Step 9.

STEP	INSPECTION		ACTION
5	**INSPECT PURGE SOLENOID VALVE** • Disconnect vacuum hose that connects to intake manifold from purge solenoid valve. • Connect vacuum pump to purge solenoid valve. • Pump vacuum several times and stop then wait **a few seconds**. • Is vacuum held?	Yes	Disconnect vacuum pump and connect vacuum hose to purge solenoid valve. Go to next step.
		No	Replace purge solenoid valve, then go to Step 9.
6	**INSPECT CHARCOAL CANISTER FOR CLOGGING** • Remove charcoal canister and inspect for clogging. (See01-16-10 CHARCOAL CANISTER INSPECTION) • Is it okay?	Yes	Go to next step.
		No	Replace charcoal canister, then go to Step 9.
7	**INSPECT FUEL TANK PRESSURE** • Inspect fuel tank pressure sensor. (See01-40A-38 FUEL TANK PRESSURE SENSOR INSPECTION [FS]) • Is it okay?	Yes	Go to next step.
		No	Replace fuel tank pressure sensor, then go to Step 9.
8	**INSPECT AIR FILTER FOR CLOGGING** • Remove and inspect air filter for clogging. • Is it okay?	Yes	Inspect for clogging in following area: • From charcoal canister to CDCV • Drain passage — Repair or replace faulty area, then go to next step.
		No	Repair or replace air filter, then go to next step.
9	**VERIFY MONITORING CONDITION FOR EVAPORATIVE SYSTEM TEST** • Turn ignition key to ON (Engine OFF). • Access BARO, ECT, IAT and FTL PIDs using NGS. — IAT: **below 38.9 °C {102 °F}**. — FTP: **-1.9—10.0 kPa {-14—74 mmHg, -0.55—2.9 inHg}** — LOAD: **15—80 %** — VSS: **40—120 km/h {25—75 mph}** — FLI: **15—85 %** — BARO: **above 76.2 kPa {571 mmHg, 22.5 inHg}** • Is there any PID that is out of specification?	Yes	Take corrective action (e.g. cool down engine), then repeat this step. **Note** • Readings need to be in the indicated ranges to perform Drive Mode.
		No	Go to next step.
10	**MONITOR EVAP SYSTEM BY DRIVE MODE** • Perform EVAP system repair verification drive mode. (See01-02A-21 EVAP System Repair Verification Drive Mode) • Stop vehicle and access ON BOARD SYSTEM READINESS TESTS menu of GENERIC OBD-II FUNCTIONS to inspect Drive Mode completion status. • Is EVAPORATIVE PURGE SYSTEM monitoring complete?	Yes	Go to next step.
		No	Go back to step 9.
11	**VERIFY TROUBLESHOOTING OF DTC P1450 COMPLETED** • Make sure to reconnect all disconnected connectors. • Is PENDING CODE of the same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1451 [FS]

Z6U010201083W16

DTC P1451	Canister drain cut valve (CDCV) circuit malfunction
DETECTION CONDITION	• The PCM monitors the input voltages from CDCV control signal. If voltage of CDCV control signal is below or above specified, PCM determines that the CDCV circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditin during two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is not available. • DTC is stored in the PCM memory. • This DTC also detectes by KOEO/KOER Self-Test.
POSSIBLE CAUSE	• CDCV malfunction • Connector or terminal malfunction • Short to power in wiring between CDCV terminal B and PCM terminal 18 • Short to ground in wiring between CDCV terminal B and PCM terminal 18 • Open circuit in wiring between main relay terminal E and CDCV terminal A • Open circuit in wiring between CDCV terminal B and PCM terminal 18 • PCM malfunction



Troubleshooting Hint

CDCV control description

- The main relay circuit supplies battery voltage to CDCV and the PCM completes the ground when the EVAP monitoring condition is met.

CDCV specification

Item	Normal	EVAP monitor testing
CDCV terminal B	B+	Approx. 0 V
EVAPCV	0 %	100 %
PCM terminal 18	B+	Approx. 0 V

Diagnostic procedure

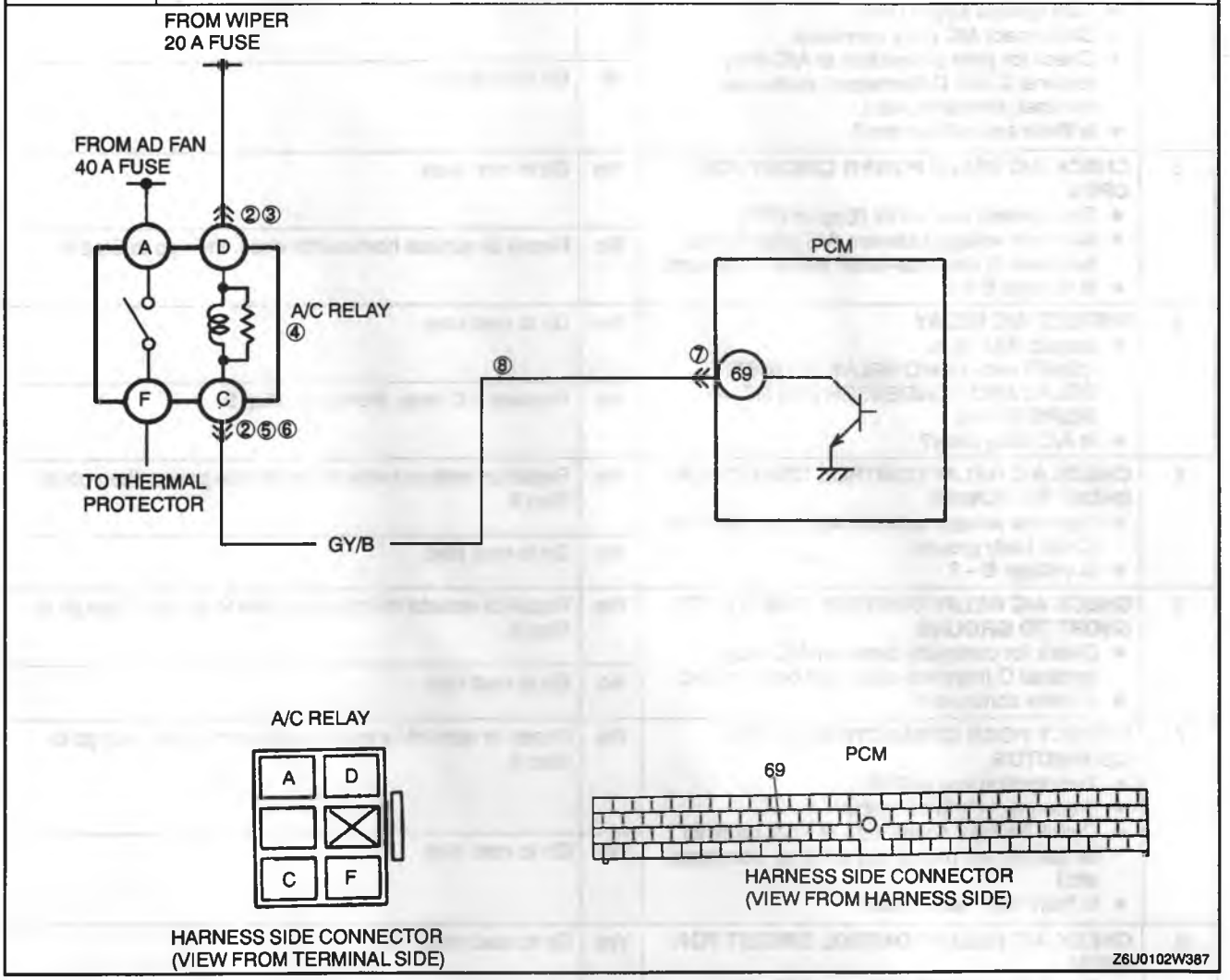
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Turn ignition key to OFF then ON (Engine OFF). • Is the same DTC present?	Yes	Go to next step.
		No	Refer to intermittent concern. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
3	**INSPECT POOR CONNECTION OF CDCV CONNECTOR** • Turn ignition key to OFF. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 10.
		No	Go to next step.
4	**INSPECT CDCV** • Measure resistance between CDCV terminals (part-side). • Is resistance **within 22 Ω —26 Ω** ?	Yes	Go to next step.
		No	Replace CDCV, then go to Step 10.
5	**INSPECT CDCV POWER SUPPLY CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Measure voltage between CDCV terminal A (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 10.
6	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 18. (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair terminal, then go to Step 10.
		No	Go to next step.
7	**INSPECT CDCV CONTROL CIRCUIT FOR SHORT TO GROUND** • Disconnect PCM connector. • Check continuity between CDCV terminal B (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 10.
		No	Go to next step.
8	**INSPECT CDCV CONTROL CIRCUIT FOR SHORT TO POWER** • Connect breakout box with PCM disconnected. • Turn ignition key to OFF. • Measure voltage between breakout box terminal 18 and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to Step 10.
		No	Go to next step.
9	**INSPECT CDCV CONTROL CIRCUIT FOR OPEN** • Connect CDCV connector. • Turn ignition key to ON (Engine OFF). • Measure voltage between breakout box terminal 18 and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.

STEP	INSPECTION		ACTION
10	**VERIFY TROUBLESHOOTING OF DTC P1451 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester OBD-II generic function. • Perform KOEO/KOER Self-Test. • Is the same DTC present during KOEO/KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1460, P1464 [FS]

Z6U010201083W17

DTC P1460 **DTC P1464**	**WOT A/C control circuit malfunction** **A/C demand out of self test range**
DETECTION CONDITION	**DTC P1460** ● The PCM monitor the A/C relay control signal at the PCM terminal 69. If the PCM detects the A/C relay control signal does not change during A/C on and WOT (A/C cut-off control), the PCM determines that A/C relay control circuit has malfunctioned. **DTC P1464** ● The PCM monitor the A/C relay control signal at the PCM terminal 69. If the PCM detects the A/C relay control signal does not change during KOER Self-Test, the PCM determines that A/C relay control circuit has malfunctioned.
POSSIBLE CAUSE	● A/C relay malfunction ● Connector or terminal malfunction ● Open circuit between ENGINE fuse and A/C relay terminal D ● Open circuit between A/C relay terminal C and PCM terminal 69 ● Short to ground circuit between A/C relay terminal C and PCM terminal 69 ● Short to power circuit between A/C relay terminal C and PCM terminal 69 ● PCM malfunction



Z6U0102W387

Troubleshooting Hint

A/C relay control description

- The battery voltage to the A/C relay and the PCM completes the ground when the following condition are met.
  —A/C switch ON and fun switch ON.
- If the PCM receives the WOT signal from TP sensor while A/C operates and drive the vehicle, the PCM cut-off the A/C relay.

Fuel pump relay specification

Item	A/C OFF	A/C ON	WOT while A/C ON
A/C relay terminal C	B+	Approx. 0 V	B+
WAC PID	OFF	ON	OFF
PCM terminal 69	B+	Approx. 0 V	B+

Diagnostic procedure

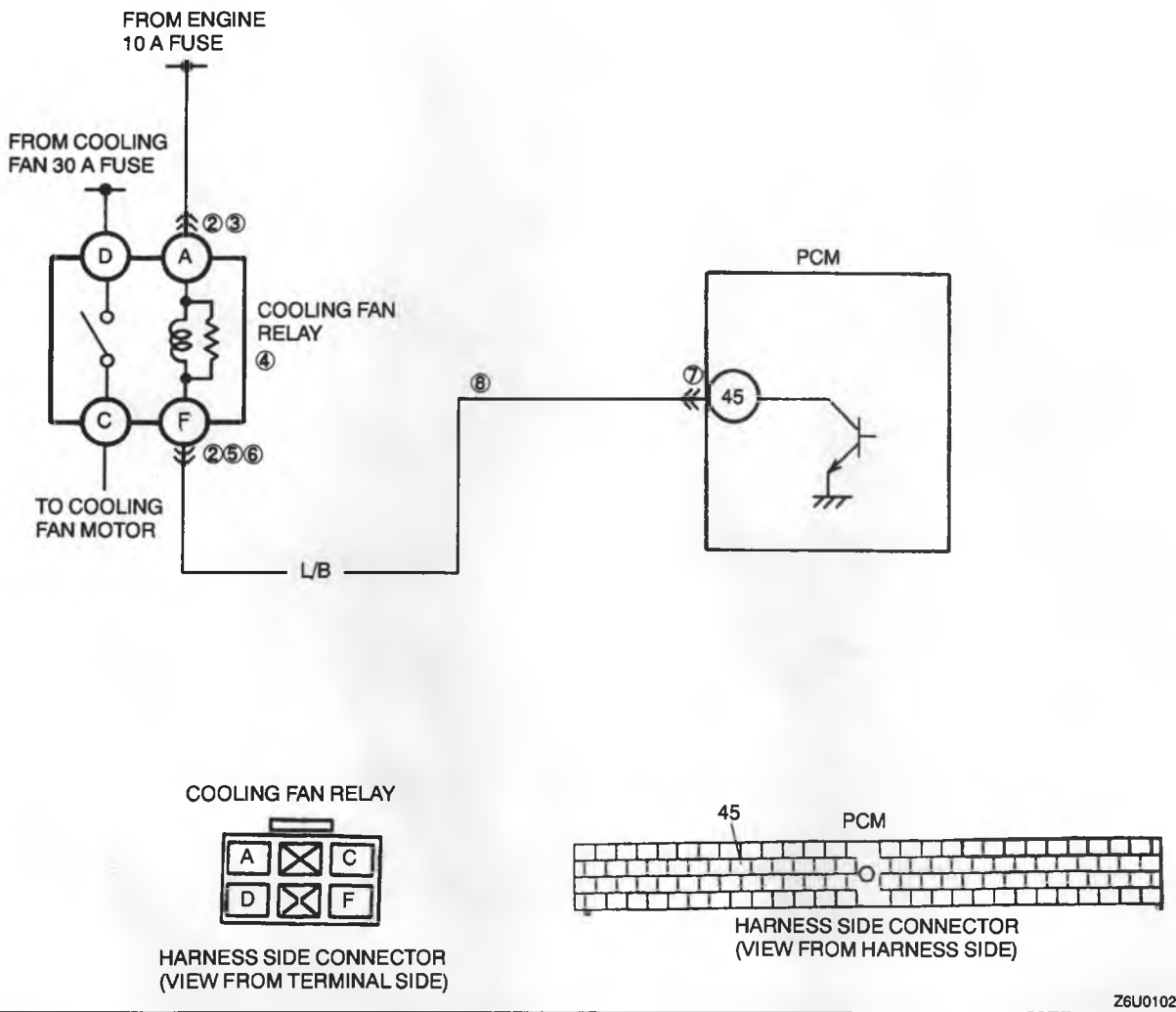
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**INSPECT POOR CONNECTION OF A/C RELAY CONNECTOR** • Turn ignition key to OFF. • Disconnect A/C relay connector. • Check for poor connection at A/C relay terminal C and D (damaged, pulled-out terminal, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
3	**CHECK A/C RELAY POWER CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Measure voltage between A/C relay sensor terminals D (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 9.
4	**INSPECT A/C RELAY** • Inspect A/C relay. (See07-40-19 A/C RELAY, BLOWER RELAY, AND CONDENSER FAN RELAY INSPECTION) • Is A/C relay okay?	Yes	Go to next step.
		No	Replace A/C relay, then go to Step 9.
5	**CHECK A/C RELAY CONTROL CIRCUIT FOR SHORT TO POWER** • Measure voltage between A/C relay terminal C and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to Step 9.
		No	Go to next step.
6	**CHECK A/C RELAY CONTROL CIRCUIT FOR SHORT TO GROUND** • Check for continuity between A/C relay terminal C (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 9.
		No	Go to next step.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at PCM terminal 69 (damaged, pulled-out terminal, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
8	**CHECK A/C RELAY CONTROL CIRCUIT FOR OPEN** • Check for continuity between A/C relay terminal C (harness-side) and Breakout box terminal 69. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.

STEP	INSPECTION		ACTION
9	**VERIFY TROUBLESHOOTING OF DTC P1460, P1464 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOEO/KOER Self-Test. • Is PENDING CODE P1460 stored or is DTC P1464 present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1474 [FS]

Z6U010201083W18

DTC P1474	Cooling fan control circuit malfunction
DETECTION CONDITION	• The PCM monitors the cooling fan relay control signal at the PCM terminal 45. If the PCM detects the cooling fan relay control signal does not change when the engine coolant temperature is **above 100 °C {212 °F}**, the PCM determine that cooling fan relay control circuit has malfunctioned. • The PCM monitors the cooling fan relay control signal at the PCM terminal 45. If the PCM detects the cooling fan relay control signal does not change during KOEO, KOER Self-Test, the PCM determines that cooling fan relay control circuit has malfunctioned.
POSSIBLE CAUSE	• Cooling fan relay malfunction • Connector or terminal malfunction • Open circuit between ENGINE fuse and cooling fan relay terminal A • Open circuit between cooling fan relay terminal F and PCM terminal 45 • Short to ground circuit between cooling fan relay terminal C and PCM terminal 45 • Short to power circuit between cooling fan relay terminal C and PCM terminal 45 • PCM malfunction



Z6U0102W388

Troubleshooting Hint

Cooling fan relay control description

- The battery voltage to the cooling fan relay and the PCM complete the ground when the following condition are met.
  - —Engine coolant temperature is **above 100 °C {212 °F}**
  - —A/C is operating
  - —ECT sensor is malfunction
- If the engine coolant temperature is **below 95.5 °C {204 °F}** during the cooling fan operating, the PCM cut-off the cooling fan relay.

Cooling fan relay specification

Item	ECT is below 95.5 °C {204 °F}	ECT is above 100 °C {212 °F}
Cooling fan relay terminal F	B+	Approx. 0 V
LFC PID	OFF	ON
PCM terminal 45	B+	Approx. 0 V

Diagnostic procedure

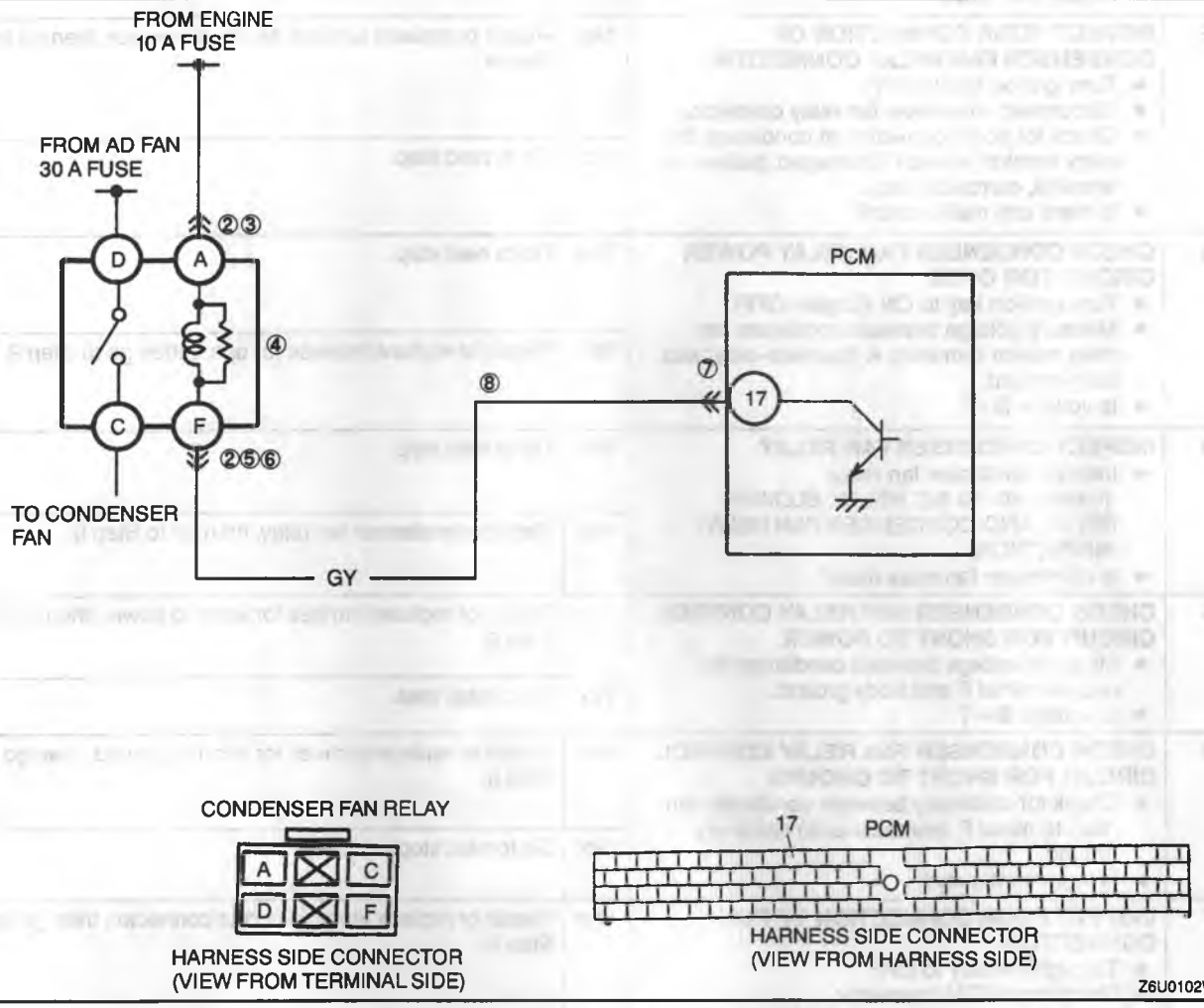
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**INSPECT POOR CONNECTION OF COOLING FAN RELAY CONNECTOR** • Turn ignition key to OFF. • Disconnect cooling fan relay connector. • Check for poor connection at cooling fan relay terminal A and F (damaged, pulled-out terminal, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
3	**CHECK COOLING FAN RELAY POWER CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Measure voltage between cooling fan relay sensor terminals A (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 9.
4	**INSPECT COOLING FAN RELAY** • Inspect cooling fan relay. (See01-12-7 COOLING FAN RELAY INSPECTION) • Is cooling fan relay okay?	Yes	Go to next step.
		No	Replace cooling fan relay, then go to Step 9.
5	**CHECK COOLING FAN RELAY CONTROL CIRCIUT FOR SHORT TO POWER** • Measure voltage between cooling fan relay terminal F and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to Step 9.
		No	Go to next step.
6	**CHECK COOLING FAN RELAY CONTROL CIRCIUT FOR SHORT TO GROUND** • Check for continuity between cooling fan relay terminal F (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 9.
		No	Go to next step.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at PCM terminal 45 (damaged, pulled-out terminal, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
8	**CHECK COOLING FAN RELAY CONTROL CIRCUIT FOR OPEN** • Check for continuity between cooling fan relay terminal F (harness-side) and Breakout box terminal 45. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.

STEP	INSPECTION		ACTION
9	**VERIFY TROUBLESHOOTING OF DTC P1474 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOEO/KOER Self-Test. • Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1479 [FS]

Z6U010201083W19

DTC P1479	Condenser fan control circuit malfunction
DETECTION CONDITION	• The PCM monitors the condenser fan relay control signal at the PCM terminal 17. If the PCM detects the condenser fan relay control signal does not change when the engine coolant temperature is **above 108° C {226° F}**, the PCM determines that condenser fan relay control circuit has malfunctioned. • The PCM monitors the condenser fan relay control signal at the PCM terminal 17. If the PCM detects the condenser fan relay control signal does not change during KOEO, KOER Self-Test, the PCM determines that condenser fan relay control circuit has malfunctioned.
POSSIBLE CAUSE	• condenser fan relay malfunction • Connector or terminal malfunction • Open circuit between ENGINE fuse and condenser fan relay terminal A • Open circuit between condenser fan relay terminal F and PCM terminal 17 • Short to ground circuit between condenser fan relay terminal F and PCM terminal 17 • Short to power circuit between condenser fan relay terminal F and PCM terminal 17 • PCM malfunction



Troubleshooting Hint

Condenser fan relay control description

- The battery voltage to the condenser fan relay and the PCM complete the ground when the following condition are met.
  - —Engine coolant temperature is **above 108 °C {226 °F}**
  - —A/C is operating
  - —ECT sensor is malfunction
- If the engine coolant temperature is **below 103 °C {217 °F}** during the cooling fan operating, the PCM cut-off the condenser fan relay.

condenser fan relay specification

Item	ECT is below 103 °C {217 °F}	ECT is above 108 °C {226 °F}
Condenser fan relay terminal F	B+	Approx. 0 V
HFC PID	OFF	ON
PCM terminal 17	B+	Approx. 0 V

Diagnostic procedure

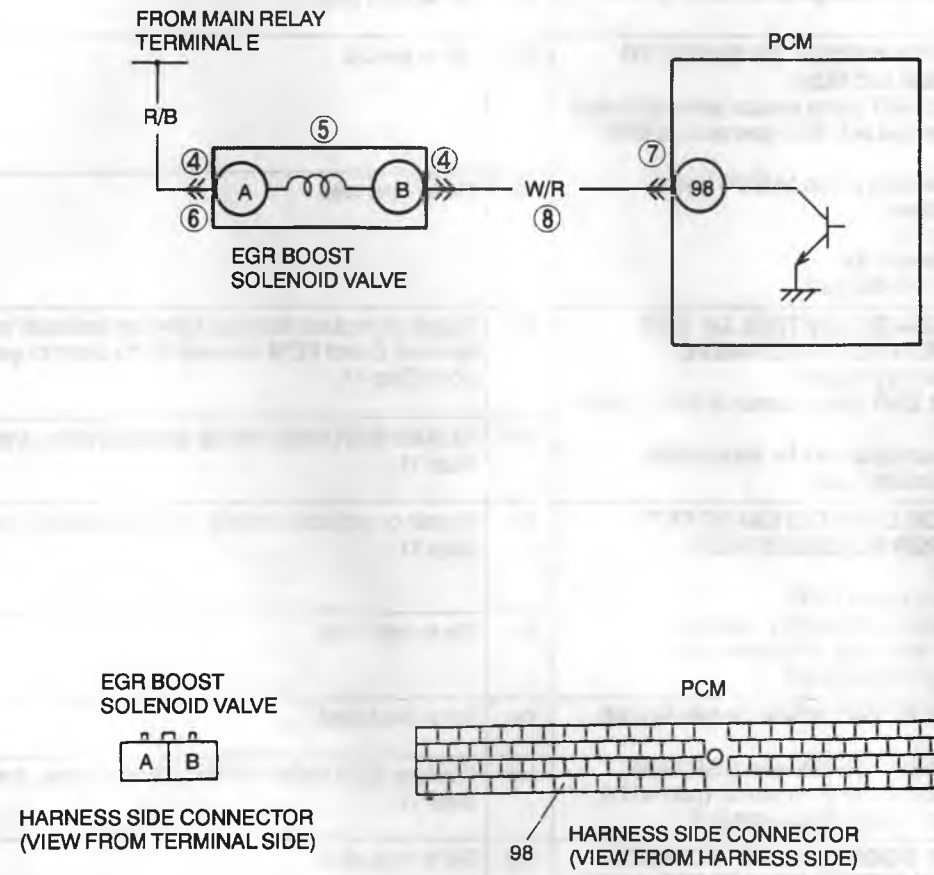
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**INSPECT POOR CONNECTION OF CONDENSER FAN RELAY CONNECTOR** • Turn ignition key to OFF. • Disconnect condenser fan relay connector. • Check for poor connection at condenser fan relay terminal A and F (damaged, pulled-out terminal, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
3	**CHECK CONDENSER FAN RELAY POWER CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Measure voltage between condenser fan relay sensor terminals A (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 9.
4	**INSPECT CONDENSER FAN RELAY** • Inspect condenser fan relay. (See07-40-19 A/C RELAY, BLOWER RELAY, AND CONDENSER FAN RELAY INSPECTION) • Is condenser fan relay okay?	Yes	Go to next step.
		No	Replace condenser fan relay, then go to Step 9.
5	**CHECK CONDENSER FAN RELAY CONTROL CIRCUIT FOR SHORT TO POWER** • Measure voltage between condenser fan relay terminal F and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to Step 9.
		No	Go to next step.
6	**CHECK CONDENSER FAN RELAY CONTROL CIRCUIT FOR SHORT TO GROUND** • Check for continuity between condenser fan relay terminal F (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 9.
		No	Go to next step.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at PCM terminal 17 (damaged, pulled-out terminal, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
8	**CHECK CONDENSER FAN RELAY CONTROL CIRCUIT FOR OPEN** • Check for continuity between condenser fan relay terminal F (harness-side) and Breakout box terminal 17. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.

STEP	INSPECTION		ACTION
9	**VERIFY TROUBLESHOOTING OF DTC P1479 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOEO/KOER Self-Test. • Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1487 [FS]

Z6U010201083W20

DTC P1487	EGR boost sensor solenoid valve circuit malfunction
DETECTION CONDITION	• The PCM monitors the input voltages from EGR boost sensor solenoid valve control signal. If voltage of EGR boost sensor solenoid valve control signal i s below or above specified, the PCM determines that the EGR boost sensor solenoid valve circuit has malfunctioned.
POSSIBLE CAUSE	• EGR boost sensor solenoid valve malfunction • Connector or terminal malfunction • Short to ground in wiring between EGR boost sensor solenoid valve terminal B and PCM terminal 98 • Open circuit in wiring between main relay terminal E and EGR boost sensor solenoid valve terminal A • Open circuit in wiring between EGR boost sensor solenoid valve terminal B and PCM terminal 98 • PCM malfunction



Z6U0102W390

Troubleshooting Hint

EGR boost sensor solenoid control description

- The main relay circuit supplies battery voltage to EGR boost sensor solenoid valve and the PCM completes the ground when EGR monitoring condition are met.

EGR boost sensor solenoid valve specification

Item	Normal	EGR monitor testing
EGR boost sensor solenoid valve terminal B	Approx. 0 V	B+
EGRBARO PID	ON	OFF
PCM terminal 98	Approx. 0 V	B+

Diagnostic procedure

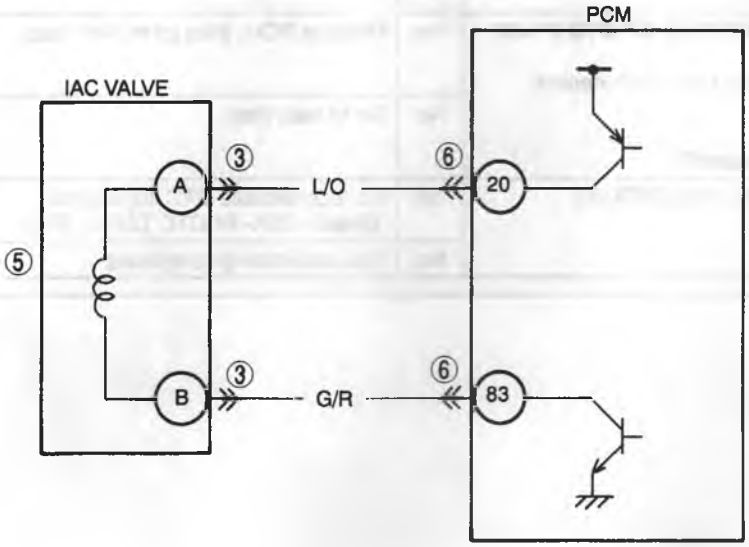
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS-IS CONCERN INTERMITTENT OR CONSTANT** • Start engine. • Access EGR PID using NGS tester. • Run drive mode. • Does EGR PID change while running drive mode?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
		No	Go to next step.
4	**CLASSIFY OPEN CIRCUIT OR SHORT TO GROUND MALFUNCTION** • Disconnect EGR boost sensor solenoid valve tube at solenoid side that connects to EGR valve. • Connect vacuum pump to EGR boost solenoid valve. • Apply vacuum. • Wait for **5 seconds**. • Is vacuum maintained?	Yes	Go to Step 6.
		No	Go to next step.
5	**INSPECT PASSAGE CONTROL OF EGR BOOST SENSOR SOLENOID VALVE** • Turn ignition key to OFF. • Disconnect EGR boost sensor solenoid valve connector. • Apply vacuum and wait for **5 seconds**. • Is vacuum maintained?	Yes	Repair or replace harness between solenoid valve terminal B and PCM terminal 98 for short to ground, then go to Step 11.
		No	Replace EGR boost sensor solenoid valve, then go to Step 11.
6	**INSPECT POOR CONNECTION OF EGR BOOST SENSOR SOLENOID VALVE CONNECTOR** • Turn ignition key to OFF. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 11.
		No	Go to next step.
7	**INSPECT EGR BOOST SENSOR SOLENOID VALVE** • Measure resistance between EGR boost sensor solenoid valve terminals (part-side). • Is resistance within **22 Ω —26 Ω** ?	Yes	Go to next step.
		No	Replace EGR boost sensor solenoid valve, then go to Step 11.
8	**INSPECT EGR BOOST SENSOR SOLENOID VALVE POWER SUPPLY CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Measure voltage between EGR boost sensor solenoid valve terminal A (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 11.

STEP	INSPECTION		ACTION
9	**INSPECT POOR CONNECTION OF PCM CONNECTOR** ● Turn ignition key to OFF. ● Disconnect PCM connector. ● Check for poor connection at terminal 98. (damaged, pulled-out terminals, corrosion, etc.). ● Is there any malfunction?	Yes	Repair terminal, then go to Step 11.
		No	Go to next step.
10	**INSPECT EGR BOOST SENSOR SOLENOID VALVE CONTROL CIRCUIT FOR OPEN** ● Connect EGR boost sensor solenoid valve connector. ● Connect breakout box with PCM disconnected. ● Turn ignition key to ON (Engine OFF). ● Measure voltage between breakout box terminal 98 and body ground. ● Is voltage B+?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P1487 COMPLETED** ● Make sure to reconnect all disconnected connectors. ● Run drive mode. ● Is the same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** ● Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1504 [FS]

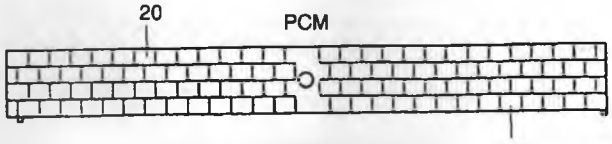
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DTC P1504	Idle air control (IAC) valve circuit malfunction
DETECTION CONDITION	• If the PCM detects open, short or over current in IAC valve circuit during engine running. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition for two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory. • This DTC also detects by KOEO/KOER Self-Test.
POSSIBLE CAUSE	• IAC valve malfunction • Connector or terminal malfunction • Open circuit between IAC valve terminal B and PCM terminal 20. • Short to ground circuit between IAC valve terminal B and PCM terminal 20. • Open circuit between IAC valve terminal A and PCM terminal 83. • Short to ground circuit between IAC valve terminal A and PCM terminal 83. • PCM malfunction





HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

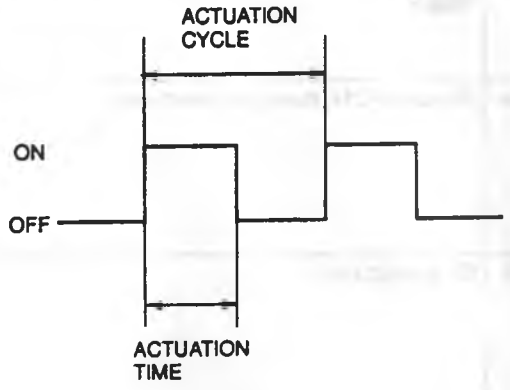
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Troubleshooting Hint

IAC description

- For the optimum idle speed control, the PCM selects one of several target airflows preset in the PCM according to the engine conditions, and converts the target airflow into the IAC valve actuation time and controls the valve opening position.

IAC duty control



$$\text{DUTY VALUE} = \frac{\text{ACTUATION TIME}}{\text{ACTUATION CYCLE}} \times 100\ (\%)$$

Z6U0102W380

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**CHECK IAC VALVE CONNECTOR** • Turn ignition key to OFF. • Verify that the IAC valve connector is connected securely. • Is connector okay?	Yes	Go to next step.
		No	Connect the connector securely, then go to Step 9.
4	**INSPECT POOR CONNECTION OF IAC VALVE CONNECTOR** • Disconnect IAC valve connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
5	**INSPECT IAC VALVE** • Inspect IAC valve. (See01-13A-8 IDLE AIR CONTROL (IAC) VALVE INSPECTION [FS]) • Is IAC valve okay?	Yes	Go to next step.
		No	Replace IAC valve, then go to Step 9.
6	**CHECK POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection of PCM terminals 20 and 83 (damaged, pulled-out terminals, corrosion, etc.) • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
7	**VERIFY IAC VALVE (POWER) CIRCUIT FOR OPEN** • Turn ignition key to ON. • Check voltage at IAC valve terminal B (harness-side). • Is voltage approx. **B+**?	Yes	Go to next.
		No	Repair or replace harness for open, then go to Step 9.

STEP	INSPECTION		ACTION
8	**VERIFY IAC VALVE CIRCUIT FOR SHORT TO GROUND** ● Turn ignition key to OFF. ● Connect break out box with PCM disconnected. ● Turn ignition key to ON. ● Measure voltage at breakout box terminal 83. ● Is voltage approx. **B+**?	Yes	Go to next step.
		No	Repair or replace harness for short to ground, then go to Step 9
9	**VERIFY TROUBLESHOOTING OF DTC P1504 COMPLETED** ● Make sure to reconnect all disconnected connectors. ● Turn ignition key to ON (Engine OFF). ● Clear DTC from PCM memory using NGS tester generic OBD-II function. ● Perform DTC CONFIRMATION PROCEDURE. (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) ● Is same DTC present during KOEO/KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** ● Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1506 [FS]

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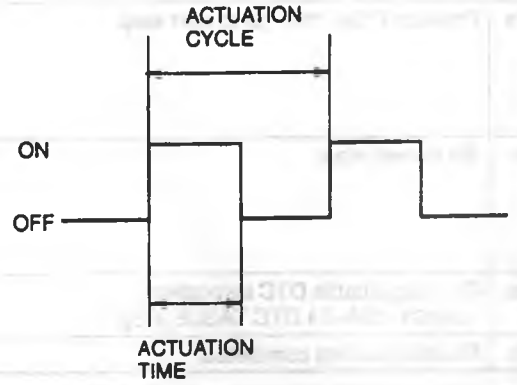
DTC P1506	Idle control system RPM lower than expected
DETECTION CONDITION	● Actual idle speed is lower than expected by **100 rpm** for **14 seconds**, when brake pedal is depressed (brake switch is ON) and steering wheel is held straight ahead (power steering pressure switch is OFF). **Note** ● If atmospheric pressure is **less than 72.0 kPa {540 mmHg, 21.3 InHg}** or intake air temperature is **below -10 °C {14 °F}**, the PCM cancels diagnostic of P1506. **Diagnostic support note** ● This is a continuous monitor (CCM). ● MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycles. ● PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. ● FREEZE FRAME DATA is available. ● DTC is stored in PCM memory.
POSSIBLE CAUSE	● IAC valve malfunction ● Air cleaner element clogged ● Air intake passage clogged ● A/C relay control circuit malfunction ● Generator control circuit malfunction ● Low engine compression (Over capacity of blow-by gas) ● PCM malfunction

Troubleshooting Hint

IAC description

- For the optimum idle speed control, the PCM selects one of several target airflow settings in the PCM according to the engine conditions, and converts the target airflow into IAC valve actuation time and controls the valve opening position.

IAC duty control



Z6U0102W380

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY RELATED PENDING OR STORED DTCS** • Turn ignition key to OFF, then ON (Engine OFF). • Verify pending code or stored DTCs using NGS tester. • Is other DTC present?	Yes	Repair applicable DTCs. (See01-02A-24 DTC TABLE [FS])
		No	Go to next step.
4	**INSPECT IAC VALVE MALFUNCTION** • Start engine. • Simulate IACV PID at **100 %** using NGS tester. • Is engine speed increased?	Yes	Go to next step.
		No	Replace IAC valve, then go to Step 10.
5	**INSPECT A/C MAGNET CLUTCH OPERATION** • Turn blower motor switch off. • Is magnet clutch still on?	Yes	Refer to "A/C is always on or A/C compressor runs continuously." of ENGINE SYMPTOM TROUBLESHOOTING, then go to Step 10. (See01-03A-46 NO.24 A/C ALWAYS ON/A/C COMPRESSOR RUNS CONTINUOUSLY [FS])
		No	Go to next step.
6	**INSPECT GENERATOR CONTROL CIRCUIT MALFUNCTION** • Simulate ALTF PID for **0 %** using NGS tester. • Is engine speed increased?	Yes	Go to next step.
		No	Repair short to power circuit in generator control circuit, then go to Step 10.
7	**INSPECT AIR CLEANER ELEMENT** • Remove air cleaner element with engine running. • Is engine speed increased?	Yes	Replace air cleaner element, then go to Step 10.
		No	Go to next step.
8	**INSPECT THROTTLE BODY PASSAGE** • Is throttle body clogged?	Yes	Clean or replace throttle body passage, then go to Step 10.
		No	Go to next step.

STEP	INSPECTION		ACTION
9	**INSPECT ENGINE COMPRESSION** • Inspect engine compression. (See 01-10A-5 COMPRESSION INSPECTION [FS]) • Is engine compression okay?	Yes	Go to next step.
		No	Overhaul engine, then go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P1506 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Depress brake pedal for **14.1 seconds or more.** • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1507 [FS]

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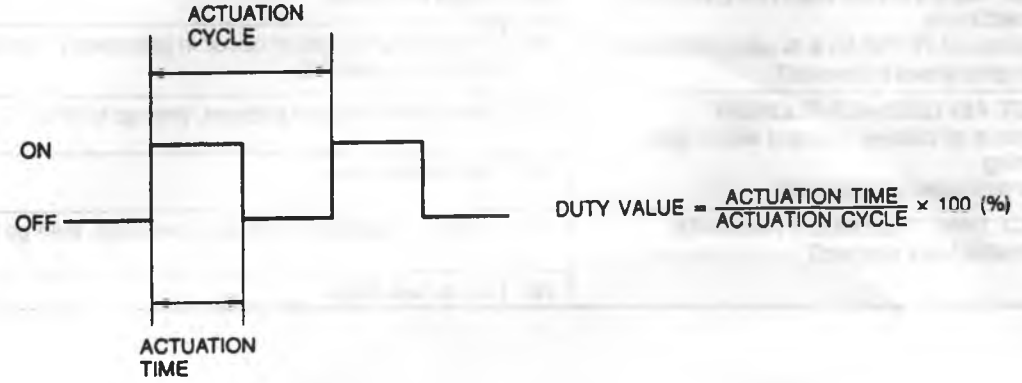
DTC P1507	Idle control system RPM higher than expected
DETECTION CONDITION	• Actual idle speed is higher than expected by **200 rpm** for **14 seconds**, when brake pedal is depressed (brake switch is ON) and steering wheel is held straight ahead (power steering pressure switch is OFF). **Note** • If atmospheric pressure is **less than 72.0 kPa {540 mmHg, 21.3 inHg}** or intake air temperature is below **-10 °C {14 °F}**, the PCM cancels diagnostic of P1507. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• IAC valve malfunction • Accelerator cable misadjusted • Actuator cable (cruise control) misadjusted • Throttle valve malfunction • Vacuum hose misconnection • PCM malfunction

Troubleshooting Hint

IAC description

- For the optimum idle speed control, the PCM selects one of several target airflow settings in the PCM according to the engine conditions, and converts the target airflow into the IAC valve actuation time and controls the valve opening position.

IAC duty control



Z6U0102W380

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY RELATED PENDING OR STORED DTCS** • Turn ignition key to OFF, then ON (Engine OFF). • Verify pending code or stored DTCs using NGS tester. • Is other DTC present?	Yes	Repair applicable DTCs. (See01-02A-24 DTC TABLE [FS])
		No	Go to next step.
4	**INSPECT IAC VALVE MALFUNCTION** • Start engine. • Simulate IACV PID for **0 %** using NGS tester. • Is engine speed decreased?	Yes	Go to next step.
		No	Replace IAC valve, then go to Step 9.
5	**INSPECT ACCELERATOR CABLE FREE PLAY** • Turn ignition key to OFF. • Is accelerator cable free play okay? (See01-13A-14 ACCELERATOR CABLE INSPECTION [FS])	Yes	Go to next step.
		No	Adjust accelerator cable free play, then go to Step 9. (See01-13A-14 ACCELERATOR CABLE INSPECTION [FS])
6	**INSPECT ACTUATOR CABLE FREE PLAY** • Are actuator cable adjustments okay? (See01-20-6 ACTUATOR CABLE ADJUSTMENT)	Yes	Go to next step.
		No	Adjust actuator cable free play, then go to Step 9. (See01-20-6 ACTUATOR CABLE ADJUSTMENT)
7	**INSPECT VACUUM HOSE CONNECTION** • Are vacuum hoses connecting accurately? (See01-13A-3 VACUUM HOSE ROUTING DIAGRAM [FS])	Yes	Go to next step.
		No	Reconnect vacuum hose accurately, then go to step 9.
8	**VISUAL INSPECT THROTTLE VALVE** • Remove throttle body. • Is throttle valve fully closed?	Yes	Go to next step.
		No	Clean or replace throttle body, then go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P1507 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Depress brake pedal for **14.1 seconds or more**. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1512 [FS]

Z6U010201083W24

DTC P1512	VTCS shutter valve stuck closed
DETECTION CONDITION	• The PCM monitors MAF sensor signal when the VTCS shutter valve from closed to open. If the MAF sensor signal does inclease when VTCS shutter valve from closed to open, the PCM determines that the VTCS shutter valve is stuck closed. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycle. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• VTCS shutter valve actuator malfunction • Short to ground in wiring between VTCS solenoid valve B and PCM terminal 42 • Vacuum hose misconnection • PCM malfunction

Troubleshooting Hint

VTCS solenoid valve control description

- The main relay circuit supplies battery voltage to the VTCS solenoid valve and the PCM completes the ground when the following condition are met.
  - —Engine coolant temperature is **below 65°C {149°F}**
  - —Engine speed is **below 3,000 rpm**
  - —Throttle opening angle is below preset value
- The PCM turns the VTCS solenoid valve OFF for **0.15 second** after engine is started.

VTCS solenoid valve specification

Item	VTCS shutter valve closed	VTCS shutter valve open
VTCS solenoid valve terminal B	Approx. 0 V	B+
IMRC PID	CLS	OPEN
PCM terminal 42	Approx. 0 V	B+

Diagnostic procedure

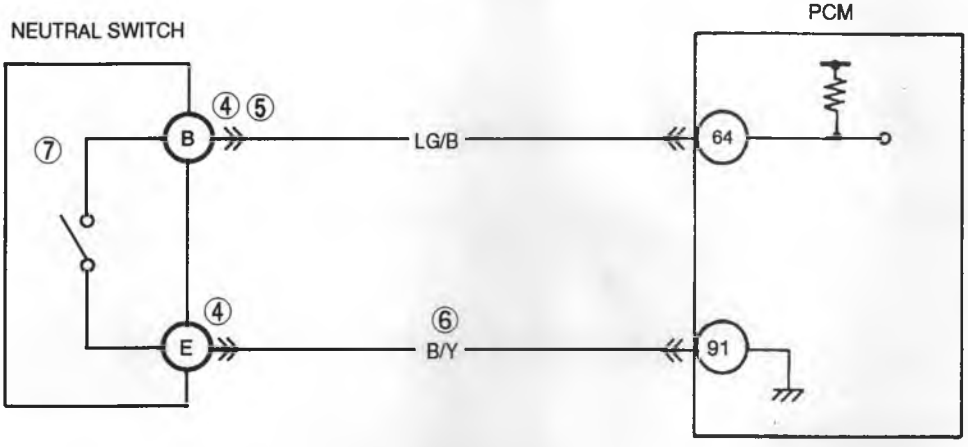
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY ANOTHER DTC DETECTED** • Is DTC P1569 detected?	Yes	Perform DTC P1569 (See01-02A-187 DTC P1569 [FS])
		No	Go to next step.
4	**CHECK VACUUM HOSE CONNECTION** • Check vacuum hose connection (See01-13A-3 VACUUM HOSE ROUTING DIAGRAM [FS]) • Is vacuum hose connection okay?	Yes	Go to next step.
		No	Reconnect vacuum hose at regular position, then go to Step 6.
5	**INSPECT VTCS SHUTTER VALVE ACTUATOR** • Inspect VTCS shutter valve actuator. (See01-13A-12 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR INSPECTION [FS]) • Is VTCS shutter valve actuator okay?	Yes	Go to next step.
		No	Replace VTCS shutter valve actuator, then go to next step. (See01-13A-12 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [FS])

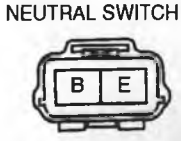
STEP	INSPECTION		ACTION
6	**VERIFY TROUBLESHOOTING OF DTC P1512 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine and warm it up completely. • Clear DTC from memory using NGS tester generic OBD-II function. • Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1516 [FS]

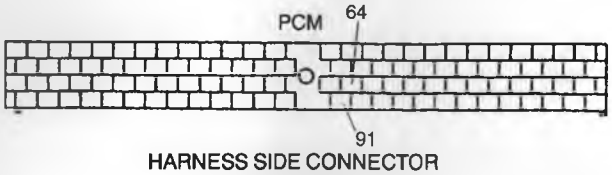
Z6U010201083W25

DTC P1516	Neutral switch circuit malfunction
DETECTION CONDITION	• If the PCM detects the neutral switch voltage at PCM terminal 64 has not been changed during driving the vehicle **below 26 km/h {16 mph}**, the PCM determines that a neutral switch circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• Clutch switch malfunction • Connector or terminal malfunction • Open circuit between neutral switch terminal A and PCM terminal 64 • Short to ground circuit between neutral switch terminal A and PCM terminal 64 • Open circuit between neutral switch terminal B and PCM terminal 91 • Short to ground circuit between neutral switch terminal B and PCM terminal 91





HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Z6U0102W392

Troubleshooting Hint

Neutral switch description

- A normally open type neutral switch is used. Therefore when the shift lever at the neutral position, the neutral switch become ON (continuity), and the shift lever at some point, the shift switch become OFF (no continuity).
- The shift switch signal is used for the following controls.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control

Neutral switch specification

Shift lever position (With KOEO/KOER)	Neutral	Other
Neutral switch	ON	OFF
Neutral switch terminal A	0 V	approx. 5 V
INDS PID	0 V	approx. 5 V
NDSFLG PID	ON	OFF
PCM terminal 64	0 V	approx. 5 V

Diagnostic procedure

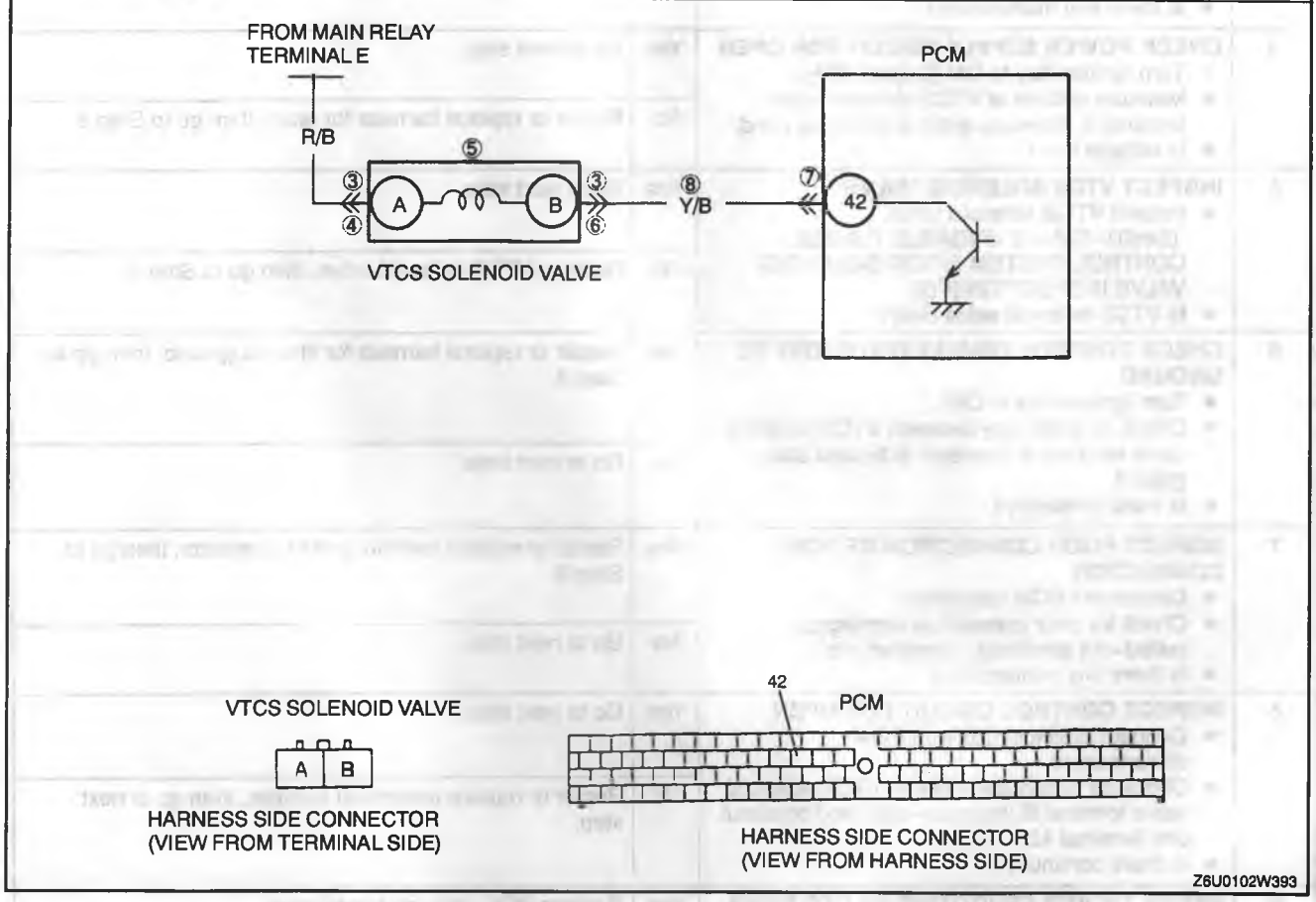
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS-IS CONCERN INTERMITTENT OR CONSTANT** • Connect NGS tester to DLC. • Start engine. • Access NDSFLG V PID using NGS tester. • Verify NDSFLG V PID as follows — Shift lever at neutral: **approx. 0 V** — Shift lever at not neutral: **approx. 5 V** • Is NDSFLG V PID as follows?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
		No	• If NDSFLG V PID stays **approx. 5 V**, go to next step • If NDSFLG V PID stays **approx. 0 V**, go to Step 6.
4	**INSPECT POOR CONNECTION OF NEWTRAL SWITCH CONNECTOR** • Turn ignition key to OFF. • Disconnect the neutral switch connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminals and/or connector, then go to Step 8.
		No	Go to next step.
5	**CHECK NEWTRAL SWITCH SIGNAL CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Check voltage at neutral switch terminal A (harness-side). • Is voltage **approx. 5 V**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go Step 8.
6	**CHECK NEWTRAL SWITCH GROUND CIRCUIT FOR OPEN** • Turn ignition key to OFF. • Connect jumper wire between neutral switch terminal A and B (harness-side). • Turn ignition key to ON (Engine OFF). • Access NDSFLG V PID using NGS tester. • Is NDSFLG V PID change from **approx. 0 V** to **approx. 5 V**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 8.
7	**INSPECT CLUTCH SWITCH** • Turn ignition key to OFF. • Verify continuity between clutch switch connector terminals A and B (part-side) as follows. — Shift lever at neutral: continuity — Shift lever at not neutral: not continuity • Is it okay?	Yes	Go to next step.
		No	Replace neutral switch, then go to next step.

STEP	INSPECTION		ACTION
8	**VERIFY TROUBLESHOOTING OF DTC P1516 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from memory using NGS tester generic OBD-II function. • Drive the vehicle **below 26 km/h {16 mph}**. • Shift shift lever at neutral and other. • Is the same PENDING CODE of DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1569 [FS]

Z6U010201083W26

DTC P1569	VTCS solenoid valve circuit low
DETECTION CONDITION	• The PCM monitors VTCS solenoid valve control circuit. If VTCS solenoid valve controls voltage at the PCM terminal 42 is **below 3 V** while PCM does not complete ground, the PCM determines that a VTCS solenoid valve circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycle. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• VTCS solenoid valve malfunction • Connector or terminal malfunction • Short to ground in wiring between VTCS solenoid valve B and PCM terminal 42 • Open circuit in wiring between VTCS solenoid valve B and PCM terminal 42 • Open circuit in wiring between main relay terminal E and VTCS solenoid valve terminal A • PCM malfunction



Z6U0102W393

Troubleshooting Hint

VTCS solenoid valve control description

- The main relay circuit supplies battery voltage to the VTCS solenoid valve and the PCM completes the ground when the following condition are met.
  - —Engine coolant temperature is **below 65 °C {149 °F}**
  - —Engine speed is **below 3,000 rpm**
  - —Throttle opening angle is below preset value
- The PCM turns the VTCS solenoid valve OFF for **0.15 second** after engine is started.

VTCS solenoid valve specification

Item	VTCS shutter valve closed	VTCS shutter valve open
VTCS solenoid valve terminal B	Approx. 0 V	B+
IMRC PID	CLS	OPEN
PCM terminal 42	Approx. 0 V	B+

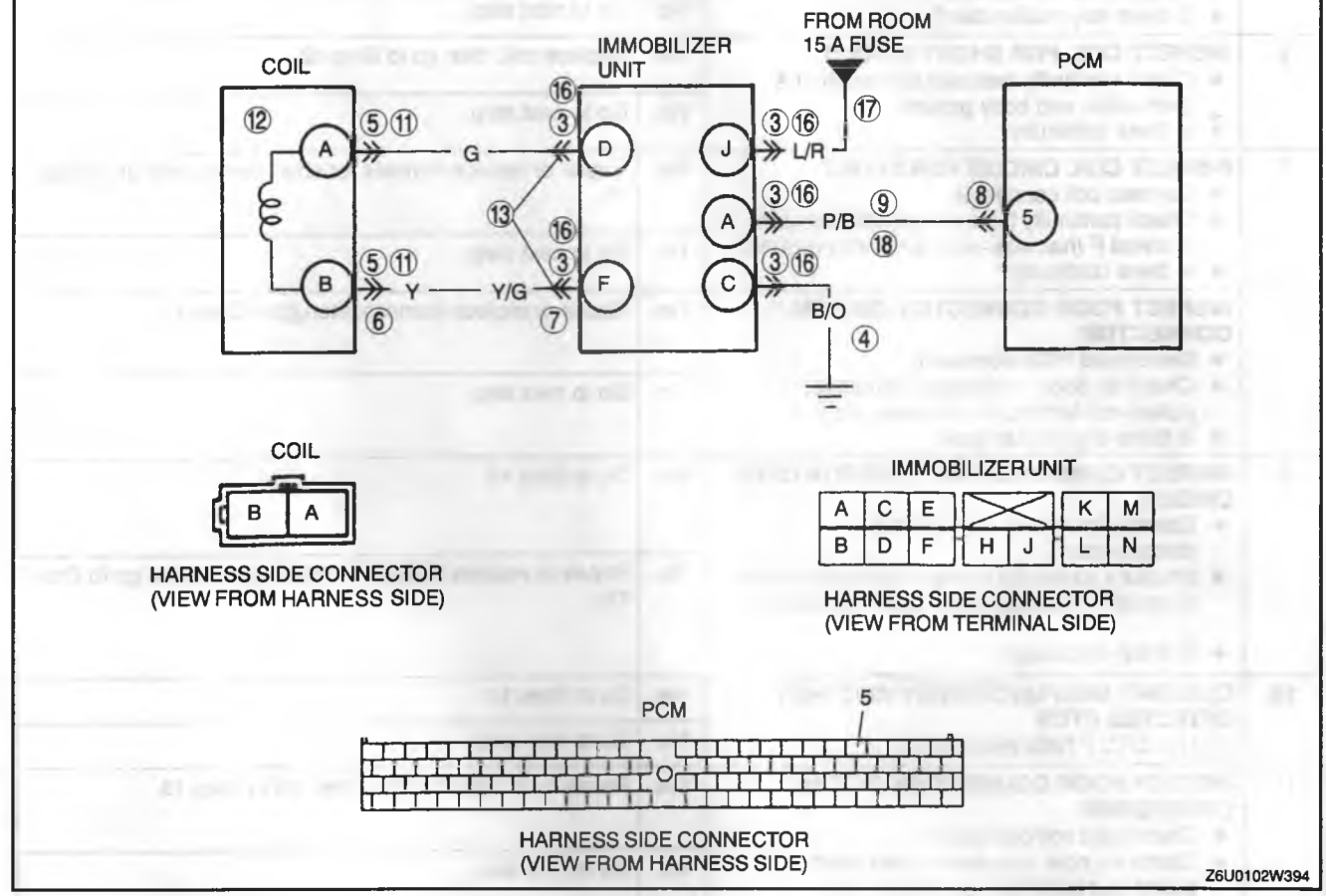
Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**INSPECT POOR CONNECTION OF VTCS SOLENOID VALVE CONNECTOR** • Turn ignition key to OFF. • Disconnect the VTCS solenoid valve connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminals and/or connector, then go to Step 9.
		No	Go to next step.
4	**CHECK POWER SUPPLY CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Measure voltage at VTCS solenoid valve terminal A (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 9.
5	**INSPECT VTCS SOLENOID VALVE** • Inspect VTCS solenoid valve. (See01-13A-13 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SOLENOID VALVE INSPECTION [FS]) • Is VTCS solenoid valve okay?	Yes	Go to next step.
		No	Replace VTCS solenoid valve, then go to Step 9.
6	**CHECK CONTROL CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Check for continuity between VTCS solenoid valve terminal B (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 9.
		No	Go to next step.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
8	**INSPECT CONTROL CIRCUIT FOR OPEN** • Connect breakout box with PCM disconnected. • Check for continuity between VTCS solenoid valve terminal B (harness-side) and breakout box terminal 42. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P1569 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine. • Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1602 [FS]

Z6U010201083W27

DTC P1602	Immobilizer unit-PCM communication error
DETECTION CONDITION	• Command transmission from the PCM to the immobilizer unit exceeds limit. • No response from immobilizer unit
POSSIBLE CAUSE	• Immobilizer unit malfunction • Coil (immobilizer system) malfunction • Key (transponder) malfunction • PCM malfunction • Open circuit in wiring between immobilizer unit terminal A and PCM terminal 5 • Open circuit in wiring between immobilizer unit terminal B and body ground • Open circuit in wiring between immobilizer unit terminal F and coil terminal A • Open circuit in wiring between immobilizer unit terminal D and coil terminal C • Short to ground circuit in wiring between immobilizer unit terminal A and PCM terminal 5 • Short to ground circuit in wiring between immobilizer unit terminal F and coil terminal A • Short to ground circuit in wiring between immobilizer unit terminal D and coil terminal C



Z6U0102W394

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
2	**CLASSIFY NO DTC DETECTED OR SOME DTC DETECTED** • Clear DTC from memory using NGS tester generic OBD-II function. • Turn ignition key to OFF and ON (Engine OFF). • Has DTC P1624 been detected?	Yes	Go to step 10.
		No	Go to next step.

STEP	INSPECTION		ACTION
3	**INSPECT POOR CONNECTION OF IMMOBILIZER UNIT CONNECTOR** • Turn ignition key to OFF. • Disconnect immobilizer unit connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminals and/or connector, then go to Step 19.
		No	Go to next step.
4	**INSPECT GROUND CIRCUIT OF IMMOBILIZER UNIT FOR OPEN** • Measure resistance between immobilizer unit terminal C (harness-side) and body ground. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 19.
5	**INSPECT COIL TERMINAL** • Disconnect coil connector. • Check for bent terminals. • Is there any malfunction?	Yes	Repair or replace terminals and/or connector, then go to Step 19.
		No	Go to next step.
6	**INSPECT COIL FOR SHORT CIRCUIT** • Check continuity between coil terminal A (part-side) and body ground. • Is there continuity?	Yes	Replace coil, then go to Step 19.
		No	Go to next step.
7	**INSPECT COIL CIRCUIT FOR SHORT** • Connect coil connector. • Check continuity between immobilizer unit terminal F (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short circuit, then go to Step 19.
		No	Go to next step.
8	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace harness, then go to Step 19.
		No	Go to next step.
9	**INSPECT COMMUNICATION LINE FOR OPEN CIRCUIT** • Connect breakout box with PCM disconnected. • Measure continuity between immobilizer unit terminal A (harness-side) and PCM terminal 5. • Is there continuity?	Yes	Go to Step 19.
		No	Repair or replace harness for open circuit, then go to Step 19.
10	**CLASSIFY MALFUNCTION BY ANOTHER DETECTED DTCS** • Has DTC P1602 detected?	Yes	Go to Step 14.
		No	Go to next step.
11	**INSPECT POOR CONNECTION OF COIL CONNECTOR** • Disconnect coil connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace harness, then go to Step 19.
		No	Go to next step.
12	**INSPECT COIL FOR OPEN** • Disconnect coil connector. • Measure resistance between coil terminals (part-side). • Is there continuity?	Yes	Go to next step.
		No	Replace coil, then go to Step 19.
13	**INSPECT COIL CIRCUIT FOR OPEN** • Connect coil connector. • Measure the resistance between immobilizer connector F and D (harness-side). • Is there continuity?	Yes	Go to Step 19.
		No	Repair or replace harness for open circuit, then go to Step 19.
14	**CLASSIFY MALFUNCTION BY ANOTHER DETECTED DTCS.** • Has immobilizer unit DTC 03 detected?	Yes	Key does not have transponder, change to registered key. Then go to Step 19.
		No	Go to next step.

STEP	INSPECTION		ACTION
15	**CLASSIFY MALFUNCTION BY ANOTHER DETECTED DTCS.** ● Has immobilizer unit DTC 01 detected?	Yes	Key that using for ignition is not registered. Reprogram key or using another registered key, then go to next step. (See09-14-29 IMMOBILIZER SYSTEM REPROGRAMMING PROCEDURE)
		No	Go to next step.
16	**INSPECT POOR CONNECTION OF IMMOBILIZER UNIT CONNECTOR** ● Turn ignition key to OFF. ● Disconnect immobilizer unit connector. ● Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). ● Is there any malfunction?	Yes	Repair or replace harness, then go to next step.
		No	Go to next step.
17	**INSPECT IMMOBILIZER UNIT POWER CIRCUIT FOR OPEN** ● Turn ignition key to ON (Engine OFF). ● Measure voltage between immobilizer connector J (harness-side) and body ground. ● Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open circuit, then go to Step 19.
18	**INSPECT COMMUNICATION LINE FOR SHORT HARNESS** ● Measure resistance between immobilizer unit terminal A (harness-side) and body ground. ● Is there continuity?	Yes	Repair or replace harness for short, then go to next step.
		No	Go to next step.
19	**VERIFY TROUBLESHOOTING OF DTC P1602 COMPLETED** ● Make sure to reconnect all disconnected connectors. ● Clear DTC from memory using NGS tester generic OBD-II function. ● Turn ignition key to OFF, then start engine. ● Is the same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
20	**VERIFY AFTER REPAIR PROCEDURE** ● Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1603 [FS]

Z6U010201083W28

DTC P1603	Code word is not registered in PCM
DETECTION CONDITION	● Code word is not registered in PCM.
POSSIBLE CAUSE	● Immobilizer system reprogram procedure (code word) was not performed after replacing PCM.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** ● Check for related Service bulletins and/or on-line repair information availability. ● Is any repair information available?	Yes	Perform repair or diagnostic according to available repair information. ● If vehicle is not repaired, then go to next step.
		No	Go to next step.
2	**VERIFY DTC P1603 DETECTED AGAIN** ● Clear DTC from memory using NGS tester generic OBD-II function. ● Turn ignition key to OFF, then start engine. ● Is the same DTC present?	Yes	Perform code word reprogram procedure. (See09-14-29 IMMOBILIZER SYSTEM REPROGRAMMING PROCEDURE)
		No	Go to next step.
3	**VERIFY TROUBLESHOOTING OF DTC P1603 COMPLETED** ● Clear DTC from memory using NGS tester generic OBD-II function. ● Turn ignition key to OFF, then start engine. ● Is the same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.

STEP	INSPECTION		ACTION
4	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1604 [FS]

Z6U010201083W29

DTC P1604	Key ID numbers are not registered in PCM
DETECTION CONDITION	• Key ID numbers are not registered in PCM.
POSSIBLE CAUSE	• Immobilizer system reprogram procedure (key IDs) was not performed after replacing PCM.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service bulletins and/or on-line repair information availability. • Is any repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
2	**VERIFY DTC P1604 DETECTED AGAIN** • Clear DTC from memory using NGS tester generic OBD-II function. • Turn ignition key to OFF, then start engine. • Is the same DTC present?	Yes	Perform key ID number reprogram procedure. (See09-14-29 IMMOBILIZER SYSTEM REPROGRAMMING PROCEDURE)
		No	Go to next step.
3	**VERIFY TROUBLESHOOTING OF DTC P1604 COMPLETED** • Clear DTC from memory using NGS tester generic OBD-II function. • Turn ignition key to OFF, then start engine. • Is the same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1621 [FS]

Z6U010201083W30

DTC P1621	Code word does not match after engine cranking
DETECTION CONDITION	• Code word stored in PCM and Immobilizer unit does not match.
POSSIBLE CAUSE	• Immobilizer system reprogram procedure (code word) was not performed correctly after replacing immobilizer unit or PCM.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service bulletins and/or on-line repair information availability. • Is any repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
2	**VERIFY DTC P1621 DETECTED AGAIN** • Clear DTC from memory using NGS tester generic OBD-II function. • Turn ignition key to OFF, then start engine. • Is the same DTC present?	Yes	Perform code word reprogram procedure. (See09-14-29 IMMOBILIZER SYSTEM REPROGRAMMING PROCEDURE)
		No	Go to next step.
3	**VERIFY TROUBLESHOOTING OF DTC P1621 COMPLETED** • Clear DTC from memory using NGS tester generic OBD-II function. • Turn ignition key to OFF, then start engine. • Is the same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1622 [FS]

Z6U010201083W31

DTC P1622	Key ID number does not match
DETECTION CONDITION	• ID number stored in immobilizer unit (IU) and PCM does not match. This DTC is indicated only after immobilizer unit is replaced and reprogramming system.
POSSIBLE CAUSE	• Transformation of key ID number stored in PCM.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service bulletins and/or on-line repair information availability. • Is any repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
2	**VERIFY DTC P1622 DETECTED AGAIN** • Clear DTC from memory using NGS tester generic OBD-II function. • Turn ignition key to OFF, then start engine. • Is the same DTC present?	Yes	Go to next step.
		No	Go to Step 4.
3	**CHECK ENGINE IS STARTING NORMALLY USING ANOTHER REGISTERED KEY** • Does engine start with another registered key?	Yes	Previous key is defective. Discard it.
		No	Go to next step.
4	**VERIFY TROUBLESHOOTING OF DTC P1622 COMPLETED** • Clear DTC from memory using NGS tester generic OBD-II function. • Turn ignition key to OFF, then start engine. • Is the same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
5	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1623 [FS]

Z6U010201083W32

DTC P1623	Code word or key ID number read/write error in PCM
DETECTION CONDITION	• PCM internal EEPROM damaged.
POSSIBLE CAUSE	• PCM internal EEPROM damaged.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service bulletins and/or on-line repair information availability. • Is any repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
2	**VERIFY DTC P1623 DETECTED AGAIN** • Clear DTC from memory using NGS tester generic OBD-II function. • Turn ignition key to OFF, then start engine. • Is the same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
3	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1624 [FS]

Z6U010201083W33

DTC P1624	Immobilizer system communication counter = 0
DETECTION CONDITION	• PCM detected immobilizer system communication malfunction more than three times.
POSSIBLE CAUSE	• Engine was attempted to start more than three times under malfunction. • Code word mismatch

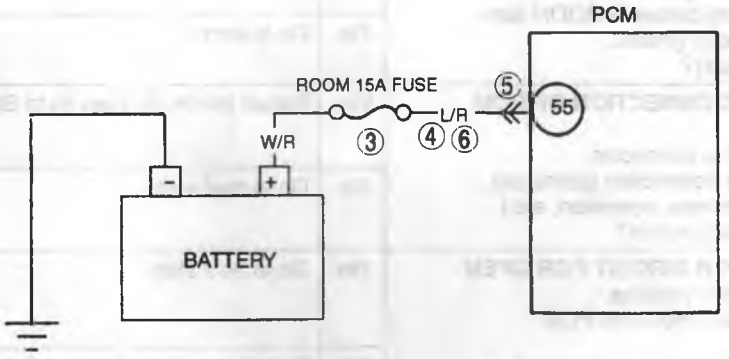
Diagnostic procedure

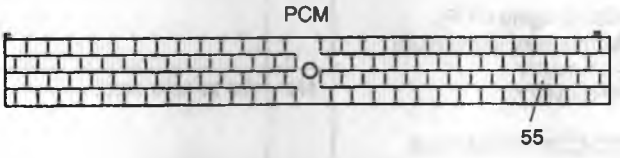
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service bulletins and/or on-line repair information availability. • Is any repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
2	**FOLLOW OTHER DETECTED DTC FIRST** • Turn ignition key to OFF and to START. • Has P1602 been detected?	Yes	Go to DTC P1602 inspection. (See01-02A-189 DTC P1602 [FS])
		No	Go to next step.
3	**INSPECT POOR CONNECTION OF IMMOBILIZER UNIT CONNECTOR** • Has P1621 been detected?	Yes	Go to DTC P1621 inspection. (See01-02A-192 DTC P1621 [FS])
		No	Go to next step.
4	**VERIFY TROUBLESHOOTING OF DTC P1624 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Turn ignition key to OFF, then start engine. • Is the same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
5	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1633 [FS]

Z6U010201083W34

DTC P1633	KAM voltage low
DETECTION CONDITION	• The PCM monitors the voltage of KAM terminal at PCM terminal 55. If the PCM detected **B+** battery positive terminal voltage is below **10 V** for **20 seconds**, the PCM determines that the KAM voltage circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC also detects by KOEO/KOER Self-Test.
POSSIBLE CAUSE	• Meltdown ROOM fuse. • Open circuit in wiring between battery positive terminal and PCM terminal 55 • Poor connection of PCM connector. • PCM malfunction





HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Z6U0102W395

Troubleshooting Hint

Keep alive memory description

- The PCM stores information in keep alive memory (a memory integrated circuit chip) about vehicle operating conditions, and then uses this information to compensate for component variability. The keep alive memory remains powered when the ignition switch is off so that this information is not lost.

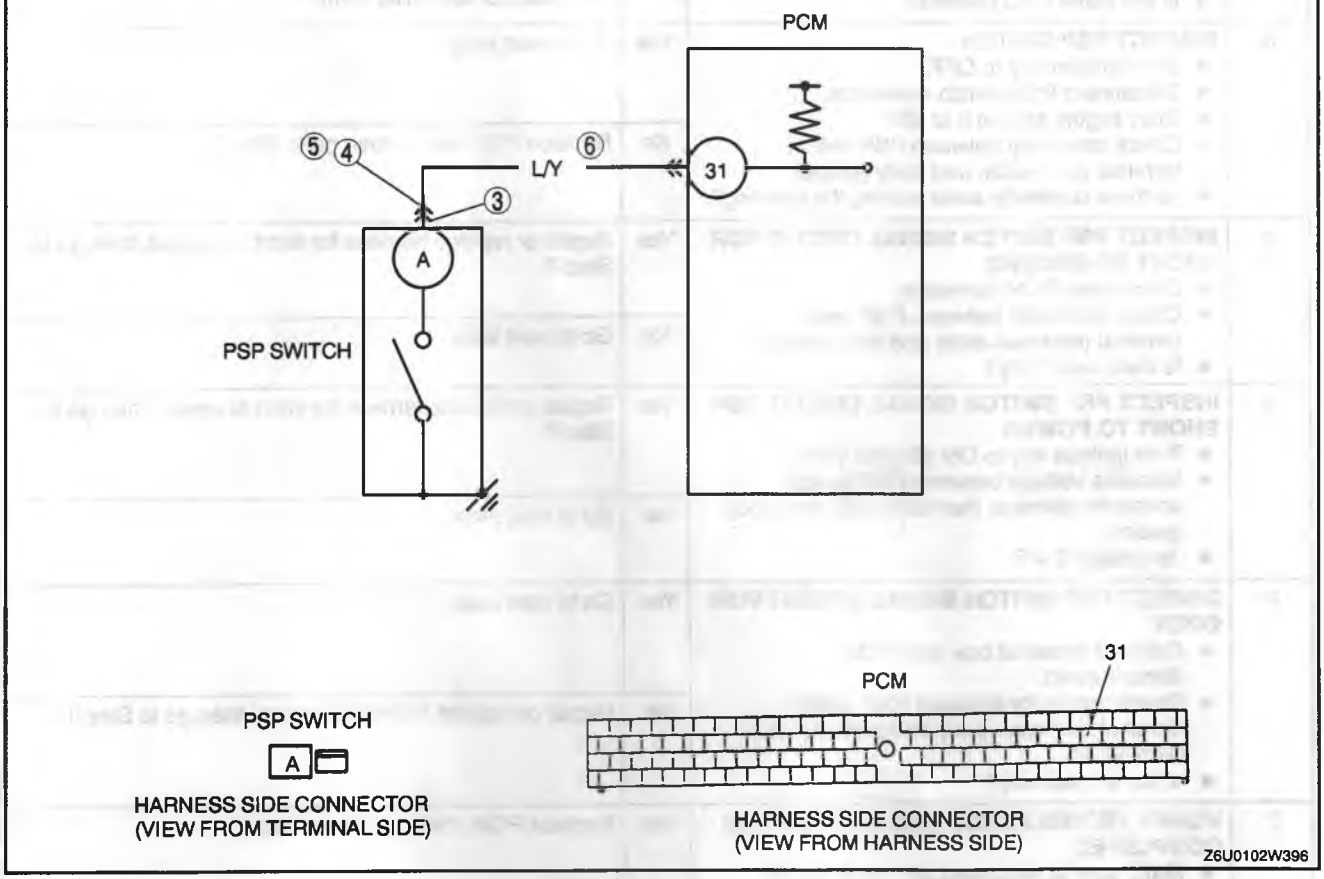
Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**INSPECT ROOM FUSE** • Turn ignition key to OFF. • Inspect ROOM fuse for failure and proper installation. • Is it okay?	Yes	Go to step 4.
		No	• If ROOM fuse has melt down, then go to next step. • If ROOM fuse is not installed correctly, install it correctly then go to Step 6.
3	**INSPECT MONITOR CIRCUIT FOR SHORT TO GROUND** • Disconnect battery cables. • Check continuity between ROOM fuse terminal and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground and install new fuse, then go to Step 6.
		No	Go to step 6.
4	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair terminals, then go to Step 6.
		No	Go to next step.
5	**INSPECT MONITOR CIRCUIT FOR OPEN** • Disconnect battery cables. • Connect breakout box with PCM disconnected. • Check continuity between ROOM fuse terminal and breakout box terminal 55. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P1633 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform DTC CONFIRMATION PROCEDURE. (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during KOEO or KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1650 [FS]

Z6U010201083W35

DTC P1650	Power steering pressure (PSP) switch out of Self-Test range
DETECTION CONDITION	• The PCM monitors the input voltages from PSP signal. If voltage of PSP switch signal is below or above specified, PCM determines that the PSP switch circuit has malfunctioned.
POSSIBLE CAUSE	• PSP switch malfunction • Connector or terminal malfunction • Short to ground circuit in wiring between PSP switch terminal A and PCM terminal 31 • Short to power circuit in wiring between PSP switch terminal A and PCM terminal 31 • Open circuit in wiring between PSP switch terminal A and PCM terminal 31 • PCM malfunction



Troubleshooting Hint

PSP switch description

- The PSP switch completes the ground, when the steering wheel is turning.

Item	Normal	Steering wheel turning
PSP V PID	Approx. 5V	Approx. 0V
PSP PID	LOW	HIGH
PSP switch	OFF	ON
PCM terminal 31	Approx. 5V	Approx. 0V

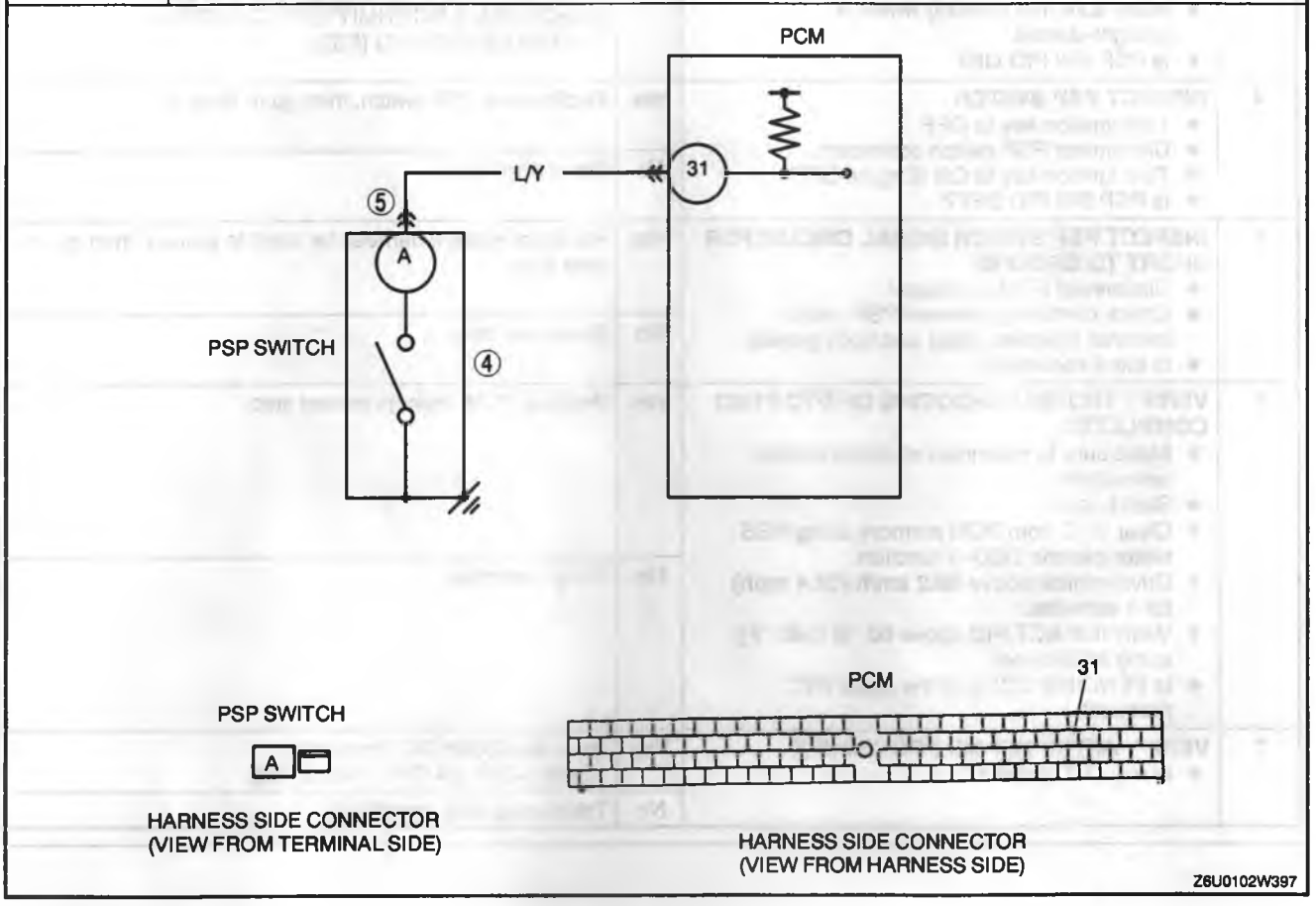
Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
2	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Turn ignition key to OFF then ON (Engine OFF). • Is the same DTC present?	Yes	Go to next step.
		No	Refer to intermittent concern. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
3	**INSPECT PSP SWITCH** • Turn ignition key to OFF. • Disconnect PSP switch connector. • Start engine and let it at idle. • Check continuity between PSP switch terminal (part-side) and body ground. • Is there continuity while turning the steering?	Yes	Go to next step.
		No	Replace PSP switch, then go to Step 7.
4	**INSPECT PSP SWITCH SIGNAL CIRCUIT FOR SHORT TO GROUND** • Disconnect PCM connector. • Check continuity between PSP switch terminal (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 7.
		No	Go to next step.
5	**INSPECT PSP SWITCH SIGNAL CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (Engine OFF). • Measure voltage between PSP switch connector terminal (harness-side) and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to Step 7.
		No	Go to next step.
6	**INSPECT PSP SWITCH SIGNAL CIRCUIT FOR OPEN** • Connect breakout box with PCM disconnected. • Check continuity between PSP switch terminal (harness-side) and breakout box terminal 31. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 11.
7	**VERIFY TROUBLESHOOTING OF DTC P1650 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform DTC CONFIRMATION PROCEDURE. (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during KOEO or KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1652 [FS]

Z6U010201083W36

DTC P1652	PSP switch circuit malfunction
DETECTION CONDITION	• The PCM monitors PSP switch signal at PCM terminal 31. If input voltage is low voltage (switch stays on) for **1 minute** when the VSS is **above 60.2 km/h {37.4 mph}** and ECT is **above 60 °C {140 °F}**, the PCM determines that PSP switch circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• PSP switch malfunction • Short to ground between PSP switch terminal and PCM terminal 31. • PCM malfunction



Z6U0102W397

Troubleshooting Hint

PSP switch description

- The PSP switch completes the ground, when the steering wheel is turning.

Item	Normal	Steering wheel turning
PSP V PID	Approx. 5 V	Approx. 0 V
PSP PID	LOW	HIGH
PSP switch	OFF	ON
PCM terminal 31	Approx. 5 V	Approx. 0 V

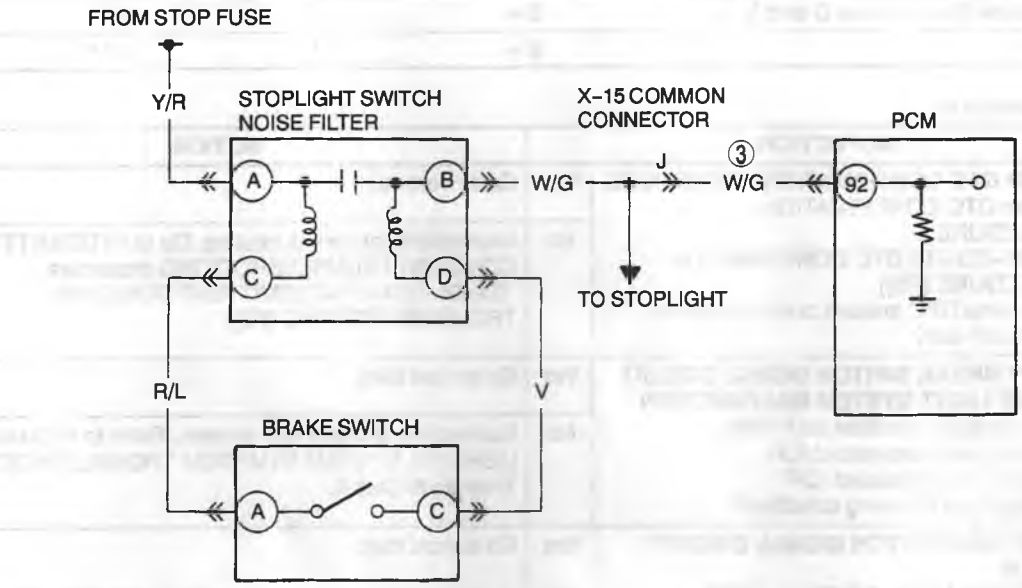
Diagnostic procedure

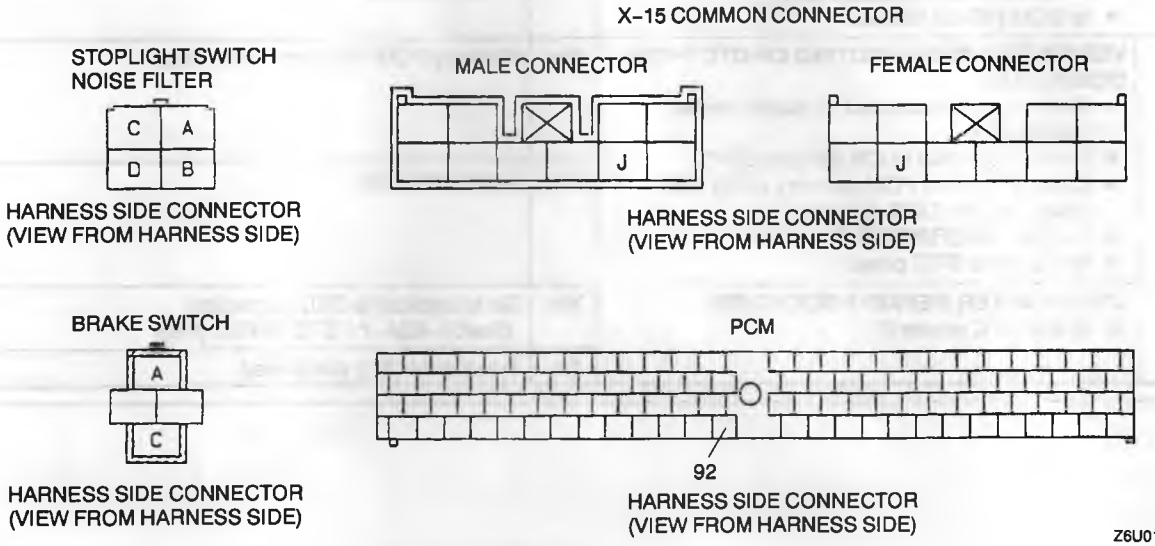
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Turn ignition key to ON (Engine OFF). • Access PSP SW PID using NGS tester. • Make sure that steering wheel is straight-ahead. • Is PSP SW PID ON?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
4	**INSPECT PSP SWITCH** • Turn ignition key to OFF. • Disconnect PSP switch connector. • Turn ignition key to ON (Engine OFF). • Is PSP SW PID OFF?	Yes	Replace the PSP switch, then go to Step 6.
		No	Go to next step.
5	**INSPECT PSP SWITCH SIGNAL CIRCUIT FOR SHORT TO GROUND** • Disconnect PCM connector. • Check continuity between PSP switch terminal (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to next step.
		No	Go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P1652 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Drive vehicle above **60.2 km/h {37.4 mph}** for **1 minutes**. • Verify that ECT PID above **60 °C {140 °F}** using NGS tester. • Is PENDING CODE of the same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

DTC P1703 [FS]

Z6U010201083W37

DTC P1703	Break switch circuit out of Self-Test range
DETECTION CONDITION	• If the PCM detects the brake switch voltage at PCM terminal change ON to OFF or OFF to ON while KOER Self-Test, the PCM determines that a circuit has malfunctioned.
POSSIBLE CAUSE	• Brake switch malfunction • Stoplight switch noise filter • Connector or terminal malfunction • Open circuit between STOP fuse and stoplight switch terminal A • Open circuit between stoplight switch noise filter terminal C and brake switch A • Open circuit between stoplight switch noise filter terminal D and brake switch C • Short to power circuit between stoplight switch noise filter terminal D and brake switch C • Open circuit between stoplight switch noise filter terminal B and PCM terminal 92 • Short to ground circuit between stoplight switch noise filter terminal B and PCM terminal 92





Z6U0102W398

Troubleshooting Hint

Brake switch description

- A normally open type brake switch is used. Therefore when depress the brake pedal, the brake switch become ON (continuity), and release the brake pedal, the brake switch become OFF (no continuity).
- The brake switch signal is used for the following controls.
  - —Idle air control
  - —Fuel injector control

Brake switch specification

Brake pedal condition	Depressed	Released
Brake switch	ON	OFF
Brake switch terminal C	B+	0 V
BOO PID	ON	OFF
Stoplight switch noise filter terminal D and B	B+	0 V
PCM terminal 92	B+	0 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is the same DTC present during KOEO or KOER self-test?	Yes	Go to next step.
		No	Intermittent concern is existing. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**CLASSIFY BREAK SWITCH SIGNAL CIRCUIT OR BRAKE LIGHT SYSTEM MALFUNCTION** • Verify stoplight condition as follows — Brake pedal depressed: ON — Brake pedal released: OFF • Is stoplight as following condition?	Yes	Go to next step.
		No	Malfunction at brake light system. Refer to SIGNAL LIGHTING SYSTEM SYMPTOM TROUBLESHOOTING. Then go to Step 4.
3	**CHECK BRAKE SWITCH SIGNAL CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Access BOO PID using NGS tester. • Verify BOO PID as follows — Brake pedal depressed: ON — Brake pedal released: OFF • Is BOO PID as follows?	Yes	Go to next step.
		No	• If BOO PID stays ON, repair for short to power, then go to next step. • If BOO PID stays OFF, repair for open circuit, then go to next step.
4	**VERIFY TROUBLESHOOTING OF DTC P1703 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOER/KOEO Self-Test. • Is the same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
5	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02A-24 DTC TABLE [FS])
		No	Troubleshooting completed.

01-02B ON-BOARD DIAGNOSTIC [ENGINE CONTROL SYSTEM (KL)]

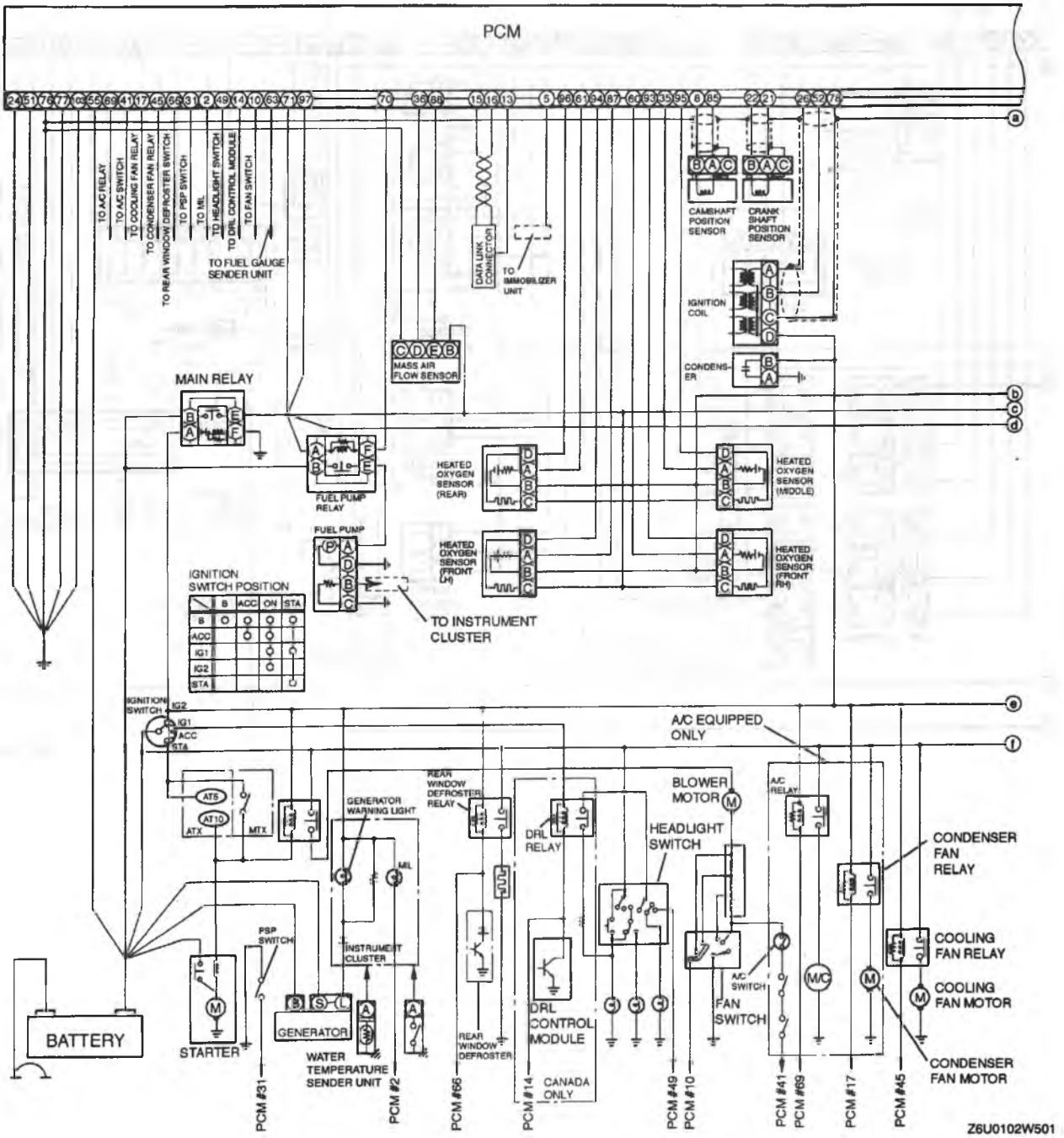
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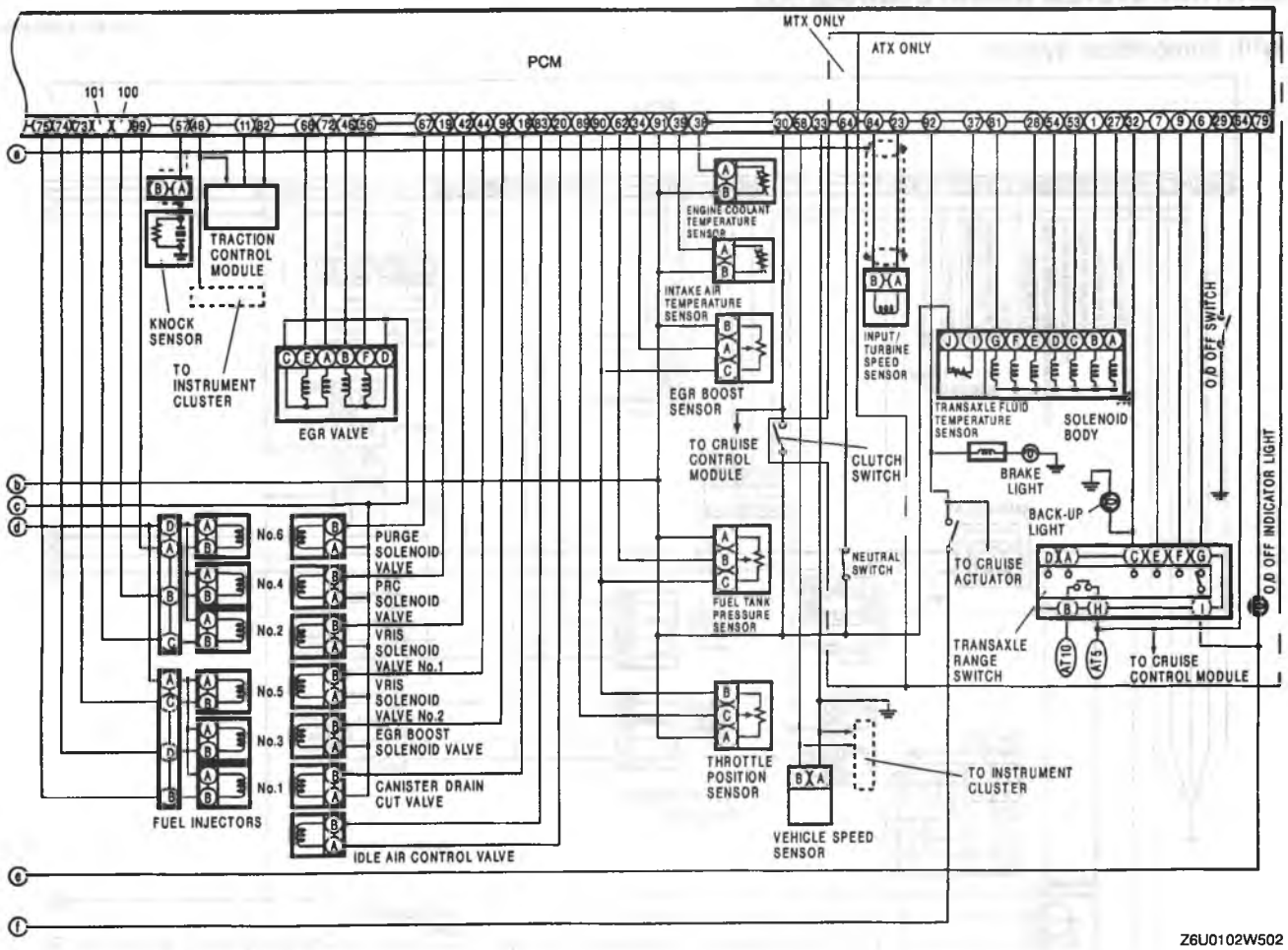
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CONTROL SYSTEM WIRING DIAGRAM [KL]

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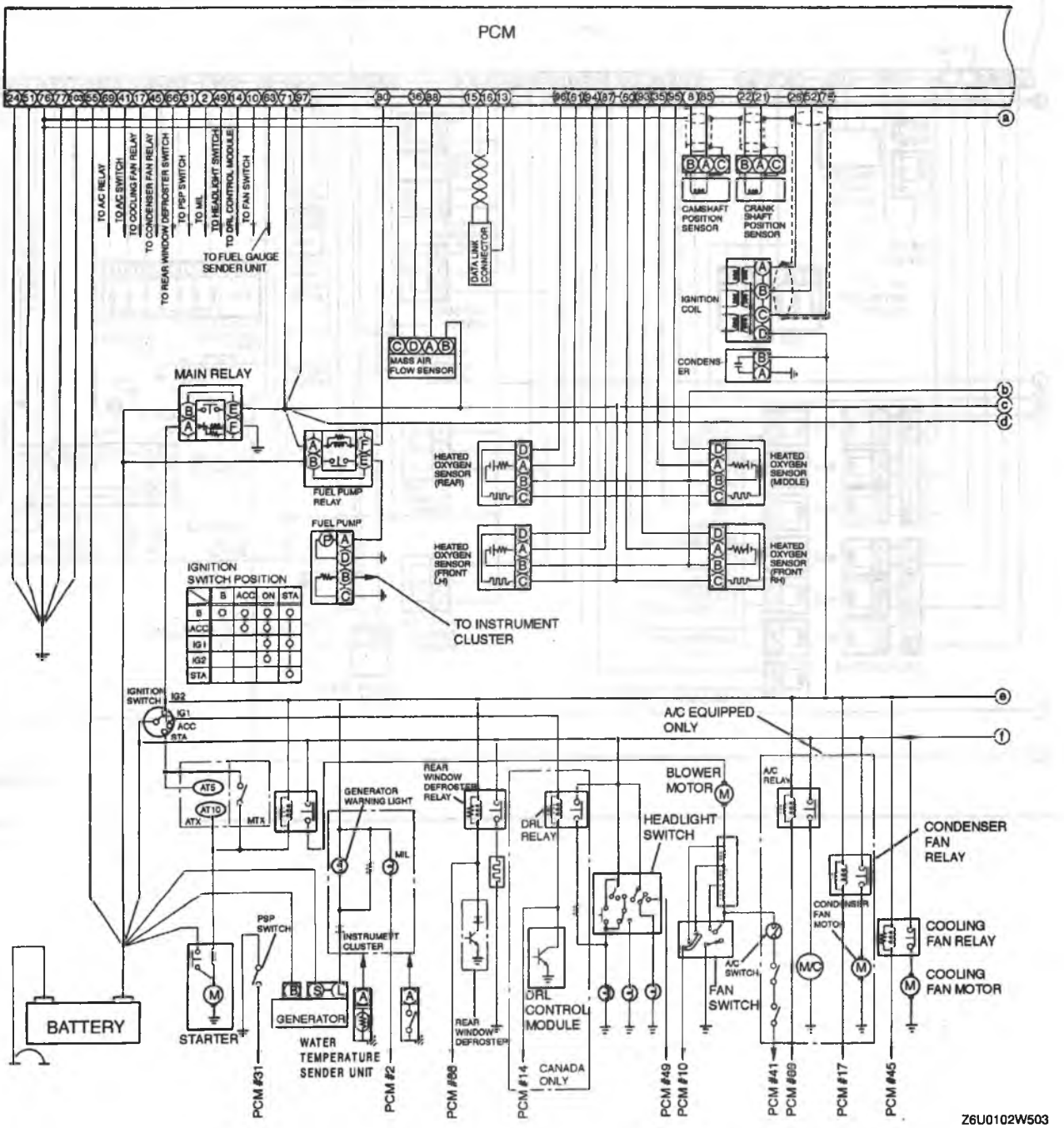
With immobilizer system

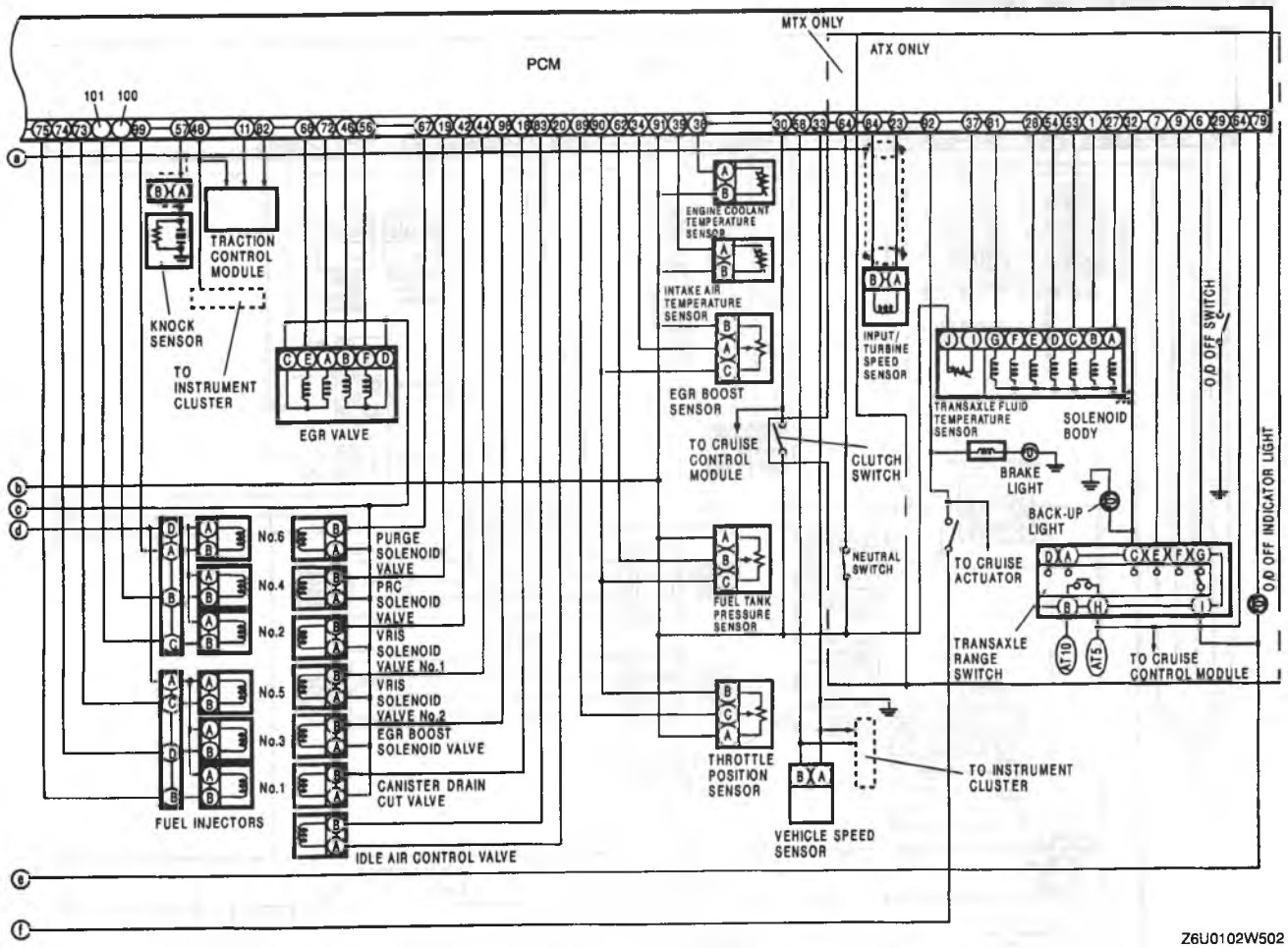




Z6U0102W502

Without immobilizer system




MTX ONLY
ATX ONLY
PCM
101
100
TRACTION CONTROL MODULE
KNOCK SENSOR
TO INSTRUMENT CLUSTER
EGR VALVE
ENGINE COOLANT TEMPERATURE SENSOR
INTAKE AIR TEMPERATURE SENSOR
EGR BOOST SENSOR
TO CRUISE CONTROL MODULE
FUEL TANK PRESSURE SENSOR
THROTTLE POSITION SENSOR
VEHICLE SPEED SENSOR
INPUT/ TURBINE SPEED SENSOR
CLUTCH SWITCH
NEUTRAL SWITCH
TRANSAXLE FLUID TEMPERATURE SENSOR
SOLENOID BODY
BRAKE LIGHT
BACK-UP LIGHT
TO CRUISE ACTUATOR
TRANSAXLE RANGE SWITCH
AT10
AT5
TO CRUISE CONTROL MODULE
O/D OFF SWITCH
O/D OFF INDICATOR LIGHT
TO INSTRUMENT CLUSTER
No.6
No.4
No.2
No.5
No.3
No.1
PURGE SOLENOID VALVE
PRC SOLENOID VALVE
VRIS SOLENOID VALVE No.1
VRIS SOLENOID VALVE No.2
EGR BOOST SOLENOID VALVE
CANISTER DRAIN CUT VALVE
IDLE AIR CONTROL VALVE
FUEL INJECTORS
Z6U0102W502

CONTROL SYSTEM DEVICE AND CONTROL RELATIONSHIP CHART [KL]

Z6U010218881W22

× : Applicable

	Component	Item														
		Idle air control	Variable resonance induction (VRIS) control	Fuel injection control	Fuel pump control	Pressure regulator control (PRC)	Electronic spark advance (ESA) control	EGR control	Purge control	Heated oxygen sensor (HO2S) heater control	A/C cut-off control	Electrical fan control	Traction control	Monitoring system	
														Evaporative system monitor	EGR system monitor
Input	Mass air flow sensor			×			×	×	×				×	×	×
	Camshaft position sensor			×*			×*						×*	×*	×*
	Crankshaft position sensor	×	×	×*	×	×	×*	×	×		×	×	×*	×*	×*
	Throttle position sensor	×		×		×	×	×	×		×		×	×	×
	Engine coolant temperature sensor	×		×		×	×	×	×		×	×	×	×	×
	Intake air temperature sensor	×		×		×	×	×	×	×		×	×	×	
	Knock sensor			×			×								
	Heated oxygen sensor			×				×	×				×		
	Vehicle speed sensor			×				×	×			×		×	×
	EGR boost sensor													×	×
	Fuel gauge sender unit													×	
	Power steering pressure switch	×		×							×				
	Neutral switch (MTX only)	×		×		×	×	×	×						
	Clutch switch (MTX only)	×		×		×	×	×	×						
	Transaxle range switch (ATX only)	×		×		×	×	×	×						
	Brake switch	×		×											
	Ignition switch													×	
	A/C switch, Refrigerant pressure switch (A/C equipped only)	×		×							×	×			
	ABS/TCS control module											×			
Output	Idle air control valve	×													
	VRIS solenoid valve No.1, No.2		×												
	Fuel injector			×									×		
	Fuel pump relay				×										
	PRC solenoid valve					×									
	Ignition coil						×						×		
	EGR valve							×							
	Purge solenoid valve								×						
	Heated oxygen sensor heater									×					
	EGR boost sensor solenoid valve														×
	Canister drain cut valve (CDCV)													×	
	A/C relay										×				
	Cooling fan relay											×			
	Condenser fan relay											×			
	ABS/TCS control module											×			

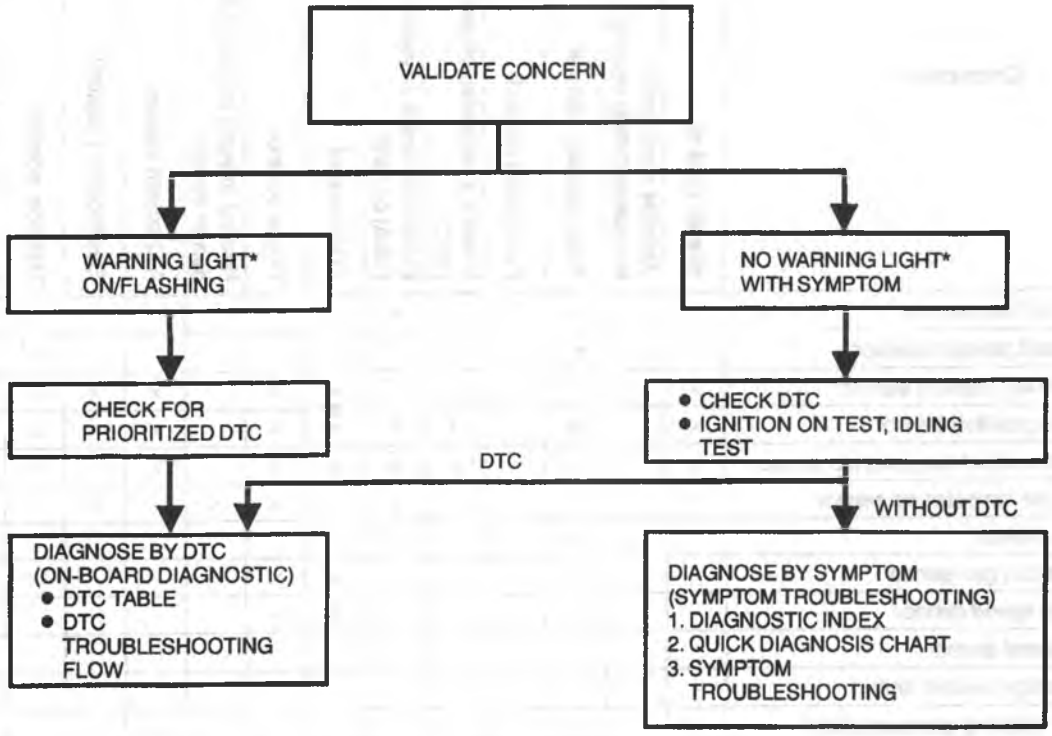
* The crankshaft position sensor signal has priority in the engine speed detection.

Z6U0102W239

FOREWORD [KL]

Z6U010218881W23

- When the customer reports a vehicle malfunction, check the malfunction indicator lamp (MIL) indication and diagnostic trouble code (DTC), then diagnose the malfunction according to following flowchart.
  - —If the DTC exists, diagnose the applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL].)
  - —If the DTC does not exist and the MIL does not illuminate or flash, diagnose the applicable symptom troubleshooting. (See 01-03B-5 SYMPTOM DIAGNOSTIC INDEX [KL].)



Z6U0102W316

* : Malfunction Indicator lamp (MIL), Generator Warning Light, Security Light

OBD-II DESCRIPTIONS [KL]

Z6U010218881W24

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

OBD-II GENERIC FUNCTION [KL]

Z6U010218881W25

- Use these functions by selecting "GENERIC OBD II FUNCTIONS" from the NGS tester menu screen. These functions enable you to monitor on-board diagnostic system data and 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".

OBD-II SPECIFIC FUNCTION [KL]

Z6U010218881W26

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

OBD-II PENDING TROUBLE CODES [KL]

Z6U010218881W27

- 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 stores the DTC.

OBD-II FREEZE FRAME DATA [KL]

Z6U010218881W28

- 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.

OBD-II ON-BOARD SYSTEM READINESS TEST [KL]

Z6U010218881W29

- 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.

OBD-II DIAGNOSTIC MONITORING TEST RESULTS [KL]

Z6U010218881W30

- 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.

OBD-II READ/CLEAR DIAGNOSTIC TEST RESULTS [KL]

Z6U010218881W31

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

OBD-II PARAMETER IDENTIFICATION (PID) ACCESS [KL]

Z6U010218881W32

- 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.

KEY ON ENGINE OFF (KOEO) SELF-TEST [KL]

Z6U010218881W33

- Key On Engine Off (KOEO) Self-Test is a functional test of the powertrain control module performed on demand with the key on and the engine off. This test will perform checks on certain sensor and actuator circuits. A fault must be present at the time of testing for the KOEO Self-Test to detect the fault. When a fault is detected, a Diagnostic Trouble Code (DTC) will be output on the data link at the end of the test when requested by a scan tool.

KEY ON ENGINE RUNNING (KOER) SELF-TEST [KL]

Z6U010218881W34

- Key On Engine Running (KOER) Self-Test is a functional test of the powertrain control module performed on demand with the key on engine running and vehicle stopped. A check of certain inputs and outputs is made during operating conditions and at normal temperature. The brake pedal position, transmission control and power steering switch tests are part of KOER On-Demand Self-Test and MUST be performed during this operation if applicable. These are described below. A fault must be present at the time of testing KOER On-Demand Self-Test to detect the fault. When a fault is detected, a Diagnostic Trouble Code (DTC) will be output on the data link at the end of the test when requested by a scan tool.

Brake On/Off Test

- This tests the ability of the powertrain control system to detect a change of state in the stoplight switch. Brake pedal MUST briefly be applied and released on all vehicles equipped with Brake Pedal Position input. This is done during KOER On-Demand Self-Test.

Transaxle Control Switch Test

- This tests the ability of the powertrain control system to detect a change of state in the O/D OFF switch. Switch MUST briefly be cycled on all vehicles equipped with O/D OFF switch. This is done during KOER On-Demand Self-Test.

Power Steering Pressure (PSP) Switch Test

- This tests the ability of the powertrain control system to detect a change in power steering fluid pressure. The steering wheel MUST briefly be turned at least 1/4 of a revolution on vehicles equipped with a power steering pressure (PSP) switch or sensor. This is done during KOER On-Demand Self-Test.

CONTINUOUS MEMORY SELF-TEST

Z6U010218881W35

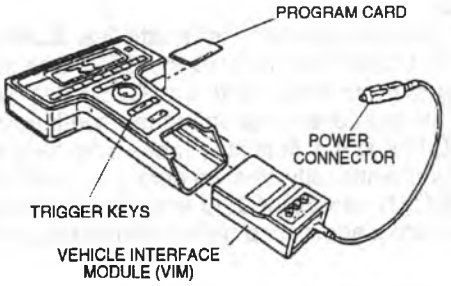
- Testing for Continuous Memory DTCs is a functional test of the powertrain control module performed under any condition (engine running or off) with the key on. Unlike the KOEO and KOER self tests, which can only be activated on demand, the Continuous Self Test is always active. A fault does not need to be present at the time of testing for Continuous DTCs and is therefore, especially valuable when diagnosing intermittent faults. This test will detect failures contributing to drivability or emission concern. The vehicle may need to be driven or the OBD-II Drive Cycle completed to allow the PCM to detect a fault. When a fault is stored in memory, a Diagnostic Trouble Code (DTC) will be output on the data link at the end of the test when requested by a scan tool.
- There are two types of Continuous DTCs. The first type is an emission related malfunction indicator lamp (MIL) code in the instrument cluster. The second is a non emission related non-MIL code which will never illuminate the cluster indicator.
- For emission related MIL codes, the PCM will store the DTC in continuous memory when a fault is detected for the first time. At this point the DTC will not illuminate the MIL and is now considered a pending code. The purpose of pending codes is to assist in repair verification by reporting a pending DTC after one drive cycle. If the same fault is detected after the next ignition start-run cycle, the emission related MIL code will illuminate the MIL. The MIL will remain on even if the fault is intermittent. The MIL will be extinguished if the fault Is not present through three consecutive drive cycles or a PCM reset is performed. Also, an emission related pending MIL and non emission related non-MIL code will be erased after approximately 40-80 vehicle warm-up cycles or a PCM reset.
- Any scan tool that meets OBD-II requirements can access Continuous Memory to retrieve emission related MIL DTCs. However, not all scan tools access pending and non emission related non-MIL DTC's in the same way. If using the NGS tester, all MIL (including pending) and non-MIL codes are retrieved together on the same screen.
- During most diagnostic procedures in this manual, it is required that all DTCs be retrieved and cleared. Consult the instruction manual from the tool manufacturer for specific instructions.

ON-BOARD DIAGNOSTIC TEST [KL]

NGS Tester Hook-up Procedure

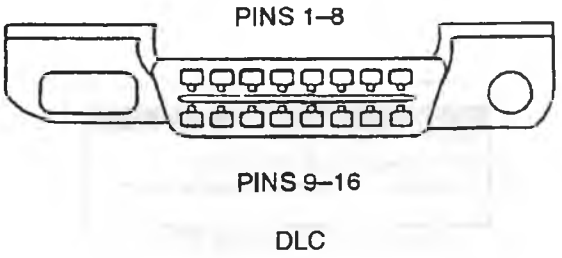
Note
- Make sure the ignition key is OFF.

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



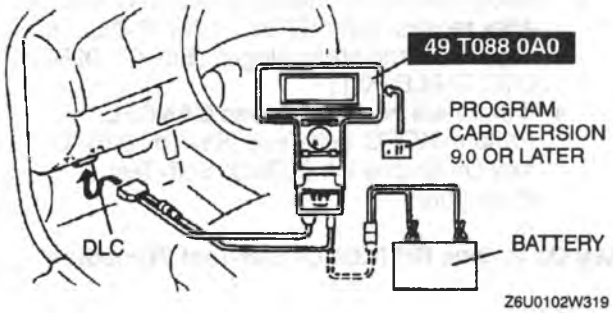
Z6U0102W317

2. Plug the NGS OBD-II adapter into the vehicle interface module and the large 16-pin connector into the vehicle DLC located under the dash board on the left side of the steering shaft.



Z6U0102W318

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.



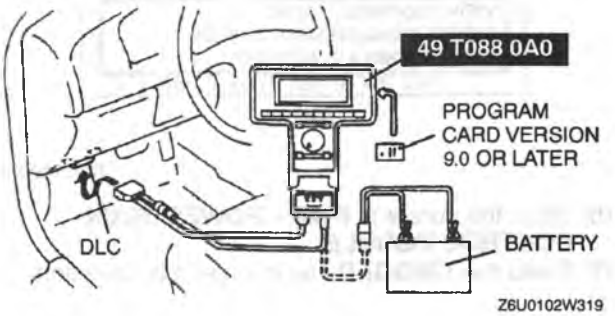
Z6U0102W319

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

Z6U010218881W36

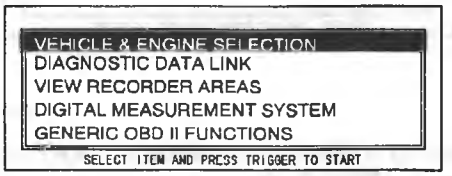
DTCs Reading Procedure

1. Start engine and keep it running.
   - If engine will not start, turn the ignition key to ON (Engine OFF) during the procedure.
2. Perform the necessary vehicle preparation and visual inspection.
3. Hook the NGS tester up to the vehicle.



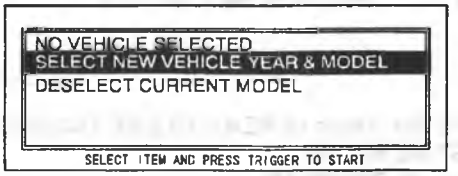
Z6U0102W319

4. Move the cursor to **VEHICLE & ENGINE SELECTION**.
5. Press the **TRIGGER** key to enter this selection.



Z6U0102W320

6. Move the cursor to **SELECT NEW VEHICLE YEAR & MODEL**.
7. Press the **TRIGGER** key to enter this selection.



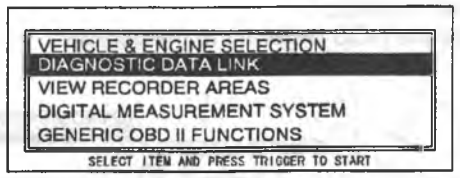
Z6U0102W321

8. Move the cursor to **2001-VIN#10:Z**.
9. Press the **TRIGGER** key to enter this selection.
10. Move the cursor to the appropriate model.
11. Press the **TRIGGER** key to choose the model.

Note
- Make sure the selected vehicle is correct.
- A vehicle selection screen showing the selected vehicle will be displayed.

12. Move the cursor to the vehicle selected.

13. Press the **TRIGGER** key.
14. Move the cursor to **DIAGNOSTIC DATA LINK** on the main menu screen.
15. Press the **TRIGGER** key to enter into menu system diagnostics.



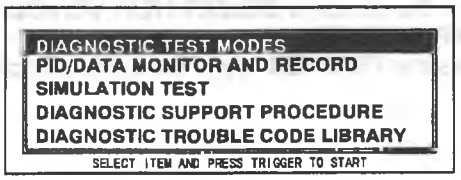
Z6U0102W322

16. Move the cursor to **PCM – POWERTRAIN CONTROL MODULE**.
17. Press the **TRIGGER** key to enter this selection.



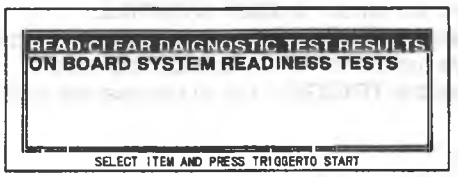
Z6U0102W323

18. Move the cursor to **DIAGNOSTIC TEST MODES**.
19. Press the **TRIGGER** key to enter this selection.



Z6U0102W324

20. Move the cursor to **READ/CLEAR DIAGNOSTIC TEST RESULTS**.
21. Press the **TRIGGER** key to enter this selection.



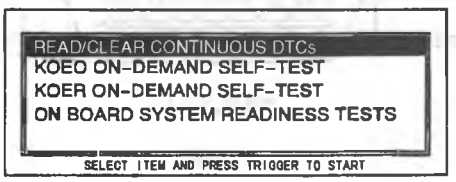
Z6U0102W325

22. Press **START**.
23. Retrieve DTCs as follows:
    1. Continuos DTCs (See 01-02B-12 Read/Clear Continuous DTCs Self-Test Procedure.)
    2. KOEO DTCs (See 01-02B-12 Key On Engine Off (KOEO) Self-Test Procedure)
    3. KOER DTCs (See 01-02B-13 Key On Engine Running (KOER) Self-Test Procedure)

Read/Clear Continuous DTCs Self-Test Procedure

Note
- The first test to run is Read/Clear Continuous DTC Self-Test. Record the DTCs on a piece of paper and proceed to the KOEO Self-Test.
- The purpose of recording the continuous DTCs at this time is to make sure they are not unintentionally cleared during any KOEO or KOER service. KOEO and KOER codes are always addressed before continuous codes.

1. Perform the NGS tester hook-up procedure. (See to 01-02B-11 NGS Tester Hook-up Procedure.)
2. Perform the "Reading DTCs Procedure". (See 01-02B-11 DTCs Reading Procedure.)
3. Move the cursor to READ/CLEAR DIAGNOSTIC TEST RESULTS.
4. Press the trigger key to enter this selection.



Z6U0102W326

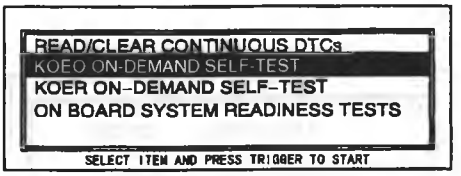
5. Press **START**.
6. Follow operating instruction from the menu.
   - If there are DTC(s), refer to Diagnostic Trouble Code Table for further diagnosis information. After repairs, clear DTCs. Press "**C-ALL**" (Key #7) button and press trigger. (See 01-02B-24 DTC TABLE [KL].)
   - If there are no codes, press **CANCEL**. Perform KOEO Self-Test. (See 01-02B-12 Key On Engine Off (KOEO) Self-Test Procedure.)

Key On Engine Off (KOEO) Self-Test Procedure

Note
- Make sure the A/C switch is OFF during KOEO Self-Test. If the A/C switch is ON during this test, DTC P1464 will be indicated on the NGS tester.

1. Perform the NGS tester hook-up procedure. (See 01-02B-11 NGS Tester Hook-up Procedure.)
2. Perform the "Reading DTCs Procedure". (See 01-02B-11 DTCs Reading Procedure.)

3. Move the cursor to **KOEO ON-DEMAND SELF-TEST**.
4. Press the trigger key to enter this selection.



Z6U0102W327

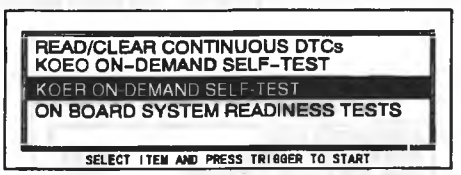
5. Note any KOEO DTCs.
6. Press **CANCEL**. Perform KOER Self-Test.

Key On Engine Running (KOER) Self-Test Procedure

Note

- Make sure the A/C switch is OFF during KOER Self-Test. If the A/C switch is ON during this test, DTC P1464 will be indicated on the NGS tester.
- The brake pedal must be depressed and released after KOER Self-Test is initiated. If not performed, DTC P1703 will be indicated on the NGS tester.
- The steering wheel must be turned to the right and left after KOER Self-Test is initiated. If not performed, DTC P1650 will be indicated on the NGS tester.
- The O/D OFF switch must be pushed and released after KOER Self-Test is initiated. If not performed, DTC P1780 will be indicated on the NGS tester.
- Start the engine and bring up to normal operating temperature before running the KOER Self-Test.

1. Perform the NGS tester hook-up procedure. (See 01-02B-11 NGS Tester Hook-up Procedure.)
2. Perform the "Reading DTCs Procedure". (See 01-02B-11 DTCs Reading Procedure.)
3. Move the cursor to **KOER ON-DEMAND SELF-TEST**.
4. Press the trigger to enter this selection.



Z6U0102W328

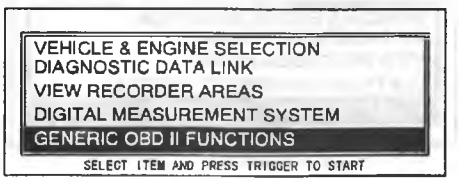
5. Start engine and bring up to normal operating temperature. Press **START**.
6. Follow operating instruction from the menu and perform Brake On/Off (BOO), O/D OFF switch and PSP cycling test, if equipped.
7. Note any KOER DTCs.
8. Press **CANCEL** several times to return to the main menu.

Pending Trouble Code Access Procedure

Note

- Start engine and keep it running. If engine will not start, turn the ignition key to ON (Engine OFF) during the procedure.

1. Perform the NGS tester hook-up procedure. (See 01-02B-11 NGS Tester Hook-up Procedure.)
2. Move the cursor to **GENERIC OBD II FUNCTIONS**.
3. Press the **TRIGGER** key to enter this selection.



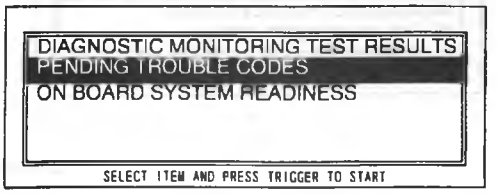
Z6U0102W329

4. Press **CONT**.



Z6U0102W330

5. Turn the menu dial clockwise to scroll the screen.
6. Move the cursor to **PENDING TROUBLE CODES**.
7. Press the **TRIGGER** key to enter this selection.

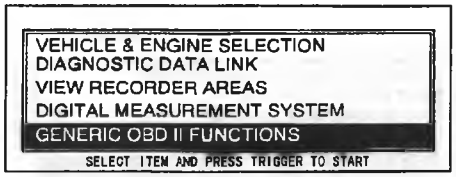


Z6U0102W331

8. Press **START**.
9. 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 OBD II 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
1. Perform the NGS tester hook-up procedure. (See 01-02B-11 NGS Tester Hook-up Procedure.)
2. Move the cursor to **GENERIC OBD II FUNCTIONS**.
3. Press the **TRIGGER** key to enter this selection.



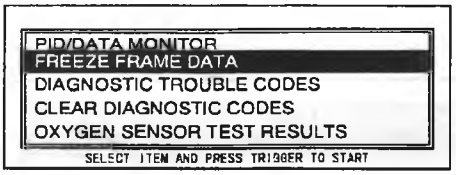
Z6U0102W329

4. Press **CONT**.



Z6U0102W330

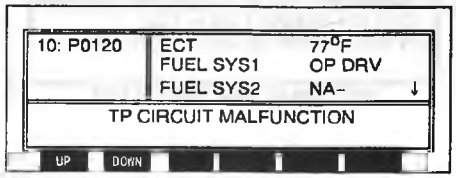
5. Move the cursor to **FREEZE FRAME PID DATA**.
6. Press the **TRIGGER** key to enter this selection.



Z6U0102W332

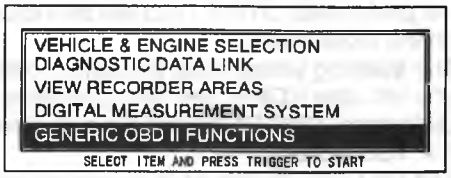
7. Record the FREEZE FRAME PID DATA.

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



Z6U0102W333

On-Board System Readiness Tests Access Procedure
1. Perform the NGS tester hook-up procedure. (See 01-02B-11 NGS Tester Hook-up Procedure.)
2. Move the cursor to **GENERIC OBD II FUNCTIONS**.
3. Press the **TRIGGER** key to enter this selection.



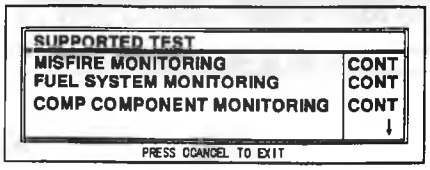
Z6U0102W329

4. Press **TESTS**.



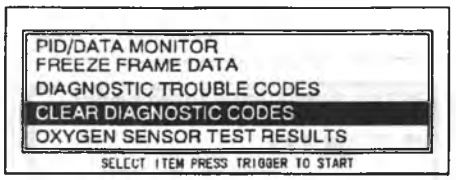
Z6U0102W330

5. Monitor the OBD-II systems operating status.



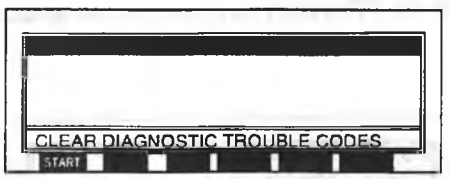
Z6U0102W334

6. 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 OBD II FUNCTIONS**.
   (3) Press the **TRIGGER** key to enter this selection.
   (4) Press **CONT**.
   (5) Move the cursor to **CLEAR DIAGNOSTIC CODES**.
   (6) Press the **TRIGGER** key to enter this selection.



Z6U0102W335

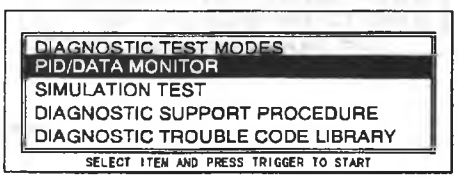
   (7) Press **START**.



Z6U0102W336

PID/DATA Monitor and Record Procedure

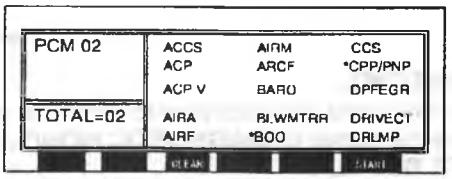
1. Perform the NGS tester hook-up procedure. (See 01-02B-11 NGS Tester Hook-up Procedure.)
2. Perform the "Reading DTCs Procedure". (See 01-02B-11 DTCs Reading Procedure.)
3. Turn the ignition key to ON (Engine OFF) or start engine.
4. Move the cursor to **PID/DATA MONITOR AND RECORD**.
5. Press the **TRIGGER** key to enter this selection.



Z6U0102W337

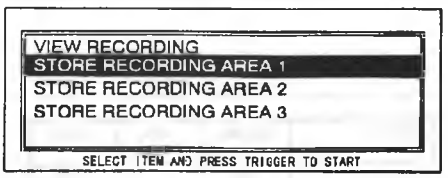
6. Move the cursor to PID values to view.
7. Press the **TRIGGER** key. A star symbol will appear next to the item when it is selected.

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



Z6U0102W338

8. Press **START** to begin.
9. When ready to capture and store the selected PIDs, press the **TRIGGER** key.
10. Press the **TRIGGER** key again when ready to save information.
11. Move the cursor to **STORE RECORDING AREA 1**.
12. Press the **TRIGGER** key.



Z6U0102W339

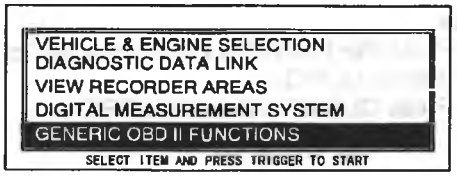
13. Follow the instructions displayed on the NGS tester to save the recording data.

Diagnostic Monitoring Test Results Access Procedure

Note
- This is a generic function.

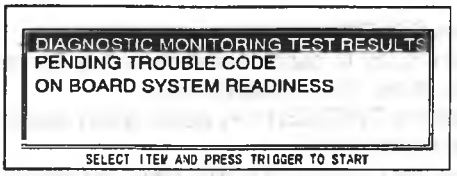
1. Perform the NGS tester hook-up procedure.
2. Move the cursor to **GENERIC OBD II FUNCTIONS**.

3. Press the **TRIGGER** key to enter this selection.



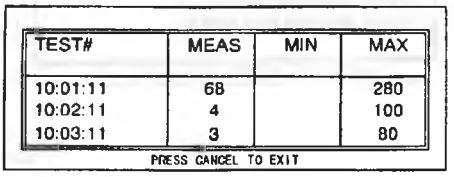
Z6U0102W329

4. Press **CONT**.
5. Turn the menu dial clockwise to scroll the screen.
6. Move the cursor to **DIAGNOSTIC MONITORING TEST RESULTS**.
7. Press the **TRIGGER** key to enter this selection.



Z6U0102W340

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



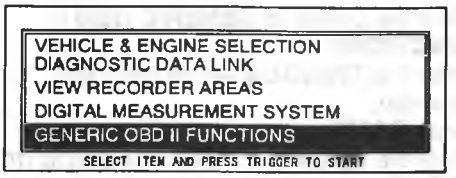
Z6U0102W341

Oxygen Sensor Test Results Access Procedure

Note
- This is a generic function.

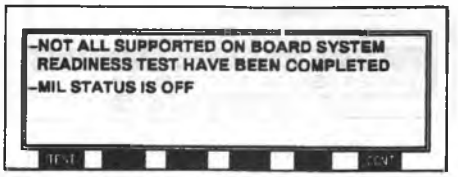
1. Perform the NGS Tester Hook-up Procedure.
2. Move the cursor to **GENERIC OBD II FUNCTIONS**.

3. Press the **TRIGGER** key to enter this selection.



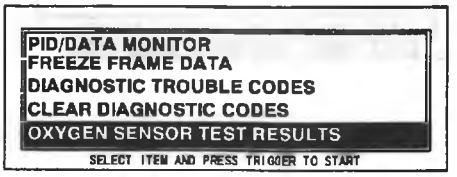
Z6U0102W329

4. Press **CONT**.



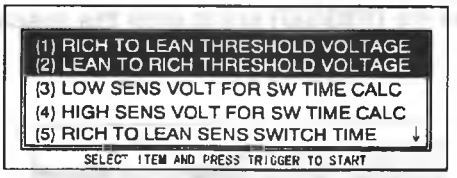
Z6U0102W330

5. Move the cursor to **OXYGEN SENSOR TEST RESULTS**.
6. Press the **TRIGGER** key to enter this selection.



Z6U0102W342

7. Select **RICH TO LEAN THRESHOLD VOLTAGE** or **LEAN TO RICH THRESHOLD VOLTAGE**.
8. Press the **TRIGGER** key.



Z6U0102W343

9. Read voltage.

BAMK	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			↓

Z6U0102W344

10. Press the cancel key.

DTC CONFIRMATION PROCEDURE [KL]

Z6U010218881W37

STEP	INSPECTION		ACTION
1	**RECORD CONTINUOUS MEMORY DTC AND FREEZE FRAME DATA** ● Turn ignition key to ON (Engine OFF). ● Connect NGS tester to DLC. ● Retrieve all stored DTCs. ● Are there any DTCs present?	Yes	Record all stored DTCs (Continuous Memory DTC) and Freeze Frame Data on repair order, then go to next step.
		No	Go to next step.
2	**VERIFY RELATED REPAIR INFORMATION** ● Check for related Service Bulletins and/or on-line repair information availability. ● Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. ● If vehicle is not repaired, go to next step.
		No	Go to next step.
3	**PERFORM KEY ON ENGINE OFF (KOEO) SELF-TEST** ● Start engine. ● Warm up engine completely. ● Turn off all electrical loads. ● Perform KOEO SELF-TEST PROCEDURE. (See 01-02B-9 KEY ON ENGINE OFF (KOEO) SELF-TEST [KL]) ● Are there any KOEO DTCs present?	Yes	Repair KOEO DTC. (See 01-02B-24 DTC TABLE [KL])
		No	Go to next step.
4	**PERFORM KEY ON ENGINE RUNNING (KOER) SELF-TEST** ● Start engine. ● Perform KOER SELF-TEST PROCEDURE. (See 01-02B-10 KEY ON ENGINE RUNNING (KOER) SELF-TEST [KL]) ● Are there any KOER DTCs present?	Yes	Repair KOER DTC. (See 01-02B-24 DTC TABLE [KL])
		No	● If Continuous Memory DTC is present at Step 1, return to applicable DTC troubleshooting procedure step. ● If Continuous Memory DTC is not present at Step 1, go to symptom troubleshooting.

OBD II DRIVE MODE [KL]

Z6U010218881W38

OBD II Drive Mode Outline

Performing the drive mode checks the OBD II system for proper operation and must be performed to ensure that no additional DTCs are present. During drive mode, the following systems are checked:

- EGR system
- Oxygen sensor (HO2S) and Oxygen sensor heater
- Three way catalytic converter (TWC)
- Fuel, misfire and evaporative emission (EVAP) control system

You have two options for conducting OBD II drive mode:

- Standard drive mode
- Individual system repair verification drive mode

Caution

- **While performing the drive mode, always operate the vehicle in a safe and lawful manner.**
- **When the NGS tester is used to observe monitor system status while driving, be sure to have another technician with you, or record the data in the NGS tester by using the PID/DATA MONITOR AND RECORD function and check later.**

Note

- Vehicle speed and engine speed detected by the PCM may differ from that indicated by the speedometer and tachometer. Use the NGS tester to monitor vehicle speed.
- Once started, the engine must not be turned "OFF" during the drive mode.
- NGS tester can be used at anytime through the course of drive mode to monitor the completion status. Monitoring can be done by viewing the ON BOARD SYSTEM READINESS menu or TRIP PID.

Drive Mode Implementation Condition
Each OBD II system is monitored (for **less than 1 minute**) when the specifications below are met.

Note
- HO2S/TWC monitoring will begin **5 minutes** after starting the engine.
- EVAP system monitoring will begin **4 minutes** from engine start, and quit monitoring after **10 minutes**. If monitoring is required after **10 minutes**, the engine must be turned off, then restarted.

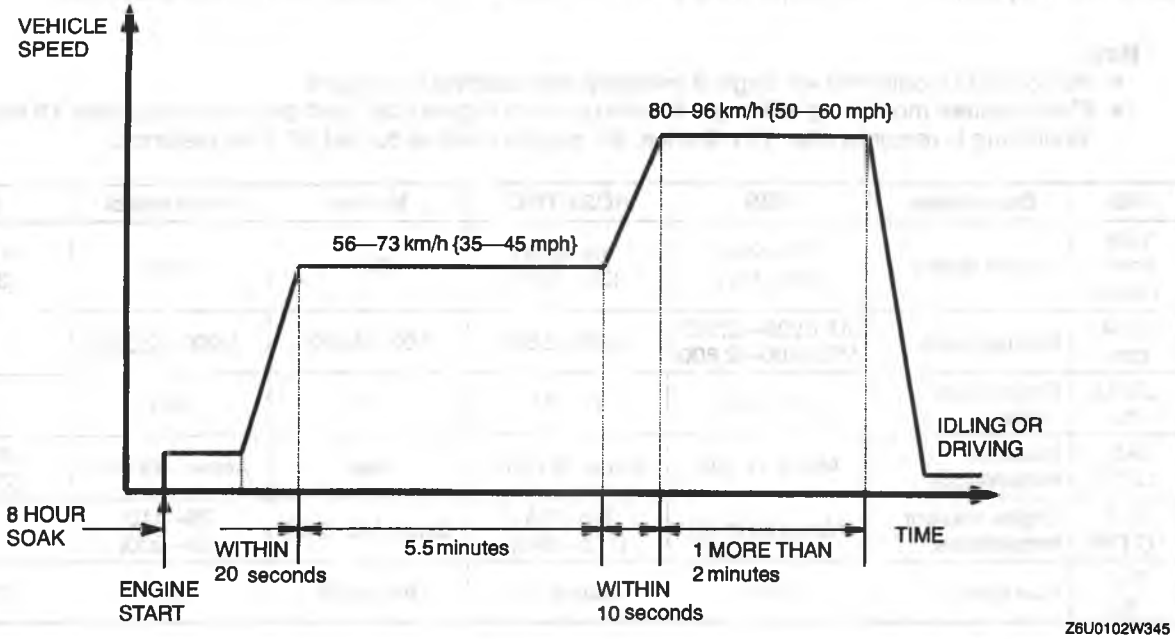
PID	Description	EGR	HO2S/TWC	Misfire	Fuel control	EVAP
VSS km/h {mph}	Vehicle speed	77—204 {48—127}	48—204 {30—127}	N/A	N/A	61—104 {38—65}
RPM rpm	Engine speed	AT:1,900—2,500 MT:2,400—2,800	1,250—2,500	500—6,500	1,000—2,500	N/A
LOAD %	Engine load value	20—45	17—37	20	N/A	15—80
IAT °C {°F}	Intake air temperature	Above 10 {50}	Below 76 {170}	N/A	Above -12 {10}	-6.7—37.6 {20—100}
ECT °C {°F}	Engine coolant temperature	Above 60 {140}	80—115 {175—240}	Below 115 {240}	26—110 {78—230}	N/A
FLI %	Fuel level	N/A	Above 15	Above 15	N/A	15—85

Standard Drive Mode
1. Cold soak the vehicle for at **least 8 hours** before performing the EVAP test.

Note
- When the 8-hour-timer bypass procedure is performed, the cold soak period can be shorten up to **3 hours** depending on vehicle conditions. If you shorten the soak period, the PCM may detect malfunction by mistake even though the EVAP system has been repaired correctly. This misdiagnosis will happen more often under warm or hot ambient temperature. If you are not sure whether the system still have malfunction, soak **8 hours** and perform the drive mode again. If malfunction is not detected, the repair is completed.

2. Connect NGS tester to data link connector.
3. Turn off all accessory load {A/C, headlights, blower fan, etc.}.
4. Start engine.
5. Drive vehicle and accelerate to **65 km/h {40mph} within 20 seconds**.
6. Drive vehicle at **56—73 km/h {35—45mph}** for **5.5 minutes**.
7. Accelerate to **80—96 km/h {50—60 mph} within 10 seconds** and drive vehicle for **at least 2 minutes**.
8. Return to idle for **at least 20 seconds**.
9. Stop vehicle and access to "ON BOARD SYSTEM READINESS" menu of "GENERIC OBD II FUNCTION" to check the drive mode completion status.
   - If completed, RFC changes from "NO" to "YES".
   - If not completed, turn the ignition key to off then repeat Steps 4 to 9 at least one more time.
10. Access to "DIAGNOSTIC MONITORING TEST RESULTS" menu of "GENERIC OBD II FUNCTIONS" to check the monitor results. If "MEAS" are not within specification, repair has not completed.

11. Verify no DTCs are available.



8-hour Timer Bypass Procedure

Note
- When 8-hour-timer is bypassed, PCM may misdiagnose the EVAP system if fuel temperature is warm. It is important to cool down the fuel tank as much as possible during the shortened soak period.

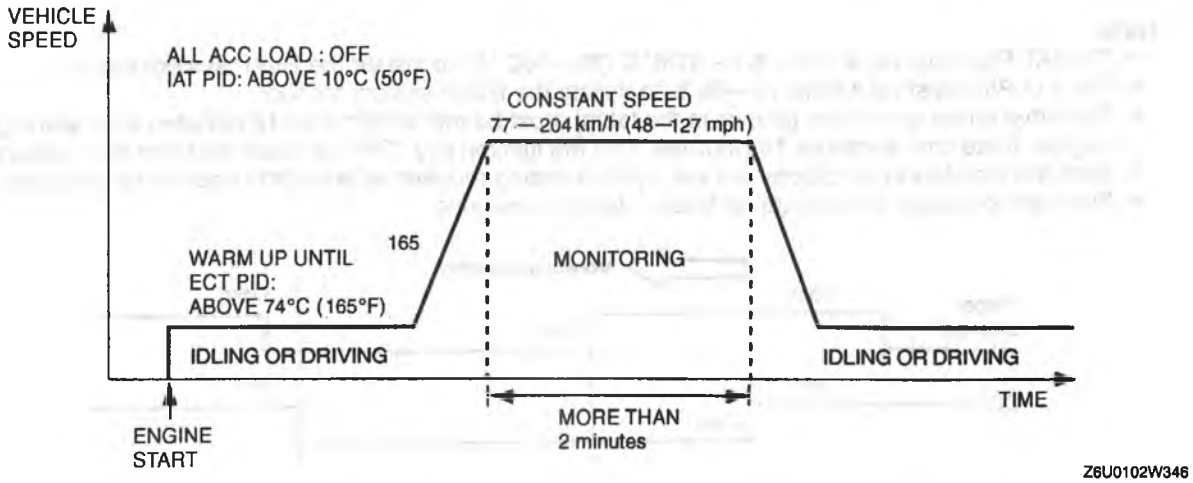
1. Connect NGS tester and turn the ignition to ON.
2. Access to "CLEAR DIAGNOSTIC CODES" menu of "GENERIC OBD II FUNCTIONS".
3. Press the "TRIGGER" to reset the 8-hour-timer.
4. Leave the ignition key to ON position.
5. Follow the drive mode procedure.

EGR System Repair Verification Drive Mode

Note
- The IAT PID must be **above 10°C {50 °F}** to initiate the EGR monitor.
- After the monitoring conditions are set, system testing requires **at least 30 seconds** to complete.

1. Connect NGS tester to data link connector.
2. Warm vehicle up to at least an engine coolant temperature (ECT PID) of **74°C {165 °F}**.
3. Verify all accessory loads (A/C, P/S, head light, blower fan) are off.
4. Drive vehicle **within 77—204 km/h {48—127 mph}** and maintain a constant speed for **at least 2 minutes**.
5. Return to idle for **at least 20 seconds**.
6. Stop vehicle and access to "ON BOARD SYSTEM READINESS" menu of "GENERIC OBD II FUNCTION" to check the drive mode completion status.
   - If completed, RFC changes from "NO" to "YES".
   - If not completed, turn the ignition key to off then repeat Steps 3 to 6 at least one more time.
7. Access to "DIAGNOSTIC MONITORING TEST RESULTS" menu of "GENERIC OBD II FUNCTIONS" to check the monitor results. If "MEAS" are not within specification, repair has not completed.

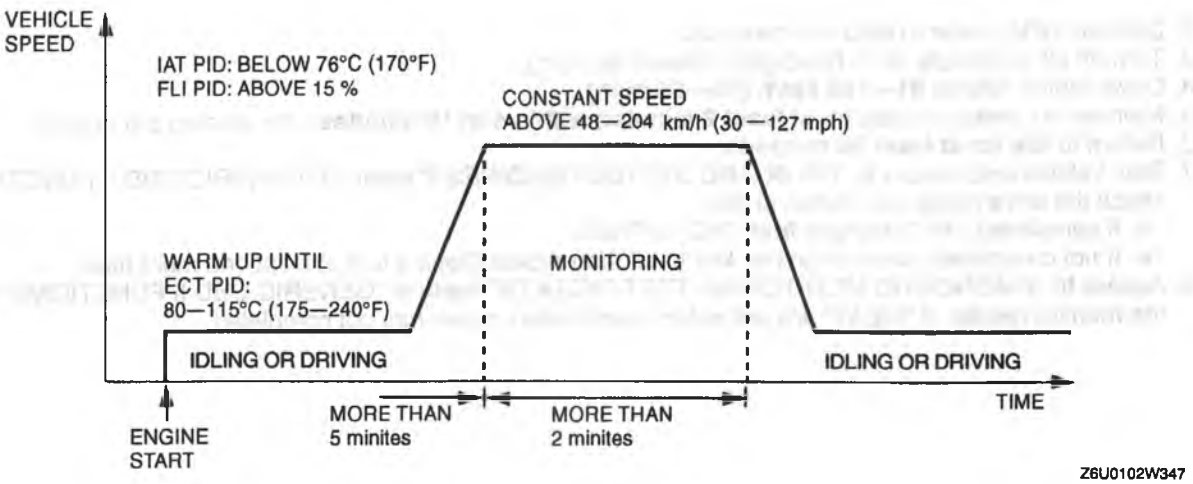
8. Verify no DTCs are available.



HO2S/TWC Repair Verification Drive Mode

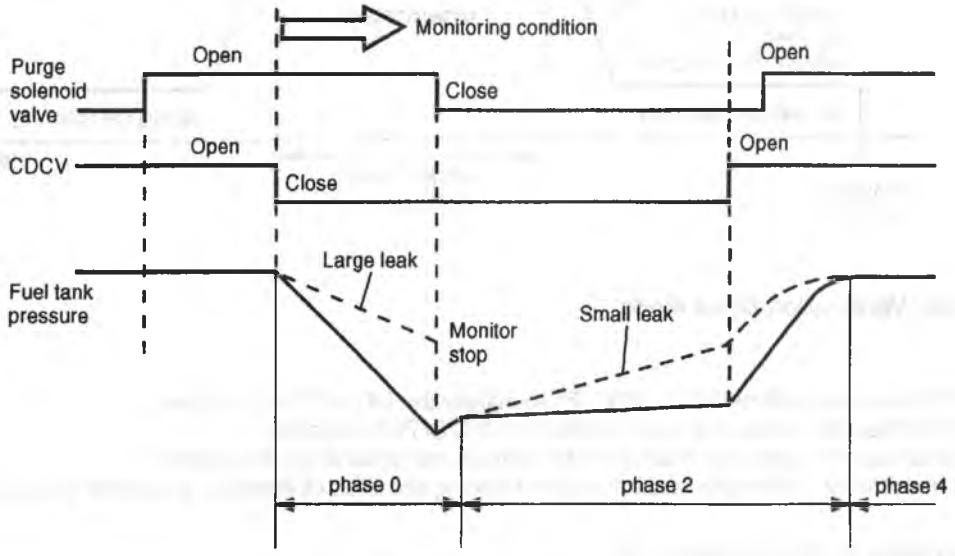
Note
- The IAT PID must be **below 76°C {170 °F}** to initiate the HO2S/TWC monitor.
- The FLI PID must be **above 15 %** to initiate the HO2S/TWC monitor.
- Monitor implement waiting condition will start after **5 minutes** of engine started.
- After the monitoring conditions are set, system testing requires **at least 30 seconds** to complete.

1. Connect NGS tester to data link connector.
2. Warm vehicle up and verify ECT PID is **within 80—115°C {175—240 °F}**.
3. Drive vehicle **within 48—204 km/h {30—127 mph}** and maintain a constant speed for **at least 2 minutes**.
4. Return to idle for **at least 20 seconds**.
5. Stop vehicle and access to "ON BOARD SYSTEM READINESS" menu of "GENERIC OBD II FUNCTION" to check the drive mode completion status.
   - If completed, RFC changes from "NO" to "YES".
   - If not completed, turn the ignition key to off then repeat Steps 3 to 5 at least one more time.
6. Access to "DIAGNOSTIC MONITORING TEST RESULTS" menu of "GENERIC OBD II FUNCTIONS" to check the monitor results. If "MEAS" are not within specification, repair has not completed.
7. Verify no DTCs are available.



EVAP System Repair Verification Drive Mode

Note
- The IAT PID must be **within -6.7—37.6°C {20—100 °F}** to initiate the EVAP system monitor.
- The FLI PID must be **within 15—85 %** to initiate the EVAP system monitor.
- The drive mode conditions (shown in the table) must be met **within 4 to 10 minutes** after starting the engine. If the time **exceeds 10 minutes**, turn the ignition key "OFF" to reset the timer then restart engine.
- After the monitoring conditions are set, system testing requires **at least 30 seconds** to complete.
- Fuel tank pressure will change as follows during monitoring.

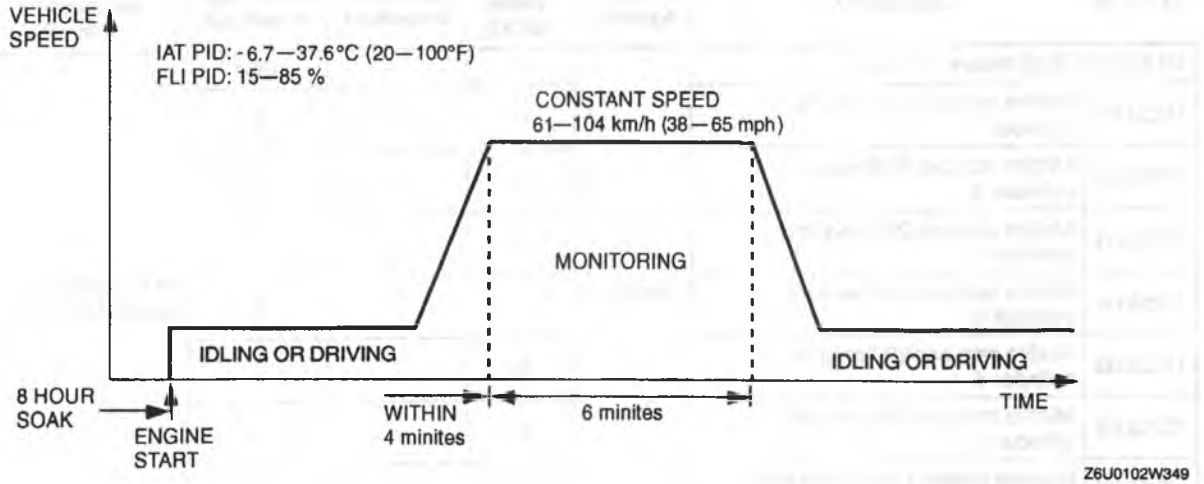


1. Cold soak the vehicle for **at least 8 hours**.

Note
- The cold soak period can be shorten up to **3 hours** depending on vehicle conditions when the 8-hour-timer bypass procedure is performed. If you shorten the soak period, the PCM may detect malfunction by mistake even though the EVAP system has been repaired correctly. This misdiagnosis will happen more often under warm or hot ambient temperature. If you are not sure whether the system still have malfunction, soak 8 hours and perform the drive mode again. If malfunction is not detected, the repair is completed.

2. Connect NGS tester to data link connector.
3. Turn off all accessory (A/C, headlights, blower fan, etc.).
4. Drive vehicle **within 61—104 km/h {38—65 mph}**.
5. Maintain a constant speed for **at least 2 minutes within 4 to 10 minutes** after starting the engine.
6. Return to idle for **at least 20 seconds**.
7. Stop vehicle and access to "ON BOARD SYSTEM READINESS" menu of "GENERIC OBD II FUNCTION" to check the drive mode completion status.
   - If completed, RFC changes from "NO" to "YES".
   - If not completed, turn the ignition key to off then repeat Steps 5 to 8 at least one more time.
8. Access to "DIAGNOSTIC MONITORING TEST RESULTS" menu of "GENERIC OBD II FUNCTIONS" to check the monitor results. If "MEAS" are not within specification, repair has not completed.

9. Verify no DTCs are available.



DIAGNOSTIC MONITORING TEST RESULTS [KL]

Z6U010218881W39

- The purpose of this test mode is to confirm the result of OBD-II monitor diagnostic test results. The result values stored when particular monitor is completed are displayed. If the monitor is not completed, initial value is displayed.

TEST ID	Description	Related system	Initial value (MEAS)	Minimum threshold	Maximum threshold	Actual calculation formula	Unit
10:01:11	Voltage amplitude between rich and lean (Bank1)	HO2S	1024	564	–	NGS reading × 0.0009765625	V
10:01:21	Voltage amplitude between rich and lean (Bank2)		1024	564	–		
10:03:01	Switching (Front HO2S)		461	0	–		ms
10:03:02	Switching (Rear HO2S)		461	0	–		
10:10:11	Ratio of Rear HEGO switches (Bank1)	CATA	0	–	96	NGS reading × 0.015625	n/a
10:10:21	Ratio of Rear HEGO switches (Bank2)		0	–	96	NGS reading × 0.015625	
10:26:00	Fuel tank vacuum change during phase 0* of monitoring	EVAP	24704	24704	28160	NGS reading × 0.0001953	inH_2O
10:27:00	Fuel tank vacuum change during phase 2* of monitoring		32768	–	40960		
10:2A:00	Fuel tank vacuum change during phase 4* of monitoring		32768	–	33280		
10:4C:31	EGR boost sensor reading difference	EGR	3	3	8	NGS reading × 0.125	inHg

TEST ID	Description	Related system	Initial value (MEAS)	Minimum threshold	Maximum threshold	Actual calculation formula	Unit
10:50:00	Total misfire number	Misfire	0	–	1507	NGS reading × 0.00001525879	times
10:53:01	Misfire rate per 200 revs for cylinder 1		0	–	0		%
10:53:02	Misfire rate per 200 revs for cylinder 2		0	–	0		
10:53:03	Misfire rate per 200 revs for cylinder 3		0	–	0		
10:53:04	Misfire rate per 200 revs for cylinder 4		0	–	0		
10:53:05	Misfire rate per 200 revs for cylinder 5		0	–	0		
10:53:06	Misfire rate per 200 revs for cylinder 6		0	–	0		
10:54:00	Highest misfire rate in 200 revs		0	–	0		
10:55:00	Highest misfire rate in 1000 revs		0	–	0		
10:56:00	Total ignition number during monitoring	EVAP	0	–	3000	NGS reading × 1	times

* : See 01-02B-22 EVAP System Repair Verification Drive Mode.

DTC TABLE [KL]

Z6U010218881W40

×: Applicable

DTC	Condition	MIL	O/D OFF indicator light flashes	DC	*1Monitor item	On-demand Self-Test		Page
						KOEO	KOER	
P0102	MAF circuit low input	ON	NO	2	CCM	–	–	(See 01-02B-32 DTC P0102 [KL])
P0103	MAF circuit high input	ON	NO	2	CCM	×	–	(See 01-02B-35 DTC P0103 [KL])
P0106	BARO sensor circuit performance problem	ON	NO	2	CCM	–	–	(See 01-02B-37 DTC P0106 [KL])
P0107	BARO sensor circuit low input	ON	NO	2	CCM	–	–	(See 01-02B-39 DTC P0107 [KL])
P0108	BARO sensor circuit high input	ON	NO	2	CCM	–	–	(See 01-02B-41 DTC P0108 [KL])
P0112	IAT circuit low input	ON	NO	2	CCM	×	×	(See 01-02B-44 DTC P0112 [KL])
P0113	IAT circuit high input	ON	NO	2	CCM	×	×	(See 01-02B-46 DTC P0113 [KL])

DTC	Condition	MIL	O/D OFF indicator light flashes	DC	*1Monitor item	On-demand Self-Test		Page
						KOEO	KOER	
P0116	ECT sensor performance problem	ON	NO	2	CCM	–	–	(See 01-02B-48 DTC P0116 [KL])
P0117	ECT circuit low input	ON	NO	2	CCM	×	×	(See 01-02B-51 DTC P0117 [KL])
P0118	ECT circuit high input	ON	NO	2	CCM	×	×	(See 01-02B-53 DTC P0118 [KL])
P0122	TP circuit low input	ON	NO	2	CCM	×	×	(See 01-02B-56 DTC P0122 [KL])
P0123	TP circuit high input	ON	NO	2	CCM	×	×	(See 01-02B-59 DTC P0123 [KL])
P0125	Insufficient ECT for CL fuel control	ON	NO	2	CCM	–	–	(See 01-02B-61 DTC P0125 [KL])
P0133	HO2S (Front: RH) circuit slow response	ON	NO	2	HO2S	–	–	(See 01-02B-62 DTC P0133, P0153 [KL])
P0135	HO2S heater (Front: RH) circuit malfunction	ON	NO	2	HO2S heater	×	×	(See 01-02B-65 DTC P0135 [KL])
P0136	HO2S (Rear: RH) circuit malfunction	ON	NO	2	HO2S	–	–	(See 01-02B-67 DTC P0136, P1137, P1138 [KL])
P0141	HO2S heater (Rear:RH) circuit malfunction	ON	NO	2	HO2S heater	×	×	(See 01-02B-69 DTC P0141 [KL])
P0142	HO2S (Rear) circuit malfunction	–	NO	2	HO2S	–	–	(See 01-02B-71 DTC P0142, P1143, P1144 [KL])
P0147	HO2S heater (Rear) circuit malfunction	ON	NO	2	HO2S heater	×	×	(See 01-02B-73 DTC P0147 [KL])
P0153	HO2S (Front: LH) circuit slow response	ON	NO	2	HO2S	–	–	(See 01-02B-62 DTC P0133, P0153 [KL])
P0155	HO2S heater (Front: LH) circuit malfunction	ON	NO	2	HO2S heater	×	×	(See 01-02B-75 DTC P0155 [KL])

DTC	Condition	MIL	O/D OFF indicator light flashes	DC	*1Monitor item	On-demand Self-Test		Page
						KOEO	KOER	
P0161	HO2S heater (Rear: LH) circuit malfunction	ON	NO	2	HO2S heater	×	×	(See 01-02B-77 DTC P0161 [KL])
P0171	Fuel trim system too lean (RH)	ON	NO	2	Fuel	–	–	(See 01-02B-79 DTC P0171, P0172, P0174, P0175, P1130, P1131, P1132, P1150, P1151, P1152 [KL])
P0172	Fuel trim system too rich (RH)	ON	NO	2	Fuel	–	–	
P0174	Fuel trim system too lean (LH)	ON	NO	2	Fuel	–	–	
P0175	Fuel trim system too rich (LH)	ON	NO	2	Fuel	–	–	
P0230	Fuel pump primary circuit malfunction	–	NO	–	–	×	×	(See 01-02B-90 DTC P0230 [KL])
P0300	Random misfire detected	Flash / ON	NO	1 or 2	Misfire	–	–	(See 01-02B-94 DTC P0300, P0301, P0302, P0303, P0304, P0305, P0306 [KL])
P0301	Cylinder 1 misfire detected	Flash / ON	NO	1 or 2	Misfire	–	–	
P0302	Cylinder 2 misfire detected	Flash / ON	NO	1 or 2	Misfire	–	–	
P0303	Cylinder 3 misfire detected	Flash / ON	NO	1 or 2	Misfire	–	–	
P0304	Cylinder 4 misfire detected	Flash / ON	NO	1 or 2	Misfire	–	–	
P0305	Cylinder 5 misfire detected	Flash / ON	NO	1 or 2	Misfire	–	–	
P0306	Cylinder 6 misfire detected	Flash / ON	NO	1 or 2	Misfire	–	–	
P0320	CKP sensor circuit malfunction	ON	NO	2	CCM	–	–	(See 01-02B-98 DTC P0320 [KL])
P0325	Knock sensor circuit malfunction	ON	NO	2	CCM	–	×	(See 01-02B-101 DTC P0325 [KL])
P0340	CMP sensor circuit malfunction	ON	NO	2	CCM	–	–	(See 01-02B-98 DTC P0320 [KL])
P0400	EGR flow malfunction	ON	NO	2	EGR	×	×	(See 01-02B-105 DTC P0400 [KL])
P0420 *1	Catalyst system efficiency below threshold	ON	NO	2	Catalyst	–	–	(See 01-02B-108 DTC P0420 [KL])

DTC	Condition	MIL	O/D OFF indicator light flashes	DC	*1Monitor item	On-demand Self-Test		Page
						KOEO	KOER	
P0421	Warm-up catalyst system efficiency below threshold (RH)	ON	NO	2	Catalyst	–	–	(See 01-02B-113 DTC P0421, P0431 [KL])
P0431	Warm-up catalyst system efficiency below threshold (LH)	ON	NO	2	Catalyst	–	–	
P0442	EVAP control system leak detected (small leak)	ON	NO	2	Evaporative	–	–	(See 01-02B-118 DTC P0442 [KL])
P0443	EVAP control system purge control valve circuit malfunction	ON	NO	2	CCM	×	×	(See 01-02B-121 DTC P0443 [KL])
P0446	EVAP control system vent control malfunction	ON	NO	2	CCM	–	–	(See 01-02B-122 DTC P0446 [KL])
P0452	EVAP control system fuel tank pressure sensor low input	ON	NO	2	CCM	×	×	(See 01-02B-125 DTC P0452 [KL])
P0453	EVAP control system fuel tank pressure sensor high input	ON	NO	2	CCM	×	×	(See 01-02B-128 DTC P0453 [KL])
P0455	EVAP control system leak detected (gross leak)	ON	NO	2	Evaporative	–	–	(See 01-02B-131 DTC P0455 [KL])
P0460	Fuel gauge sender unit circuit malfunction	ON	NO	2	CCM	–	×	(See 01-02B-136 DTC P0460 [KL])
P0461	Fuel gauge sender unit circuit performance problem	ON	NO	2	CCM	–	–	(See 01-02B-138 DTC P0461 [KL])
P0500	VSS circuit malfunction	ON	NO	2	CCM	–	–	(See 01-02B-140 DTC P0500 [KL])
P0505	IAC system malfunction	–	NO	–	–	–	×	(See 01-02B-142 DTC P0505 [KL])
P0603	PCM Keep Alive Memory (KAM) test error	–	NO	–	CCM	×	–	(See 01-02B-144 DTC P0603, P0605 [KL])
P0605	PCM Read Only Memory (ROM) test error	–	NO	–	CCM	×	–	
P0703	Brake switch input malfunction	–	NO	2	CCM	–	–	(See 01-02B-145 DTC P0703 [KL])
P0704	Clutch switch input circuit malfunction	ON	NO	2		–	–	(See 01-02B-147 DTC P0704 [KL])
P0705	Transaxle range (TR) switch malfunction (Short circuit)	(See 05-02B-13 DTC P0705 [GF4A-EL])						

DTC	Condition	MIL	O/D OFF Indicator light flashes	DC	*1Monitor Item	On-demand Self-Test		Page
						KOEO	KOER	
P0706	Transaxle range (TR) switch malfunction (Open circuit)	(See 05-02B-16 DTC P0706 [GF4A-EL])						
P0710	Transaxle fluid temperature (TFT) sensor circuit malfunction (Short to ground/open circuit)	(See 05-02B-19 DTC P0710 [GF4A-EL])						
P0711	Transaxle fluid temperature (TFT) sensor circuit malfunction (Stuck)	(See 05-02B-22 DTC P0711 [GF4A-EL])						
P0715	Input/turbine speed sensor circuit malfunction	(See 05-02B-24 DTC P0715 [GF4A-EL])						
P0731	Gear 1 incorrect ratio	(See 05-02B-26 DTC P0731 [GF4A-EL])						
P0732	Gear 2 incorrect ratio	(See 05-02B-29 DTC P0732 [GF4A-EL])						
P0733	Gear 3 incorrect ratio	(See 05-02B-32 DTC P0733 [GF4A-EL])						
P0734	Gear 4 incorrect ratio	(See 05-02B-35 DTC P0734 [GF4A-EL])						
P0740	Torque converter clutch (TCC) system malfunction	(See 05-02B-38 DTC P0740 [GF4A-EL])						
P0743	Torque converter clutch (TCC) control solenoid valve circuit malfunction	(See 05-02B-40 DTC P0743 [GF4A-EL])						
P0745	Pressure control solenoid circuit malfunction	(See 05-02B-43 DTC P0745 [GF4A-EL])						
P0750	Shift solenoid A circuit malfunction	(See 05-02B-46 DTC P0750 [GF4A-EL])						
P0755	Shift solenoid B circuit malfunction	(See 05-02B-49 DTC P0755 [GF4A-EL])						
P0760	Shift solenoid C circuit malfunction	(See 05-02B-52 DTC P0760 [GF4A-EL])						
P1001	DLC malfunction	–	NO	–	–	–	×	(See 01-02B-149 DTC P1001 [KL])
P1100	MAF sensor intermittent malfunction	–	NO	2	–	–	–	(See 01-02B-152 DTC P1100 [KL])
P1101	MAF sensor out of self test range	–	NO	–	–	×	×	(See 01-02B-153 DTC P1101 [KL])
P1112	IAT sensor intermittent malfunction	–	NO	2	–	–	–	(See 01-02B-155 DTC P1112 [KL])
P1116	ECT sensor out of self test range	–	NO	–	–	×	–	(See 01-02B-156 DTC P1116 [KL])
P1117	ECT sensor intermittent malfunction	–	NO	2	–	–	–	(See 01-02B-158 DTC P1117 [KL])
P1120	TP sensor out of range low	ON	NO	2	CCM	×	×	(See 01-02B-160 DTC P1120 [KL])
P1121	TP sensor inconsistent with MAF sensor	ON	NO	2	CCM	–	–	(See 01-02B-161 DTC P1121 [KL])

DTC	Condition	MIL	O/D OFF indicat or light flashes	DC	*1Monitor item	On-demand Self-Test		Page
						KOEO	KOER	
P1124	TP sensor out of self test range	–	NO	–	–	×	×	(See 01-02B-163 DTC P1124 [KL])
P1125	TP sensor intermittent problem	–	NO	2	CCM	–	–	(See 01-02B-164 DTC P1125 [KL])
P1127	Exhaust not warm enough	–	NO	–	–	–	×	(See 01-02B-166 DTC P1127 [KL])
P1130	Lack of HO2S (Front: RH) switch, adaptive fuel limit	ON	NO	2	HO2S	–	–	(See 01-02B-79 DTC P0171, P0172, P0174, P0175, P1130, P1131, P1132, P1150, P1151, P1152 [KL])
P1131	Lack of HO2S (Front: RH) switch, Sensor indicates lean	ON	NO	2	HO2S	–	×	
P1132	Lack of HO2S (Front: RH) switch, Sensor indicates rich	ON	NO	2	HO2S	–	×	
P1137	Lack of HO2S (Rear:RH) switch, Sensor indicates lean	–	NO	2	HO2S	–	×	(See 01-02B-67 DTC P0136, P1137, P1138 [KL])
P1138	Lack of HO2S (Rear:RH) switch, Sensor indicates rich	–	NO	2	HO2S	–	×	
P1143	HO2S (Rear) switch, sensor indicates lean	ON	NO	2	HO2S	–	×	(See 01-02B-71 DTC P0142, P1143, P1144 [KL])
P1144	HO2S (Rear) switch, sensor indicates rich	ON	NO	2	HO2S	–	×	
P1150	Lack of HO2S (Front: LH) switch, adaptive fuel at limit	ON	NO	2	HO2S	–	–	(See 01-02B-79 DTC P0171, P0172, P0174, P0175, P1130, P1131, P1132, P1150, P1151, P1152 [KL])
P1151	Lack of HO2S (Front: LH) switch, sensor indicates lean	ON	NO	2	HO2S	–	×	
P1152	Lack of HO2S (Front: LH) switch, sensor indicates rich	ON	NO	2	HO2S	–	×	
P1157	HO2S (Rear: LH) switch sensor indicates lean	–	NO	2	HO2S	–	×	(See 01-02B-166 DTC P1157, P1158 [KL])
P1158	HO2S (Rear: LH) switch sensor indicates rich	–	NO	2	HO2S	–	×	
P1250	PRC solenoid valve circuit malfunction	OFF	NO	–	–	×	×	(See 01-02B-168 DTC P1250 [KL])
P1409	EGR valve control circuit malfunction	ON	NO	2	CCM	×	×	(See 01-02B-170 DTC P1409 [KL])
P1410	EGR boost sensor solenoid valve stuck	–	NO	2	CCM	–	–	(See 01-02B-172 DTC P1410 [KL])
P1450	EVAP control system malfunction (excessive vacuum)	ON	NO	2	EVAP	–	–	(See 01-02B-174 DTC P1450 [KL])

DTC	Condition	MIL	O/D OFF indicator light flashes	DC	*1Monitor item	On-demand Self-Test		Page
						KOEO	KOER	
P1451	CDCV circuit malfunction	ON	NO	2	CCM	×	×	(See 01-02B-176 DTC P1451 [KL])
P1460	WOT A/C control circuit malfunction	OFF	NO	2	–	×	×	(See 01-02B-178 DTC P1460, P1464 [KL])
P1464	A/C demand out of self test range	OFF	NO	–	–	×	×	
P1474	Cooling fan control circuit malfunction	OFF	NO	2	–	×	×	(See 01-02B-181 DTC P1474 [KL])
P1479	Condenser fan control circuit malfunction	OFF	NO	2	–	×	×	(See 01-02B-184 DTC P1479 [KL])
P1487	EGR boost sensor solenoid valve circuit malfunction	OFF	NO	–	–	–	–	(See 01-02B-186 DTC P1487 [KL])
P1501	VSS out of self test range	OFF	NO	–	–	–	×	(See 01-02B-189 DTC P1501 [KL])
P1504	IAC valve circuit malfunction	ON	NO	2	CCM	×	×	(See 01-02B-191 DTC P1504 [KL])
P1506	Idle control system RPM lower than expected	ON	NO	2	CCM	–	–	(See 01-02B-194 DTC P1506 [KL])
P1507	Idle control system RPM higher than expected	ON	NO	2	CCM	–	–	(See 01-02B-195 DTC P1507 [KL])
P1516	Neutral switch input circuit malfunction	ON	NO	2	CCM	–	–	(See 01-02B-198 DTC P1516 [KL])
P1602	Immobilizer unit-PCM communication error	OFF	NO	–	–	–	–	(See 01-02B-200 DTC P1602 [KL])
P1603	Code word unregistered in PCM	OFF	NO	–	–	–	–	(See 01-02B-203 DTC P1603 [KL])
P1604	Key ID number unregistered in PCM	OFF	NO	–	–	–	–	(See 01-02B-203 DTC P1604 [KL])
P1621	Code word mismatch after engine cranking	OFF	NO	–	–	–	–	(See 01-02B-204 DTC P1621 [KL])
P1622	Key ID number mismatch	OFF	NO	–	–	–	–	(See 01-02B-204 DTC P1622 [KL])

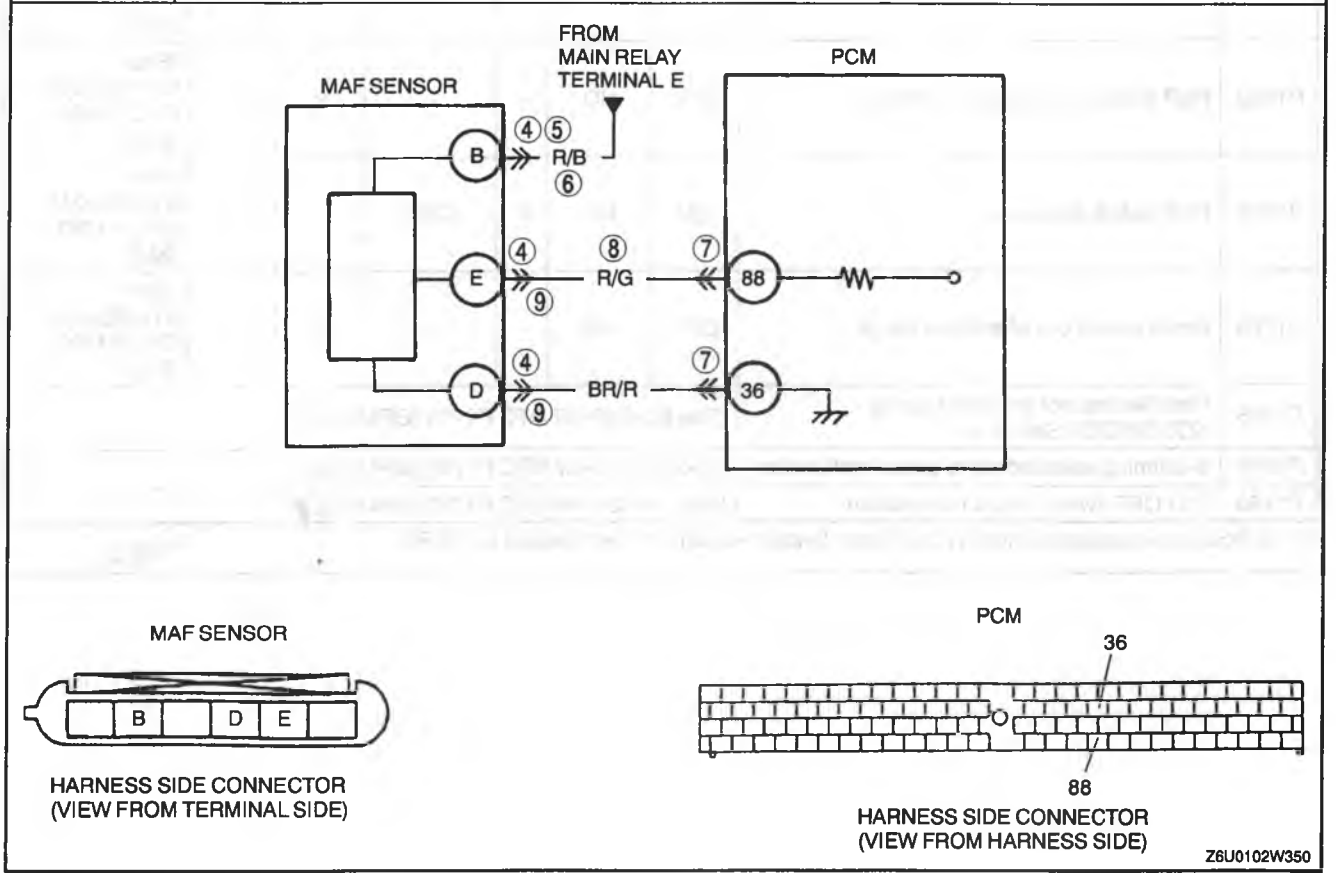
DTC	Condition	MIL	O/D OFF indicat or light flashes	DC	*1Monitor item	On-demand Self-Test		Page
						KOEO	KOER	
P1623	Code word or key ID number read/write error in PCM	OFF	NO	–	–	–	–	(See 01-02B-205 DTC P1623 [KL])
P1624	Immobilizer system communication counter = 0	OFF	NO	–	–	–	–	(See 01-02B-205 DTC P1624 [KL])
P1633	PCM KAM voltage low	ON	NO	2	CCM	×	×	(See 01-02B-206 DTC P1633 [KL])
P1650	PSP switch out of self test range	OFF	NO	–	–	×	×	(See 01-02B-208 DTC P1650 [KL])
P1652	PSP switch failed on	ON	NO	2	CCM	–	–	(See 01-02B-210 DTC P1652 [KL])
P1703	Brake switch out of self test range	OFF	NO	–	–	×	×	(See 01-02B-212 DTC P1703 [KL])
P1705	Park/Neutral not indicated during KOEO/KOER Self-Test	(See 05-02B-55 DTC P1705 [GF4A-EL])						
P1765	3-2 timing solenoid valve circuit malfunction	(See 05-02B-57 DTC P1765 [GF4A-EL])						
P1780	O/D OFF switch circuit malfunction	(See 05-02B-60 DTC P1780 [GF4A-EL])						

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

DTC P0102 [KL]

Z6U010201082W39

DTC P0102	MAF circuit low input
DETECTION CONDITION	• The PCM monitors input voltage from the MAF sensor while the engine is running. If input voltage at the PCM terminal 88 is **below 0.36 V**, the PCM determines that a MAF circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycle. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• MAF sensor malfunction • Connector or terminal malfunction • Short to ground in wiring between MAF sensor terminal E and PCM terminal 88 • Open circuit in wiring between MAF sensor terminal E and PCM terminal 88 • Open circuit in wiring between main relay terminal E and MAF sensor terminal B

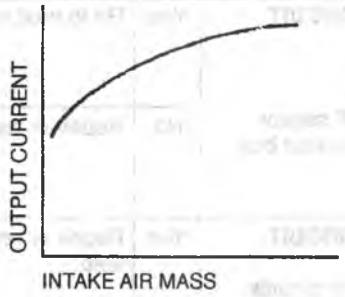


Troubleshooting Hint

MAF sensor description

- A hot wire type mass airflow sensor is used.
- MAF sensor signal is used for following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —Evaporative system monitor
  - —EGR system monitor
- MAF sensor output voltage present when ignition key is turned to ON (Engine OFF).

MAF sensor signal characteristic



Z6U0102W351

MAF sensor specification

Condition	KOEO	KOER
MAF PID	Approx. 0 g/s {0 lb/min}	1.9—3.0 g/s {0.25—0.39 lb/min}
MAF V PID	Approx. 0.02 V	0.5—1.1 V
PCM 88 (Signal)	Approx. 0.02 V	0.6—1.1 V

Diagnostic procedure

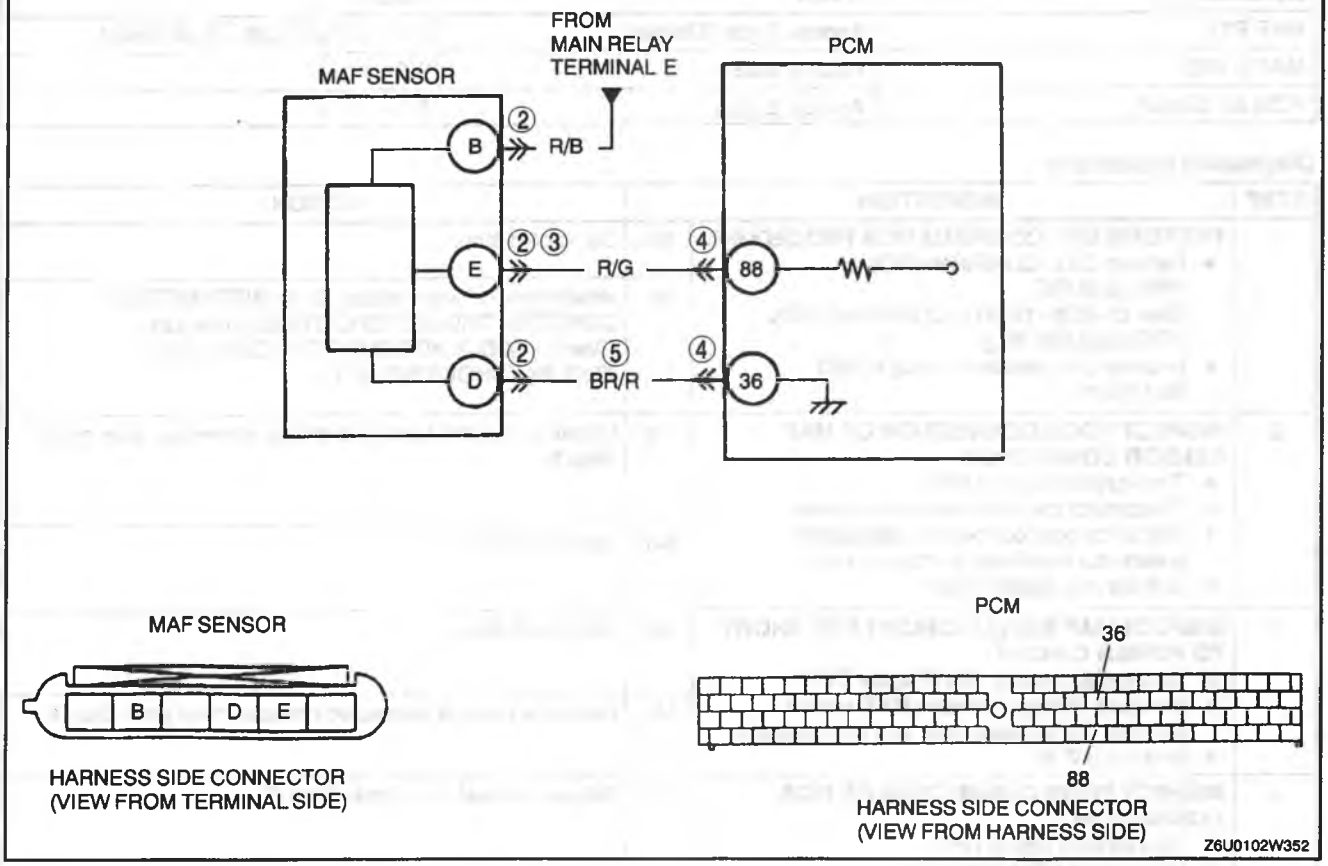
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS-IS CONCERN INTERMITTENT OR CONSTANT** • Connect NGS tester to DLC. • Start engine. • Access MAF V PID using NGS tester. • Is MAF V PID **within 0.36— 4.89V**?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
		No	Go to next step.
4	**INSPECT POOR CONNECTION OF MAF SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect the MAF sensor connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminals and/or connector, then go to Step 10.
		No	Go to next step.
5	**CHECK POWER SUPPLY CIRCUIT VOLTAGE** • Turn ignition key to ON (Engine OFF). • Check voltage at MAF sensor terminal B (harness-side). • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 10.
6	**CHECK POWER SUPPLY CIRCUIT FOR OPEN** • Check for continuity between MAF sensor terminal B (harness-side) and main relay terminal **E** (harness-side). • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 10.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair terminal, then go to Step 10.
		No	Go to next step.

STEP	INSPECTION		ACTION
8	**INSPECT MAF SENSOR SIGNAL CIRCUIT FOR OPEN** • Connect breakout box with PCM disconnected. • Check for continuity between MAF sensor terminal E (harness-side) and breakout box terminal 88 (harness-side). • Is there continuity?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to Step 10.
9	**INSPECT MAF SENSOR SIGNAL CIRCUIT FOR SHORTS** • Check continuity between following circuits: — MAF sensor terminal E (harness-side) and body ground — MAF sensor connector terminal D and E (harness-side) • Is there continuity?	Yes	Repair or replace suspected harness, then go to next step.
		No	Replace MAF sensor, then go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P0102 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from memory using NGS tester generic OBD-II functions. • Turn ignition key to OFF and ON (Engine OFF) • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0103 [KL]

Z6U010201082W40

DTC P0103	MAF circuit high input
DETECTION CONDITION	• The PCM monitors input voltage from the MAF sensor while the engine is running. If input voltage at the PCM terminal 88 is **above 4.89 V**, the PCM determines that a MAF sensor circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycle. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC also detected by KOEO Self-Test.
POSSIBLE CAUSE	• MAF sensor malfunction • Connector or terminal malfunction • Open circuit in wiring between MAF sensor terminal D and PCM terminal 36 • Open circuit in MAF sensor ground circuit

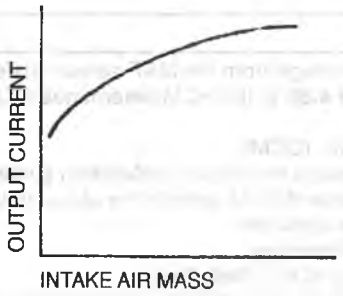


Troubleshooting Hint

MAF sensor description

- A hot wire type mass airflow sensor is used.
- MAF sensor signal is used for following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —Evaporative system monitor
  - —EGR system monitor
- The MAF signal may also receive an output voltage signal when air flow does not flow through the MAF sensor.

MAF sensor signal characteristic



Z6U0102W351

MAF sensor specification

Condition	KOEO	KOER
MAF PID	Approx. 0 g/s {0 lb/min}	1.9—3.0 g/s {0.25—0.39 lb/min}
MAF V PID	Approx. 0.02 V	0.5—1.1 V
PCM 88 (Signal)	Approx. 0.02 V	0.6—1.1 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** ● Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) ● Is same DTC present during KOEO Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**INSPECT POOR CONNECTION OF MAF SENSOR CONNECTOR** ● Turn ignition key to OFF. ● Disconnect the MAF sensor connector. ● Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). ● Is there any malfunction?	Yes	Repair or replace terminals and/or connector, then go to Step 6.
		No	Go to next step.
3	**INSPECT MAF SIGNAL CIRCUIT FOR SHORT TO POWER CIRCUIT** ● Turn ignition key to ON (Engine OFF). ● Measure voltage between MAF sensor terminal E (harness-side) and body ground. ● Is voltage **0 V**?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to Step 6.
4	**INSPECT POOR CONNECTION OF PCM CONNECTOR** ● Turn ignition key to OFF. ● Disconnect PCM connector. ● Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). ● Is there any malfunction?	Yes	Repair terminal, then go to Step 6.
		No	Go to next step.
5	**INSPECT MAF SENSOR GROUND CIRCUIT FOR OPEN** ● Connect breakout box with PCM disconnected. ● Check for continuity between MAF sensor terminal D (harness-side) and breakout box terminal 36 (harness-side). ● Is there continuity?	Yes	Replace MAF sensor, then go to next step.
		No	Repair or replace suspected harness, then go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P0103 COMPLETED** ● Connect NGS tester to DLC. ● Clear DTC from memory using NGS tester generic OBD-II function. ● Perform KOEO Self-test. ● Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.

STEP	INSPECTION		ACTION
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0106 [KL]

Z6U010201082W41

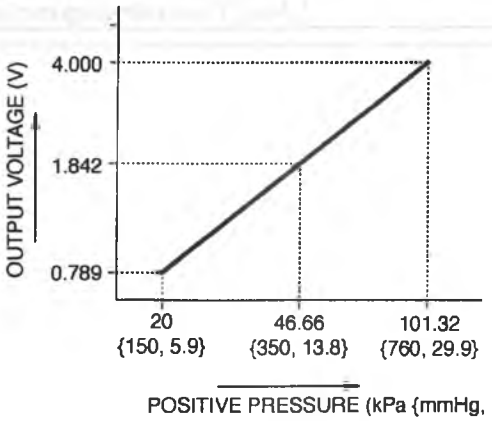
DTC P0106	BARO circuit range/performance problem
DETECTION CONDITION	• The PCM monitors input voltage from the EGR boost sensor while the engine is running. If input voltage at PCM terminal 34 is **below 0.22 V** or **above 4.79 V**, the PCM determines that an EGR boost circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycle. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• BARO sensor malfunction

Troubleshooting Hint

EGR boost sensor description

- The EGR boost sensor uses the piezo-electric effect to convert the intake manifold pressure into voltage values, and outputs the voltage to the PCM.
- The EGR boost sensor signal is used for following monitors.
  - —Evaporative system monitor
  - —EGR system monitor

EGR boost sensor signal characteristic



Z6U0102W353

EGR boost sensor specification

Condition	KOEO	KOER
EGR	14.6 psi	14.6 psi
PCM 34 (Signal)	Approx. 4.0 V	Approx. 4.0 V

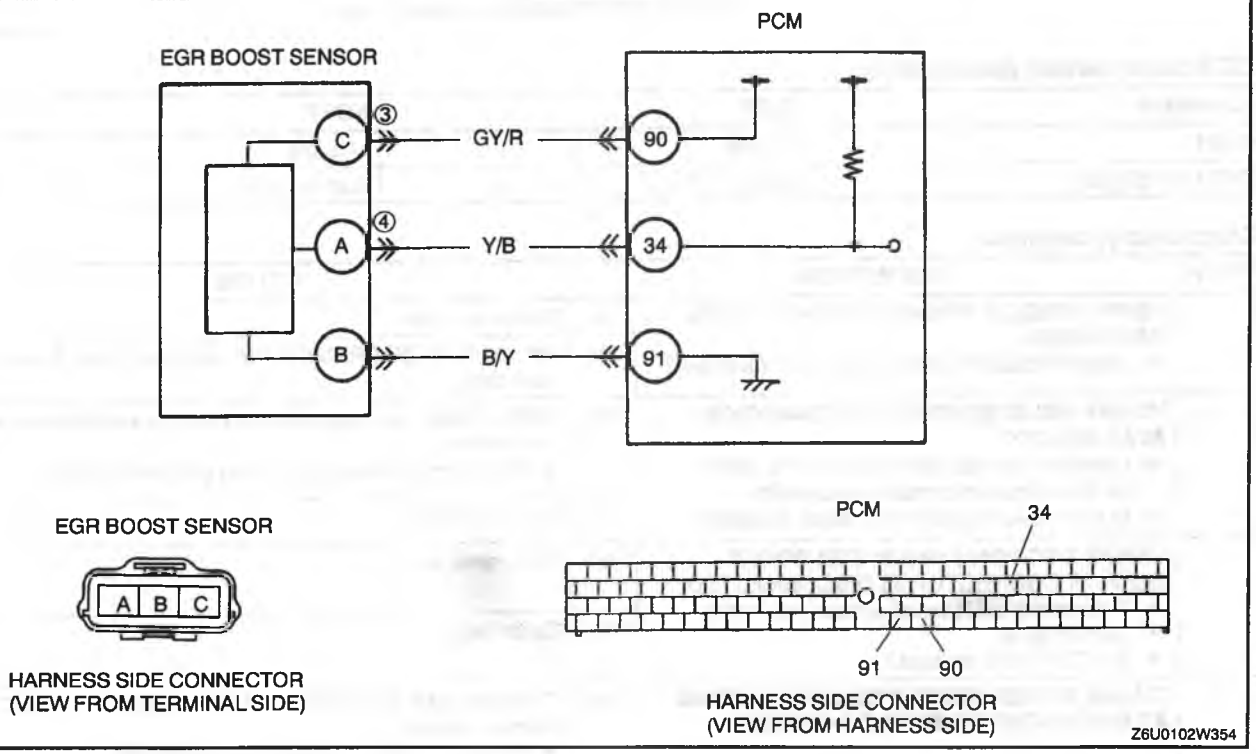
Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or online repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY DTC P0107 AND/OR P0108 DETECTED** • Is DTC P0107 and/or P0108 present?	Yes	Go to DTC P0107 and/or P0108. (See 01-02B-39 DTC P0107 [KL])
		No	Go to next step.
4	**INSPECT EGR BOOST SENSOR** • Inspect EGR boost sensor. (See 01-40B-40 EGR BOOST SENSOR INSPECTION [KL]) • Is EGR boost sensor okay?	Yes	Go to next step.
		No	Replace EGR boost sensor, then go to next step.
5	**VERIFY TROUBLESHOOTING OF DTC P0106 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
6	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0107 [KL]

Z6U010201082W42

DTC P0107	BARO circuit low input
DETECTION CONDITION	• The PCM monitors input voltage from the EGR boost sensor while the engine is running. If input voltage at PCM terminal 34 is **below 0.01 V**, the PCM determines that an EGR boost circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycle. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• BARO sensor malfunction • Connector or terminal malfunction • Short to ground in wiring between EGR boost sensor terminal A and PCM terminal 34 • Open circuit in wiring between EGR boost sensor terminal C and PCM terminal 90

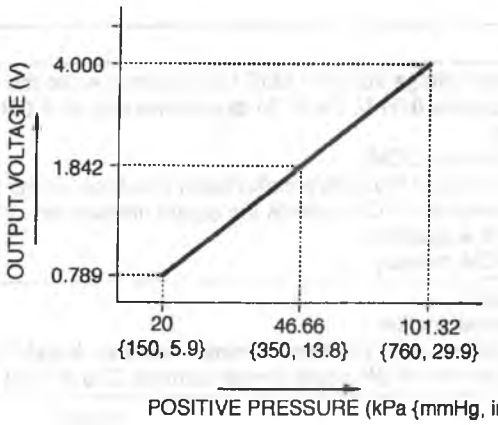


Troubleshooting Hint

EGR boost sensor description

- The EGR boost sensor uses the piezo-electric effect to convert the intake manifold pressure into voltage values, and outputs the voltage to the PCM.
- The EGR boost sensor signal is used for following monitors.
  - —Evaporative system monitor
  - —EGR system monitor

EGR boost sensor signal characteristic



Z6U0102W353

EGR boost sensor specification

Condition	KOEO	KOER
EGR	14.6 psi	14.6 psi
PCM 34 (Signal)	Approx. 4.0 V	Approx. 4.0 V

Diagnostic procedure

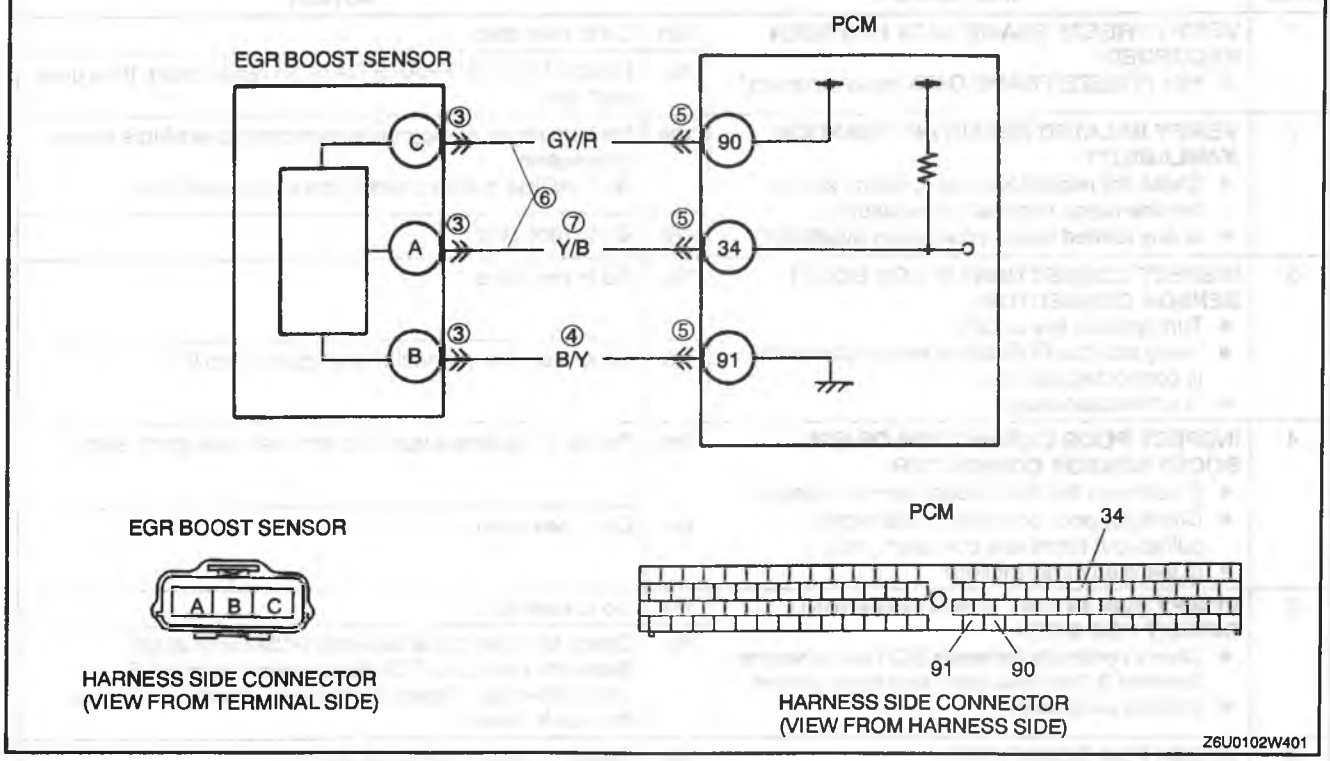
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY DTC P0108 WHEN EGR BOOST SENSOR CONNECTOR IS DISCONNECTED** • Disconnect EGR boost sensor connector. • Start engine. • Is DTC P0108 present?	Yes	Go to next step.
		No	Go to Step 5.
4	**CHECK POWER SUPPLY CIRCUIT VOLTAGE AT EGR BOOST SENSOR CONNECTOR** **Note** • If DTC P0122 and P0452 are also retrieved with P0107, then go to REFERENCE VOLTAGE troubleshooting procedure. (See 01-03B-51 NO.29 CONSTANT VOLTAGE [KL]) • Turn ignition key to ON (Engine OFF). • Measure voltage between EGR boost sensor terminal C (harness-side) and body ground. • Is voltage **within 4.5— 5.5 V?**	Yes	Check for poor connection of BARO sensor terminal C (harness-side). • Repair or replace terminal as necessary. • If okay, replace BARO sensor. Then go to Step 6.
		No	Check for open circuit between PCM terminal 90 (harness-side) and BARO terminal C (harness-side). Repair or replace suspected harness, then go to Step 6.
5	**INSPECT EGR BOOST SENSOR SIGNAL CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Disconnect PCM connector. • Check continuity between EGR boost sensor terminal A (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace suspected harness, then go to next step.
		No	Check for EGR boost sensor signal circuit and EGR boost sensor ground circuit for shorts. Repair or replace suspected harness, then go to next step.

STEP	INSPECTION		ACTION
6	**VERIFY TROUBLESHOOTING OF DTC P0107 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0108 [KL]

Z6U010201082W43

DTC P0108	BARO circuit high input
DETECTION CONDITION	• PCM monitors input voltage from EGR boost sensor while the engine is running. If input voltage at PCM terminal 34 is **above 4.99 V**, PCM determines that EGR boost sensor circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycle. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• EGR boost sensor malfunction • Connector or terminal malfunction • Open circuit in wiring between EGR boost sensor terminal A and PCM terminal 34 • Open circuit in wiring between EGR boost sensor terminal B and PCM terminal 91 • EGR boost sensor signal circuit shorts to constant voltage supply circuit



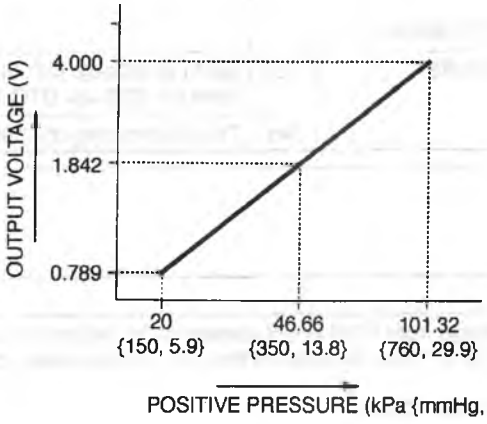
Z6U0102W401

Troubleshooting Hint

EGR boost sensor description

- The EGR boost sensor uses the piezo-electric effect to convert the intake manifold pressure into voltage values, and outputs the voltage to the PCM.
- The EGR boost sensor signal is used for following monitors.
  - —Evaporative system monitor
  - —EGR system monitor

EGR boost sensor signal characteristic



Z6U0102W353

EGR boost sensor specification

Condition	KOEO	KOER
EGR	14.6 psi	14.6 psi
PCM 34 (Signal)	Approx. 4.0 V	Approx. 4.0 V

Diagnostic procedure

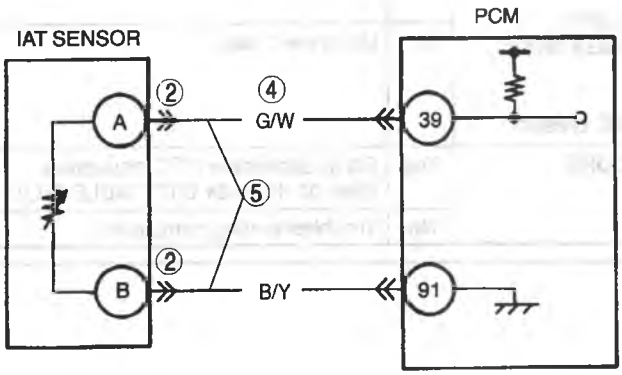
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**INSPECT CONNECTION OF EGR BOOST SENSOR CONNECTOR** • Turn ignition key to OFF. • Verify that the EGR boost sensor connector is connected securely. • Is connection okay?	Yes	Go to next step.
		No	Reconnect the connector, then go to Step 9.
4	**INSPECT POOR CONNECTION OF EGR BOOST SENSOR CONNECTOR** • Disconnect the EGR boost sensor connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace suspected terminal, then go to Step 9.
		No	Go to next step.
5	**VERIFY EGR BOOST SENSOR GROUND CIRCUIT FOR OPEN** • Check continuity between EGR boost sensor terminal B (harness-side) and body ground. • Is there continuity?	Yes	Go to next step.
		No	Check for open circuit between PCM terminal 91 (harness-side) and EGR boost sensor terminal B (harness-side). Repair or replace suspected harness, then go to Step 9.
6	**CHECK PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.

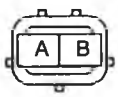
STEP	INSPECTION		ACTION
7	**VERIFY EGR BOOST SENSOR SIGNAL CIRCUIT FOR SHORT TO CONSTANT VOLTAGE CIRCUIT** • Check for continuity between BARO sensor terminal A and C (harness-side). • Is there continuity?	Yes	Repair or replace suspected harness, then go to Step 9.
		No	Go to next step.
8	**VERIFY EGR BOOST SENSOR SIGNAL CIRCUIT FOR OPEN** • Check continuity between EGR boost sensor terminal A (harness-side) and PCM terminal 34 (harness-side). • Is there continuity?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P0108 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0112 [KL]

Z6U010201082W44

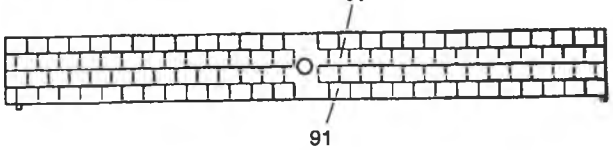
DTC P0112	IAT circuit low input
DETECTION CONDITION	• The PCM monitors IAT sensor signal at PCM terminal 39. If the PCM detects IAT sensor voltage is **below 0.20 V**, the PCM determines that the IAT sensor circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycle. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC also detects by KOEO/KOER Self-Test
POSSIBLE CAUSE	• IAT sensor malfunction • Short to ground circuit between IAT sensor terminal A and PCM terminal 39 • Short each harness IAT signal circuit and IAT ground circuit. • PCM malfunction





IAT SENSOR

HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

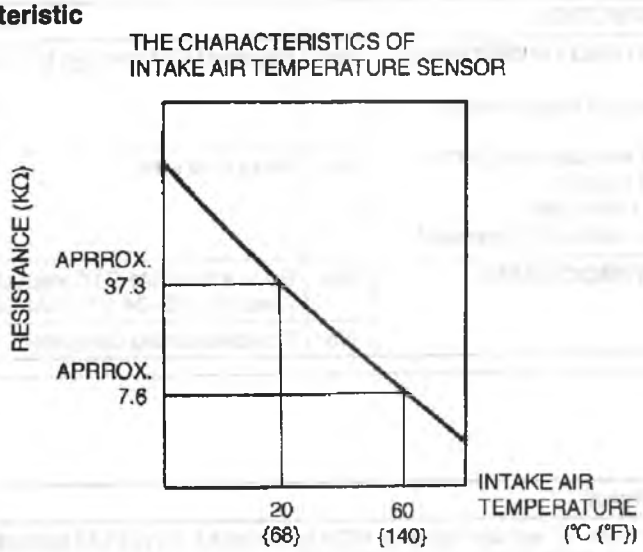
Z6U0102W357

Troubleshooting Hint

IAT sensor description

- The IAT is in inverse proportion to IAT sensor resistance. Therefore IAT is in inverse proportion to IAT output voltage.
- The IAT sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —Purge control
  - —HO2S heater control
  - —Electric cooling fan control
  - —Evaporative system monitor

ECT sensor signal characteristic



Z6U0102W177

IAT sensor specification

IAT temperature	20°C {68°F}	40°C {104°F}	60°C {140°F}	80°C {176°F}	100°C {212°F}	120°C {248°F}
IAT	2°C {68°F}	40°C {104°F}	6°C {140°F}	80°C {176°F}	100°C {212°F}	120°C {248°F}
IAT V*	3.07 V	2.13 V	1.33 V	0.78 V	0.46 V	0.27 V
IAT resistance	37.3 kΩ	16.15 kΩ	7.70 kΩ	3.84 kΩ	2.07 kΩ	1.18 kΩ

* : Voltage values shown in the table were calculated for Vref = **5.0 V**. These values may vary **15 %** due to the IAT sensor and Vref variations.

Diagnostic procedure

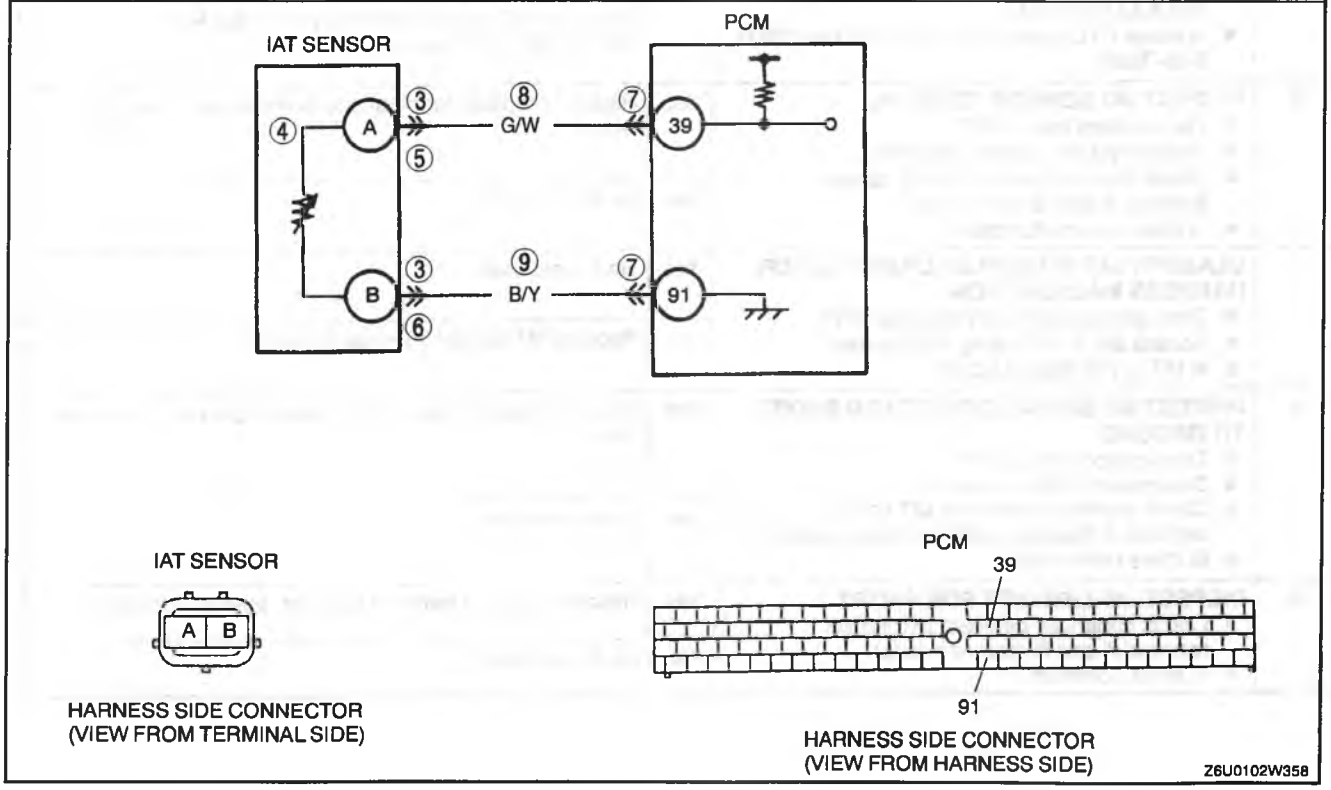
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL]
2	**INSPECT IAT SENSOR TERMINAL** • Turn ignition key to OFF. • Disconnect IAT sensor connector. • Check for bent terminal of IAT sensor terminal A and B (part-side). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 6.
		No	Go to next step.
3	**CLASSIFY IAT SENSOR MALFUNCTION OR HARNESS MALFUNCTION** • Turn ignition key to ON (Engine OFF). • Access IAT V PID using NGS tester. • Is IAT V PID **below 0.2 V**?	Yes	Go to next step.
		No	Replace IAT sensor, then go to Step 6.
4	**INSPECT IAT SIGNAL CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Disconnect PCM connector. • Check continuity between IAT sensor terminal A (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 6.
		No	Go to next step.
5	**INSPECT IAT CIRCUITS FOR SHORT** • Check continuity between IAT sensor terminal A and B (harness-side). • Is there continuity?	Yes	Repair or replace harness for short, then go to Step 6.
		No	Go to next step.

STEP	INSPECTION		ACTION
6	**VERIFY TROUBLESHOOTING OF DTC P0112 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOEO/KOER Self-Test. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0113 [KL]

Z6U010201082W45

DTC P0113	IAT circuit high input
DETECTION CONDITION	• The PCM monitors IAT sensor signal at PCM terminal 39. If the PCM detects IAT sensor voltage is **above 4.80 V**, the PCM determines that the IAT sensor circuit has malfunctioned. • The PCM monitors IAT sensor signal and ECT sensor signal. If the PCM detects the difference in temperature is **above 32.2°C {90°F}**, the PCM determines that IAT sensor circuit has malfunctioned. (ECT is subtracted from IAT) **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycle. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is not stored in the PCM memory. • This DTC also detected by KOEO/KOER Self-Test.
POSSIBLE CAUSE	• IAT sensor malfunction • ECT sensor malfunction • Open circuit between IAT sensor terminal A and PCM terminal 39 • Short to power circuit between IAT sensor terminal A and PCM terminal 39 • Open circuit between IAT sensor terminal B and PCM terminal 91 • Poor connection at IAT sensor or PCM connector. • PCM malfunction

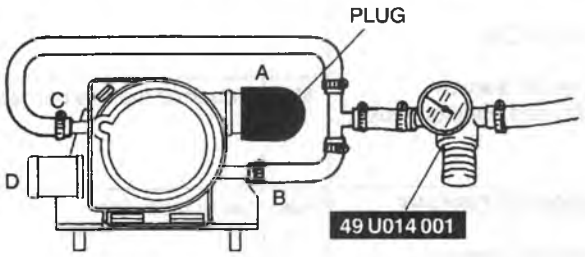


Troubleshooting Hint

IAT sensor description

- The IAT is in inverse proportion to IAT sensor resistance. Therefore IAT is in inverse proportion to IAT output voltage.
- The IAT sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —Purge control
  - —HO2S heater control
  - —Electric cooling fan control
  - —Evaporative system monitor

ECT sensor signal characteristic



Z6U0102W117

IAT sensor specification

IAT temperature	20°C {68°F}	40°C {104°F}	60°C {140°F}	80°C {176°F}	100°C {212°F}	120°C {248°F}
IAT	20°C {68°F}	40°C {104°F}	60°C {140°F}	80°C {176°F}	100°C {212°F}	120°C {248°F}
IAT V*	3.07 V	2.13 V	1.33 V	0.78 V	0.46 V	0.27 V
IAT resistance	37.3 kΩ	16.15 kΩ	7.70 kΩ	3.84 kΩ	2.07 kΩ	1.18 kΩ

* : Voltage values shown in the table were calculated for Vref = **5.0 V**. These values may vary **15 %** due to the IAT sensor and Vref variations.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** ● Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) ● Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**VERIFY CONTINUOUS DTC P0118** ● Is DTC P0118 also detected by continuous monitor?	Yes	Refer to DTC P0118. (See 01-02B-53 DTC P0118 [KL])
		No	Go to next step.
3	**INSPECT POOR CONNECTION OF IAT SENSOR CONNECTOR** ● Turn ignition key to OFF. ● Disconnect IAT sensor connector. ● Check for poor connection (damaged, pulled-out pins, corrosion, etc.). ● Is there any malfunctions?	Yes	Repair or replace terminal and/or connector, then go to Step 10.
		No	Go to next step.
4	**INSPECT IAT SENSOR** ● Measure resistance between IAT sensor terminal A and B (part-side). ● Is resistance **above 16 kΩ** ?	Yes	Replace IAT sensor, then go to Step 10.
		No	Go to next step.
5	**INSPECT IAT SENSOR SIGNAL CIRCUIT FOR SHORT TO POWER** ● Turn ignition key to ON (Engine OFF). ● Measure voltage between IAT sensor terminal A (harness-side) and body ground. ● Is voltage **B+** ?	Yes	Repair or replace harness for short to power, then go to Step 10.
		No	Go to next step.

STEP	INSPECTION		ACTION
6	**INSPECT IAT SENSOR GROUND CIRCUIT FOR SHORT TO POWER** • Measure voltage between IAT sensor terminal B (harness-side) and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to Step 10.
		No	Go to next step.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Inspect PCM terminal 39 and 91 (harness-side) for tightness using feeler tool. • Is there any malfunctions?	Yes	Repair or replace terminal and/or connector, then go to Step 10.
		No	Go to next step.
8	**INSPECT IAT SENSOR SIGNAL CIRCUIT FOR OPEN** • Connect breakout box with PCM disconnected. • Check continuity between IAT sensor terminal A (harness-side) and breakout box terminal 39. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 10.
9	**INSPECT IAT SENSOR GROUND CIRCUIT FOR OPEN** • Check continuity between IAT sensor terminal B (harness-side) and breakout box terminal 91. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P0113 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester generic OBD function. • Perform KOEO/KOER Self-Test. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0116 [KL]

Z6U010201082W46

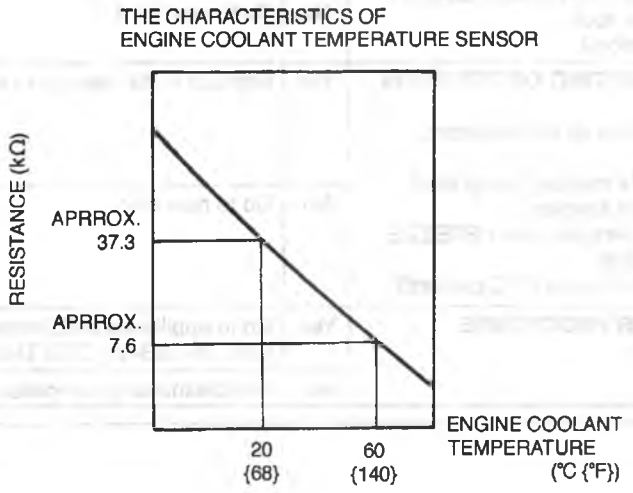
DTC P0116	ECT circuit performance problem
DETECTION CONDITION	• The PCM monitors the ECT when monitoring condition are met. If the ECT is below **10° C {50° F}**, the PCM determines that ECT signal circuit has malfunctioned. **MONITORING CONDITION** — Vehicle soak time is above **6 hours** — ECT is **above 110°C {230°F}** — Vehicle speed is above **24 km/h {15 mph}** **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• ECT sensor malfunction • Poor connection at ECT sensor or PCM connector • PCM malfunction

Troubleshooting Hint

ECT sensor description

- The engine coolant temperature is in inverse proportion to ECT sensor resistance. Therefore engine coolant temperature voltage, signal is in inverse proportion to ECT output voltage.
- The ECT sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —A/C cut-off control
  - —Electric cooling fan control
  - —Evaporative system monitor
  - —EGR system monitor

ECT sensor signal characteristic



Z6U0102W181

ECT sensor specification

ECT temperature	20°C {68°F}	40°C {104°F}	60°C {140°F}	80°C {176°F}	100°C {212°F}	120°C {248°F}
ECT	20°C {68°F}	40°C {104°F}	60°C {140°F}	80°C {176°F}	100°C {212°F}	120°C {248°F}
ECT V*	3.07 V	2.13 V	1.33 V	0.78 V	0.46 V	0.27 V
ECT resistance	37.3 kΩ	16.15 kΩ	7.70 kΩ	3.84 kΩ	2.07 kΩ	1.18 kΩ

* : Voltage values shown in the table were calculated for Vref = **5.0 V**. These values may vary **15 %** due to the ECT sensor and Vref variations.

Diagnostic procedure

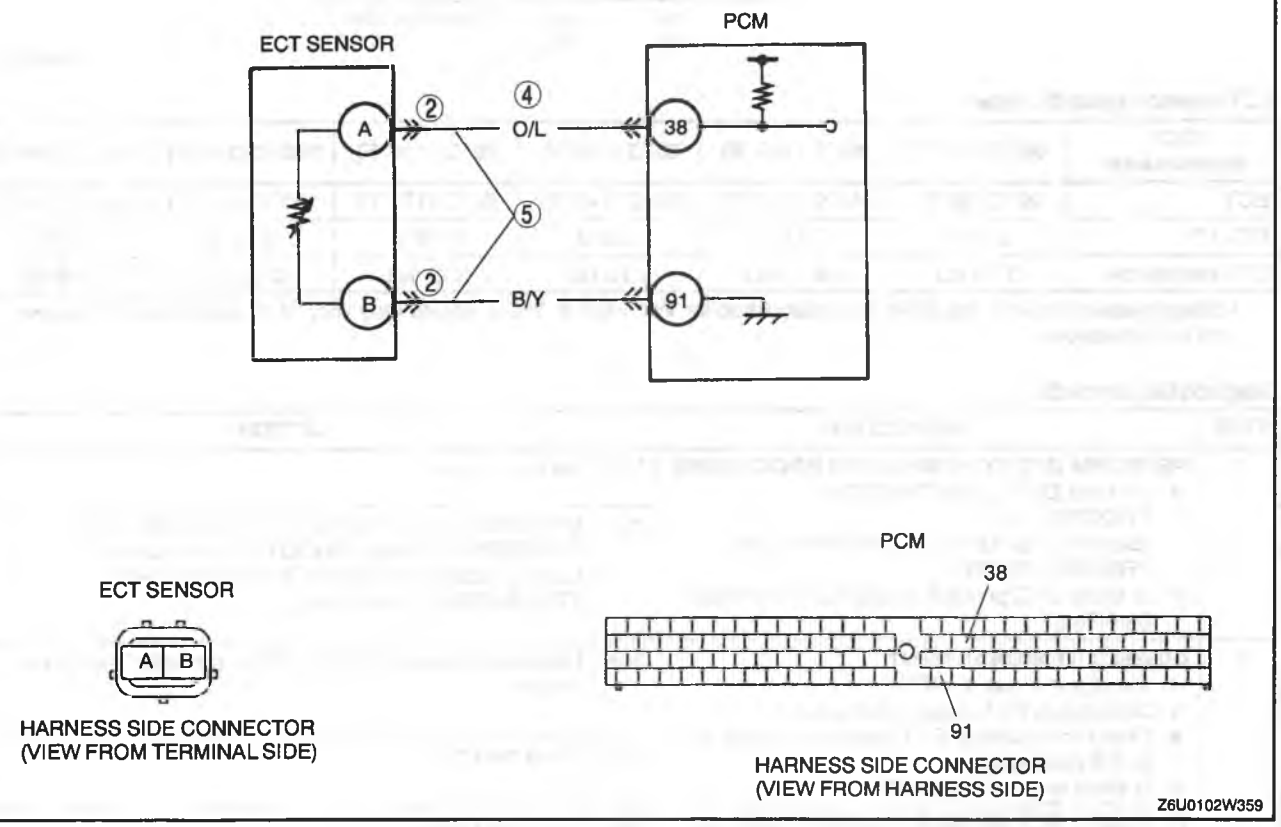
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS– IS CONCERN INTERMITTENT OR CONSTANT?** • Start engine. • Access ECT PID continuously using NGS tester. • Warm up engine completely. • Is ECT PID **below 10°C {50°F}**?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
		No	Go to next step.

STEP	INSPECTION		ACTION
4	**INSPECT POOR CONNECTION OF ECT SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect ECT sensor connector. • Check for poor connection (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunctions?	Yes	Repair or replace terminal and/or connector, then go to Step 7.
		No	Go to next step.
5	**INSPECT ECT SENSOR** • Measure resistance between ECT sensor terminal A and B (part-side). • Is resistance **approx. 2 kΩ** ?	Yes	Go to next step.
		No	Repair or replace ECT sensor, then go to Step 7.
6	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Disconnect PCM connector. • Inspect PCM terminal 38 (harness-side) for tightness using feeler tool. • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to next step.
		No	Go to next step.
7	**VERIFY TROUBLESHOOTING OF DTC P0116 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Start engine and run engine under FREEZE FRAME DATA condition. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0117 [KL]

Z6U010201082W47

DTC P0117	ECT circuit low input
DETECTION CONDITION	• The PCM monitors ECT sensor signal at PCM terminal 38. If the PCM detects ECT sensor voltage is **below 0.20 V,** the PCM determines that the ECT sensor circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycle. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC also detects by KOEO/KOER Self-Test.
POSSIBLE CAUSE	• ECT sensor malfunction • Short to ground circuit between ECT sensor terminal A and PCM connector terminal 38. • Short each harness ECT signal circuit and ECT ground circuit. • PCM malfunction



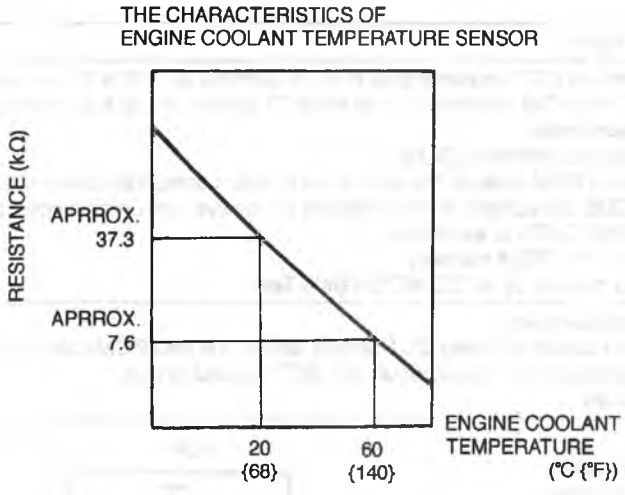
Z6U0102W359

Troubleshooting Hint

ECT sensor description

- The ECT is in inverse proportion to ECT sensor resistance. Therefore ECT is in inverse proportion to ECT output voltage.
- The ECT sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —A/C cut-off control
  - —Electric cooling fan control
  - —Evaporative system monitor
  - —EGR system monitor

ECT sensor signal characteristic



ECT sensor specification

ECT temperature	20°C {68°F}	40°C {104°F}	60°C {140°F}	80°C {176°F}	100°C {212°F}	120°C {248°F}
ECT	20°C {68°F}	40°C {104°F}	60°C {140°F}	80°C {176°F}	100°C {212°F}	120°C {248°F}
ECT V*	3.07 V	2.13 V	1.33 V	0.78 V	0.46 V	0.27 V
ECT resistance	37.3 kΩ	16.15 kΩ	7.70 kΩ	3.84 kΩ	2.07 kΩ	1.18 kΩ

* : Voltage values shown in the table were calculated for Vref = **5.0 V**. These values may vary **15 %** due to the ECT sensor and Vref variations.

Diagnostic procedure

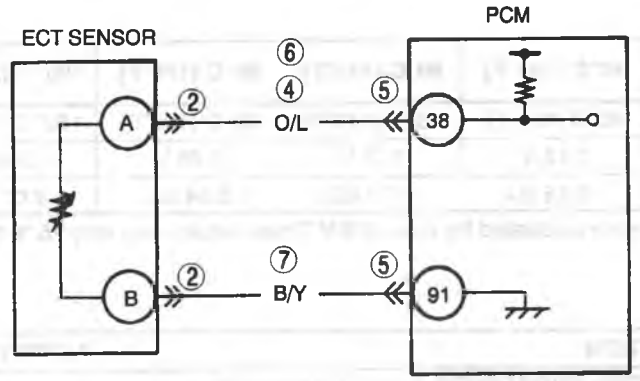
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**INSPECT TERMINAL BENT** • Turn ignition key to OFF. • Disconnect ECT sensor connector. • Check for bends in ECT sensor terminals A and B (part-side). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 6.
		No	Go to next step.
3	**CLASSIFY ECT SENSOR MALFUNCTION OR HARNESS MALFUNCTION** • Disconnect ECT sensor connector. • Turn ignition key to ON (Engine OFF). • Access ECT V PID using NGS tester. • Is ECT V PID **below 0.20 V**?	Yes	Go to next step.
		No	Replace ECT sensor, then go to Step 6.
4	**INSPECT ECT SIGNAL CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Disconnect PCM connector. • Check continuity between ECT sensor terminal A (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 6.
		No	Go to next step.
5	**INSPECT ECT CIRCUIT FOR SHORT HARNESSES** • Check continuity between ECT sensor terminal A and B (harness-side). • Is there continuity?	Yes	Repair or replace harness for short, then go to next step.
		No	Go to next step.

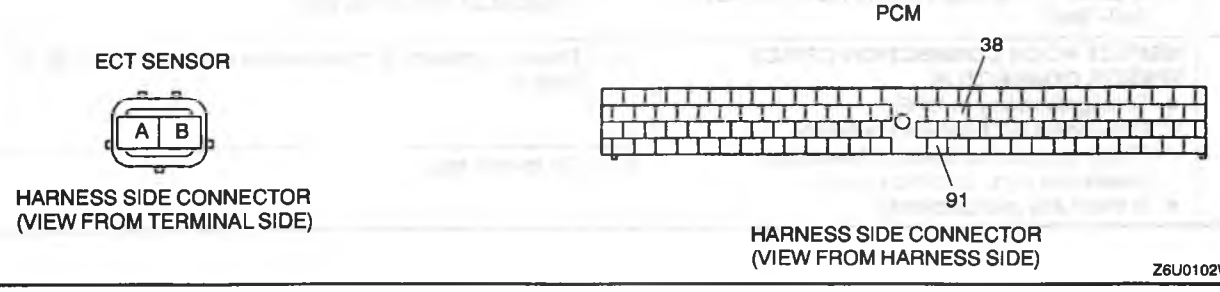
STEP	INSPECTION		ACTION
6	**VERIFY TROUBLESHOOTING OF DTC P0117 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOEO/KOER Self-Test. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0118 [KL]

Z6U010201082W48

DTC P0118	ECT circuit high input
DETECTION CONDITION	• The PCM monitors ECT sensor signal at PCM terminal 38. If the PCM detects ECT sensor voltage is **above 4.80 V**, the PCM determines that the ECT sensor circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycle. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC also detects by KOEO/KOER Self-Test.
POSSIBLE CAUSE	• ECT sensor malfunction • Open circuit between ECT sensor terminal A and PCM terminal 38. • Short to power circuit between ECT sensor terminal A and PCM terminal 38. • Open circuit between ECT sensor terminal B and PCM terminal 91. • Poor connection of ECT sensor or PCM connectors. • PCM malfunction • This DTC also detects by KOEO/KOER Self-test.





Z6U0102W402

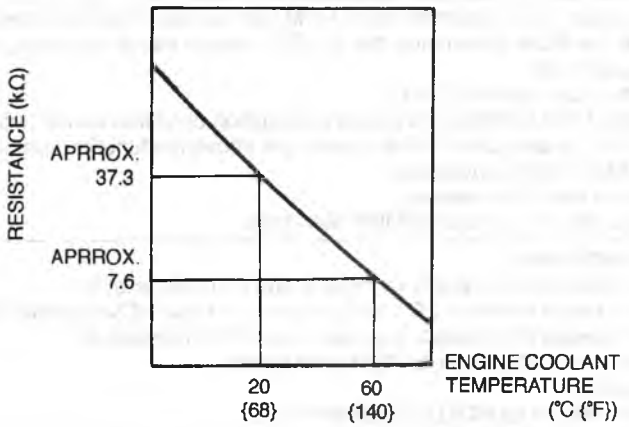
Troubleshooting Hint

ECT sensor description

- The ECT is in inverse proportion to ECT sensor resistance. Therefore ECT is in inverse proportion to ECT output voltage.
- The ECT sensor signal is used for the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —A/C cut-off control
  - —Electric cooling fan control
  - —Evaporative system monitor
  - —EGR system monitor

ECT sensor signal characteristic

THE CHARACTERISTICS OF
ENGINE COOLANT TEMPERATURE SENSOR



Z6U0102W181

ECT sensor specification

ECT temperature	20°C {68°F}	40°C {104°F}	60°C {140°F}	80°C {176°F}	100°C {212°F}	120°C {248°F}
ECT	20°C {68°F}	40°C {104°F}	60°C {140°F}	80°C {176°F}	100°C {212°F}	120°C {248°F}
ECT V*	3.07 V	2.13 V	1.33 V	0.78 V	0.46 V	0.27 V
ECT resistance	37.3 kΩ	16.15 kΩ	7.70 kΩ	3.84 kΩ	2.07 kΩ	1.18 kΩ

* : Voltage values shown in the table were calculated for Vref = **5.0 V**. These values may vary **15 %** due to the ECT sensor and Vref variations.

Diagnostic procedure

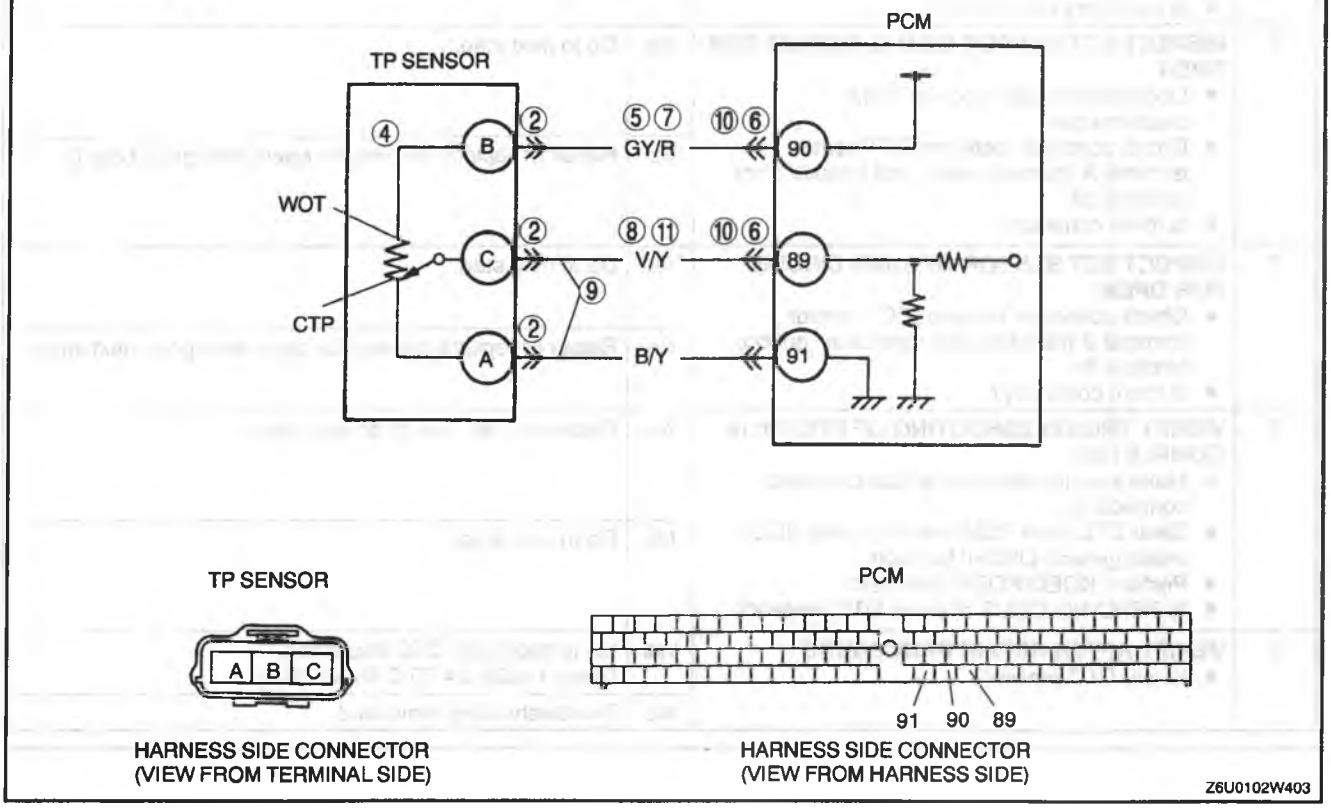
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**INSPECT POOR CONNECTION OF ECT SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect ECT sensor connector. • Check for poor connection (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunctions?	Yes	Repair or replace terminal and/or connector, then go to Step 8.
		No	Go to next step.

STEP	INSPECTION		ACTION
3	**CLASSIFY ECT SENSOR OR HARNESS MALFUNCTION** • Connect jumper wire between ECT sensor terminal A and B (harness-side) • Access ECT V PID using NGS tester. • Is ECT V PID **approx. 0 V**?	Yes	Replace ECT sensor, then go to Step 8.
		No	Go to next step.
4	**INSPECT ECT SENSOR SIGNAL CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (Engine OFF). • Measure voltage between ECT sensor terminal A (harness-side) and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to Step 8.
		No	Go to next step.
5	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 8.
		No	Go to next step.
6	**INSPECT ECT SENSOR SIGNAL CIRCUIT FOR OPEN** • Connect breakout box with PCM disconnected. • Check continuity between ECT sensor terminal A (harness-side) and breakout box terminal 38. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 8.
7	**INSPECT ECT SENSOR GROUND CIRCUIT FOR OPEN** • Check continuity between ECT sensor terminal B (harness-side) and breakout box terminal 91. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.
8	**VERIFY TROUBLESHOOTING OF DTC P0118 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOEO/KOER Self-Test. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0122 [KL]

Z6U010201082W49

DTC P0122	TP circuit low input
DETECTION CONDITION	• If the PCM detects the TP sensor voltage at PCM terminal 89 is **below 0.17 V** after the ignition key is turned to ON, the PCM determines that a TP circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycle. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC also detects by KOEO/KOER Self-Test
POSSIBLE CAUSE	• TP sensor malfunction • Connector or terminal malfunction • Open circuit between TP sensor terminal C and PCM terminal 89. • Short to ground circuit between TP sensor terminal C and PCM terminal 89. • Open circuit between TP sensor terminal B and PCM terminal 90. • Short to ground circuit between TP sensor terminal B and PCM terminal 90.

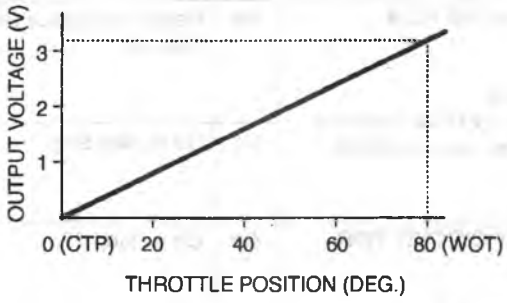


Troubleshooting Hint

TP sensor description

- A liner type throttle sensor is use
- The TP sensor resistance between terminal A and C increases while depressing the accelerator pedal.
- The TP sensor resistance between terminal B and C decreases while depressing the accelerator pedal.
- The TP sensor signal is used for following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —A/C cut-off control
  - —Electric cooling fan control
  - —Evaporative system monitor
  - —EGR system monitor

TP sensor signal characteristic



Z6U0102W404

TP sensor specification

Accelerator pedal position	Closed throttle position	Wide open throttle
TP V PID	0.3—0.7 V	3.4—5.3 V
TP MODE PID	C/T	WOT
PCM 89	0.3—0.7 V	3.4—5.3 V

Diagnostic procedure

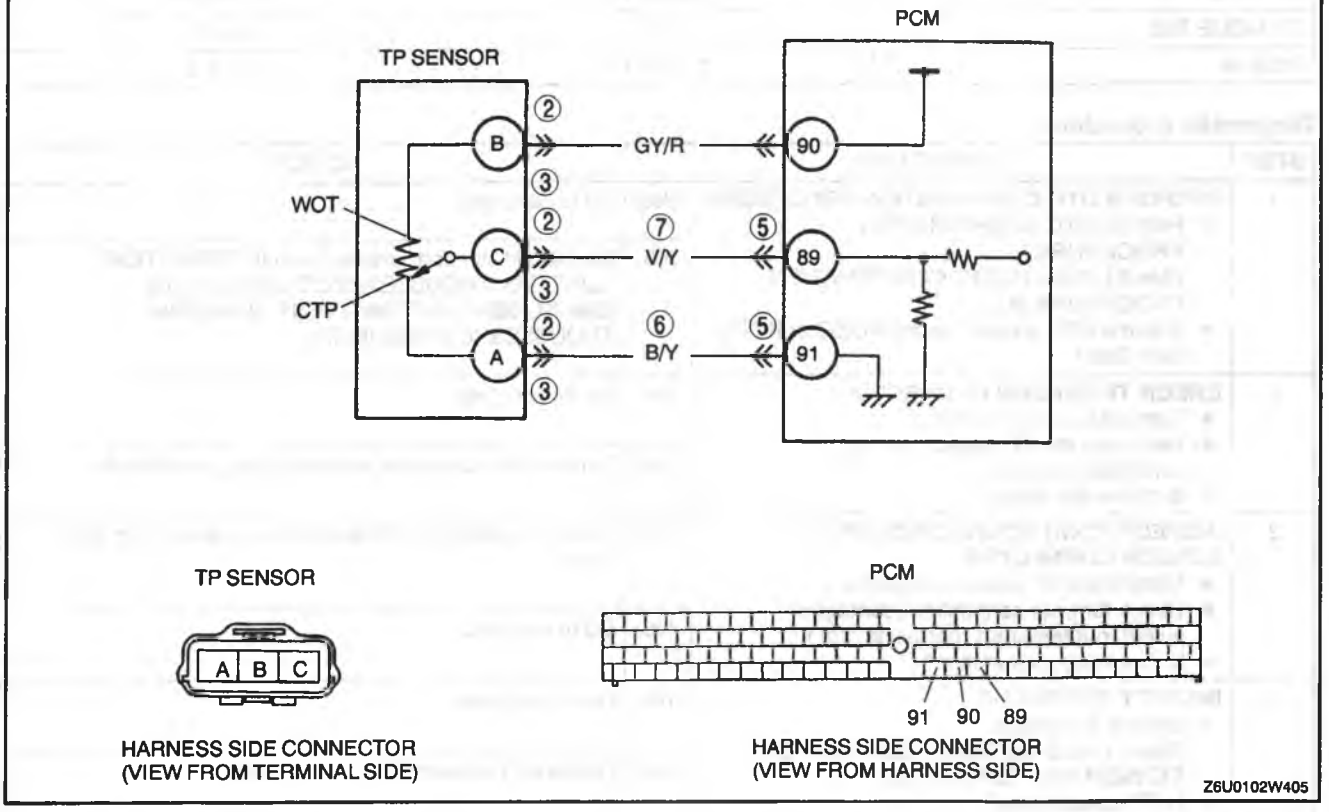
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**CHECK POOR CONNECTION OF TP SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect TP sensor connector. • Check for poor connection of TP sensor connector (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 12.
		No	Go to next step.
3	**CLASSIFY TP SENSOR OR HARNESS MALFUNCTION** • Connect a jumper wire between TP sensor terminals B and C (harness-side). • Turn ignition key to ON (Engine OFF). • Access TP V PID using NGS tester. • Is TP V PID **within 4.5—5.5 V**?	Yes	Go to next step.
		No	Go to Step 5.
4	**INSPECT TP SENSOR** • Inspect TP sensor. (See 01-40B-33 THROTTLE POSITION SENSOR INSPECTION [KL]) • Is TP sensor okay?	Yes	Go to Step 12.
		No	Replace TP sensor, then go to Step 12.
5	**CHECK TP SENSOR POWER SUPPLY CIRCUIT** **Note** • If DTC P0107 and P0452 are also retrieved with P0122, then go to REFERENCE VOLTAGE troubleshooting procedure. (See 01-03B-51 NO.29 CONSTANT VOLTAGE [KL]) • Turn ignition key to ON (Engine OFF). • Check voltage at TP sensor terminal B (harness-side). • Is voltage **within 4.5— 5.5 V**?	Yes	Go to Step 8.
		No	Go to next step.

STEP	INSPECTION		ACTION
6	**CHECK POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection of PCM terminals 90 and 89 (damaged, pulled-out terminals, corrosion, etc.) • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 12.
		No	Go to next step.
7	**VERIFY TP POWER SUPPLY CIRCUIT FOR OPEN** • Turn ignition key to OFF. • Connect breakout box with PCM disconnected. • Check continuity between TP sensor terminal B (harness-side) and breakout box terminal 90. • Is there continuity?	Yes	Go to Step 12.
		No	Repair or replace harness for open, then go to Step 12.
8	**VERIFY TP SIGNAL CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Check continuity between TP sensor terminal C (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 12.
		No	Go to next step.
9	**VERIFY SHORTED BETWEEN TP SIGNAL AND TP GROUND CIRCUIT** • Check continuity between TP sensor terminals A and C (harness-side). • Is there continuity?	Yes	Repair or replace shorts each harnesses, then go to Step 12.
		No	Go to next step.
10	**CHECK POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection of PCM terminals 90 and 89 (damaged, pulled-out terminals, corrosion, etc.) • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 12.
		No	Go to next step.
11	**VERIFY TP SIGNAL CIRCUIT FOR OPEN** • Turn ignition key to OFF. • Connect breakout box with PCM disconnected. • Check continuity between TP sensor terminal C (harness-side) and breakout box terminal 89. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.
12	**VERIFY TROUBLESHOOTING OF DTC P0122 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD function. • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is PENDING CODE of same DTC present during KOEO or KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
13	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0123 [KL]

Z6U010201082W50

DTC P0123	TP circuit high input
DETECTION CONDITION	• If the PCM detects the TP sensor voltage at the PCM terminal 89 is **above 4.79 V** while the engine is running, the PCM determines that a TP circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycle. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC also detects by KOEO/KOER Self-Test.
POSSIBLE CAUSE	• TP sensor malfunction • Connector or terminal malfunction • Open circuit between TP sensor terminal A and PCM terminal 91 • Short to reference voltage (Vref) between TP sensor terminal C and PCM terminal 89

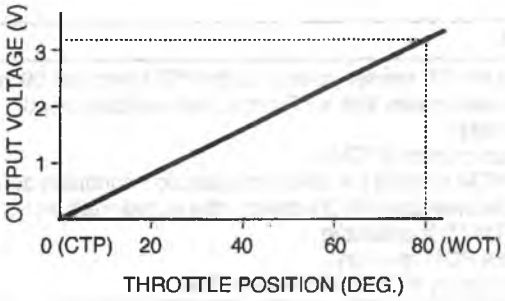


Troubleshooting Hint

TP sensor description

- A liner type throttle sensor is use
- The TP sensor resistance between terminal A and C increases while depressing the accelerator pedal.
- The TP sensor resistance between terminal B and C decreases while depressing the accelerator pedal.
- The TP sensor signal is used for following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —A/C cut-off control
  - —Electric cooling fan control
  - —Evaporative system monitor
  - —EGR system monitor

TP sensor signal characteristic



Z6U0102W404

TP sensor specification

Accelerator pedal position	Closed throttle position	Wide open throttle
TP V PID	0.3—0.7 V	3.4—5.3 V
TP MODE PID	C/T	WOT
PCM 89	0.3—0.7 V	3.4—5.3 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**CHECK TP SENSOR CONNECTOR** • Turn ignition key to OFF. • Verify that the TP sensor connector is connected securely. • Is connector okay?	Yes	Go to next step.
		No	Connect the connector securely, then go to Step 8.
3	**INSPECT POOR CONNECTION OF TP SENSOR CONNECTOR** • Disconnect TP sensor connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 8.
		No	Go to next step.
4	**INSPECT TP SENSOR** • Inspect TP sensor. (See 01-40B-33 THROTTLE POSITION SENSOR INSPECTION [KL]) • Is TP sensor okay?	Yes	Go to next step.
		No	Replace TP sensor, then go to Step 8.
5	**CHECK POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection of PCM terminals 89 and 91 (damaged, pulled-out terminals, corrosion, etc.) • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 8.
		No	Go to next step.
6	**VERIFY TP GROUND CIRCUIT FOR OPEN** • Turn ignition key to OFF. • Connect breakout box with PCM disconnected. • Check continuity between TP sensor terminal A (harness-side) and breakout box terminal 91. • Is there continuity?	Yes	Go to next.
		No	Repair or replace harness for open, then go to Step 8.
7	**VERIFY TP SIGNAL CIRCUIT FOR OPEN** • Measure voltage between TP sensor terminal C (harness-side) and body ground. • Is voltage **above 4.79 V**?	Yes	Repair or replace harness for short to Vref, then go to Step 8.
		No	Go to next step.

STEP	INSPECTION		ACTION
8	**VERIFY TROUBLESHOOTING OF DTC P0123 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOEO/KOER Self-Test. • Is PENDING CODE of same DTC present during KOEO or KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0125 [KL]

Z6U010201082W51

DTC P0125	Excessive time to enter closed loop fuel control
DETECTION CONDITION	• The PCM monitors ECT sensor signal at PCM terminal 38 after engine is started and the engine is cold. If ECT is not **above 25.5°C {78°F}** for a specified period, PCM determines that it has taken an excessive amount of time for the engine coolant temperature to reach the temperature necessary to start closed-loop fuel control. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• ECT sensor malfunction • Poor connection of connectors • PCM malfunction

Troubleshooting Hint
Closed loop description

- The closed loop which is feedback zone of fuel injection control, keeps a good air/fuel ratio to improve fuel economy and to reduce exhaust emissions level.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS-IS CONCERN INTERMITTENT OR CONSTANT** • Start engine. • Warm up engine completely. • Access ECT PID using NGS tester. • Is ECT PID **above 25.5°C {78°F}**?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
		No	Go to next step.
4	**INSPECT POOR CONNECTION OF ECT SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect ECT sensor connector. • Check for poor connection (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunctions?	Yes	Repair or replace terminal and/or connector, then go to Step 7.
		No	Go to next step.

STEP	INSPECTION		ACTION
5	**INSPECT ECT SENSOR** • Inspect ECT sensor. (See 01-40B-36 ENGINE COOLANT TEMPERATURE SENSOR INSPECTION [KL]) • Is it okay?	Yes	Go to next step.
		No	Replace ECT sensor, then go to Step 7.
6	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunctions?	Yes	Repair or replace terminal and/or connector, then go to Step 7.
		No	Go to next step.
7	**VERIFY TROUBLESHOOTING OF DTC P0125 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Access ECT PID using NGS tester. • Wait until ECT PID is **below 20°C {6°F}**. • Start engine and warm it up completely. • Is PENDING CODE of same DTC stored?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0133, P0153 [KL]

Z6U010201082W52

DTC P0133 **DTC P0153**	**HO2S (Front: RH) circuit slow response** **HO2S (Front: LH) circuit slow response**
DETECTION CONDITION	• DTC P0133, P0153 indicates response rate of HO2S is below some calibrated window.
POSSIBLE CAUSE	• Contaminated HO2S • Exhaust leaks • Shorted/open wires • Improper fueling • MAF sensor • Air leaks • Deteriorating HO2S

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**PERFORM KOER SELF TEST** • Key on, engine running and engine at operating temperature. • Perform KOER self-test. • Is DTCs P1127 present during KOER self-test?	Yes	Perform DTC P1127 troubleshooting. (See 01-02B-166 DTC P1127 [KL])
		No	Go to next step.

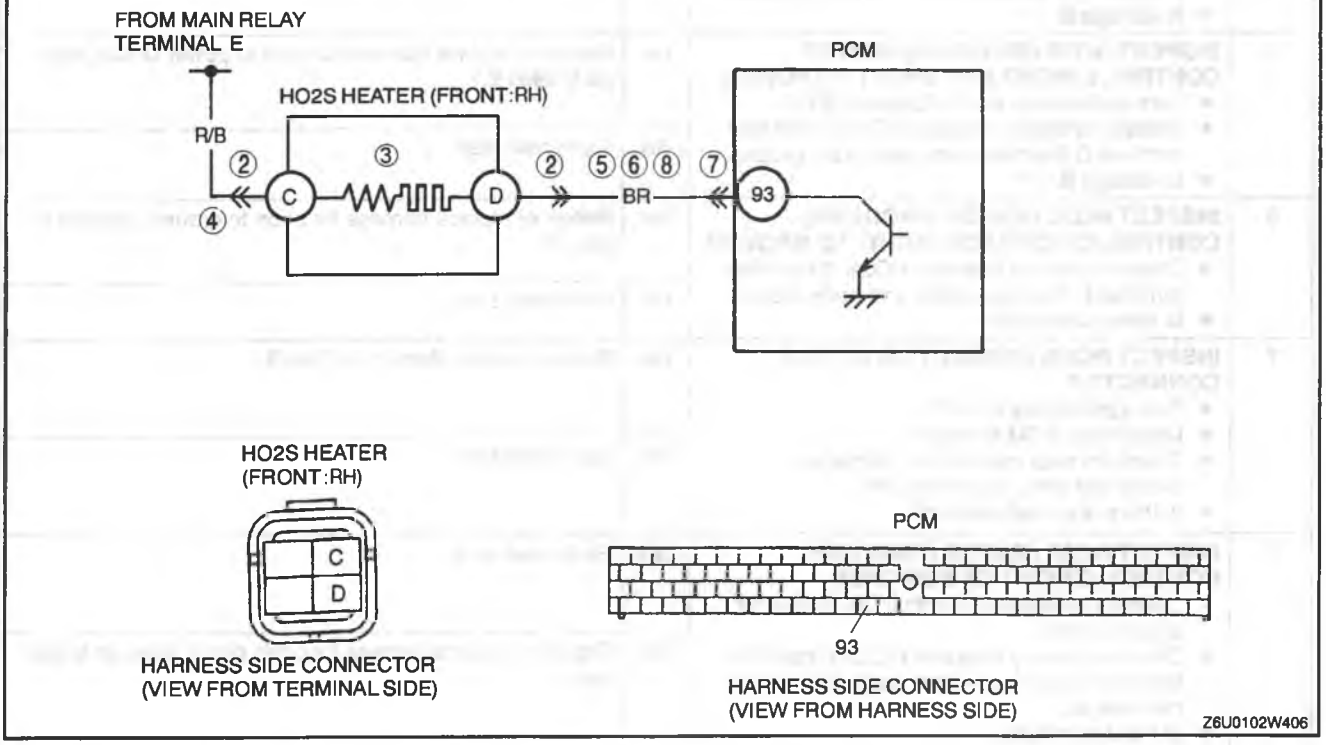
STEP	INSPECTION		ACTION
4	**HO2S RESPONSE TEST** ● Key on, engine off. ● Select Generic OBD II function from menu and trigger. ● Press Continue. ● Select Diagnostic Monitoring Test Results from menu and trigger. ● Scroll to Test ID: 10:03:81 trigger and press start. ● Does measured value indicate greater than **461**?	Yes	Go to Step 9.
		No	HO2S test results indicate fail. Go to next step.
5	**CHECK FOR SOURCE OF POTENTIAL HO2S CONTAMINATION** ● Investigate following items as potential source of HO2S contamination. ● Use of unapproved silicone sealers ● Fuel contaminated by silicone additives ● Excessive oil burning (i.e. rings, valve seals and oil overfill) ● Glycol (antifreeze) leaking internally in engine ● Contaminated fuel ● Use of unapproved cleaning agents ● Are any of above conditions present?	Yes	Replace HO2S (Front: RH or LH), then go to Step 9.
		No	Go to next step.
6	**CHECK FOR UNMETERED AIR LEAKS** Fuel calculations can be affected by unmetered air leaks. ● Carefully inspect following areas for potential air leaks. ● Hoses connecting to MAF sensor ● Hoses connecting to throttle body ● Intake manifold gasket leaks ● Positive crankcase ventilation (PCV) disconnected ● Vacuum lines disconnected ● Improperly seated engine oil dipstick and tube ● Exhaust leaks at flanges and gaskets ● Are there any air leaks?	Yes	Replace damaged parts, then go to Step 9.
		No	Go to next step.
7	**CHECK RESISTANCE OF HO2S SIGNAL CIRCUIT** ● Key off. ● Disconnect NGS tester. ● Disconnect PCM. Inspect both ends of connection for bent or pushed out pins, corrosion or other damage. Service as necessary. ● Install breakout box. Leave PCM disconnected. ● Measure resistance between heated oxygen sensor signal Test Pin 60 HO2S (Front: RH) or 87 HO2S(Front: LH) at breakout box and HO2S harness connector terminal A. ● Measure resistance between following Test Pin 35 at breakout box and HO2S harness connector terminal A.(Except California emission regulation applicable model) ● Measure resistance between HO2S body and ground. ● Is resistance **less than 5.0** Ω?	Yes	Go to next step.
		No	Replace wiring harness, then go to Step 9.

STEP	INSPECTION		ACTION
8	**CHECK FOR SHORT IN HO2S CIRCUIT** ● Key off. ● Install breakout box and disconnect PCM connector. ● Measure resistance between HO2S signal Test Pin at breakout box and power circuit and HO2S signal Test Pin and ground circuit at breakout box. — HO2S (Front: RH) = Test Pin 60 — HO2S (Front: LH) = Test Pin 87 — Power circuit = Test Pin 71/97 — Ground = Test Pin 91 ● Is resistance **greater than 10,000 Ω**?	Yes	Go to next step.
		No	Replace wiring harness, then go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P0133, P0153 COMPLETED** ● Make sure to reconnect all disconnected connectors. ● Turn ignition key to ON (Engine OFF). ● Clear DTC from memory using NGS tester generic OBD-II function. ● Start engine and perform DRIVE MODE. (See 01-02B-18 OBD II DRIVE MODE [KL]) ● Access DIAGNOSTIC MONITORING TEST RESULTS of generic OBD-II function. (See 01-02B-15 Diagnostic Monitoring Test Results Access Procedure) ● Verify following TEST ID value: — 10:01:91 Voltage amplitude between rich and lean (bank RH) — 10:01:A1 Voltage amplitude between rich and lean (bank LH) — 10:03:81 Switch point (rear HO2S) ● Is value within specification?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** ● Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0135 [KL]

Z6U010201082W53

DTC P0135	HO2S heater (Front:RH) circuit malfunction
DETECTION CONDITION	• The PCM monitors the HO2S heater (Front:RH) control signal at the PCM terminal 93. If electric current at PCM terminal 93 is **below 0.14 A** or **above 3.0 A** after the HO2S heater (Front:RH) has been on for **254 seconds**, the PCM determines that the HO2S heater (Front:RH) circuit has malfunctioned. **Diagnostic support note** • This is an intermittent monitor (HO2S heater). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory. • This DTC also detects by KOEO/KOER Self-Test.
POSSIBLE CAUSE	• HO2S (Front:RH) malfunction • Open circuit between the main relay terminal E and HO2S (Front:RH) terminal C • Open circuit between the HO2S (Front:RH) terminal D and PCM terminal 93 • Short to ground circuit between HO2S (Front:RH) terminal D and PCM terminal 93 • Short to power circuit between HO2S (Front:RH) terminal D and PCM terminal 93 • Poor connection at HO2S (Front:RH) or PCM connector • PCM malfunction • This DTC also detects by KOEO/KOER Self-Test.



Troubleshooting Hint

HO2S heater description

- The main relay circuit supplies battery voltage to the HO2S heater, and the PCM completes the ground when the proper conditions occur.
- The use of HO2S heater requires that the heater control be duty cycled, to prevent damage to the heater.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])

STEP	INSPECTION		ACTION
2	**INSPECT POOR CONNECTION OF HO2S (FRONT: RH) CONNECTOR** • Turn ignition key to OFF. • Disconnect HO2S (Front:RH) connector. • Check for poor connection (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunctions?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
3	**INSPECT HO2S HEATER (FRONT:RH)** • Measure resistance between HO2S (Front:RH) terminals C and D (part-side). • Is resistance as follows? — Federal emission regulation applicable models: **approx. 6 Ω** — California emission regulation applicable models: **approx. 3.3 Ω**	Yes	Go to next step.
		No	Replace the HO2S (Front:RH), then go to Step 9.
4	**INSPECT HO2S HEATER (FRONT:RH) POWER CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Measure voltage between HO2S (Front:RH) terminal C (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open circuit, then go to Step 9.
5	**INSPECT HO2S (FRONT:RH) HEATER CONTROL CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (Engine OFF). • Measure voltage between HO2S (Front:RH) terminal D (harness-side) and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for shot to power circuit, then go to Step 9.
		No	Go to next step.
6	**INSPECT HO2S HEATER (FRONT:RH) CONTROL CIRCUIT FOR SHORT TO GROUND** • Check continuity between HO2S (Front:RH) terminal D (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 9.
		No	Go to next step.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunctions?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.
8	**INSPECT HO2S HEATER (FRONT:RH) CONTROL CIRCUIT OF FOR OPEN** • Connect breakout box with PCM connector disconnected. • Check continuity between HO2S (Front:RH) terminal D (harness-side) and breakout box terminal 93. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open circuit, then go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P0135 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester OBD-II generic function. • Perform KOEO/KOER Self-Test. • Is same DTC present during KOEO or KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0136, P1137, P1138 [KL]

Z6U010201082W54

DTC P0136 **DTC P1137** **DTC P1138**	**HO2S (Rear: RH) circuit malfunction** **Lack of HO2S (Rear: RH) switch, sensor indicates lean** **Lack of HO2S (Rear: RH) switch, sensor indicates rich**
DETECTION CONDITION	• DTC P0136 indicate output voltage of HO2S (Rear: RH), is less than PCM pre programmed voltage.(no activity detected) • DTC P1137 and P1138 can only be retrieved during KOER self-test when fuel control is fluctuating between rich and lean, and monitor voltage changes in the HO2S (Rear: RH).
POSSIBLE CAUSE	• Wiring concern • Pinched, shorted, and corroded wiring and pins • Crossed sensor wires • Other concern • Exhaust leaks • Contaminated or damaged sensor

Troubleshooting Hint

See 01-40B-11 Heated Oxygen Sensor Description.

Diagnostic procedure

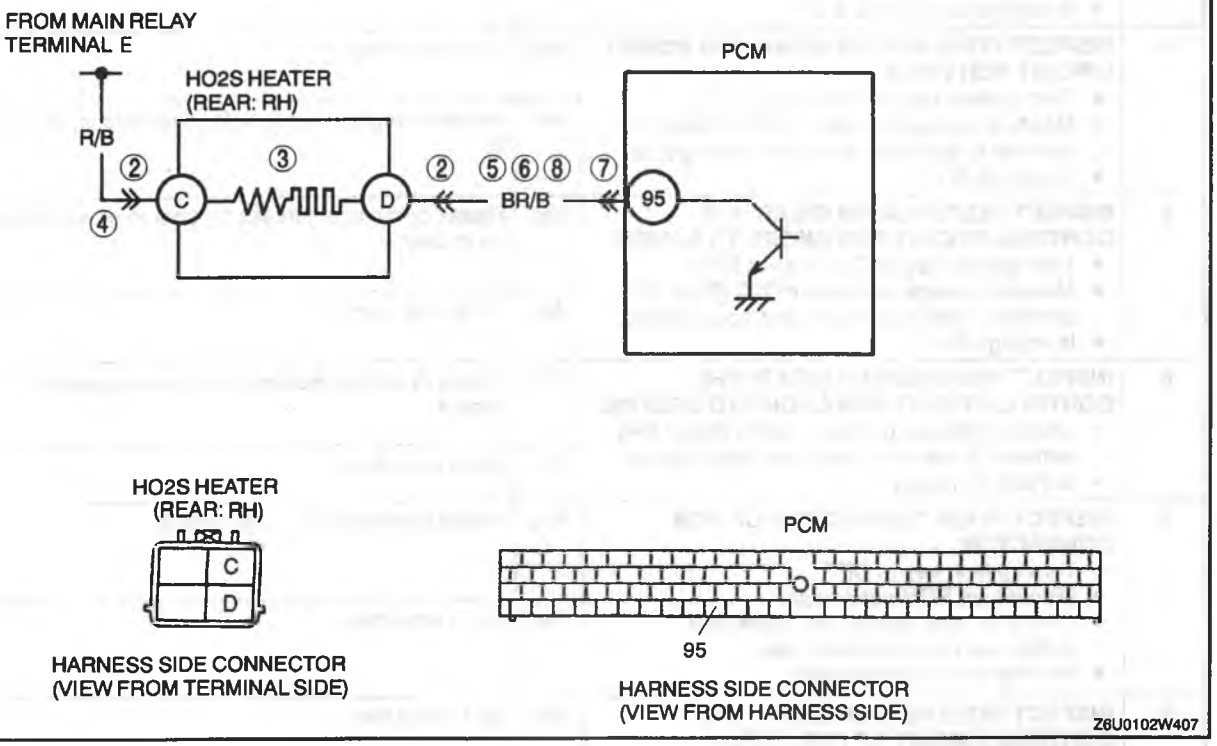
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**CHECK PID STATUS** • Check for broken/loose air hose clamps, cracks/holes in air hose. If it was damaged, service as necessary. • Check exhaust gas leaks from exhaust system. If it was damaged, service as necessary. • Start engine and bring to normal operating temperature. • Access O2S12 (HO2S (Rear: RH) with NGS tester. • Is HO2S activated?	Yes	Go to Step 7.
		No	Go to next step.
4	**CHECK CONNECTION OF HO2S CONNECTOR AND PCM CONNECTOR** • Key off. • Verify connection of HO2S connector and PCM connector. • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and pins then go to next step.
5	**CHECK HO2S (Rear: RH) SIGNAL CIRCUIT SHORTS TO GROUND CIRCUIT** • Key off. • Disconnect HO2S connector. • Disconnect PCM connector. • Install breakout box. • Measure resistance between Test pins 35 and 76. • Is their resistance **greater than 10,000 ohms**?	Yes	Repair or replace wiring harness or connector then go to Step 9.
		No	Replace HO2S (Rear: RH).
6	**CHECK HO2S (Rear: RH) GROUND CIRCUIT OPEN** • Key off. • Check continuity between Test pin 35 and 91. • Is their continuity?	Yes	Replace HO2S (Rear: RH).
		No	Repair or replace wiring harness or connector then go to next step.

STEP	INSPECTION		ACTION
7	**VERIFY TROUBLESHOOTING OF DTC P0136, P1137, P1138 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine and perform DRIVE MODE. (See 01-02B-18 OBD II DRIVE MODE [KL]) • Access DIAGNOSTIC MONITORING TEST RESULTS of generic OBD-II function. (See 01-02B-15 Diagnostic Monitoring Test Results Access Procedure) • Verify following TEST ID value: — 10:01:91 Voltage amplitude between rich and lean (bank1) • Is value within specification?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0141 [KL]

Z6U010201082W55

DTC P0141	HO2S heater (Rear: RH) circuit malfunction
DETECTION CONDITION	• The PCM monitors the HO2S heater (Rear: RH) control signal at the PCM terminal 95. If electric current at PCM terminal 95 is **below 0.14 A** or **above 3.0 A** after the HO2S heater (Rear: RH) has been on for **254 seconds**, the PCM determines that the HO2S heater (Rear: RH) circuit has malfunctioned. **Diagnostic support note** • This is an intermittent monitor (HO2S heater). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory. • This DTC also detects by KOEO/KOER Self-test.
POSSIBLE CAUSE	• HO2S (Rear: RH) malfunction • Open circuit between the main relay terminal E and HO2S (Rear: RH) terminal C • Open circuit between the HO2S (Rear: RH) terminal D and PCM terminal 95 • Short to ground circuit between HO2S (Rear: RH) terminal D and PCM terminal 95 • Short to power circuit between HO2S (Rear: RH) terminal D and PCM terminal 95 • Poor connection at HO2S (Rear: RH) or PCM connector • PCM malfunction



Z6U0102W407

Troubleshooting Hint

HO2S heater description

- The main relay circuit supplies battery voltage to the HO2S heater, and the PCM completes the ground when the proper conditions occur.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** ● Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) ● Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**INSPECT POOR CONNECTION OF HO2S (REAR: RH) CONNECTOR** ● Turn ignition key to OFF. ● Disconnect HO2S (Rear: RH) connector. ● Check for poor connection (damaged, pulled-out pins, corrosion, etc.). ● Are there any malfunctions?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
3	**INSPECT HO2S HEATER (REAR: RH)** ● Measure resistance between HO2S (Calif.(Rear: RH) terminals C and D (part-side). ● Is resistance **approx. 6 Ω**?	Yes	Go to next step.
		No	Replace the HO2S (Rear: RH) (Middle), then go to Step 9.
4	**INSPECT HO2S HEATER (REAR: RH) POWER CIRCUIT FOR OPEN** ● Turn ignition key to ON (Engine OFF). ● Measure voltage between HO2S (Rear: RH) terminal C (harness-side) and body ground. ● Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open circuit, then go to Step 9.
5	**INSPECT HO2S HEATER (REAR: RH) CONTROL CIRCUIT FOR SHORT TO POWER** ● Turn ignition key to ON (Engine OFF). ● Measure voltage between HO2S (Rear: RH) terminal D (harness-side) and body ground. ● Is voltage **B+**?	Yes	Repair or replace harness for shot to power circuit, then go to Step 9.
		No	Go to next step.
6	**INSPECT HO2S HEATER (REAR: RH) CONTROL CIRCUIT FOR SHORT TO GROUND** ● Check continuity between HO2S (Rear: RH) terminal D (harness-side) and body ground. ● Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 9.
		No	Go to next step.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** ● Turn ignition key to OFF. ● Disconnect PCM connector. ● Check for poor connection (damaged, pulled-out pins, corrosion, etc.). ● Are there any malfunctions?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.
8	**INSPECT HO2S HEATER (REAR: RH) CONTROL CIRCUIT OF FOR OPEN** ● Connect breakout box with PCM connector disconnected. ● Check continuity between HO2S (Rear: RH) terminal D (harness-side) and breakout box terminal 95. ● Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open circuit, then go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P0141 COMPLETED** ● Make sure to reconnect all disconnected connectors. ● Clear DTC from PCM memory using NGS tester OBD-II generic function. ● Perform KOEO/KOER Self-Test. ● Is same DTC present during KOEO or KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** ● Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0142, P1143, P1144 [KL]

Z6U010201082W56

DTC P0142 **DTC P1143** **DTC P1144**	• HO2S (Rear) circuit malfunction • Lack of HO2S (Rear) switch, sensor indicates lean • Lack of HO2S (Rear) switch, sensor indicates rich
DETECTION CONDITION	• DTC P0142 indicate the output voltage of the HO2S (Rear) is less than some calibrating functional window. • DTC P1143 and P1144 can only be retrieved during key on engine running (KOER) Self-Test when the fuel control is fluctuating between rich and lean and monitored for a voltage change on the HO2S (Rear).
POSSIBLE CAUSE	• Wiring concern • Pinched, shorted, and corroded wiring and pins • Crossed sensor wires • Other concern • Exhaust leaks • Contaminated or damaged sensor

Diagnostic procedure

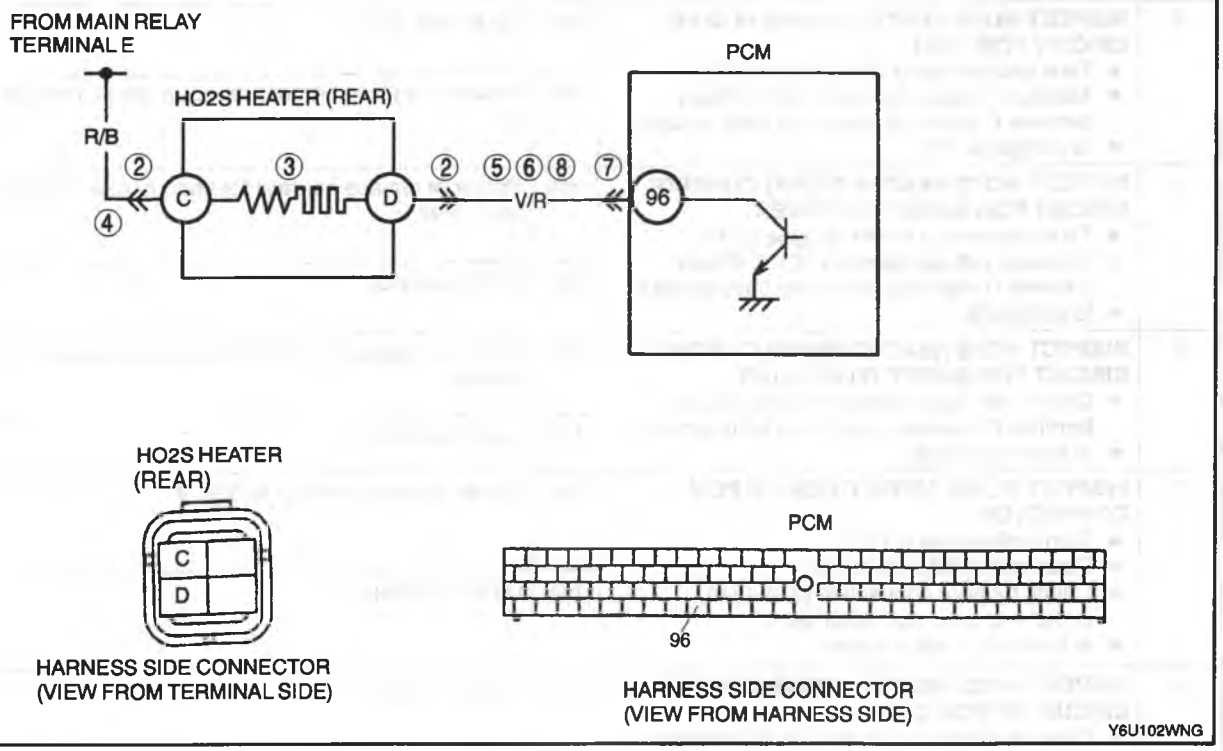
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**CHECK PID STATUS** • Check for broken/loose air hose clamps, cracks/holes in air hose. If it was damaged, service as necessary. • Check exhaust gas leaks from exhaust system. If it was damaged, service as necessary. • Start engine and bring to normal operating temperature. • Access O2S13 (HO2S (Rear)) with NGS tester. • Is HO2S activated?	Yes	Go to Step 7.
		No	Go to next step.
4	**CHECK CONNECTION OF HEATED OXYGEN SENSOR CONNECTOR AND PCM CONNECTOR** • Key off. • Verify connection of heated oxygen sensor connector and PCM connector. • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and terminals then go to next step.
5	**CHECK HO2S (REAR) SIGNAL CIRCUIT SHORTS TO GROUND CIRCUIT** • Key off. • Disconnect HO2S (Rear) connector. • Disconnect PCM connector. • Install breakout box. • Measure resistance between Test pin 61 and 76. • Is their resistance **greater than 10,000** Ω?	Yes	Go to next step.
		No	Repair or replace wiring harness or connector then go to Step 7.
6	**CHECK HO2S (REAR) GROUND CIRCUIT OPEN** • Key off. • Check continuity between Test pin 61 and 91. • Is their continuity?	Yes	Replace heated oxygen sensor.
		No	Repair or replace wiring harness or connector then go to next step.

STEP	INSPECTION		ACTION
7	**VERIFY TROUBLESHOOTING OF DTC P0142, P1143, P1144 COMPLETED** ● Make sure to reconnect all disconnected connectors. ● Turn ignition key to ON (Engine OFF). ● Clear DTC from memory using NGS tester generic OBD II functions. ● Start engine and perform DRIVE MODE. (See 01-02B-18 OBD II DRIVE MODE [KL]) ● Access DIAGNOSTIC MONITORING TEST RESULTS of generic OBD II functions. (See 01-02B-23 DIAGNOSTIC MONITORING TEST RESULTS [KL]) ● Verify TEST ID value. — 10:03:82 Switching point (rear HO2S) ● Is value within specification?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** ● Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0147 [KL]

Z6U010201082W57

DTC P0147	HO2S heater (Rear) circuit malfunction
DETECTION CONDITION	• The PCM monitors the HO2S heater (Rear) control signal at the PCM terminal 96. If electric current at PCM terminal 96 is **below 0.14 A** or **above 3.0 A** after the HO2S heater (Rear) has been on for **60 seconds**, the PCM determines that the HO2S heater (Rear) circuit has malfunctioned. **Diagnostic support note** • This is an intermittent monitor (O_2 sensor heater). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory. • This DTC also detects by KOEO/KOER Self-test.
POSSIBLE CAUSE	• HO2S (Rear) malfunction • Open circuit between the main relay terminal E and HO2S (Rear) terminal C • Open circuit between the HO2S (Rear) terminal D and PCM terminal 96 • Short to ground circuit between HO2S (Rear) terminal D and PCM terminal 96 • Short to power circuit between HO2S (Rear) terminal D and PCM terminal 96 • Poor connection at HO2S (Rear) or PCM connector • PCM malfunction



Troubleshooting Hint

HO2S heater description

- The main relay circuit supplies battery voltage to the HO2S heater, and the PCM completes the ground when the proper conditions occur.

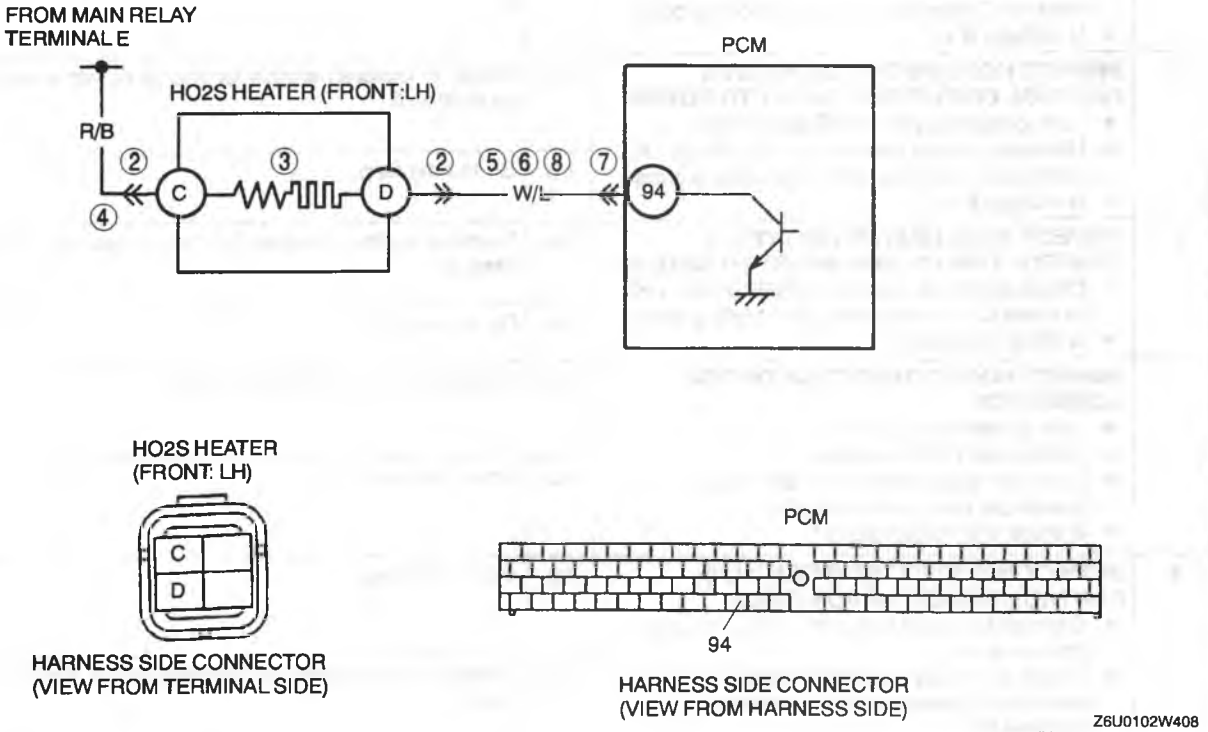
Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**INSPECT POOR CONNECTION OF HO2S (REAR) CONNECTOR** • Turn ignition key to OFF. • Disconnect HO2S (Rear) connector. • Check for poor connection (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunctions?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
3	**INSPECT HO2S HEATER (REAR)** • Measure resistance between HO2S (Rear) terminals C and D (part-side). • Is resistance **approx. 6 Ω**?	Yes	Go to next step.
		No	Replace the HO2S (Rear), then go to Step 9.
4	**INSPECT HO2S HEATER (REAR) POWER CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Measure voltage between HO2S (Rear) terminal C (harness-side) and body ground. • Is voltage **B**+?	Yes	Go to next step.
		No	Repair or replace harness for open circuit, then go to Step 9.
5	**INSPECT HO2S HEATER (REAR) CONTROL CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (Engine OFF). • Measure voltage between HO2S (Rear) terminal D (harness-side) and body ground. • Is voltage **B**+?	Yes	Repair or replace harness for short to power circuit, then go to Step 9.
		No	Go to next step.
6	**INSPECT HO2S HEATER (REAR) CONTROL CIRCUIT FOR SHORT TO GROUND** • Check continuity between HO2S (Rear) terminal D (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 9.
		No	Go to next step.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunctions?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.
8	**INSPECT HO2S HEATER (REAR) CONTROL CIRCUIT OF FOR OPEN** • Connect breakout box with PCM connector disconnected. • Check continuity between HO2S (Rear) terminal D (harness-side) and breakout box terminal 96. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open circuit, then go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P0147 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester OBD-II generic function. • Perform KOEO/KOER Self-Test. • Is PENDING CODE of same DTC present during KOEO or KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0155 [KL]

Z6U010201082W58

DTC P0155	HO2S heater (Front: LH) circuit malfunction
DETECTION CONDITION	• The PCM monitors the HO2S heater (Front: LH) control signal at the PCM terminal 94. If electric current at PCM terminal 94 is **below 0.14 A** or **above 3.0 A** after the HO2S heater (Front: LH) has been on for **254 seconds**, the PCM determines that the HO2S heater (Front: LH) circuit has malfunctioned. **Diagnostic support note** • This is an intermittent monitor (HO2S heater). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory. • This DTC also detects by KOEO/KOER Self-test.
POSSIBLE CAUSE	• HO2S (Front: LH) malfunction • Open circuit between the main relay terminal E and HO2S (Front: LH) terminal C • Open circuit between the HO2S (Front: LH) terminal D and PCM terminal 94 • Short to ground circuit between HO2S (Front: LH) terminal D and PCM terminal 94 • Short to power circuit between HO2S (Front: LH) terminal D and PCM terminal 94 • Poor connection at HO2S (Front: LH) or PCM connector • PCM malfunction



Z6U0102W408

Troubleshooting Hint

HO2S heater description

- The main relay circuit supplies battery voltage to the HO2S heater, and the PCM completes ground when the proper conditions occur.
- The use of HO2S heater requires that the heater control be duty cycled, to prevent damage to the heater.

Diagnostic procedure

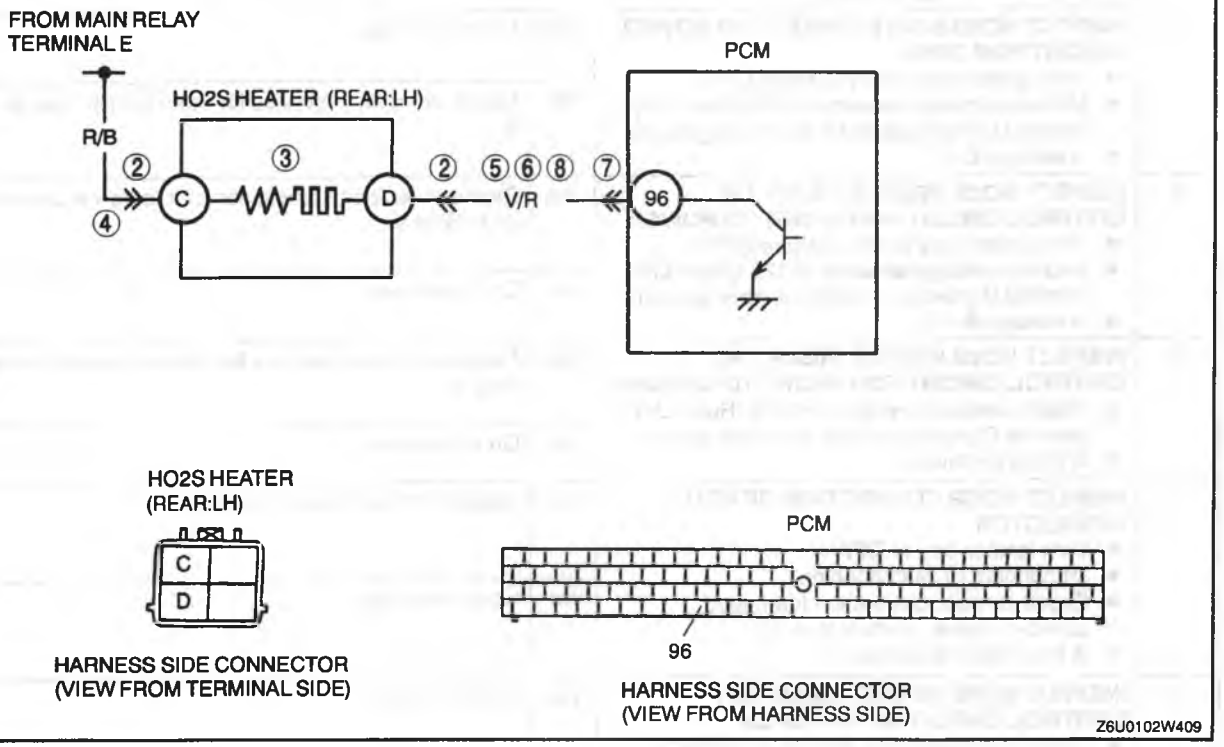
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])

STEP	INSPECTION		ACTION
2	**INSPECT POOR CONNECTION OF HO2S (FRONT: LH) CONNECTOR** ● Turn ignition key to OFF. ● Disconnect HO2S (Front: LH) connector. ● Check for poor connection (damaged, pulled-out pins, corrosion, etc.). ● Is there any malfunctions?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
3	**INSPECT HO2S HEATER (FRONT: LH)** ● Measure resistance between HO2S (Front: LH) terminals C and D (part-side). ● Is resistance as follows? — Federal emission regulations applicable models: **approx. 6 Ω** — California emission regulations applicable models: **approx. 3.3 Ω**	Yes	Go to next step.
		No	Replace the HO2S (Front: LH), then go to Step 9.
4	**INSPECT HO2S HEATER (FRONT: LH) POWER CIRCUIT FOR OPEN** ● Turn ignition key to ON (Engine OFF). ● Measure voltage between HO2S (Front: LH) terminal C (harness-side) and body ground. ● Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open circuit, then go to Step 9.
5	**INSPECT HO2S (FRONT: LH) HEATER CONTROL CIRCUIT FOR SHORT TO POWER** ● Turn ignition key to ON (Engine OFF). ● Measure voltage between HO2S (Front: LH) terminal D (harness-side) and body ground. ● Is voltage **B+**?	Yes	Repair or replace harness for shot to power circuit, then go to Step 9.
		No	Go to next step.
6	**INSPECT HO2S HEATER (FRONT: LH) CONTROL CIRCUIT FOR SHORT TO GROUND** ● Check continuity between HO2S (Front: LH) terminal D (harness-side) and body ground. ● Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 9.
		No	Go to next step.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** ● Turn ignition key to OFF. ● Disconnect PCM connector. ● Check for poor connection (damaged, pulled-out pins, corrosion, etc.). ● Is there any malfunctions?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.
8	**INSPECT HO2S HEATER (FRONT: LH) CONTROL CIRCUIT OF FOR OPEN** ● Connect breakout box with PCM connector disconnected. ● Check continuity between HO2S (Front: LH) terminal D (harness-side) and breakout box terminal 94. ● Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open circuit, then go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P0155 COMPLETED** ● Make sure to reconnect all disconnected connectors. ● Clear DTC from PCM memory using NGS tester OBD generic function. ● Perform KOEO/KOER Self-Test. ● Is PENDING CODE of same DTC present during KOEO or KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** ● Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0161 [KL]

Z6U010201082W59

DTC P0161	HO2S heater (Rear: LH) circuit malfunction
DETECTION CONDITION	• The PCM monitors the HO2S heater (Rear: LH) control signal at the PCM terminal 96. If electric current at PCM terminal 96 is **below 0.14 A** or **above 3.0 A** after the HO2S heater (Rear: LH) has been on for **60 seconds**, the PCM determines that the HO2S heater (Rear: LH) circuit has malfunctioned. **Diagnostic support note** • This is an intermittent monitor (HO2S heater). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory. • This DTC also detects by KOEO/KOER Self-test.
POSSIBLE CAUSE	• HO2S (Rear: LH) malfunction • Open circuit between the main relay terminal E and HO2S (Rear: LH) terminal C • Open circuit between the HO2S (Rear: LH) terminal E and PCM terminal 96 • Short to ground circuit between HO2S (Rear: LH) terminal E and PCM terminal 96 • Short to power circuit between HO2S (Rear: LH) terminal E and PCM terminal 96 • Poor connection at HO2S (Rear: LH) or PCM connector • PCM malfunction



Z6U0102W409

Troubleshooting Hint

HO2S heater description

- The main relay circuit supplies battery voltage to the HO2S heater, and the PCM completes ground when the proper conditions occur.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**INSPECT POOR CONNECTION OF HO2S (REAR: LH) CONNECTOR** • Turn ignition key to OFF. • Disconnect HO2S (Rear: LH) connector. • Check for poor connection (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunctions?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
3	**INSPECT HO2S HEATER (REAR: LH)** • Measure resistance between HO2S (Rear: LH) terminals C and D (part-side). • Is resistance **approx. 6 Ω**?	Yes	Go to next step.
		No	Replace the HO2S (Rear: LH), then go to Step 9.
4	**INSPECT HO2S HEATER (REAR: LH) POWER CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Measure voltage between HO2S (Rear: LH) terminal C (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open circuit, then go to Step 9.
5	**INSPECT HO2S HEATER (REAR: LH) CONTROL CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (Engine OFF). • Measure voltage between HO2S (Rear: LH) terminal D (harness-side) and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for shot to power circuit, then go to Step 9.
		No	Go to next step.
6	**INSPECT HO2S HEATER (REAR: LH) CONTROL CIRCUIT FOR SHORT TO GROUND** • Check continuity between HO2S (Rear: LH) terminal D (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 9.
		No	Go to next step.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunctions?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.
8	**INSPECT HO2S HEATER (REAR: LH) CONTROL CIRCUIT OF FOR OPEN** • Connect breakout box with PCM connector disconnected. • Check continuity between HO2S (Rear: LH) terminal D (harness-side) and breakout box terminal 96. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open circuit, then go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P0161 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester OBD-II generic function. • Perform KOEO/KOER Self-Test. • Is PENDING CODE of same DTC present during KOEO or KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0171, P0172, P0174, P0175, P1130, P1131, P1132, P1150, P1151, P1152 [KL]

Z6U010201082W60

DTC P0171 **DTC P0172** **DTC P0174** **DTC P0175** **DTC P1130** **DTC P1131** **DTC P1132** **DTC P1150** **DTC P1151** **DTC P1152**	**Adaptive fuel control system (RH) too lean** **Adaptive fuel control system (RH) too rich** **Adaptive fuel control system (LH) too lean** **Adaptive fuel control system (LH) too rich** **Lack of HO2S (Front: RH) switch, adaptive fuel at limit** **Lack of HO2S (Front: RH) switch, sensor indicates too lean** **Lack of HO2S (Front: RH) switch, sensor indicates too rich** **Lack of HO2S (Front: LH) switch, adaptive fuel at limit** **Lack of HO2S (Front: LH) switch, sensor indicates too lean** **Lack of HO2S (Front: LH) switch, sensor indicates too rich**
DETECTION CONDITION	• DTC P0171 right bank and DTC P0174 left bank indicate fuel/air ratio is too lean. Fuel trim system is at rich correction limit. • DTC P0172 right bank and DTC P0175 left bank indicate fuel/air ratio is too rich. Fuel trim system is at lean correction limit. • DTCs P1130 right bank and P1150 left bank indicate fuel control system has reached maximum compensation for lean or rich condition and HO2S is not switching. • DTC P1131 right bank and P1151 left bank indicate fuel/air ratio is correcting rich for an overly lean condition. HO2S voltage is **less than 0.45 volt**. • DTC P1132 right bank and P1152 left bank indicate fuel/air ratio is correcting lean for an overly lean condition. HO2S voltage is **greater than 0.45 volt**.
POSSIBLE CAUSE	Fuel System • Excessive fuel pressure • Leaking fuel injector(s) • Leaking pressure regulator • Low fuel pressure or running out of fuel • Contaminated fuel injector(s) Base Engine • Oil overfill • Cam timing • Cylinder compression • Exhaust leaks before or near HO2S Induction System • Air leaks between the MAF sensor and intake manifold • Vacuum leaks • Restricted air inlet • Positive crankcase ventilation (PCV) system • Fuel purge system • Improperly seated engine oil dipstick EGR System • Leaking gasket • Stuck open EGR valve • Leaking diaphragm **Warning** **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VISUAL CHECKS** • Check intake air system for leaks, obstructions and damage. • Check air cleaner element and air cleaner housing for blockage. • Verify integrity of PCV system. • Check for vacuum leaks. • Are any of the above concern present?	Yes	Service as necessary, than go to Step 47.
		No	Go to next step.
4	**PERFORM KOER SELF-TEST** • Key off. • NGS tester connected. • Disconnect fuel vapor hose from intake manifold and plug fitting at intake manifold. • Start engine and run at **2,000 rpm** for **5 minutes** and return to idle. • Perform KOER Self-Test. • Are any HO2S DTCs P1127, P1131, P1132, P1151 or P1152 present?	Yes	**If DTC(s) P1127 is present:** Perform P1127 troubleshooting. **DTCs P1131, P1130 or P1151, P1150:** Go to next step. **DTCs P1132, P1130 or P1152, P1150:** Go to Step 10.
		No	**For Continuous DTCs P1130, P1150, P0171, P0174, and P0172 and P0175:** Go to Step 14. **If DTC(s) P1132 and/or P1152 are no longer present:** Reconnect fuel vapor line. Check purge solenoid valve DTC (P0443). **All others:** Fault that produced DTC is intermittent. Check for poor connection or component malfunction (Service or replace as necessary).
5	**HO2S CIRCUIT TEST (WITH LEAN DTCs)** • Key off. • NGS tester connected. • Disconnect HO2S. Inspect for damaged or pushed out pins, water, corrosion, loose wires. Service as necessary. • Key on, engine off. • Access 02S11 with NGS tester. • Jumper HO2S signal circuit to HO2S heater power circuit at HO2S vehicle harness connector. **Note** • If spark occurs, remove jumper and go to Step 8 (check fuse in the heater circuit) • Is reading **1.30 V** or greater?	Yes	Check HO2S ground circuit. Go to next step.
		No	An open or short to ground exists in vehicle harness or PCM. Go to Step 8.
6	**CHECK SIGNAL RETURN CIRCUIT FOR SHORTS AND OPENS** • Key off. • Install breakout box. PCM connected. • Measure resistance between HO2S ground terminal at HO2S vehicle harness connector and ground Test Pin 91 at breakout box. • Is resistance reading **less than 5.0 Ω**?	Yes	Go to Step 14.
		No	Go to next step.
7	**CHECK HO2S SIGNAL RETURN CIRCUIT IN VEHICLE HARNESS** • Breakout box installed. PCM disconnected. • Measure resistance between HO2S ground terminal at HO2S vehicle harness connector and ground Test Pin 91 at breakout box. • Is resistance reading **less than 5.0 Ω**?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to Step 47.

STEP	INSPECTION		ACTION
8	**CHECK RESISTANCE OF HO2S AND HO2S GROUND CIRCUIT** • Key off. • Disconnect PCM. Inspect both ends of connector for bent or pushed out pins, corrosion or other damage. Service as necessary. • Install breakout box. Leave PCM disconnected. • Disconnected suspected HO2S from harness. Inspect both ends of connector for damaged or pushed out pins, moisture, corrosion, loose pins. Service as required. • Measure resistance between suspected HO2S signal Test Pin at breakout box and HO2S vehicle harness connector. Use pin assignment below and record reading: — HO2S (Front: RH) = Test Pin 60 — HO2S (Front: LH) = Test Pin 87 — HO2S ground = Test Pin 91 • Is resistance reading **less than 5.0 Ω**?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to Step 47.
9	**CHECK HO2S CIRCUIT WIRING HARNESS FOR SHORT TO GROUND** • Key off. • Breakout box installed. PCM disconnected. • HO2S disconnected. • Measure resistance between HO2S signal Test Pin 60, 87 and Test Pins 24, 51, 76, 77, 103, 91 at breakout box. • Is each resistance **greater than 10,000 Ω**?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to Step 47.
10	**CHECK HO2S FOR SHORT TO GROUND OR PCM GROUND (BETWEEN PCM AND HO2S GROUND CIRCUIT)** • Key off. • Breakout box installed. PCM disconnected. • Reconnect HO2S. • Measure resistance between ground and PCM ground Test Pins and HO2S signal Test Pin at breakout box: — HO2S (Front: RH) = Test Pin 60 — HO2S (Front: LH) = Test Pin 87 — Ground = Test Pin 24 and 103 — HO2S ground = Test Pin 91 • Is resistance **greater than 10,000 Ω**?	Yes	Go to next step.
		No	Replace HO2S, then go to Step 47.
11	**HO2S CIRCUIT CHECK (FOR RICH DTCs)** • Key off. • Disconnect HO2S. Inspect for damaged or pushed out pins, corrosion and loose wires. Service as necessary. • NGS tester connected. • Access O2S11, O2S21 PID with NGS tester. • Is reading **0.2 V or less**?	Yes	Go to Step 13.
		No	A short to power exists. Go to next step.
12	**CHECK FOR SHORTS TO VOLTAGE SOURCE IN HARNESS CIRCUIT** • Key off. • Disconnect NGS tester from DLC. • Disconnect HO2S. • Disconnect PCM. Inspect for damaged or pushed out pins, corrosion and loose wires. Service as necessary. • Install breakout box. Leave PCM disconnected. • Measure resistance between appropriate test pins at breakout box: — DTC P1130, P1132 = HO2S (Front: RH) Test Pin 60 and Test Pins 71, 93 and 97. — DTC P1150, P1152 = HO2S (Front: LH) Test Pin 87 and Test Pins 71, 94 and 97. • Is resistance **greater than 10,000 Ω**?	Yes	Go to next step.
		No	Replace HO2S, then go to next step.

STEP	INSPECTION		ACTION
13	**CHECK FOR HO2S SIGNAL SHORTED TO HO2S HEATER CIRCUIT** • Key off. • Connect HO2S. • NGS tester connected. • Key on, engine off. • Access O2S11, O2S21 PID with NGS tester. • Is HO2S voltage **greater than 0.45 V**?	Yes	Replace HO2S, then go to Step 47.
		No	Go to next step.
14	**CHECK FUEL PRESSURE** • Key off. • Install fuel pressure gauge. • Verify vacuum source to fuel pressure regulator. • Connect jumper wire to fuel pump relay socket terminal 30 and 87. • Is fuel pressure **260—310 kPa {2.6—3.2 kgf/cm^2, 37—46 psi}**?	Yes	Fuel system is capable of required fuel pressure. Go to Step 24.
		No	Go to next step.
15	**CHECK PRESSURE REGULATOR CONTROL (PRC) SOLENOID VALVE POWER CIRCUIT** Symptom charts have indicated lack of power during acceleration and/or cruise drive modes. Possible causes: • Damaged PRC solenoid valve. • Damaged input port or output port vacuum lines. • Damaged PRC solenoid valve harness circuits. • Damaged PCM. • Key off. • PRC solenoid valve disconnected. • Key on, engine off. • Measure voltage between power circuit at PRC solenoid valve vehicle harness connector and battery ground. • Is voltage **greater than 10.5 V**?	Yes	PRC solenoid valve power circuit is okay. Go to next step.
		No	Repair or replace wiring harness, then go to Step 47.
16	**CHECK PRC SOLENOID VALVE HARNESS CIRCUIT RESISTANCE** • Key off. • PRC solenoid valve disconnected. • Disconnect PCM. Inspect for damaged or pushed out pins, corrosion and loose wires. Service as necessary. • Install breakout box. Leave PCM disconnected. • Measure resistance between Test Pin 19 at breakout box and PRC solenoid valve circuit at solenoid vehicle harness connector. • Is resistance **less than 5.0 Ω**?	Yes	PRC solenoid valve circuit is complete. Go to next step.
		No	Repair or replace wiring harness, then go to Step 47.
17	**CHECK PRC SOLENOID VALVE CIRCUIT FOR SHORTS TO POWER AND GROUND** • Key off. • PRC solenoid valve disconnected. • Breakout box installed, PCM disconnected. • Disconnect NGS tester from DLC. • Measure resistance between Test Pin 19 and Test Pin 71 and 97 at breakout box. • Measure resistance between Test Pin 19 and Test Pins 24, 77 and 91 at breakout box. • Is resistance **greater than 10,000 Ω**?	Yes	There are no power or ground short circuits to PRC solenoid valve. Go to next step.
		No	Repair or replace wiring harness, then go to Step 47.
18	**CHECK VACUUM LINE: MANIFOLD VACUUM SOURCE TO PRC SOLENOID VALVE INPUT PORT** • Key off. • Disconnect and inspect vacuum line between manifold vacuum source and PRC solenoid valve input vacuum port for blockage, kinks or cracks. • Is vacuum line free of damage?	Yes	Vacuum line is okay. Reconnect vacuum line to manifold vacuum source, leave other end of line. Go to next step.
		No	Repair or replace vacuum line, then go to Step 47.

STEP	INSPECTION		ACTION
19	**CHECK VACUUM SIGNAL: MANIFOLD VACUUM SOURCE TO PRC SOLENOID VALVE INPUT** • Key off. • Connect vacuum gauge at unattached end of vacuum line. • Start engine while observing vacuum gauge display. • Key off. • Was a vacuum signal present?	Yes	PRC solenoid valve normally receives manifold vacuum signal. Go to next step.
		No	Go to Step 40.
20	**CHECK VACUUM LINE: FUEL PRESSURE REGULATOR TO PRC SOLENOID VALVE OUTPUT PORT** • Key off. • Disconnect and inspect vacuum line between fuel pressure regulator and PRC solenoid valve output vacuum port for blockage, kinks or cracks. • Is vacuum line free of damage?	Yes	Vacuum line is okay. Reconnect vacuum line. Go to next step.
		No	Vacuum line is damaged. Repair or replace vacuum line, then go to Step 47.
21	**CHECK FOR PRC SOLENOID VALVE STUCK CLOSED** • Key off. • Breakout box installed. PCM connected. • Disconnect vacuum line from PRC solenoid valve to fuel pressure regulator at fuel pressure regulator. Install vacuum gauge at unattached end of vacuum line. • Disconnect vacuum line from intake manifold vacuum to PRC solenoid valve at manifold vacuum source. **Note** • PRC solenoid valve contains normally open valve. If solenoid is not energized while vacuum is applied at input port, vacuum signal will normally be allowed to pass. • Install vacuum pump at input port of PRC solenoid valve and apply **-27 kPa — -33 kPa{-203 — -247 mmHg, -8— -10 inHg}** of vacuum to PRC solenoid valve while observing vacuum gauge. • Is vacuum signal indicated by vacuum gauge?	Yes	PRC solenoid valve is not stuck closed. Go to next step.
		No	The PRC solenoid valve is stuck closed. Replace PRC solenoid valve, then go to Step 47.

STEP	INSPECTION		ACTION
22	**CHECK FOR PRC SOLENOID VALVE STUCK OPEN** • Key off. • Breakout box installed. PCM connected. • Install vacuum gauge at output port of PRC solenoid valve. • Vacuum pump installed at input port of PRC solenoid valve. • Apply −27 kPa — −33 kPa{−203 — −247 mmHg, −8— −10 inHg} of vacuum to PRC solenoid valve input port. • Key on. • Momentarily jumper Test Pin 19 to Test Pin 103 at breakout box and observe vacuum gauge. **Note** • PRC solenoid valve contains normally open valve. If solenoid is energized while vacuum is applied at input port, vacuum signal will normally not be allowed to pass because solenoid valve will be closed. • Key off. • Did vacuum gauge reading drop from **−27 kPa— −33 kPa {−203 — −247 mmHg, −8 — −10 InHg}** to **0 — −3.3 kPa {0— −25 mmHg, 0— −1 InHg}** when Test Pin 19 was jumpered to Pin 76?	Yes	PRC solenoid valve is not stuck open. Go to next step.
		No	PRC solenoid valve is stuck open. Replace PRC solenoid valve, then go to Step 47.
23	**CHECK PCM CONTROL OF PRC SOLENOID VALVE** • Key off. • Breakout box installed. PCM connected. • Install digital multimeter between Test Pin 19 and Test Pin 71 of breakout box. • Record digital multimeter readings under following conditions: • Key on, engine off. • Engine crank. • Engine running (**more than 10 seconds** after start-up). **Note** • PRC solenoid valve should only be energized during engine crank for previous conditions. • Is voltage reading between Pin 19 and Pin 71 **10—12 V** during engine crank and **0—2 V** during other conditions?	Yes	PCM is properly controlling the PRC solenoid valve. Replace pressure regulator, then go to next step.
		No	Go to Step 47.
24	**CHECK SYSTEM ABILITY TO HOLD FUEL PRESSURE** Disconnect battery negative terminal • Install fuel pressure gauge. • Verify there are no external leaks (Service as necessary) • Connect jumper wire to fuel pump relay socket terminal 87 and 30. • Connect battery negative terminal for **10 seconds**. • Disconnect battery negative terminal. • Does fuel pressure remain **within 147 kPa {1.5 kgf/cm^2, 21 psi}** of highest reading after **5 minute**?	Yes	**For Continuous DTCs P1130, P1150, P0171, P0172, P0174 and P0175:** Go to Step 33. **For No Starts:** Go to Step 34. **For Fuel Control DTCs displayed with Misfire DTCs:** Go to Step 35. **All other DTCs:** Go to Step 36.
		No	Excessive pressure loss. Go to next step.

STEP	INSPECTION		ACTION
25	**CHECK FUEL PRESSURE LEAKDOWN** • Install fuel pressure gauge to fuel filter and plug outlet. • Connect jumper wire to fuel pump relay socket terminal 30 and 87. • Verify fuel pressure remains of maximum pressure for **5 minute** after turning pump off. • Does fuel pressure remain **within 343 kPa {3.50 kgf/cm^2, 49.8 psi}**?	Yes	Go to Step 27.
		No	Go to next step.
26	**CHECK PRESSURE REGULATOR DIAPHRAGM** • Key off. • Install fuel pressure gauge. • Start and run engine for **10 seconds**. • Key off. Wait **10 seconds**. • Start and run engine for **10 seconds**. • Key off. Remove vacuum hose from fuel pressure regulator. • Inspect for fuel in vacuum hose or regulator port. • Is vacuum hose and regulator port free of fuel?	Yes	Go to Step 30.
		No	Replace fuel pressure regulator. Go to Step 47.
27	**CHECK FUEL PRESSURE, ENGINE RUNNING** • Key off. • Install fuel pressure gauge. • Disconnect vacuum hose at fuel pressure regulator and plug it. • Drive vehicle with heavy accelerations while observing fuel pressure gauge reading. • Does fuel pressure reading hold steady **within 260—320 kPa {2.6—3.3 kgf/cm^2, 37—46 psi}** during test?	Yes	Go to next step.
		No	Go to Step 30.
28	**CHECK FUEL PRESSURE REGULATOR RESPONSE TO VACUUM** • Key off. • Install fuel pressure tester. • Install vacuum gauge to intake manifold. • Start engine and observe both gauges. • Accelerate and decelerate engine speed to vary vacuum gauge reading. • Does fuel pressure gauge reading increase as vacuum gauge reading decreases, or decrease as vacuum gauge reading increases?	Yes	Remove vacuum gauge and fuel pressure tester. Concern is elsewhere. (See 01-03B-5 SYMPTOM DIAGNOSTIC INDEX [KL])
		No	Go to next step.
29	**CHECK VACUUM SUPPLY** • Key off. • Install fuel pressure tester. • Disconnect vacuum hose at the fuel pressure regulator and plug it. • Install hand held vacuum pump to fuel pressure regulator. • Start engine and let run at idle. • Observe fuel pressure while applying vacuum. • Does fuel pressure change according to vacuum changes?	Yes	Go to next step.
		No	Replace fuel pressure regulator, then go to Step 47.
30	**CHECK FUEL INJECTOR LEAKAGE AND FLOW** • Verify that flow rate for each fuel injector is within specification using **SST** (49 E018 9A0). • Is flow rate for each injector within specification?	Yes	Go to next step.
		No	Replace damaged fuel injector, then go to Step 47.

STEP	INSPECTION		ACTION
31	**CHECK VOLTAGE AT FUEL PUMP VEHICLE HARNESS CONNECTOR** • Key off. • Disconnect fuel pump harness connector at fuel pump. Inspect for damaged or pushed out pins, corrosion and loose wires. Service as necessary. • Key on, engine off. • Connect a digital multimeter between fuel pump power circuit and fuel pump ground circuit at fuel pump vehicle harness connector. • Enter Output Test Mode and active fuel pump circuit. Record voltage reading. • Is the voltage **greater than 10.5 V**?	Yes	Go to next step.
		No	Go to Step 47.
32	**CHECK SUPPLY FUEL LINE FOR RESTRICTIONS** • Key off. • Observe Warnings, Cautions and Notes at beginning of this Pinpoint Test. • Disconnect supply fuel line at fuel rail and at fuel pump. • Inspect supply line for blockage, kinks or pinching. • Apply **260—310 kPa {2.6—3.2 kgf/cm^2, 37—46 psi}** regulated shop air to supply line at fuel rail side supply line. • Does air flow freely through supply line?	Yes	Replace fuel pump, then go to Step 47.
		No	Go to next step.
33	**CHECK SYSTEM ABILITY TO HOLD FUEL PRESSURE WITH KEY ON** • Install fuel pressure gauge. • Key on then off three times. • Turn key on and engine off, monitor fuel pressure gauge. • Does the fuel pressure remain **within 147 kPa {1.5 kgf/cm^2, 21 psi}** of the highest reading after **10 seconds**?	Yes	**For Continuous DTCs P1130, P1150, P0171 and P0174:** Go to Step 35. **For DTCs P0172 and P0175:** Go to Step 37.
		No	Go to next step.
34	**CHECK ABILITY OF FUEL INJECTOR(S) TO DELIVER FUEL** • Pressure gauge installed. • Cycle key **3 times**. • Monitor pressure gauge while cranking the engine for **at least 5 seconds**. • Does pressure drop **greater than 310 kPa {3.2 kgf/cm^2, 46 psi}** while cranking the engine?	Yes	Engine control system is not cause of no start. (See 01-03B-5 SYMPTOM DIAGNOSTIC INDEX [KL])
		No	Go to next step.

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>35</td><td>CHECK RESISTANCE OF FUEL INJECTOR(S) AND HARNESS
• Key off.

Note
• This erases Continuous Memory DTCs.

• Disconnect PCM. Inspect for damaged or pushed out pins, corrosion and loose wires. Service as necessary.
• Install breakout box. Leave PCM disconnected.

Note
• If misfire DTCs are displayed with fuel control DTCs, use the misfire DTCs to determine fuel injector circuits requiring testing.

• Measure resistance between suspect fuel injector Test Pin(s) and Test Pin 71/97 at breakout box using chart below.
<table><tr><th>Cylinder Number</th><th>Test pin</th><th>Cylinder Number</th><th>Test pin</th></tr><tr><td>1</td><td>75</td><td>4</td><td>100</td></tr><tr><td>2</td><td>101</td><td>5</td><td>73</td></tr><tr><td>3</td><td>74</td><td>6</td><td>99</td></tr></table>Z6U0102W410
• Is resistance 2.0—16.0 Ω?</td><td>Yes</td><td>Fuel injector and harness resistance is okay. Go to Step 38.</td></tr>
<tr><td></td><td></td><td>No</td><td>Go to next step.</td></tr>
<tr><td>36</td><td>CHECK RESISTANCE OF FUEL INJECTOR HARNESS
• Key off.
• Breakout box installed. PCM disconnected.
• Disconnect fuel injector harness connector at suspect fuel injector.
• Measure resistance between Test Pin 71/97 at breakout box and power circuit pin at suspected fuel injector harness connector.
• Measure resistance between fuel injector Test Pin(s) at breakout box and Fuel Injector Signal Pin at fuel injector connector. (Go to Step 34 for Injector Pin location.)
• Is each resistance less than 5.0 Ω?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td></td><td></td><td>No</td><td>Repair or replace wiring harness, then go to Step 47.</td></tr>
<tr><td>37</td><td>CHECK FUEL INJECTOR HARNESS CIRCUIT FOR SHORT TO POWER OR GROUND
• Key off.
• Breakout box installed. PCM disconnected.
• Disconnect suspected fuel injector harness.
• Measure resistance between the fuel injector Test Pin(s) (Go to Step 34) and Test Pin 71 or 97, 24 and 103 at breakout box.
• Measure the resistance between the Fuel injector Test Pin(s) at the breakout box and chassis ground.
• Is each resistance greater than 10,000 Ω?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td></td><td></td><td>No</td><td>Repair or replace wiring harness, then go to Step 47.</td></tr>
</table>

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>38</td><td>CHECK INJECTOR DRIVER SIGNAL

Note
• This test requires standard 12 volt test lamp.

• Key off.
• Install breakout box.
• Connect test lamp between Test Pin 71/97 and suspected fuel injector Test Pin(s).
<table><tr><th>Cylinder Number</th><th>Test pin</th><th>Cylinder Number</th><th>Test pin</th></tr><tr><td>1</td><td>75</td><td>4</td><td>100</td></tr><tr><td>2</td><td>101</td><td>5</td><td>73</td></tr><tr><td>3</td><td>74</td><td>6</td><td>99</td></tr></table>Z6U0102W410
Note
• At idle properly operating system will cause dim glow on test lamp.

• Crank or start engine.
• Does test lamp have a dim glow while cranking or running engine?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td></td><td></td><td>No</td><td>No light and/or continuous bright light.
Go to Step 47.</td></tr>
<tr><td>39</td><td>FLOW TEST FUEL INJECTOR(S)
• Is leakage and flow within specification?</td><td>Yes</td><td>DTCs P0171, P0174, P1130, P1131, P1150 and P1151:
Go to next step.
DTCs P0172 and P0175:
The fault that produced the DTC is intermittent.
Go to ENGINE SYMPTOM TROUBLESHOOTING No. 27 with following data:
SHORTFT1, LONGFT1, PIDs and list of possible causes.
(See 01-03B-5 SYMPTOM DIAGNOSTIC INDEX [KL])
For DTCs P1132 and P1152:
Go to Step 43.</td></tr>
<tr><td></td><td></td><td>No</td><td>Replace fuel injector, then go to Step 47.</td></tr>
<tr><td>40</td><td>INSPECT INDUCTION SYSTEM FOR AIR LEAKS
• Inspect following areas for signs of air leaks:
• Inlet tube(s) from air cleaner to throttle body.
• Gaskets which seal upper and lower intake manifold.
• Vacuum hoses and lines for cranks and proper connections.
• PCV system.
• Are there any signs of leaks or damage?</td><td>Yes</td><td>Replace damaged parts, then go to Step 47.</td></tr>
<tr><td></td><td></td><td>No</td><td>DTCs P0171, P0174, P1130 or P1150:
Fault that produced DTC is intermittent.
Go to ENGINE SYMPTOM TROUBLESHOOTING No. 27 with following data:
SHORTFT1, LONGFT1, O2S11 PIDs and a list of possible causes.
(See 01-03B-5 SYMPTOM DIAGNOSTIC INDEX [KL])
DTCs P1131 and P1130 or P1151 and P1150:
Go to next step.</td></tr>
<tr><td>41</td><td>CHECK CYLINDER COMPRESSION

Note
• Use Misfire DTC(s) displayed on prior DTC retrieval to determine which cylinder to perform compression.

• Check cylinder compression.
(See 01-10B-5 COMPRESSION INSPECTION [KL])
• Are cylinder compression readings within specification?</td><td>Yes</td><td>For DTCs P1131, P1130, P1151 and P1150:
Go to next step.
For DTC P1132 and P1152:
Go to Step 43.</td></tr>
<tr><td></td><td></td><td>No</td><td>Repair appropriate parts, then go to Step 47.</td></tr>
</table>

STEP	INSPECTION		ACTION
42	**CHECK HO2S ABILITY TO GENERATE A VOLTAGE** **Note** ● Any vacuum or air leaks can cause DTCs P1131, P1151, P1130 and P1150. Possible cause: ● Leaking vacuum actuators. ● Engine sealing (Intake and IAC). ● EGR system (valve). ● PCV system (hose and valve). ● Unmetered air leaks between throttle body and MAF sensor assembly. ● Silicone contaminated HO2S. ● Key off. ● Inspect HO2S harness for chafing, burned out wires or other damage and service as necessary. ● Disconnect suspected HO2S from vehicle harness. ● Connect digital multimeter to HO2S signal and HO2S ground or HO2S ground at sensor connector. ● Run engine at **2,000 rpm** for **3 minutes**. ● Monitor HO2S voltage. ● Is voltage **greater than 0.5 V**?	Yes	Go to Step 45.
		No	Replace HO2S, then go to Step 47.
43	**ATTEMPT TO GENERATE DTC P1131 AND P1151** ● Key off. ● Disconnect HO2S. ● Jumper HO2S signal at HO2S harness vehicle connector to battery negative post. ● Activate Key On Engine Running (KOER) self-test. ● Are DTCs P1131 or P1151 present?	Yes	Remove jumper. Go to next step.
		No	Remove jumper, then go to Step 47.
44	**HO2S CHECK** ● Key off. ● Disconnect suspected HO2S. ● Connect digital multimeter to HO2S signal circuit and HO2S ground at sensor connector. ● Disconnect vacuum hose from vacuum tree. ● Start engine and run at **2,000 rpm**. ● Does voltage reading indicate **less than 0.4 V within 30 seconds**?	Yes	Go to next step.
		No	Replace HO2S, then go to Step 47.
45	**MONITOR HO2S (PID) FOR PROPER SWITCHING** ● Key on, engine running. ● Engine at operating temperature. ● Connect NGS tester. **Note** ● HO2S PID displayed as O2S on NGS tester. ● Access O2S11 and O2S21 PID with NGS tester. ● Monitor PID while wiggling, bending, and shaking small sections of harness from PCM to HO2S. ● Did HO2S voltage stay high (**greater than 0.45 V**) or low (**less than 0.45 V**)?	Yes	Go to Step 47.
		No	Go to next step.

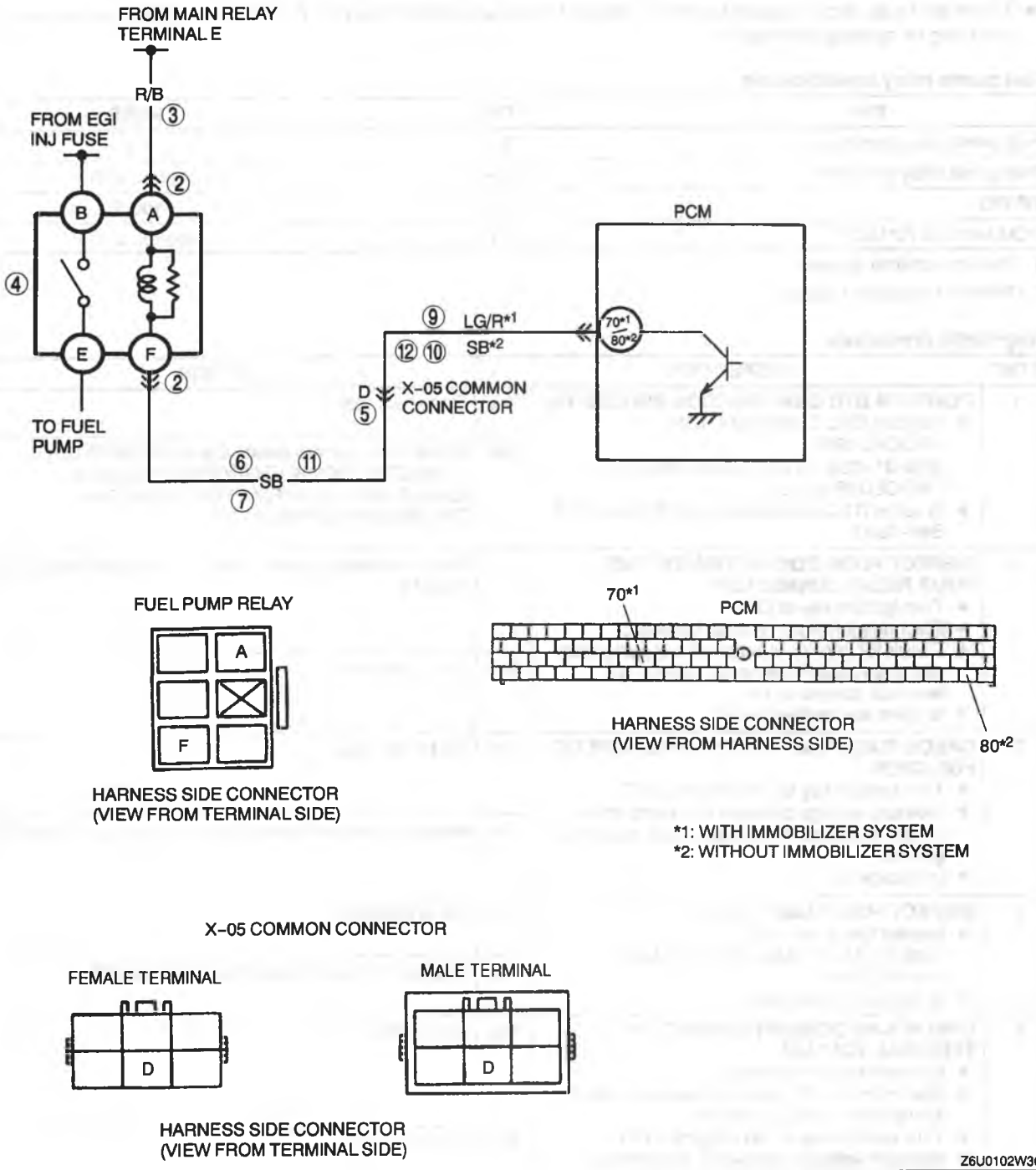
STEP	INSPECTION		ACTION
46	**TEST DRIVE WHILE MONITORING HO2S PID FOR PROPER SWITCHING** **Note** • This test step requires an observer to monitor PID for proper operation. • NGS tester connected. • While observer views HO2S PID, test drive vehicle under different road conditions in attempt to simulate original fault. • Does HO2S appear to switch properly?	Yes	Go to next step.
		No	Replace HO2S, then go to next step.
47	**VERIFY TROUBLESHOOTING OF DTC P0171, P0172, P0174, P0175, P1130, P1131, P1132, P1150, P1151, P1152 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine and perform DRIVE MODE. (See 01-02B-18 OBD II DRIVE MODE [KL]) • Access DIAGNOSTIC MONITORING TEST RESULTS of generic OBD-II function. (See 01-02B-15 Diagnostic Monitoring Test Results Access Procedure) • Verify following TEST ID value: — 10:01:91 Voltage amplitude between rich and lean (bank1) — 10:01:A1 Voltage amplitude between rich and lean (bank2) — 10:03:81 Switching point (front HO2S) • Is value within specification?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
48	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0230 [KL]

Z6U010201082W61

DTC P0230	Fuel pump primary circuit malfunction
DETECTION CONDITION	• The PCM monitor the fuel pump relay control signal at the PCM terminal 70 (with immobilizer system) or 80 (without immobilizer system) during KOEO Self-Test. If the PCM detects the excessive current draw on fuel pump circuit during the fuel pump control circuit ON or fuel pump control terminal does not receive the voltage from main relay E during the fuel pump control circuit OFF, the PCM determine that fuel pump circuit has malfunctioned.
POSSIBLE CAUSE	• Fuel pump relay malfunction • Connector or terminal malfunction • Open circuit between main relay terminal E and fuel pump relay terminal A • Open circuit between fuel pump relay terminal F and PCM terminal 70/80 (with immobilizer system/without immobilizer system) • Short to ground circuit between fuel pump relay terminal F and PCM terminal 70/80 (with immobilizer system/without immobilizer system). • Short to power circuit between fuel pump relay terminal F and PCM terminal 70/80 (with immobilizer system/without immobilizer system). • PCM malfunction

DTC P0230	Fuel pump primary circuit malfunction



Troubleshooting Hint

Fuel pump relay control description

- The main relay circuit supplies battery voltage to the fuel pump relay and the PCM complete ground when the cranking or running the engine.

Fuel pump relay specification

Item	KOEO	KOER
Fuel pump relay terminal A	B+	B+
Fuel pump relay terminal F	B+	Approx. 0.20 V
FP PID	0 %	100 %
PCM terminal 70*1/80*2	B+	Approx. 0.20 V

*1 : With immobilizer system

*2 : Without immobilizer system

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**INSPECT POOR CONNECTION OF FUEL PUMP RELAY CONNECTOR** • Turn ignition key to OFF. • Disconnect fuel pump relay connector. • Check for poor connection at fuel pump relay terminal A and F (damaged, pulled-out terminal, corrosion, etc.). • Is there any malfunctions?	Yes	Repair or replace terminal and/or connector, then go to Step 13.
		No	Go to next step.
3	**CHECK FUEL PUMP RELAY POWER CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Measure voltage between fuel pump relay sensor terminals A (harness-side) and body ground. • Is voltage B+?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 13.
4	**INSPECT FUEL PUMP RELAY** • Inspect fuel pump relay. (See 01-14-29 FUEL PUMP RELAY INSPECTION) • Is fuel pump relay okay?	Yes	Go to next step.
		No	Replace fuel pump relay, then go to Step 13.
5	**CHECK X-05 COMMON CONNECTOR TERMINAL VOLTAGE** • Connect fuel pump relay. • Disconnect X-05 common connector which locate at the back of joint box. • Turn ignition key to ON (Engine OFF). • Measure voltage between X-05 common connector female terminal D and body ground. • Is voltage B+?	Yes	Go to Step 8.
		No	Go to next step.
6	**VERIFY FUEL PUMP RELAY CONTROL CIRCUIT SHORT TO GROUND (FUEL PUMP RELAY—X-05 COMMON CONNECTOR)** • Turn ignition key to OFF. • Disconnect X-05 common connector. • Turn ignition key to ON (Engine OFF). • Open the fuel-filler cap. • Check the fuel pump operation sound from fuel tank. • Does operating sound come out from fuel tank?	Yes	Repair or replace harness for short to ground, then go to Step 13.
		No	Go to next step.

STEP	INSPECTION		ACTION
7	**VERIFY FUEL PUMP RELAY CONTROL CIRCUIT OPEN (FUEL PUMP RELAY—X-05 COMMON CONNECTOR)** • Disconnect fuel pump relay connector. • Check continuity between fuel pump relay terminal F (harness-side) and X-05 common connector female terminal D. • Is there continuity?	Yes	Go to Step 13.
		No	Repair or replace harness for open, then go to Step 13.
8	**CHECK FUEL PUMP RELAY CONNECTOR TERMINAL VOLTAGE** • Turn ignition key to OFF. • Measure voltage between fuel pump relay terminal F (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to Step 11.
		No	Go to next step.
9	**VERIFY FUEL PUMP RELAY CONTROL CIRCUIT SHORT TO GROUND (X-05 COMMON CONNECTOR—PCM)** • Connect X-05 common connector. • Disconnect PCM connector. • Turn ignition key to ON (Engine OFF). • Open the fuel-filler cap. • Check the fuel pump operation sound from fuel tank. • Does operating sound come out from fuel tank?	Yes	Repair or replace harness for short to ground, then go to Step 13.
		No	Go to next step.
10	**VERIFY FUEL PUMP RELAY CONTROL CIRCUIT OPEN (X-05 COMMON CONNECTOR—PCM)** • Disconnect X-05 common connector. • Connect Breakout Box with PCM disconnected. • Check continuity between X-05 common connector male terminal D and following Breakout Box terminal. — Terminal 70: with immobilizer system — Terminal 80: without immobilizer system • Is there continuity?	Yes	Go to Step 13.
		No	Repair or replace harness for open, then go to Step 13.
11	**VERIFY FUEL PUMP RELAY CONTROL CIRCUIT FOR SHORT TO POWER (FUEL PUMP RELAY—X-05 COMMON CONNECTOR)** • Disconnect fuel pump relay. • Measure voltage between X-05 common connector female terminal D and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to Step 13.
		No	Go to next step.
12	**VERIFY FUEL PUMP RELAY CONTROL CIRCUIT FOR SHORT TO POWER (X-05 COMMON CONNECTOR—PCM)** • Measure voltage between X-05 common connector female terminal D and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to next step.
		No	Go to next step.
13	**VERIFY TROUBLESHOOTING OF DTC P0230 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOEO/KOER Self-Test. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
14	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0300, P0301, P0302, P0303, P0304, P0305, P0306 [KL]

Z6U010201082W62

DTC P0300 **DTC P0301** **DTC P0302** **DTC P0303** **DTC P0304** **DTC P0305** **DTC P0306**	**Random misfire detected** **Cylinder No.1 misfire detected** **Cylinder No.2 misfire detected** **Cylinder No.3 misfire detected** **Cylinder No.4 misfire detected** **Cylinder No.5 misfire detected** **Cylinder No.6 misfire detected**
DETECTION CONDITION	• DTC P0300 indicates multiple cylinders misfiring, or cannot identify cylinder due to camshaft position sensor failure • DTC P0301, P0302, P0303, P0304, P0305 or P0306 indicates specific cylinder misfiring
POSSIBLE CAUSE	• Ignition system • Fuel injection • Fuel pressure • Evaporative emission system • Purge solenoid valve • Base engine • Running out of fuel **Warning** **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**CHECK POSSIBLE CAUSES TO MISFIRE** **Note** • Running out of fuel may turn on MIL and possibly store Continuous Misfire DTC. • Has vehicle recently run out of fuel?	Yes	Go to Step 16.
		No	Go to next step.
4	**CHECK FOR OTHER NON-MISFIRE CONTINUOUS MEMORY DTCS** Check for other non-misfire Continuous Memory DTCs which could cause Misfire DTC. Possible causes: • CMP sensor • Ignition coil primary circuit • Knock sensor • Are other non-misfire Continuous Memory DTCs present?	Yes	Perform presented DTC troubleshooting.
		No	Check spark plugs and secondary wires. If okay, go to next step.

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td rowspan="2">5</td><td>CHECK FOR OTHER KEY ON ENGINE RUNNING (KOER) DTCS

Note
• Check for any KOER DTCs which could cause misfire DTCs.

• Are any KOER DTCs displayed on NGS tester?</td><td>Yes</td><td>If DTCs P1131, P1151 are present:
Go to next step.
All others:
Perform presented DTC troubleshooting.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
<tr><td rowspan="2">6</td><td>CHECK RESISTANCE OF INJECTOR(S) AND HARNESS
• Key off.
• Disconnect PCM. Inspect for damaged or pushed out pins, corrosion, loose wires etc. Service as necessary.
• Install breakout box. Leave PCM disconnected.
• Measure resistance between suspect fuel injector test pin and Test Pin 71 or 97 at breakout box.
• Is resistance 12.0—16.0 Ω?</td><td>Yes</td><td>Fuel injector and harness resistance is okay.
Go to next step.</td></tr>
<tr><td>No</td><td>Go to Step 16.</td></tr>
<tr><td rowspan="2">7</td><td>CHECK INJECTOR DRIVER SIGNAL

Note
• Requires standard 12 volt test lamp. Properly operating system will show a dim glow on Test Lamp.

• Key off.
• Breakout box installed.
• Connect PCM to breakout box.
• Connect Test Lamp between Test Pin 71 or 97 and suspect injector test pin.

<table><tr><th>Cylinder Number</th><th>Test pin</th><th>Cylinder Number</th><th>Test pin</th></tr><tr><td>1</td><td>75</td><td>4</td><td>100</td></tr><tr><td>2</td><td>101</td><td>5</td><td>73</td></tr><tr><td>3</td><td>74</td><td>6</td><td>99</td></tr></table>Z6U0102W411
• Start engine.
• Does test lamp emit dim glow while engine is running?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td>No</td><td>Go to Step 16.</td></tr>
<tr><td rowspan="2">8</td><td>CHECK FUEL PRESSURE
• Key off.
• Install fuel pressure gauge.
• Start and run engine at idle. Record fuel pressure.
• Increase engine speed to 2,500 rpm and maintain for 1 minute. Note and compare fuel pressure.
• Is fuel pressure 260—310 kPa {2.6—3.1 kgf/cm^2, 37—46 psi}?</td><td>Yes</td><td>Go to Step 16.</td></tr>
<tr><td>No</td><td>Go to next step.</td></tr>
</table>

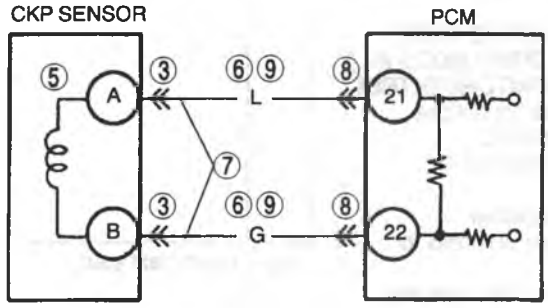
STEP	INSPECTION		ACTION
9	**CHECK ABILITY OF FUEL SYSTEM TO HOLD FUEL PRESSURE** • Start engine at idle. Note fuel pressure. • Increase engine speed to **2,500 rpm** and maintain for **1 minute**. • Visually check for fuel leaking at injector O-ring, fuel pressure regulator and fuel lines to fuel charging component. Service as necessary. • Turn engine off. • Key on, engine off. • Does fuel pressure remain at specification **within 147 kPa {1.5 kgf/cm^2, 21 psi}** for **60 seconds**?	Yes	Go to next step.
		No	Check Fuel Delivery System is at fault. (See 01-14-22 Fuel Leakage Test [KL])
10	**CHECK FUEL INJECTOR FOR FLOW AND LEAKAGE** • Verify that flow rate for each fuel injector is within specification using **SST** (49 L018 901). • Is flow rate for each fuel injector within specification?	Yes	Fuel delivery system is not likely to have caused Misfire DTC. Go to next step.
		No	Replace or clean inoperative fuel injector(s) as required, then go to Step 16.
11	**CHECK VACUUM SYSTEM** • Inspect all vacuum lines for damage, such as pinched lines, cracks, proper routing and component. • Is vehicle vacuum system okay?	Yes	Go to next step.
		No	Repair or replace vacuum lines, then go to Step 16.
12	**CHECK EVAPORATIVE EMISSION SYSTEM** • Check charcoal canister for fuel saturation. • Is there an excess amount of liquid fuel present in charcoal canister.	Yes	Replace charcoal canister, then go to Step 16.
		No	Go to next step.
13	**CHECK VACUUM IN EVAPORATIVE EMISSION SYSTEM** • Check for blockage/restriction or cut hoses between engine vacuum port and charcoal canister. • Check for blockage in fuel tank vent system. • Is there fault indicated?	Yes	Replace damaged vacuum hoses, or remove blockage/restrictions, then go to Step 16.
		No	Go to next step.
14	**CHECK PURGE SOLENOID VALVE** This step will verify mechanical integrity of purge solenoid valve. Solenoid and circuit have been checked electrically and reported during key on engine off (KOEO) Self-Test. • Key off. • Disconnect purge solenoid valve. • Connect **12 V** DC power source to solenoid. **Caution** • **Must be observed for proper pin orientation.** • Connect positive power source to power circuit and negative lead to purge solenoid valve circuit at purge solenoid valve harness connector. • Apply **53 kPa {407 mmHg, 16 inHg}** of vacuum to manifold side of purge solenoid valve. Apply power source. • Does solenoid open and pass air freely?	Yes	Evaporative system is functioning properly. Go to next step for base engine concern.
		No	Replace purge solenoid valve, then go to Step 16.

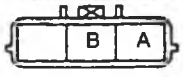
STEP	INSPECTION		ACTION
15	**CHECK FOR BASE ENGINE CONCERN** Purpose of this step is to determine if there are any Base Engine concern that may have caused Misfire DTC or drive concern. Perform following tests in order to evaluate Base Engine integrity. • Perform an Engine Compression test. (See 01-10B-5 COMPRESSION INSPECTION [KL]) • Check Positive Crankcase Ventilation System. • Check possible leakage points. • Is any service required?	Yes	Repair or replace damaged parts, then go to next step.
		No	Go to next step.
16	**VERIFY TROUBLESHOOTING OF DTC P0300, P0301, P0302, P0303, P0304, P0305, P0306 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD II functions. • Start engine and perform DRIVE MODE. (See 01-02B-18 OBD II DRIVE MODE [KL]) • Access DIAGNOSTIC MONITORING TEST RESULTS of generic OBD II functions. (See 01-02B-23 DIAGNOSTIC MONITORING TEST RESULTS [KL]) • Verify TEST ID value. — 10:50:00 Total misfire number — 10:53:01 Misfire rate par 200 revs for cylinder1 — 10:53:02 Misfire rate par 200 revs for cylinder2 — 10:53:03 Misfire rate par 200 revs for cylinder3 — 10:53:04 Misfire rate par 200 revs for cylinder4 — 10:53:05 Misfire rate par 200 revs for cylinder5 — 10:53:06 Misfire rate par 200 revs for cylinder6 — 10:54:00 Highest misfire rate in 200 revs — 10:55:00 Highest misfire rate in 1000 revs — 10:56:00 Total ignition number during monitoring • Is value within specification?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
17	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0320 [KL]

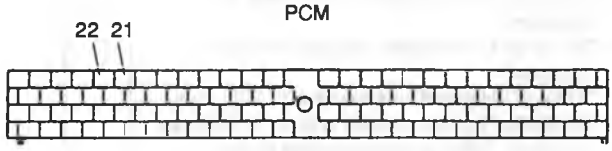
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DTC P0320	CKP sensor circuit malfunction
DETECTION CONDITION	• The PCM monitors input signal from CKP sensor. If the PCM receive the CKP signal which indicates that two successive erratic signals have occurred, the PCM determines that the CKP sensor circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycle. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• CKP sensor malfunction • Connector or terminal malfunction • CKP sensor is dirty. • Short to ground between CKP sensor terminal A to PCM terminal 21 • Short to ground between CKP sensor terminal B to PCM terminal 22 • Open circuit between CKP sensor terminal A to PCM terminal 21 • Open circuit between CKP sensor terminal B to PCM terminal 22 • CKP sensor pulse wheel malfunction





HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

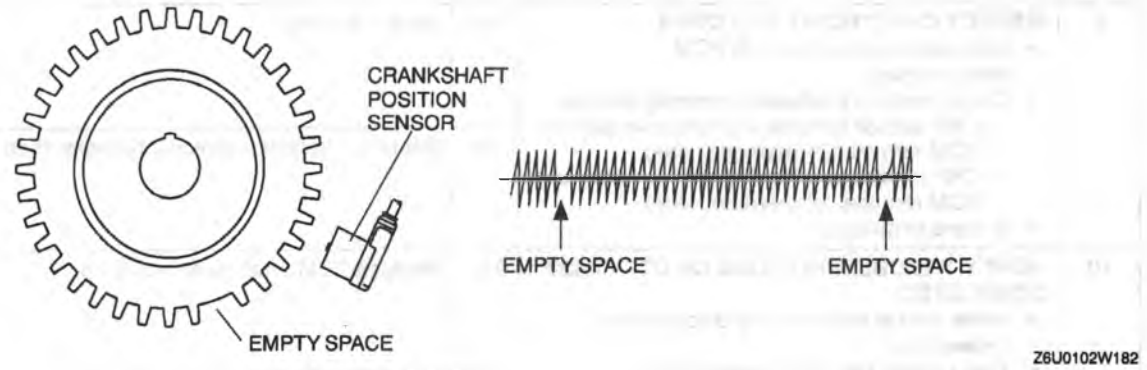
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Troubleshooting Hint

CKP sensor description

- A pick-up coil type of the CKP sensor is used.
- CKP sensor signal is used for following controls and monitors
  - —Idle air control
  - —Fuel injector control
  - —Fuel pump control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —A/C cut-off control
  - —Electric cooling fun control
  - —Evaporative system monitor
  - —EGR system monitor

CKP sensor signal characteristic



Diagnostic procedure

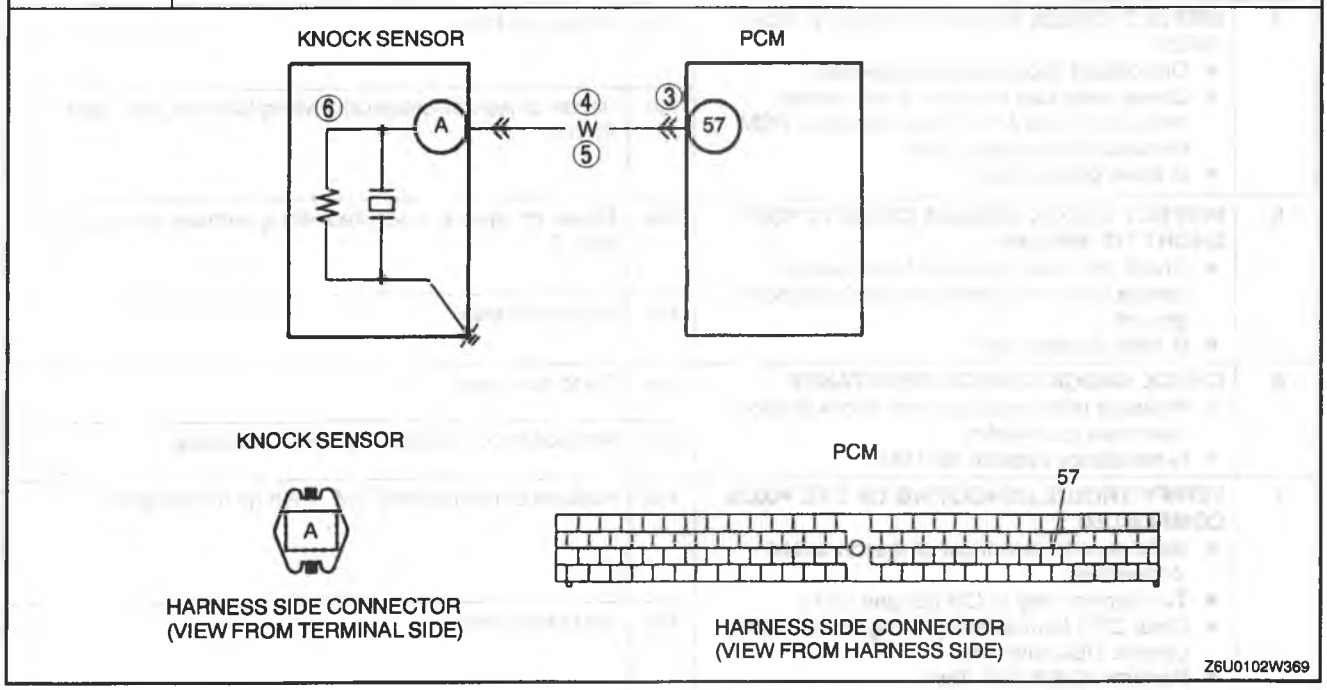
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CKP SENSOR VOLTAGE** • Disconnect CKP connector. • Check the voltage in AC range while cranking the engine. • Is any voltage read?	Yes	Go to Step 9.
		No	Go to next step.
4	**INSPECT CKP SENSOR AIR GAP** • Check air gap between CKP sensor and crankshaft pulley. • Is air gap **within 0.5—1.5 mm {0.020—0.059 in}** ?	Yes	Go to next step.
		No	Adjust air gap between CKP sensor and crankshaft pulley, then go to Step 10
5	**INSPECT CKP SENSOR** • Turn ignition key to OFF. • Check resistance CKP sensor terminals A and B (part-side). • Is resistance **approx. 560 Ω** ?	Yes	Check crankshaft pulley for damage. Replace pulley and go to Step 10.
		No	Go to next step.
6	**CHECK CKP CIRCUIT FOR SHORT TO GROUND** • Check continuity between following terminal and body ground: — CKP sensor terminal A (harness-side) — CKP sensor terminal B (harness-side) • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 10.
		No	Go to next step.
7	**INSPECT CKP CIRCUITS FOR SHORTS** • Check continuity between CKP sensor terminals A and B (harness-side). • Is there continuity?	Yes	Repair or replace shorted harnesses, then go to Step 10.
		No	Go to nest step.
8	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection of PCM terminals 21 and 22 (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair terminal, then go to Step 10.
		No	Go to next step.

STEP	INSPECTION		ACTION
9	**INSPECT CKP CIRCUIT FOR OPEN** ● Connect breakout box with PCM disconnected. ● Check continuity between following circuits: — CKP sensor terminal A (harness-side) and PCM terminal 21 (harness-side) — CKP sensor terminal B (harness-side) and PCM terminal 22 (harness-side) ● Is there continuity?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to Step 10.
10	**VERIFY TROUBLESHOOTING OF DTC P0320 COMPLETED** ● Make sure to reconnect all disconnected connectors. ● Turn ignition key ON (Engine OFF). ● Clear DTC from memory using NGS tester generic OBD-II function. ● Start engine. ● Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** ● Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0325 [KL]

Z6U010201082W64

DTC P0325	Knock sensor circuit malfunction
DETECTION CONDITION	• The PCM monitors the input signal from the knock sensor when the engine running. If the PCM does not receive the input signal from a knock sensor for **5 seconds**, PCM determines that knock sensor circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycle. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC also detects KOER Self-Test.
POSSIBLE CAUSE	• Knock sensor malfunction • Connector or terminal malfunction • Open or short to ground circuit between knock sensor connector terminal and PCM terminal 57 • PCM malfunction



Troubleshooting Hint

Knock sensor description

- A piezo-electrical type knock sensor (which utilizes the piezo electric effect) is used.
- The knock sensor signal is used for the following controls
  - —Fuel injector control
  - —Electric spark control

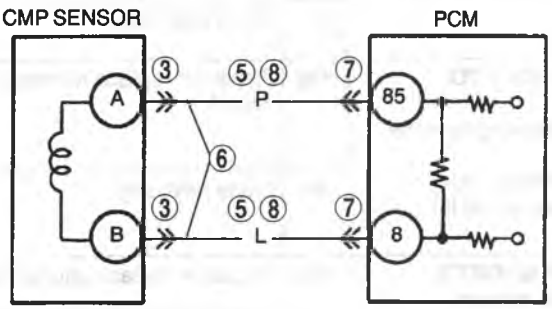
Diagnostic procedure

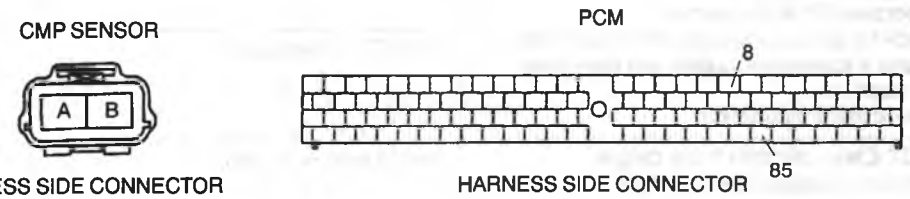
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**INSPECT PCM CONNECTOR TERMINAL** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunction?	Yes	Repair terminal, then go to Step 7.
		No	Go to next step.
4	**INSPECT KNOCK SENSOR CIRCUITS FOR OPEN** • Disconnect knock sensor connector. • Check continuity between knock sensor female terminal A (harness-side) and PCM terminal 57 (harness-side) • Is there continuities?	Yes	Go to next step.
		No	Repair or replace suspected wiring harness, then go to Step 7.
5	**INSPECT KNOCK SENSOR CIRCUITS FOR SHORT TO GROUND** • Check continuity between knock sensor female terminal A (harness-side) and body ground • Is there continuities?	Yes	Repair or replace suspected wiring harness, then go to Step 7.
		No	Go to next step.
6	**CHECK KNOCK SENSOR RESISTANCE** • Measure resistance between knock sensor terminals (part-side). • Is resistance **approx. 560 kΩ** ?	Yes	Go to next step.
		No	Replace knock sensor, then go to next step.
7	**VERIFY TROUBLESHOOTING OF DTC P0325 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD function. • Perform KOER Self-Test. • Is PENDING CODE of same DTC present?	Yes	Replace or reprogram PCM. Then go to next step.
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0340 [KL]

Z6U010201082W65

DTC P0340	Camshaft position (CMP) sensor circuit malfunction
DETECTION CONDITION	• The PCM monitors input signal from CMP sensor. If the PCM can no longer detect the signal from the CMP sensor, the PCM determines that the CMP sensor circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycle. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• CMP sensor malfunction • Connector or terminal malfunction • CMP sensor is dirty • Short to ground circuit between CMP sensor terminal A and PCM terminal 85 • Short to ground circuit between CMP sensor terminal B and PCM terminal 8 • Open circuit between CMP sensor terminal A and PCM terminal 85 • Open circuit between CMP sensor terminal B and PCM terminal 8





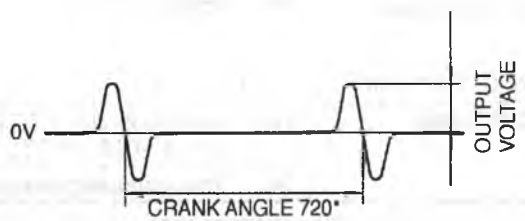
Z6U0102W412

Troubleshooting Hint

CMP sensor description

- A pick-up coil type of the CMP sensor is used.
- The CMP sensor signal is used for following controls and monitors.
  - —Fuel injector control
  - —Electric spark control
  - —Evaporative system monitor
  - —EGR system monitor

CMP sensor signal characteristic



Z6U0102W371

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** ● Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** ● Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. ● If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CMP SENSOR VOLTAGE** ● Disconnect CMP connector. ● Check the voltage in AC range while cranking the engine. ● Is any voltage read?	Yes	Go to Step 9.
		No	Go to next step.
4	**INSPECT CMP SENSOR** ● Turn ignition key to OFF. ● Check resistance CMP sensor terminals A and B (part-side). ● Is resistance **approx. 550 Ω** ?	Yes	Check camshaft pulley for damage. Replace pulley and go to Step 9.
		No	Go to next step.
5	**CHECK CMP CIRCUIT FOR SHORT TO GROUND** ● Check continuity between following terminal and body ground: — TP sensor terminal A (harness-side) — TP sensor terminal B (harness-side) ● Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 9.
		No	Go to next step.
6	**INSPECT CMP CIRCUITS FOR SHORTS** ● Check continuity between TP sensor terminals A and B (harness-side). ● Is there continuity?	Yes	Repair or replace shorted harnesses, then go to Step 9.
		No	Go to nest step.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** ● Turn ignition key to OFF. ● Disconnect PCM connector. ● Check for poor connection of PCM terminals 85 and 8 (damaged, pulled-out terminals, corrosion, etc.). ● Is there any malfunction?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.
8	**INSPECT CMP CIRCUIT FOR OPEN** ● Connect breakout box with PCM disconnected. ● Check continuity between following circuits: — TP sensor terminal A (harness-side) and PCM terminal 85 (harness-side) — TP sensor terminal B (harness-side) and PCM terminal 8 (harness-side) ● Is there continuity?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to Step 9.
9	**VERIFY TROUBLESHOOTING OF DTC P0340 COMPLETED** ● Make sure to reconnect all disconnected connectors. ● Turn ignition key ON (Engine OFF). ● Clear DTC from memory using NGS tester generic OBD-II function. ● Start engine. ● Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** ● Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0400 [KL]

Z6U010201082W66

DTC P0400	EGR flow malfunction
DETECTION CONDITION	• DTC P0400 indicates difference in intake manifold pressure when EGR is operated and when it is stopped is too large or too small.
POSSIBLE CAUSE	• Damaged EGR valve • Damaged EGR boost sensor • Damaged EGR boost solenoid valve • Restriction in exhaust system • Damaged PCM • Damaged harness connector • Damaged harness

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**OUTPUT ALL DTCS** • Verify EGR boost solenoid valve connection and repair as necessary. • Check all continuous memory, KOEO and KOER Self-Test DTCs. • Are any other DTCs displayed on NGS tester?	Yes	Perform appropriate DTC troubleshooting.
		No	Go to next step.
3	**CHECK FOR UNMETERED AIR LEAKS** • Carefully inspect following areas for potential air leaks: • Hoses connecting to MAF sensor assembly. • Hoses connecting to throttle body. • Intake manifold gasket leaks. • Positive crankcase ventilation (PCV) disconnected. • Vacuum lines disconnected. • Improperly seated engine oil dipstick and tube. • Exhaust leaks at flanges and gaskets. • Are there any air leaks?	Yes	Repair or replace damaged parts, then go to Step 15.
		No	Go to next step.
4	**CHECK CYLINDER COMPRESSION** • Check cylinder compression. (See 01-10B-5 COMPRESSION INSPECTION [KL]) • Are cylinder compression readings within specification?	Yes	Go to next step.
		No	Repair appropriate parts, then go to Step 15.
5	**CHECK OPERATION OF EGR VALVE** • Turn ignition switch on and listen for initialization noise (clicks) of EGR valve with screwdriver or soundscope. **Note** • EGR valve initialization is closing action of valve observed before and after engine is started, and when engine is stopped. • Does EGR valve initialization noise heard?	Yes	Go to Step 10.
		No	Go to next step.
6	**CHECK POWER CIRCUIT TO EGR VALVE** • Key off. • EGR valve disconnected. • Key on, engine off. • Measure voltage between power circuit and chassis ground at EGR valve vehicle harness connector. • Is EGR valve power voltage **greater than 10.5 V**?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to Step 15.

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>7</td><td>CHECK RESISTANCE OF EGR VALVE
● Key off.
● EGR valve disconnected.
● Measure resistance of EGR valve coils.
● Is each resistance approx. 22 Ω?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td></td><td></td><td>No</td><td>Replace EGR valve, then go to Step 15.</td></tr>
<tr><td>8</td><td>CHECK EGR VALVE CIRCUIT CONTINUITY
● Key off.
● Disconnect PCM. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary.
● Install breakout box. Leave PCM disconnected.
● Measure resistance between EGR valve Test Pin at the breakout box and EGR valve vehicle harness connector. Record readings.
<table><tr><th>Test pin</th><th>EGR valve terminal</th></tr><tr><td>68</td><td>E</td></tr><tr><td>72</td><td>A</td></tr><tr><td>46</td><td>B</td></tr><tr><td>56</td><td>F</td></tr></table>Z6U0102W372
● Is each resistance less than 5.0 Ω?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td></td><td></td><td>No</td><td>Repair or replace wiring harness, then go to Step 15.</td></tr>
<tr><td>9</td><td>CHECK EGR VALVE CIRCUIT FOR SHORT TO POWER AND SHORT TO GROUND
● Key off.
● EGR valve disconnected.
● Breakout box installed.
● Measure resistance between Test Pins 46, 56, 68, 72 and Test Pins 71, 97 and 90 at breakout box.
● Measure resistance between Test Pins 46, 56, 68, 72 and Test Pins 51, 76 and 91 at breakout box.
● Is each resistance greater than 10,000 Ω?</td><td>Yes</td><td>Replace EGR valve, then go to Step 15.</td></tr>
<tr><td></td><td></td><td>No</td><td>Go to next step.</td></tr>
<tr><td>10</td><td>CHECK POWER CIRCUIT TO EGR BOOST SOLENOID VALVE
● Key off.
● EGR boost solenoid valve disconnected.
● Key on, engine off.
● Measure voltage between power circuit and chassis ground at EGR boost solenoid valve vehicle harness connector.
● Is EGR boost solenoid valve power circuit voltage greater than 10.5 V?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td></td><td></td><td>No</td><td>Repair or replace wiring harness, then go to Step 15.</td></tr>
<tr><td>11</td><td>CHECK RESISTANCE OF EGR BOOST SOLENOID VALVE
● Key off.
● EGR boost solenoid valve disconnected.
● Measure EGR boost solenoid valve resistance.
● Is resistance 30— 70 Ω?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td></td><td></td><td>No</td><td>Replace EGR boost solenoid valve, then go to Step 15.</td></tr>
<tr><td>12</td><td>CHECK EGR BOOST SOLENOID VALVE CIRCUIT CONTINUITY
● Key off.
● EGR boost solenoid valve disconnected.
● Disconnect PCM. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary.
● Install breakout box.
● Measure resistance between Test Pin 98 at breakout box and EGR boost solenoid valve circuit at vehicle harness connector.
● Is resistance less than 5.0 Ω?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td></td><td></td><td>No</td><td>Repair or replace wiring harness, then go to Step 15.</td></tr>
</table>

STEP	INSPECTION		ACTION
13	**CHECK EGR BOOST SOLENOID VALVE CIRCUIT FOR SHORT TO POWER AND SHORT TO GROUND** • EGR boost solenoid valve disconnected. • Breakout box installed. • Measure resistance between Test Pin 98 and Test Pins 71, 97 and 90 at breakout box. • Measure the resistance between Test Pin 98 and Test Pins 51, 76 and 91 at breakout box. • Is each resistance **greater than 10,000 Ω**?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to Step 15.
14	**CHECK OPERATION OF EGR BOOST SOLENOID VALVE** • Key off. • Breakout box installed. PCM connected. • Disconnect vacuum line from EGR boost sensor solenoid valve to intake manifold vacuum at solenoid valve. • Install vacuum pump at input port of EGR boost solenoid valve and apply **-27— -30 kPa {-203— -247 mmHg, -8— -10 InHg}** of vacuum. • Disconnect vacuum line from EGR boost solenoid valve to EGR boost sensor at sensor. Inspect vacuum line for damage, service as necessary. • Install vacuum gauge at unattached end of vacuum line. • Key on. • Jumper Test Pin 98 to ground at breakout box and observe vacuum gauge. Remove jumper. • Apply **-27— -30 kPa {-203— -247 mmHg, -8— -10 InHg}** of vacuum to EGR boost sensor solenoid valve once again. • Again jumper Test Pin 98 to ground at breakout box and observe vacuum gauge. Remove jumper. • Key off. • Was vacuum signal indicated at any time by vacuum gauge?	Yes	The fault that produced DTC P0400 is intermittent, and cannot be identified at this time. Go to ENGINE SYMPTOM TROUBLESHOOTING No. 27. (See 01-03B-5 SYMPTOM DIAGNOSTIC INDEX [KL])
		No	Replace damaged EGR boost solenoid valve, then go to next step.
15	**VERIFY TROUBLESHOOTING OF DTC P0400 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine and perform DRIVE MODE. (See 01-02B-18 OBD II DRIVE MODE [KL]) • Access DIAGNOSTIC MONITORING TEST RESULTS of generic OBD-II function. (See 01-02B-15 Diagnostic Monitoring Test Results Access Procedure) • Verify following TEST ID value: — 10:4C:31 EGR boost sensor reading difference — 10:4C:B1 EGR boost sensor reading difference • Is value within specification?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
16	**VERIFY AFTER REPAIR PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0420 [KL]

Z6U010201082W67

DTC P0420	Catalyst efficiency below threshold (Except California emission regulation applicable model)
DETECTION CONDITION	• DTCs P0420 indicate catalyst system efficiency is below acceptable threshold
POSSIBLE CAUSE	• Use of leaded fuel • Oil contamination • Cylinder misfiring • Damaged HO2S • Damaged ECT sensor • Downstream HO2S wires improperly connected • Fuel pressure too high • Damaged exhaust system pipe • Damaged exhaust manifold • Damaged silencer/tailpipe component • Damaged catalytic converter **Warning** **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.

STEP	INSPECTION		ACTION
3	**CHECK FOR MISFIRE MONITOR DTC** **Note** • Complete the spark timing check in OBD Test before proceeding with this step. Spark timing retarded below specification may increase exhaust gas temperature and decrease catalyst efficiency overtime. **Note** Be sure customer has not: • Refueled vehicle with leaded gasoline. • Experienced excessive oil consumption. **Note** • Internal deterioration of catalytic converter is usually caused by abnormal engine operation upstream of catalyst. Events that may produce higher than normal temperature in catalyst are particularly suspect. For example, misfiring can cause higher than normal catalyst operating temperature higher than normal. • Key on, engine off. • Retrieve and record all Continuous Memory DTCs. • Were any of following misfire monitor DTCs recorded: P0300, P0301, P0302, P0303, P0304, P0305 and P0306?	Yes	Perform detected DTCs troubleshooting.
		No	Go to next step.
4	**CHECK FOR ECT SENSOR DTCS** **Note** • ECT sensor DTCs can indicate that thermostat is not operating correctly or that engine coolant level is not filled to specifications. Resulting in above normal operating temperatures. • Were any of following ECT sensor DTCs recorded: P0117, P0118, P0125, P1116 and P1117?	Yes	Perform appropriate DTC troubleshooting.
		No	Go to next step.
5	**CHECK FOR ANY OTHER DTCS** • Were any other DTCs recorded in Step 2?	Yes	Perform appropriate DTC troubleshooting.
		No	Go to next step.
6	**CHECK CATALYST MONITOR OPERATION** • Key off. • NGS tester connected. • Key on, engine on. • Select PID/DATA MONITOR AND RECORD and monitor O2S12 (Middle) and O2S22 (Rear) PIDs. • Drive the vehicle for **approx. 10 min. at 64—96 km/h {40—60 mph}**. • Allow vehicle to idle in Neutral or Park. • Maintain idle engine speed. • Record PID/DATA and count inversion times of O2S12 (Middle) and O2S22 (Rear). • Calculate divide O2S12 (Middle) by O2S22 (Rear). • Is ratio of O2S12 (Middle) and O2S22 (Rear) **greater than 2.0**?	Yes	Go to Step 14.
		No	If ratio of O2S12 (Middle) and O2S22 (Rear) is **below 2.0** after three attempts, go to next step.

STEP	INSPECTION		ACTION
7	**CHECK FUEL PRESSURE** **Note** • Fuel pressures above specification may produce abnormally rich air/fuel mixture. Rich air/fuel mixture may cause higher than normal catalyst operating temperatures. • Key off. • Inspection vacuum hose going to fuel pressure regulator for proper installation, cracks, etc. Service as necessary. • Install fuel pressure gauge. • Verify vacuum source to fuel pressure regulator. • Start and run engine at idle. Record fuel pressure. • Increase engine speed to **2,500 rpm** and maintain for one minute. Record fuel pressure. • Is fuel pressure **210—310 kPa {2.2—3.1 kgf/cm^2, 31—46 psi}**?	Yes	Fuel pressure is okay. Go to next step.
		No	Fuel pressure is out of specification. (See 01-14-22 Fuel Leakage Test [KL]).
8	**CHECK FOR OBVIOUS LEAK SOURCES IN EXHAUST SYSTEM** **Note** • Catalyst in series with leaking exhaust system, it can cause Catalyst Efficiency Monitor Test to fail. • Key off. • Inspect following for leaks, cracks, loose connections or punctures: • Exhaust manifold • Front exhaust pipe • Rear exhaust pipe • Silencer/tailpipe component • Are above components free of cracks and punctures, etc.?	Yes	Check that exhaust manifold to catalyst inlet pipe joint is tight. Go to next step.
		No	Repair or replace damaged parts, then go to Step 14.
9	**CHECK FOR OBVIOUS RESTRICTIONS IN EXHAUST SYSTEM** • Inspect following for dents, areas of collapsed material and unusual bending: • Front exhaust pipe • Rear exhaust pipe • Silencer/tailpipe component • Are above components free of dents and areas of collapsed material or unusual bending, etc.?	Yes	Go to next step.
		No	Repair or replace damaged parts, then go to Step 14.

STEP	INSPECTION		ACTION
10	**CHECK MANIFOLD VACUUM FOR INDICATION OF EXCESSIVE EXHAUST SYSTEM RESTRICTION** • Attach vacuum gauge to intake manifold vacuum source. • Install tachometer. • Observe vacuum gauge needle while performing following: **Note** • Vacuum gauge reading may be normal when engine is first started and idling. However, excessive restriction in exhaust system will cause vacuum. Gauge needle to drop to low point even while engine is idling. • Start engine and gradually increase to **2,000 rpm** with transaxle in neutral position. • Decrease engine speed to idle rpm. • Key off. • Did manifold vacuum rise **above 54 kPa {407 mmHg, 16 inHg} with engine at 2,000 rpm**?	Yes	Go to next step.
		No	Manifold vacuum did not reach an acceptable level. Excessive restriction may be present. Go to Step 12.
11	**CHECK MANIFOLD VACUUM FOR INDICATION OF MODERATE EXHAUST SYSTEM RESTRICTION** • Vacuum gauge installed. • Tachometer installed. • Key on, engine idling. • Increase engine speed gradually from base idle rpm to **2,000 rpm** with transaxle in neutral position. • Observe vacuum gauge needle rises while maintaining increased engine rpm. **Note** • On a non-restricted exhaust system, vacuum gauge needle will rise quickly to normal range as increased rpm is maintained. • On a restricted exhaust system, vacuum gauge needle will rise slowly to normal range as the increased rpm is maintained. **Note** • As increased rpm is maintained, rate of speed of vacuum gauge needle rising to normal range is slower on restricted system than on non-restricted system. • Decrease engine speed to base idle rpm. • Key off. • Is the rate of speed that vacuum gauge needle rises back to normal range (**above 54 kPa {407 mmHg, 16 inHg}**) much slower than non-restricted system?	Yes	Moderate restriction may be present. Go to next step.
		No	No indications of restrictions or leaks have been detected in exhaust system. If DTCs P0420 and is presenting catalytic converter is chemically inactive. Perform appropriate symptom troubleshooting (e.g. Lack of power, Loss of Power, or No Start). (See 01-03B-5 SYMPTOM DIAGNOSTIC INDEX [KL]).

STEP	INSPECTION		ACTION
12	**CHECK MANIFOLD VACUUM WITH EXHAUST MANIFOLD DISCONNECTED FOR INDICATION OF RESTRICTION** • Key off. • Disconnect exhaust system immediately after catalytic converter. • Repeat vacuum measurement from Step 11. • Did vacuum needle quickly rise **above 54 kPa {407 mmHg, 16 InHg}** with engine rpm at **2,000**? **Note** • Intake manifold gasket leak can also cause vacuum gauge needle to remain well below normal range.	Yes	The exhaust system restriction is downstream of exhaust manifold. Go to next step.
		No	A restriction is present in exhaust manifold. Remove vacuum gauge and tachometer. Inspect each exhaust port for casting flash/restrictions by dropping a length of chain into it. **Note** • Do not use wire or lamp to check ports. Restriction can be small enough for both to pass through but large enough to cause excessive back pressure at high engine rpm. Replace exhaust manifold if unable to remove casting flash/restriction, then go to Step 14.
13	**CHECK MANIFOLD VACUUM WITH SILENCER/TAILPIPE ASSEMBLY DISCONNECTED FOR INDICATION OF RESTRICTION** • Key off. • Disconnect silencer/tailpipe component located after the catalytic converter. • Repeat vacuum measurement found in test Step 11. • Did vacuum needle quickly rise **above 54 kPa {407 mmHg, 16 InHg}** with engine rpm at **2,000**?	Yes	There is restriction in the silencer/tail pipe assembly. Replace silencer/tail pipe assembly, then go to next step.
		No	There is restriction in three way catalytic converter. Go to next step.
14	**VERIFY TROUBLESHOOTING OF DTC P0420 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine and perform DRIVE MODE. (See 01-02B-18 OBD II DRIVE MODE [KL]) • Access DIAGNOSTIC MONITORING TEST RESULTS of generic OBD-II function. (See 01-02B-15 Diagnostic Monitoring Test Results Access Procedure) • Verify TEST ID 10:10:11 value. • Is value within specification?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
15	**VERIFY AFTER REPAIR PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0421, P0431 [KL]

Z6U010201082W68

DTC P0421 **DTC P0431**	**Catalyst efficiency below threshold (RH)** **Catalyst efficiency below threshold (LH)**
DETECTION CONDITION	• DTCs P0421, P0431 indicate catalyst system efficiency is below acceptable threshold
POSSIBLE CAUSE	• Use of leaded fuel • Oil contamination • Cylinder misfiring • Damaged HO2S • Damaged ECT sensor • Downstream HO2S wires improperly connected • Fuel pressure too high • Damaged exhaust system pipe • Damaged exhaust manifold • Damaged silencer/tailpipe component • Damaged catalytic converter **Warning** **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.

STEP	INSPECTION		ACTION
3	**CHECK FOR MISFIRE MONITOR DTC** **Note** • Complete the spark timing check in OBD Test before proceeding with this step. Spark timing retarded below specification may increase exhaust gas temperature and decrease catalyst efficiency overtime. **Note** Be sure customer has not: • Refueled vehicle with leaded gasoline. • Experienced excessive oil consumption. **Note** • Internal deterioration of catalytic converter is usually caused by abnormal engine operation upstream of catalyst. Events that may produce higher than normal temperature in catalyst are particularly suspect. For example, misfiring can cause higher than normal catalyst operating temperature higher than normal. • Key on, engine off. • Retrieve and record all Continuous Memory DTCs. • Were any of following misfire monitor DTCs recorded: P0300, P0301, P0302, P0303, P0304, P0305 and P0306?	Yes	Perform detected DTCs troubleshooting.
		No	Go to next step.
4	**CHECK FOR ECT SENSOR DTCS** **Note** • ECT sensor DTCs can indicate that thermostat is not operating correctly or that engine coolant level is not filled to specifications. Resulting in above normal operating temperatures. • Were any of following ECT sensor DTCs recorded: P0117, P0118, P0125, P1116 and P1117?	Yes	Perform appropriate DTC troubleshooting.
		No	Go to next step.
5	**CHECK FOR ANY OTHER DTCS** • Were any other DTCs recorded in Step 2?	Yes	Perform appropriate DTC troubleshooting.
		No	Go to next step.
6	**CHECK CATALYST MONITOR OPERATION** • Key off. • NGS tester connected. • Key on, engine on. • Select following PID/DATA MONITOR AND RECORD and monitor. — O2S11(Front:RH) and O2S12 (Rear: RH) with P0421 — O2S21(Front:LH) and O2S22 (Rear: LH) with P0431 • Drive the vehicle for **approx. 10 min. at 64—96 km/h {40—60 mph}**. • Allow vehicle to idle in Neutral or Park. • Maintain idle engine speed. • Record PID/DATA and count inversion times of front HO2S and rear HO2S. • Calculate divide front HO2S by rear HO2S. • Is ratio of front HO2S and rear HO2S **greater than 2.0**?	Yes	Go to Step 14.
		No	If ratio of front HO2S and rear HO2S **below 2.0** after three attempts, go to next step.

STEP	INSPECTION		ACTION
7	**CHECK FUEL PRESSURE** **Note** • Fuel pressures above specification may produce abnormally rich air/fuel mixture. Rich air/fuel mixture may cause higher than normal catalyst operating temperatures. • Key off. • Inspection vacuum hose going to fuel pressure regulator for proper installation, cracks, etc. Service as necessary. • Install fuel pressure gauge. • Verify vacuum source to fuel pressure regulator. • Start and run engine at idle. Record fuel pressure. • Increase engine speed to **2,500 rpm** and maintain for one minute. Record fuel pressure. • Is fuel pressure **210—310 kPa {2.2—3.1 kgf/cm^2, 31—46 psi}**?	Yes	Fuel pressure Is okay. Go to next step.
		No	Fuel pressure is out of specification. (See 01-14-22 Fuel Leakage Test [KL])
8	**CHECK FOR OBVIOUS LEAK SOURCES IN EXHAUST SYSTEM** **Note** • Catalyst in series with leaking exhaust system, it can cause Catalyst Efficiency Monitor Test to fail. • Key off. • Inspect following for leaks, cracks, loose connections or punctures: • Exhaust manifold • Front exhaust pipe • Rear exhaust pipe • Silencer/tailpipe component • Are above components free of cracks and punctures, etc.?	Yes	Check that exhaust manifold to catalyst inlet pipe joint is tight. Go to next step.
		No	Repair or replace damaged parts, then go to Step 14.
9	**CHECK FOR OBVIOUS RESTRICTIONS IN EXHAUST SYSTEM** • Inspect following for dents, areas of collapsed material and unusual bending: • Front exhaust pipe • Rear exhaust pipe • Silencer/tailpipe component • Are above components free of dents and areas of collapsed material or unusual bending, etc.?	Yes	Go to next step.
		No	Repair or replace damaged parts, then go to Step 14.

STEP	INSPECTION		ACTION
10	**CHECK MANIFOLD VACUUM FOR INDICATION OF EXCESSIVE EXHAUST SYSTEM RESTRICTION** • Attach vacuum gauge to intake manifold vacuum source. • Install tachometer. • Observe vacuum gauge needle while performing following: **Note** • Vacuum gauge reading may be normal when engine is first started and idling. However, excessive restriction in exhaust system will cause vacuum. Gauge needle to drop to low point even while engine is idling. • Start engine and gradually increase to **2,000 rpm** with transaxle in neutral position. • Decrease engine speed to idle rpm. • Key off. • Did manifold vacuum rise **above 54 kPa {407 mmHg, 16 inHg} with engine at 2,000 rpm**?	Yes	Go to next step.
		No	Manifold vacuum did not reach an acceptable level. Excessive restriction may be present. Go to Step 12.
11	**CHECK MANIFOLD VACUUM FOR INDICATION OF MODERATE EXHAUST SYSTEM RESTRICTION** • Vacuum gauge installed. • Tachometer installed. • Key on, engine idling. • Increase engine speed gradually from base idle rpm to **2,000 rpm** with transaxle in neutral position. • Observe vacuum gauge needle rises while maintaining increased engine rpm. **Note** • On a non-restricted exhaust system, vacuum gauge needle will rise quickly to normal range as increased rpm is maintained. • On a restricted exhaust system, vacuum gauge needle will rise slowly to normal range as the increased rpm is maintained. **Note** • As increased rpm is maintained, rate of speed of vacuum gauge needle rising to normal range is slower on restricted system than on non-restricted system. • Decrease engine speed to base idle rpm. • Key off. • Is the rate of speed that vacuum gauge needle rises back to normal range (**above 54 kPa {407 mmHg, 16 inHg}**) much slower than non-restricted system?	Yes	Moderate restriction may be present. Go to next step.
		No	No indications of restrictions or leaks have been detected in exhaust system. If DTCs P0421 and P0431 are presenting catalytic converter is chemically inactive. Perform appropriate symptom troubleshooting (e.g. Lack of power, Loss of Power, or No Start). (See 01-03B-5 SYMPTOM DIAGNOSTIC INDEX [KL])

STEP	INSPECTION		ACTION
12	**CHECK MANIFOLD VACUUM WITH EXHAUST MANIFOLD DISCONNECTED FOR INDICATION OF RESTRICTION** • Key off. • Disconnect exhaust system immediately after catalytic converter. • Repeat vacuum measurement from Step 11. • Did vacuum needle quickly rise above **54 kPa {407 mmHg, 16 inHg}** with engine rpm at **2,000**? **Note** • Intake manifold gasket leak can also cause vacuum gauge needle to remain well below normal range.	Yes	The exhaust system restriction is downstream of exhaust manifold. Go to next step.
		No	A restriction is present in exhaust manifold. Remove vacuum gauge and tachometer. Inspect each exhaust port for casting flash/restrictions by dropping a length of chain into it. **Note** • Do not use wire or lamp to check ports. Restriction can be small enough for both to pass through but large enough to cause excessive back pressure at high engine rpm. Replace exhaust manifold if unable to remove casting flash/restriction, then go to Step 14.
13	**CHECK MANIFOLD VACUUM WITH SILENCER/TAILPIPE ASSEMBLY DISCONNECTED FOR INDICATION OF RESTRICTION** • Key off. • Disconnect silencer/tailpipe component located after the catalytic converter. • Repeat vacuum measurement found in test Step 11. • Did vacuum needle quickly rise **above 54 kPa {407 mmHg, 16 inHg}** with engine at **2,000 rpm**?	Yes	There is restriction in the silencer/tail pipe assembly. Replace silencer/tail pipe assembly, then go to next step.
		No	There is restriction in three way catalytic converter. Go to next step.
14	**VERIFY TROUBLESHOOTING OF DTC P0421, P0431 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine and perform DRIVE MODE. (See 01-02B-18 OBD II DRIVE MODE [KL]) • Access DIAGNOSTIC MONITORING TEST RESULTS of generic OBD-II function. (See 01-02B-15 Diagnostic Monitoring Test Results Access Procedure) • Verify TEST ID value: — 10:10:11 Ratio of Rear HEGO switches with P0421 — 10:10:21 Ratio of Rear HEGO switches with P0431 • Is value within specification?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
15	**VERIFY AFTER REPAIR PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0442 [KL]

Z6U010201082W69

DTC P0442	Evaporative emission control system leak detected (Small leak)
DETECTION CONDITION	• DTC P0442 indicates leak has been detected [as small as **1 mm {0.040 inch}**] in Evaporative Emission System.
POSSIBLE CAUSE	• Purge solenoid valve malfunction • Canister Drain Cut Valve (CDCV) malfunction • Loose fuel-filler cap • Charcoal canister malfunction • Catch tank malfunction • Pressure control valve malfunction • Cracked fuel tank • Fuel tank component parts poorly installed • Evaporative hose damaged or loose • Fuel tank level sensor malfunction • Fuel tank pressure sensor malfunction • Engine coolant temperature sensor malfunction • Intake air temperature sensor malfunction • Throttle position sensor malfunction • Mass air flow sensor malfunction • Vehicle speed sensor malfunction • Poor connection of connector **Warning** **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**CHECK FOR OTHER CONTINUOUS MEMORY DTC** Check for other Continuous Memory DTCs which could cause Evaporative Emission Monitor DTC. • Key off. • NGS tester connected. • Key on, engine off. • Retrieve and record any Continuous Memory DTCs. • Are there any other continuous Memory DTCs present?	Yes	Perform appropriate DTC troubleshooting.
		No	Go to next step.
4	**CHECK FOR KOEO SELF-TEST** • Activate key on, engine off (KOEO) Self-Test. • Are any KOEO DTCs displayed?	Yes	Perform appropriate DTC troubleshooting.
		No	Go to next step.
5	**CHECK FOR KOER SELF-TEST** • Key on, engine running. • Warm up engine to normal operating temperature. • Activate key on, engine running (KOER) self-test. • Are any KOER DTCs displayed?	Yes	Perform appropriate DTC troubleshooting.
		No	Go to next step.

STEP	INSPECTION		ACTION
6	**INSPECTION OF FUEL-FILLER CAP** • Key off. • Disconnect NGS tester. • Confirm filler cap is not either disconnected, loose or damaged. **Note** • When filler caps other than order entry system (OES parts) caps are attached, it is considered abnormal. • Is fault detected?	Yes	Replace or properly attach the filler cap, then go to Step 17.
		No	Go to next step.
7	**INSPECTION OF VACUUM HOSES** • Pull slightly on vacuum hoses at purge solenoid, catch tank and charcoal canister. • Check for loose connections. • Visually inspect for improperly connected and cracked hoses between dynamic chamber and purge solenoid, purge solenoid and catch tank and catch tank and charcoal canister. • Confirm air-tightness of vacuum hose using vacuum pump. • Is fault detected?	Yes	Repair or replace damaged parts, then go to Step 17.
		No	Go to next step.
8	**CHECK FOR PURGE SOLENOID VALVE STUCK CLOSED OR STUCK OPEN** • Remove the purge solenoid valve. • Confirm the purge solenoid valve air vents properly when ON and is air tight when OFF. • Is fault detected?	Yes	Replace purge solenoid valve, then go to Step 17.
		No	Go to next step.
9	**INSPECTION OF CATCH TANK** • Remove catch tank. • Visually inspect for cracked catch tank. • Inspect catch tank for plugging using vacuum pump. • Is fault detected?	Yes	Replace catch tank, then go to Step 17.
		No	Reconnect all components. Go to next step.
10	**INSPECTION OF CHARCOAL CANISTER** • Remove charcoal canister. • Visually inspect for cracked charcoal canister. • Inspect charcoal canister for plugging using vacuum pump. • Is fault detected?	Yes	Replace charcoal canister, then go to Step 17.
		No	Go to next step.
11	**CHECK FOR EVAPORATIVE EMISSION MONITOR SYSTEM** • Key off. • Disconnect vacuum hose from charcoal canister at fuel tank side. • Attach the vacuum pump to vacuum hose. • Connect NGS tester. • Key on, engine off. • Access FTP V PID with NGS tester. • Apply **17 kPa {13 mmHg, 0.5 inHg}** vacuum by using vacuum pump, then leave it for one minute. • Did FTP V PID value maintain negative pressure?	Yes	Go to Step 16.
		No	Go to next step.

STEP	INSPECTION		ACTION
12	**INSPECTION OF VACUUM HOSES** ● Key off. ● Pull slightly on vacuum hoses at pressure control valve, FTP sensor, fuel-filler pipe and fuel tank. ● Check for loose connections. ● Visually inspect for wrongly connected and cracked hoses between fuel tank and FTP sensor, fuel tank and pressure control valve, fuel-filler pipe and pressure control valve and pressure control valve and charcoal canister. ● Confirm air tightness of vacuum hose using vacuum pump. ● Is fault detected?	Yes	Repair or replace damaged parts, then go to Step 17.
		No	Go to next step.
13	**CHECK FOR PRESSURE CONTROL VALVE** ● Remove and inspect pressure control valve. ● Is fault detected?	Yes	Replace pressure control valve, then go to Step 17.
		No	Go to next step.
14	**INSPECTION FUEL-FILLER PIPE** ● Remove fuel-filler pipe. ● Visually inspect fuel-filler pipe for damage. ● Is fault detected?	Yes	Replace fuel-filler pipe, then go to Step 17.
		No	Go to next step.
15	**INSPECTION OF FUEL TANK** ● Remove fuel tank and visually inspect for damage. ● Visually inspect for insufficient sealing or poorly attached accessories on fuel tank. (i.e. fuel gauge.) ● Is fault detected?	Yes	Replace fuel tank or sealing, then go to Step 17.
		No	Go to next step.
16	**CHECK FOR CANISTER DRAIN CUT VALVE (CDCV)** ● Key off. ● Remove CDCV. ● Confirm CDCV is not damaged, and that air vents is tight when at ON. ● Is fault detected?	Yes	Replace CDCV, then go to next step.
		No	Inspect hoses between charcoal canister to CDCV, and repair any detached, incorrectly installed or cracked, then go to next step.
17	**VERIFY TROUBLESHOOTING OF DTC P0442 COMPLETED** ● Make sure to reconnect all disconnected connectors. ● Turn ignition key to ON (Engine OFF). ● Clear DTC from memory using NGS tester generic OBD-II function. ● Start engine and perform DRIVE MODE. (See 01-02B-18 OBD II DRIVE MODE [KL]) ● Access DIAGNOSTIC MONITORING TEST RESULTS of generic OBD-II function. (See 01-02B-15 Diagnostic Monitoring Test Results Access Procedure) ● Verify following TEST ID value: — 10:26:80 EVAP phase0 (PGM_P0_PRSK) — 10:26:00 EVAP phase0 (PGM_P0_PRSK) — 10:27:00 EVAP phase2 (PGM_P2_DLTPK) — 10:2A:80 EVAP vapor gen (PGM_P4_DELPK) ● Is value within specification?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
18	**VERIFY AFTER REPAIR PROCEDURE** ● Perform DTC CONFIRMATION PROCEDURE ● Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0443 [KL]

Z6U010201082W70

DTC P0443	Evaporative emission control system purge solenoid valve circuit malfunction
DETECTION CONDITION	• DTC P0443 indicates failure in purge solenoid valve circuit
POSSIBLE CAUSE	• Power circuit open • Purge solenoid valve signal open in harness • Purge solenoid valve signal circuit short to power ground • Damaged purge solenoid valve • Damaged PCM

Troubleshooting Hint
See 01-16-8 EVAP Control System Monitor Outline.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**CHECK CONNECTION OF PURGE SOLENOID VALVE CONNECTOR** • Key off. • Verify connection of purge solenoid valve connector. • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and pins then go to next step.
3	**CHECK PURGE SOLENOID VALVE** • Remove purge solenoid valve. • See 01-16-12 PURGE SOLENOID VALVE INSPECTION. • Is purge solenoid valve okay?	Yes	Go to next step.
		No	Replace knock sensor, then go to Step 8.
4	**CHECK VOLTAGE OF PURGE SOLENOID VALVE POWER CIRCUIT** • Key on, engine off. • Disconnect purge solenoid valve connector. • Measure voltage at the purge solenoid valve connector terminal A (harness side). • Is voltage **greater than 10.5 V**?	Yes	Power harness circuit to purge solenoid valve is okay. Go to next step.
		No	Repair or replace wiring harness, then go to Step 8.
5	**CHECK PURGE SOLENOID VALVE CIRCUIT SHORTS TO GROUND CIRCUIT** • Key off. • Disconnect purge solenoid valve connector. • Check continuity between purge solenoid valve connector terminal B (harness side) and battery negative terminal. • Is there continuity?	Yes	Repair or replace wiring harness or connector then go to next step.
		No	Go to Step 8.
6	**CHECK CONNECTION OF PCM CONNECTOR** • Key off. • Verify connection of PCM connector. • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and pins then go to next step.
7	**CHECK CONTINUITY OF PURGE SOLENOID VALVE SIGNAL CIRCUIT OPEN** • Key off. • Disconnect purge solenoid valve connector. • Disconnect PCM connector. • Install breakout box. • Check continuity between Test pin 67 at breakout box and purge solenoid valve connector terminal B (harness side). • Is there continuity?	Yes	Go to next step.
		No	Repair or replace wiring harness or connector then go to next step.

STEP	INSPECTION		ACTION
8	**VERIFY TROUBLESHOOTING OF DTC P0443 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Perform KOEO/KOER Self-Test. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0446 [KL]

Z6U010201082W71

DTC P0446	Evaporative emission control system vent control malfunction
DETECTION CONDITION	• DTC P0446 indicates an excessive fuel tank pressure (FTP) or vent control malfunction in Evaporative Emission Control System (Canister drain cut valve (CDCV) is stacking)
POSSIBLE CAUSE	• Damaged FTP sensor • Kinks or blockage in fuel vapor hose/tube • Constant voltage circuit to FTP sensor open • Fuel vapor storage canister vent restriction • Damaged Canister Vent side filter • Damaged Canister Drain Cut Valve (CDCV) • Damaged PCM **Warning** **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**CHECK FTP SENSOR** • Key on, engine off. • Access FTP V PID. • Key on, engine running. • Idle engine for 3 minutes. • Loosen fuel filler cap. • Again, access FTP V PID with NGS tester. • Is FTP V PID voltage **2.42 — 2.58 V**?	Yes	Install fuel-filler cap only **1/8 turn** so that cap initially clicks by sound or touch. Go to Step 5.
		No	Install fuel-filler cap only 1/8 turn so cap initially clicks by sound or touch. Go to next step.

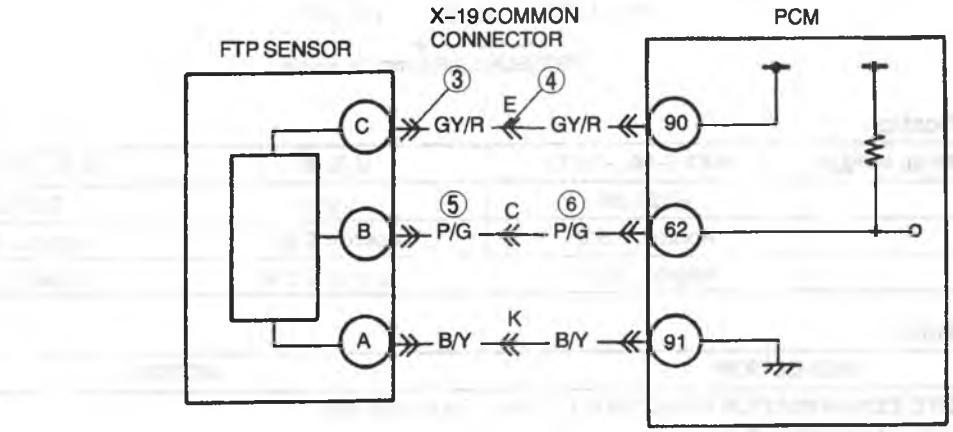
STEP	INSPECTION		ACTION
4	**CHECK CONSTANT VOLTAGE AT FTP SENSOR VEHICLE HARNESS CONNECTOR** • Key off. • Disconnect FTP sensor vehicle harness connector. • Key on, engine off. • Measure voltage between the constant voltage circuit and FTP sensor ground circuit at the FTP sensor harness connector. • Is constant voltage **4.5 — 5.5 V**?	Yes	Constant voltage is open in FTP sensor. Replace FTP sensor, then go to Step 13.
		No	Repair or replace wiring harness, then go to Step 13.
5	**CHECK FOR RESTRICTION AT CHARCOAL CANISTER AND CDCV** • Check for kinks or bends in fuel vapor hoses from fuel tank to the in-line tee and from tee to both purge solenoid valve and charcoal canister. • Disconnect both ends of fuel vapor hose between charcoal canister and pressure control valve. • Check for vacuum bleed on disconnected fuel vapor hose with vacuum pump. Fuel vapor hose must not hold vacuum. • Check for excessive debris in charcoal canister or restrictions at charcoal canister atmosphere venting port to CDCV. • Check for kinks or bends in purge air inlet tube between CDCV and atmosphere. • Is obstruction indicated?	Yes	Repair or replace damaged parts, then go to Step 13.
		No	Go to next step.
6	**CHECK HOSE FROM CANISTER DRAIN CUT VALVE (CDCV) FILTER PORT TO ATMOSPHERE** • Disconnect vacuum hose to atmosphere at CDCV. • Install hand-held vacuum pump to CDCV side of vacuum hose. • Apply vacuum to vacuum hose. • Does air flow?	Yes	Go to Step 9.
		No	Go to next step.
7	**INSPECTION OF CHECK VALVE** • Remove and inspect check valve for plugging. • Is fault detected?	Yes	Replace check valve, then go to Step 13.
		No	Go to next step.
8	**INSPECTION OF AIR FILTER** • Remove and inspect air filter for plugging. • Is fault detected?	Yes	Replace air filter, then go to Step 13.
		No	Replace vacuum hose, then go to Step 13.
9	**CHECK CDCV MECHANICAL OPERATION OPEN VACUUM POSITION** • Key off. • Disconnect vacuum hose at both ends of CDCV. • If CDCV is directly attached to charcoal canister, disconnect fuel vapor hose from purge solenoid valve to charcoal canister at charcoal canister. • Install hand-held vacuum pump vent to atmosphere side of CDCV. • CDCV electrically connected. • Apply **53 kPa {0.53 kgf/cm^2, 16 inHg}** of vacuum to CDCV. • Does CDCV hold vacuum for 1 minute?	Yes	Replace CDCV, then go to Step 13.
		No	Go to next step.
10	**CHECK CDCV OPERATION** • Key off. • Remove CDCV. • Perform CDCV inspection. (See 01-16-11 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION) • Is CDCV okay?	Yes	Go to next step.
		No	Replace CDCV, then go to Step 13.

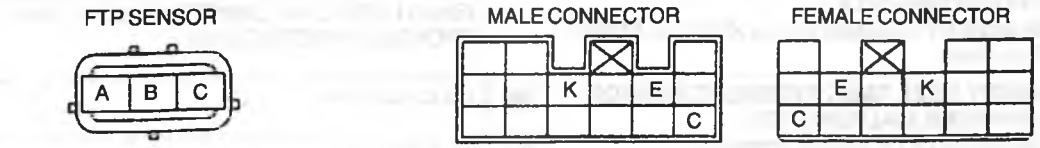
STEP	INSPECTION		ACTION
11	**CHECK CDCV CIRCUIT FOR SHORT TO GROUND CIRCUIT** ● Key off. ● CDCV disconnected. ● Disconnect PCM. Inspect for damaged or pushed out pins, corrosion and loose wires. Service as necessary. ● Install breakout box. Leave PCM disconnected. ● Disconnect NGS tester from DLC. ● Measure resistance between Test Pin 67 and Test Pins 51 and 103 at breakout box. ● Is each resistance **greater than 10,000 Ω**?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to Step 13.
12	**INSPECTION OF FUEL TANK** ● Remove and inspect fuel tank. ● Is fault detected?	Yes	Replace fuel tank or sealing, then go to next step.
		No	Go to ENGINE SYMPTOM TROUBLESHOOTING No.28. (See 01-03B-5 SYMPTOM DIAGNOSTIC INDEX [KL])
13	**VERIFY TROUBLESHOOTING OF DTC P0446 COMPLETED** ● Make sure to reconnect all disconnected connectors. ● Turn ignition key to ON (Engine OFF). ● Clear DTC from memory using NGS tester generic OBD-II function. ● Start engine and perform DRIVE MODE. (See 01-02B-18 OBD II DRIVE MODE [KL]) ● Access DIAGNOSTIC MONITORING TEST RESULTS of generic OBD-II function. (See 01-02B-15 Diagnostic Monitoring Test Results Access Procedure) ● Verify following TEST ID value: — 10:26:80 EVAP phase0 (PGM_P0_PRSK) — 10:26:00 EVAP phase0 (PGM_P0_PRSK) — 10:27:00 EVAP phase2 (PGM_P2_DLTPK) — 10:2A:80 EVAP vapor gen (PGM_P4_DELPK) ● Is value within specification?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
14	**VERIFY AFTER REPAIR PROCEDURE** ● Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0452 [KL]

Z6U010201082W72

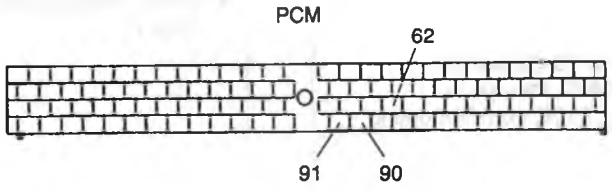
DTC P0452	Fuel tank pressure sensor circuit low input
DETECTION CONDITION	• PCM monitors input voltage from fuel tank pressure sensor while the engine is running. If PCM terminal 62 voltage is **below 0.22 V** after engine is started, PCM determines that fuel tank pressure sensor circuit has malfunctioned. **Diagnostic support note** • This is a continuous CCM monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC also detects by KOEO/KOER Self-Test
POSSIBLE CAUSE	• FTP sensor malfunction • Connector or terminal malfunction • Short to ground in wiring harness between fuel tank pressure sensor terminal B and PCM terminal 62 • Open circuit in wiring harness between fuel tank pressure sensor terminal C to PCM terminal 90 • PCM malfunction





HARNESS SIDE CONNECTOR (VIEW FROM TERMINAL SIDE)

HARNESS SIDE CONNECTOR (VIEW FROM HARNESS SIDE)



HARNESS SIDE CONNECTOR (VIEW FROM HARNESS SIDE)

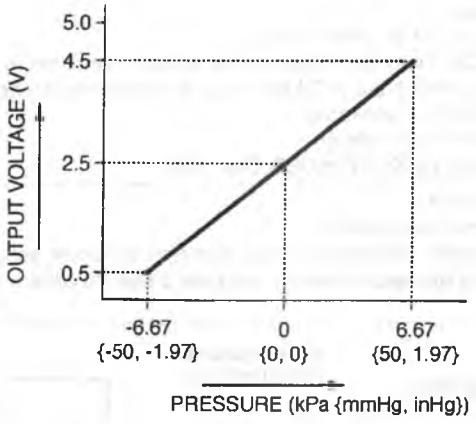
Z6U0102W413

Troubleshooting Hint

FTP sensor description

- The FTP sensor converts the fuel tank pressure into electric signals by using piezoelectric effect of the semi-conductor.
- The FTP sensor signal is used for the evaporative system monitor.

FTP sensor signal characteristic



Z6U0102W374

FTP sensor specification

Pressure (kPa {mmHg, inHg})	-6.67 {-50, -1.97}	0 {0, 0}	6.67 {50, 1.97}
FTP PID	-0.97 psi	0 psi	0.97 psi
FTP V PID	Approx. 0.5 V	Approx. 2.5 V	Approx. 4.5 V
PCM 62 (Signal)	Approx. 0.5 V	Approx. 2.5 V	Approx. 4.5 V

Diagnostic procedure

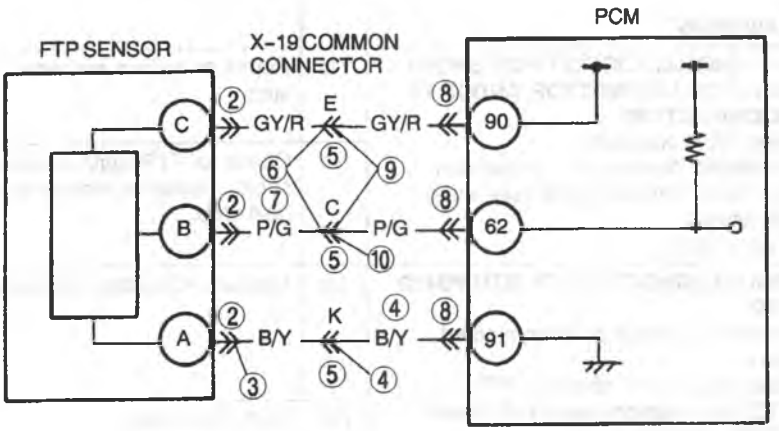
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**CLASSIFY FUEL TANK PRESSURE SENSOR OR HARNESS MALFUNCTION** • Disconnect FTP sensor connector. • Is FTP V PID **above 4.8 V**?	Yes	Go to next step.
		No	Go to Step 5.
3	**CHECK POWER SUPPLY CIRCUIT VOLTAGE AT FTP SENSOR CONNECTOR** **Note** • If DTC P0107 and P0122 are also retrieved with P0452, then go to CONSTANT VOLTAGE troubleshooting procedure. • Turn ignition key to OFF. • Disconnect fuel tank pressure sensor connector. • Turn ignition key to ON (Engine OFF). • Check voltage between fuel tank pressure sensor terminal C (harness-side) and body ground. • Is t voltage **within 4.5— 5.5 V**?	Yes	Check for poor fuel tank pressure sensor terminal C connection. Repair or replace as necessary. • If okay, replace fuel tank pressure sensor. Then go to Step 7.
		No	Go to next step.

STEP	INSPECTION		ACTION
4	**CHECK POWER SUPPLY CIRCUIT VOLTAGE AT X-19 COMMON CONNECTOR** • Disconnect X-19 common connector. • Measure voltage at X-19 common connector male terminal E (PCM-side). • Is voltage **within 4.5— 5.5 V**?	Yes	Check for open circuit between following terminals: • X-19 common connector female terminal E and fuel tank pressure sensor terminal C (harness-side) — Repair or replace suspected harness, then go to Step 7.
		No	Check for open circuit between following terminals: • PCM terminal 90 (harness-side) and X-19 common connector male terminal E. — Repair or replace suspected harness, then go to Step 7.
5	**INSPECT FTP SIGNAL CIRCUIT FOR SHORT TO GROUND (FTP SENSOR CONNECTOR AND X-19 COMMON CONNECTOR)** • Turn ignition key to off. • Disconnect X-19 common connector. • Check continuity between X-19 common connector female terminal C and body ground. • Is there continuity?	Yes	Repair or replace suspected harness, then go to Step 7.
		No	Go to next step.
6	**INSPECT FTP SIGNAL CIRCUIT FOR SHORT TO GROUND (PCM CONNECTOR AND X-19 COMMON CONNECTOR)** • Disconnect PCM connector. • Check continuity between X-19 common connector male terminal C (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace suspected harness, then go to next step.
		No	Check for FTP signal circuit and FTP ground circuit for shorts. Repair or replace suspected harness, then go to next step.
7	**VERIFY TROUBLESHOOTING OF DTC P0452 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Perform KOEO/KOER Self-Test. • Is same DTC present during KOEO or KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

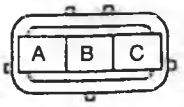
DTC P0453 [KL]

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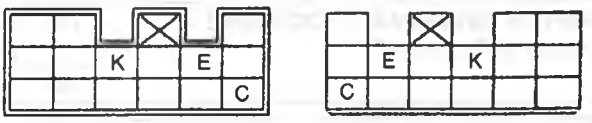
DTC P0453	Fuel tank pressure sensor circuit high input
DETECTION CONDITION	• PCM monitors input voltage from the fuel tank pressure sensor while the engine is running. If PCM terminal voltage is **above 4.5 V** after engine is started, PCM determines that fuel tank pressure circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycles. • PENDING CODE is available if PCM detects the above detection condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC also detects by KOEO/KOER Self-test.
POSSIBLE CAUSE	• Fuel tank pressure sensor malfunction • Connector or terminal malfunction • Open circuit in wiring between fuel tank pressure sensor terminal B and PCM terminal 62 • Open circuit in wiring between fuel tank pressure sensor terminal A and PCM terminal 91 • FTP sensor signal circuit shorts to constant voltage supply circuit



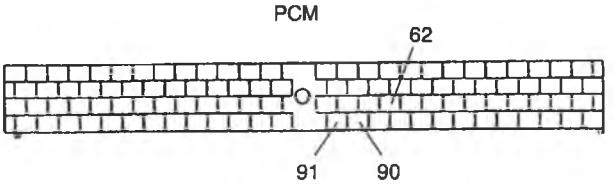
X-19 COMMON CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

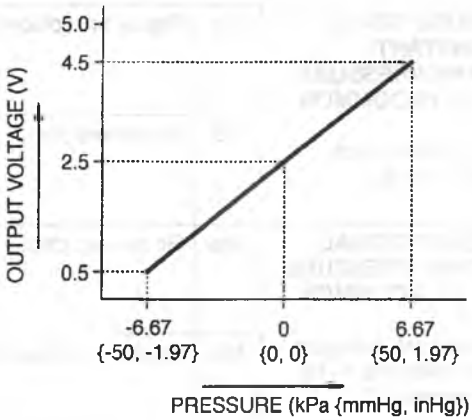
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Troubleshooting Hint

FTP sensor description

- The FTP sensor converts the fuel tank pressure into electric signal by using piezo-electric effect of the semi-conductor.
- The FTP sensor signal is used for the evaporative system monitor.

FTP sensor signal characteristic



Z6U0102W374

FTP sensor specification

Pressure (kPa {mmHg, inHg})	-6.67 {-50, -1.97}	0 {0, 0}	6.67 {50, 1.97}
FTP PID	-0.97 psi	0 psi	0.97 psi
FTP V PID	Approx. 0.5 V	Approx. 2.5 V	Approx. 4.5 V
PCM 62 (Signal)	Approx. 0.5 V	Approx. 2.5 V	Approx. 4.5 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**INSPECT POOR CONNECTION OF FUEL TANK PRESSURE SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect fuel tank pressure sensor connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace suspected terminal, then go to Step 11.
		No	Go to next step.
3	**INSPECT FUEL TANK PRESSURE SENSOR GROUND CIRCUIT FOR OPEN (AT FUEL TANK PRESSURE SENSOR CONNECTOR)** • Check continuity between fuel tank pressure sensor terminal A (harness-side) and body ground. • Is there continuity?	Yes	Go to Step 5.
		No	Go to next step.
4	**INSPECT FUEL TANK PRESSURE SENSOR GROUND CIRCUIT FOR OPEN (AT X-19 COMMON CONNECTOR)** • Disconnect X-19 common connector. • Check continuity between X-19 common connector male terminal K and body ground. • Is there continuity?	Yes	Check for open circuit between following terminals: • X-19 common connector female terminal K and FTP sensor terminal A (harness-side) Repair or replace suspected harness, then go to Step 11.
		No	Check for open circuit between following terminals: • PCM terminal 91 (harness-side) and X-19 common connector male terminal K Repair or replace suspected harness, then go to Step 11.

STEP	INSPECTION		ACTION
5	**CHECK X-19 COMMON CONNECTOR** • Disconnect X-19 common connector. • Check for poor connection (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace suspected terminal, then go to Step 11.
		No	Go to next step.
6	**INSPECT FUEL TANK PRESSURE SIGNAL CIRCUIT FOR SHORT TO CONSTANT VOLTAGE CIRCUIT (FUEL TANK PRESSURE SENSOR CONNECTOR AND X-19 COMMON CONNECTOR)** • Check continuity between X-19 common connector female terminals C and E. • Is there continuity?	Yes	Repair or replace suspected harness, then go to Step 11.
		No	Go to next step.
7	**INSPECT FUEL TANK PRESSURE SIGNAL CIRCUIT FOR OPEN (FUEL TANK PRESSURE SENSOR CONNECTOR AND X-19 COMMON CONNECTOR)** • Check continuity between fuel tank pressure sensor terminal B (harness-side) and X-19 common connector female terminal C. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to Step 11.
8	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair terminal, then go to Step 11.
		No	Go to next step.
9	**INSPECT FUEL TANK PRESSURE SIGNAL CIRCUIT FOR SHORT TO CONSTANT VOLTAGE CIRCUIT (X-19 COMMON CONNECTOR AND PCM CONNECTOR)** • Check continuity between X-19 common connector male terminals C and E (PCM-side). • Is there continuity?	Yes	Repair or replace suspected harness, then go to Step 11.
		No	Go to next step.
10	**INSPECT FUEL TANK PRESSURE SIGNAL CIRCUIT FOR OPEN (X-19 COMMON CONNECTOR AND PCM CONNECTOR)** • Connect breakout box with PCM disconnected. • Check continuity between X-19 common connector male terminal C (PCM-side) and breakout box terminal 62. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace suspected harness, then go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P0453 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Perform KOEO/KOER Self-Test. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0455 [KL]

Z6U010201082W74

DTC P0455	Evaporative emission control system leak detected (Gross leak)
DETECTION CONDITION	• DTC P0455 indicates substantial leak has been detected in Evaporative Emission System.
POSSIBLE CAUSE	• Purge solenoid valve malfunction • CDCV malfunction • Loose fuel-filler cap • Charcoal canister malfunction • Catch tank malfunction • Pressure control valve malfunction • Cracked fuel tank • Fuel tank component parts poorly installed • Evaporative hose damaged or loose • Insufficient manifold absolute pressure • Fuel tank level sensor malfunction • Fuel tank pressure sensor malfunction • Engine coolant temperature sensor malfunction • Intake air temperature sensor malfunction • Throttle position sensor malfunction • Mass air flow sensor malfunction • Vehicle speed sensor malfunction • Poor connection of connector **Warning** **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** • **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** • **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**CHECK FOR OTHER CONTINUOUS MEMORY DTC** Check for other Continuous Memory DTCs which could cause this DTC. • Key off. • NGS tester connected. • Key on, engine off. • Retrieve and record any Continuous Memory DTCs. • Are there any other continuous Memory DTCs present?	Yes	Perform appropriate DTC troubleshooting.
		No	Go to next step.
4	**CHECK FOR KOEO SELF-TEST** • Key on, engine off. • Perform KOEO Self Test. • Are any KOEO DTCs displayed?	Yes	Perform appropriate DTC troubleshooting.
		No	Go to next step.

STEP	INSPECTION		ACTION
5	**CHECK FOR KOER SELF-TEST** ● Key on, engine running. ● Warm up engine to normal operating temperature. ● Key on, engine running (KOER) self test. ● Per form KOEO self test. ● Are any KOER DTCs displayed?	Yes	Perform appropriate DTC troubleshooting.
		No	Go to next step.
6	**CHECK FOR INTAKE MANIFOLD VACUUM** ● Key off. ● Attach vacuum gauge to intake manifold vacuum source beside purge control system. ● Key on, engine running. ● Warm up engine to normal operating temperature. ● Measure intake manifold vacuum. ● Does manifold vacuum rise **above 60 kPa {450 mmHg, 18 inHg}**.	Yes	Go to next step.
		No	Check for broken/loose air hose clamps, cracks/holes in air hose. If they are damaged, repair or replace them, then go to Step 28.
7	**INSPECTION OF FUEL-FILLER CAP** ● Key off. ● Disconnect NGS tester. ● Confirm the filler cap is not either disconnected, loose or damaged. **Note** ● It is considered abnormal when filler caps other than order entry system (OES) caps are attached. ● Is fault detected?	Yes	Replace or properly attach filler cap, then go to Step 28.
		No	Go to next step.
8	**INSPECTION OF VACUUM HOSES** ● Pull slightly on vacuum hoses at purge solenoid valve, catch tank and charcoal canister. ● Check for loose connections. ● Visually inspect for improperly connection and cracked hoses between dynamic chamber and purge solenoid valve, catch tank and charcoal canister. ● Confirm air tightness of vacuum hose using vacuum pump. ● Is fault detected?	Yes	Repair or replace damaged/loosed parts, then go to Step 28.
		No	Go to next step.
9	**CHECK FOR PURGE SOLENOID VALVE - VALVE STUCK CLOSED OR STUCK OPEN** ● Remove purge solenoid valve. ● (See 01-16-12 PURGE SOLENOID VALVE INSPECTION). ● Is fault detected?	Yes	Replace purge solenoid valve, then go to Step 28.
		No	Go to next step.
10	**INSPECTION OF CATCH TANK** ● Remove catch tank. ● Visually inspect for cracked catch tank. ● Inspect catch tank for plugging using vacuum pump. ● Is fault detected?	Yes	Replace catch tank, then go to Step 28.
		No	Go to next step.
11	**CHECK FOR INTAKE MANIFOLD VACUUM TO PURGE CONTROL SYSTEM** ● Key off. ● Attach vacuum gauge to intake manifold vacuum source for purge control system. ● Key on, engine running. ● Warm up engine to normal operating temperature. ● Measure intake manifold vacuum. ● Did manifold vacuum rise **above 60 kPa {450 mmHg, 18 inHg}**.	Yes	Go to next step.
		No	Repair or replace damaged/loosed parts, then go to Step 28.

STEP	INSPECTION		ACTION
12	**INSPECTION OF CHARCOAL CANISTER** • Remove charcoal canister. • Visually inspect for cracked charcoal canister. • Inspect charcoal canister for plugging using vacuum pump. • Is fault detected?	Yes	Replace charcoal canister, then go to Step 28.
		No	Go to next step.
13	**VERIFY FTP SIGNAL VOLTAGE** • Clamp on hose on tank side of the charcoal canister. • Remove filler cap. • Connect NGS tester. • Key on, engine off. • Access FTP V PID with NGS tester. • Are FTP V PID values same as atmospheric pressure **(2.42—2.58 V)**?	Yes	Install filler cap. Go to Step 17.
		No	Install filler cap. Go to next step.
14	**INDUCE OPPOSITE FTP SIGNAL** • Key off. • Disconnect FTP sensor vehicle harness connector. • Connect jumper wire at constant voltage circuit between FTP sensor terminal C and sensor vehicle harness connector terminal B. • Key on, engine off. • If NGS tester communication concern exists, remove jumper immediately and go directly to next step. • Access FTP V PID. • Is FTP V PID value **4.5—5.5 V**?	Yes	Replace FTP sensor, then go to Step 28.
		No	Go to next step.
15	**CHECK VREF AT FTP SENSOR VEHICLE HARNESS CONNECTOR** • FTP sensor disconnected. • Key on, engine off. • Measure voltage between terminal C of constant voltage circuit and terminal A of FTP sensor ground circuit at FTP sensor vehicle harness connector. • Is constant voltage 4.5—5.5 V?	Yes	Go to next step.
		No	Repair or replace wiring harness, then go to Step 28.
16	**CHECK FTP SIGNAL CIRCUIT FOR SHORTS TO FTP SENSOR GROUND AND GROUND CIRCUIT** • Key off. • Disconnect FTP sensor. • Disconnect PCM. Inspect for damaged or pushed out pins, corrosion and loose wires. Service as necessary. • Install breakout box. Leave PCM disconnected. • Disconnect NGS tester from DLC. • Measure resistance between Test Pin 62 and Test Pin 91 at breakout box. • Measure resistance between Test Pin 62 and Test Pins 51 and 76 at breakout box. • Is each resistance **greater than 10,000 Ω**?	Yes	Repair or replace wiring harness, then go to Step 28.
		No	Repair or replace wiring harness, then go to Step 28.
17	**CHECK FOR EVAPORATIVE EMISSION MONITOR SYSTEM** • Key off. • Disconnect vacuum hose from charcoal canister at fuel tank side. • Attach vacuum pump to vacuum hose. • Connect NGS tester. • Key on, engine off. • Access FTP V PID. • Apply vacuum using vacuum pump. • Does FTP V PID value change on negative pressure side? . (See 01-40B-41 FUEL TANK PRESSURE SENSOR INSPECTION [KL])	Yes	Go to step 22.
		No	Go to next step.

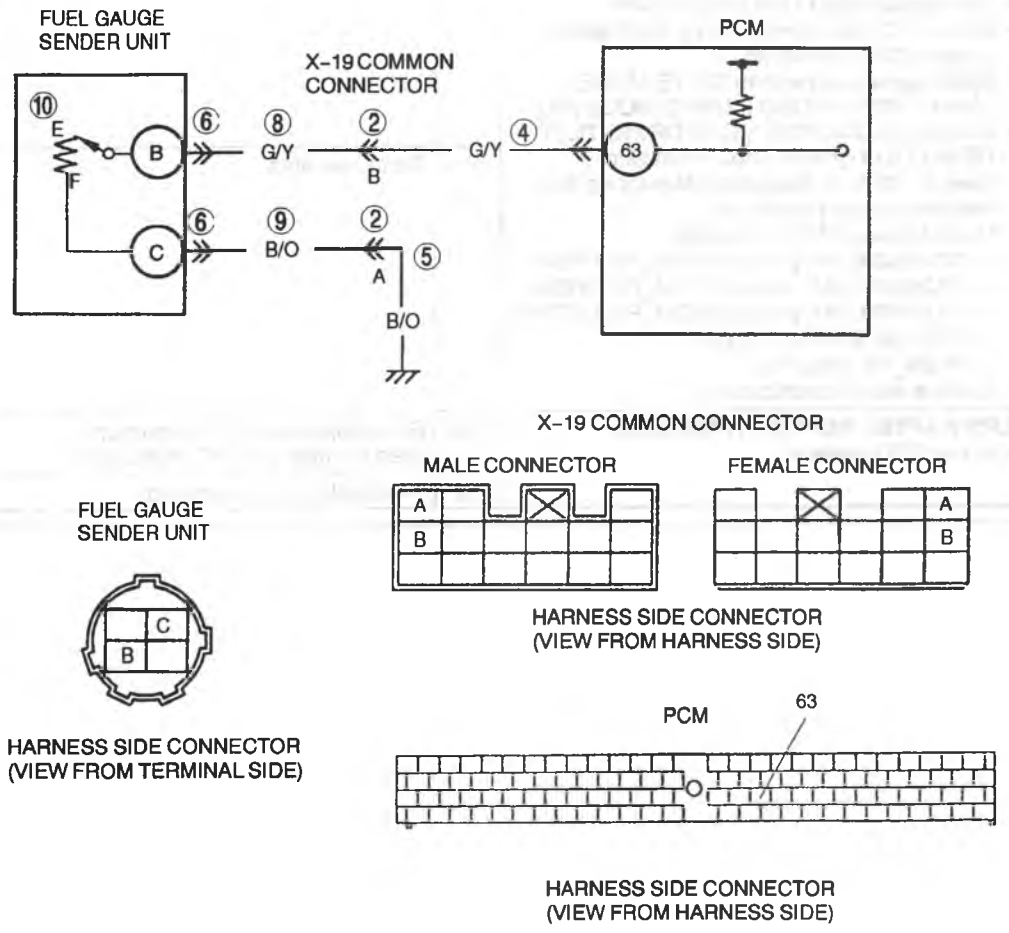
STEP	INSPECTION		ACTION
18	**INSPECTION OF VACUUM HOSES** • Key off. • Pull slightly on vacuum hoses at pressure control valve, FTP sensor, fuel-filler pipe and fuel tank. • Check for loose connections. • Visually inspect for improperly connections and cracked hoses between fuel tank and FTP sensor, fuel tank and pressure control valve, fuel- filler pipe and pressure control valve and pressure control valve and charcoal canister. • Confirm air tightness of vacuum hose using vacuum pump. • Is fault detected?	Yes	Repair or replace damaged parts, then go to Step 28.
		No	Go to next step.
19	**CHECK FOR PRESSURE CONTROL VALVE** • Remove and inspect pressure control valve. • Is fault detected?	Yes	Replace pressure control valve, then go to Step 28.
		No	Go to next step.
20	**INSPECTION FUEL-FILLER PIPE** • Remove fuel-filler pipe. • Visually inspect for fuel-filler pipe damage. • Is fault detected?	Yes	Replace fuel-filler pipe, then go to Step 28.
		No	Go to next step.
21	**INSPECTION OF FUEL TANK** • Remove fuel tank. • Visually inspect for fuel tank damage. • Visually inspect for insufficient sealing or poorly attached accessories on fuel tank: i.e., fuel gauge. • Is fault detected?	Yes	Replace fuel tank or sealing, then go to Step 28.
		No	Go to next step.
22	**CHECK FOR EVAPORATIVE EMISSION MONITOR SYSTEM** • Key off. • Disconnect vacuum hose from charcoal canister at fuel tank side. • Attach the vacuum pump to vacuum hose. • Connect NGS tester. • Key on, engine off. • Access FTP V PID. • Apply **6.66 kPa {50 mmHg, 1.97 inHg}** vacuum by using vacuum pump, then leave it for one minute. • Does FTP V PID value maintained **within 0.38—0.62 V**?	Yes	Go to Step 27.
		No	Go to next step.
23	**INSPECTION OF VACUUM HOSES** • Key off. • Pull slightly on vacuum hoses at pressure control valve, FTP sensor, fuel-filler pipe and fuel tank. • Check for loose connections. • Visually inspect for improper connections and cracked hoses between fuel tank and FTP sensor, fuel tank and pressure control valve, fuel- filler pipe and pressure control valve and pressure control valve and charcoal canister. • Confirm the air tightness of vacuum hose using vacuum pump. • Is fault detected?	Yes	Repair or replace damaged parts, then go to Step 28.
		No	Go to next step.
24	**CHECK FOR PRESSURE CONTROL VALVE** • Remove and inspect pressure control valve. • Is fault detected?	Yes	Replace pressure control valve, then go to Step 28.
		No	Go to next step.
25	**INSPECTION FUEL-FILLER PIPE** • Remove fuel-filler pipe. • Visually inspect for fuel-filler pipe damage. • Is fault detected?	Yes	Replace fuel-filler pipe, then go to Step 28.
		No	Go to next step.

STEP	INSPECTION		ACTION
26	**INSPECTION OF FUEL TANK** ● Remove fuel tank. ● Visually inspect for fuel tank damage. ● Visually inspect for insufficient sealing or poorly attached accessories on fuel tank: i.e., fuel gauge. ● Is fault detected?	Yes	Replace fuel tank or sealing, then go to Step 28.
		No	Go to next step.
27	**CHECK CANISTER DRAIN CUT VALVE (CDCV)** ● Key off. ● Remove CDCV. ● Confirm CDCV is not damaged, and that air vents are tight when at ON. ● Is fault detected?	Yes	Replace CDCV, then go to next step.
		No	Inspect hoses between the charcoal canister and CDCV, and repair any detached, incorrectly installed or cracked. Go to next step.
28	**VERIFY TROUBLESHOOTING OF DTC P0455 COMPLETED** ● Make sure to reconnect all disconnected connectors. ● Turn ignition key to ON (Engine OFF). ● Clear DTC from memory using NGS tester generic OBD-II function. ● Start engine and perform DRIVE MODE. (See 01-02B-18 OBD II DRIVE MODE [KL]) ● Access DIAGNOSTIC MONITORING TEST RESULTS of generic OBD-II function. (See 01-02B-15 Diagnostic Monitoring Test Results Access Procedure) ● Verify following TEST ID value: — 10:26:80 EVAP phase0 (PGM_P0_PRSK) — 10:26:00 EVAP phase0 (PGM_P0_PRSK) — 10:27:00 EVAP phase2 (PGM_P2_DLTPK) — 10:2A:80 EVAP vapor gen (PGM_P4_DELPK) ● Is value within specification?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
29	**VERIFY AFTER REPAIR PROCEDURE** ● Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0460 [KL]

Z6U010201082W75

DTC P0460	Fuel gauge sender unit circuit malfunction
DETECTION CONDITION	• If the PCM detects the fuel gauge sender unit input voltage at PCM terminal 63 is below **0 V** or above **3.48 V**, the PCM determines that a fuel gauge sender unit circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory. • This DTC also detects by KOER Self-Test.
POSSIBLE CAUSE	• Fuel gauge sender unit malfunction • Short to ground circuit between fuel gauge sender unit terminal B and PCM terminal 63 • Short circuit between fuel level signal circuit and fuel gauge sender unit ground circuit • Open circuit between fuel gauge sender unit terminal B and PCM terminal 63. • Open circuit between fuel gauge sender unit terminal C and body ground. • Poor connection of fuel gauge sender unit and/or PCM connector



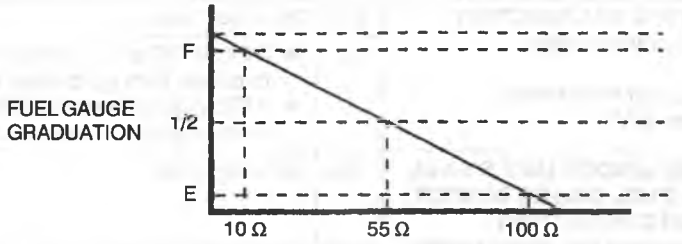
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Troubleshooting Hint

Fuel gauge sender unit description

- The fuel gauge sender unit converts the fuel level into electric signals using variable resistor.
- The fuel gauge sender unit signal is used for the evaporative system monitor.

Fuel gauge sender unit signal characteristic



Z6U0102W377

Fuel gauge sender unit specification

Fuel level	Empty	Half	Full
FLI PID	7 %	50 %	92 %
FLI V PID	Approx. 6.0 V	Approx. 2.10 V	Approx. 0.62 V
PCM 63 (Signal)	Approx. 6.0 V	Approx. 2.10 V	Approx. 0.62 V
Resistance	Approx. 100 Ω	Approx. 55 Ω	Approx. 10Ω

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**INSPECT POOR CONNECTION X-19 COMMON CONNECTOR** • Turn ignition key to OFF. • Disconnect X-19 common connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunctions?	Yes	Repair or replace terminal and/or harness, then go to Step 11.
		No	Go to next step.
3	**CLASSIFY REAR OR INSTRUMENT PANEL HARNESS MALFUNCTION** • Turn ignition key to OFF. • Start engine. • Access FLI V PID using NGS tester. • Is FIL V PID **approx. 5 V?**	Yes	Go to next step.
		No	• If FIL V PID is B+, repair or replace harness for short to power, then go to Step 11. • If FIL V PID **approx. 0 V**, repair or replace harness for short to ground, then go to Step 11.
4	**CHECK FUEL GAUGE SENDER UNIT SIGNAL CIRCUIT FOR OPEN (X-19 COMMON CONNECTOR—PCM)** • Measure voltage between X-19 common connector male terminals B and body ground. • Is voltage **approx. 5 V?**	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 11.
5	**CHECK FUEL GAUGE SENDER UNIT GROUND CIRCUIT FOR OPEN (X-19 COMMON CONNECTOR—BODY GROUND)** • Turn ignition key to OFF. • Connect jumper wire between X-19 common connector male terminals A and B. • Turn ignition key to ON. • Access FLI V PID using NGS tester. • Is FLI V PID **approx. 0 V?**	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 11.
6	**INSPECT POOR CONNECTION FUEL GAUGE SENDER UNIT CONNECTOR** • Turn ignition key to OFF. • Disconnect fuel gauge sender unit connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or harness, then go to Step 11.
		No	Go to next step.

STEP	INSPECTION		ACTION
7	**CHECK REAR HARNESS MALFUNCTION** • Connect X-19 common connector. • Start engine. • Access FLI V PID using NGS tester. • Is FIL V PID **approx. 5 V**?	Yes	Go to next step.
		No	• If FIL V PID is B+, repair or replace harness for short to power, then go to Step 11. • If FIL V PID **approx. 0 V**, repair or replace harness for short to ground, then go to Step 11.
8	**CHECK FUEL GAUGE SENDER UNIT SIGNAL CIRCUIT FOR OPEN (FUEL GAUGE SENDER UNIT—X-19 COMMON CONNECTOR)** • Measure voltage between fuel gauge sender unit terminal B (harness-side) and body ground. • Is voltage **approx. 5 V**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 11.
9	**CHECK FUEL GAUGE SENDER UNIT GROUND CIRCUIT FOR OPEN (FUEL GAUGE SENDER UNIT—X-19 COMMON CONNECTOR)** • Turn ignition key to OFF. • Connect jumper wire between fuel gauge sender unit terminal B and C (harness-side). • Access FLI V PID using NGS tester. • Is FLI V PID **approx. 0 V**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 11.
10	**INSPECT FUEL GAUGE SENDER UNIT** • Inspect fuel gauge sender unit. (See 09-22-9 FUEL GAUGE SENDER UNIT INSPECTION) • Is fuel gauge sender unit okay?	Yes	Go to next step.
		No	Replace fuel gauge sender unit, then go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P0460 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Is PENDING CODE of some DTC present? • Is same DTC present during KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0461 [KL]

Z6U010201082W76

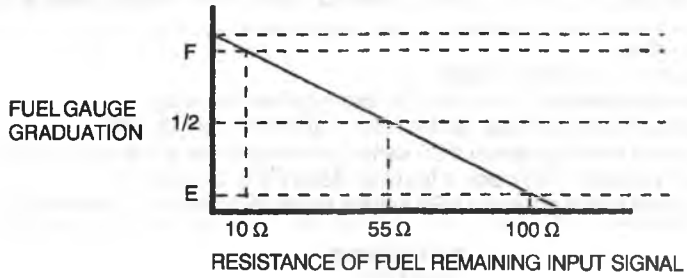
DTC P0461	Fuel gauge sender unit circuit range/performance
DETECTION CONDITION	• The PCM monitors the fuel gauge sender unit input voltage difference once per a second. If input voltage difference is **above 0.8 V/s** for **25 seconds**, the PCM determines that the fuel gauge sender unit circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Fuel gauge sender unit malfunction or substandard performance

Troubleshooting Hint

Fuel gauge sender unit description

- The fuel gauge sender unit converts the fuel level into an electric signal using a variable resistor.
- The fuel gauge sender unit signal is used for the evaporative system monitor.

Fuel gauge sender unit signal characteristic



Z6U0102W377

Fuel gauge sender unit specification

Fuel level	Empty	Half	Full
FLI PID	7 %	50 %	92 %
FLI V PID	Approx. 6.0 V	Approx. 2.10 V	Approx. 0.62 V
PCM 63 (Signal)	Approx. 6.0 V	Approx. 2.10 V	Approx. 0.62 V
Resistance	Approx. 100 Ω	Approx. 55 Ω	Approx. 10Ω

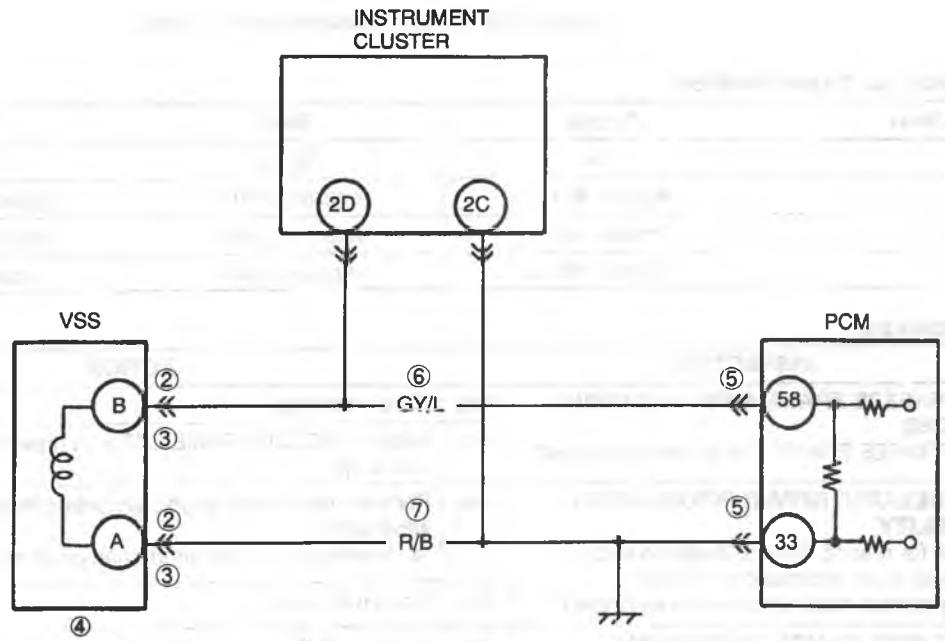
Diagnostic procedure

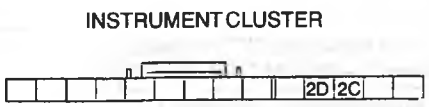
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**INSPECT FUEL GAUGE SENDER UNIT** • Turn ignition key to OFF. • Inspect fuel gauge sender unit. (See 09-22-9 FUEL GAUGE SENDER UNIT INSPECTION) • Is fuel gauge sender unit okay?	Yes	Replace PCM, then go to next step.
		No	Repair or replace fuel gauge sender unit, then go to next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0500 [KL]

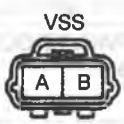
Z6U010201082W77

DTC P0500	Vehicle speed sensor (VSS) circuit malfunction
DETECTION Self-Test CONDITION	**DTC P0500** • Vehicle speed signal is out of preprogrammed range when vehicle speed **exceeds 8km/h {5 mph}**.
POSSIBLE CAUSE	• VSS malfunction • Connector or terminal malfunction • Intermittent signal inputs from other sources (Ignition harness) • Open circuit between VSS sensor terminal A and PCM terminal 33 • Short to ground circuit between VSS sensor terminal A and PCM terminal 33 • Open circuit between VSS sensor terminal Band PCM terminal 58 • Short to ground circuit between VSS sensor terminal B and PCM terminal 58

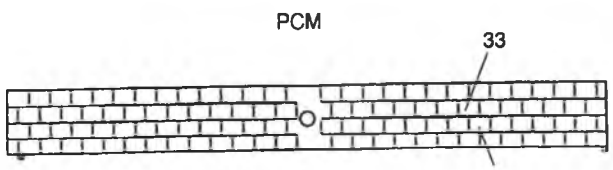




HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

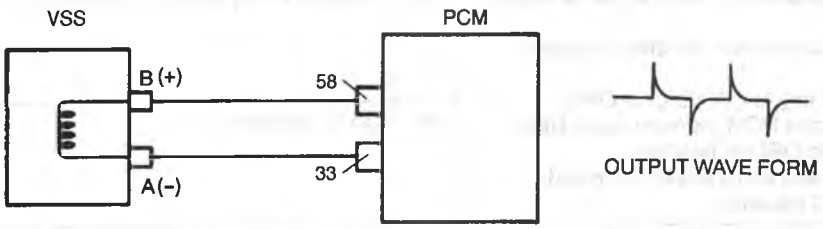


HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Z6U0102W378

Troubleshooting Hint
VSS description

- The VSS generates signals per turn of the sensor rotor and input to the PCM.
- The PCM performs each control based on the VSS signal and throttle position sensor signal.



Z6U0102W379

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS–IS CONCERN INTERMITTENT OR CONSTANT?** • Start engine. • Access VSS PID using NGS tester. • Run vehicle **above 10 km/h {6.2 mph}**. • Does VSS PID change?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL]
		No	Go to next step.
4	**CHECK VSS CONNECTOR** • Turn ignition key to OFF. • Verify that the VSS connector is connected securely. • Is connector okay?	Yes	Go to next step.
		No	Connect the connector securely, then go to Step 10.
5	**INSPECT POOR CONNECTION OF VSS CONNECTOR** • Disconnect VSS connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 10.
		No	Go to next step.
6	**INSPECT VSS** • Inspect VSS sensor. (See 05-17B-28 VEHICLE SPEEDOMETER SENSOR INSPECTION [GF4A-EL]) • Is VSS okay?	Yes	Go to next step.
		No	Replace VSS, then go to Step 10.
7	**CHECK POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection of PCM terminals 58 and 33 (damaged, pulled-out terminals, corrosion, etc.) • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 10.
		No	Go to next step.
8	**VERIFY VSS (+) CIRCUIT FOR OPEN** • Turn ignition key to OFF. • Connect breakout box with PCM disconnected. • Check continuity between VSS terminal A (harness-side) and breakout box terminal 33. • Is there continuity?	Yes	Go to next.
		No	Repair or replace harness for open, then go to Step 10.

STEP	INSPECTION		ACTION
9	**VERIFY VSS (-) CIRCUIT FOR OPEN** • Check continuity between VSS terminal B (harness-side) and breakout box terminal 58. • Is there continuity?	Yes	Repair or replace harness for short to ground circuit, then go to Step 10.
		No	Go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P0500 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Run vehicle **above 10 km/h {6.2 mph}** • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0505 [KL]

Z6U010201082W78

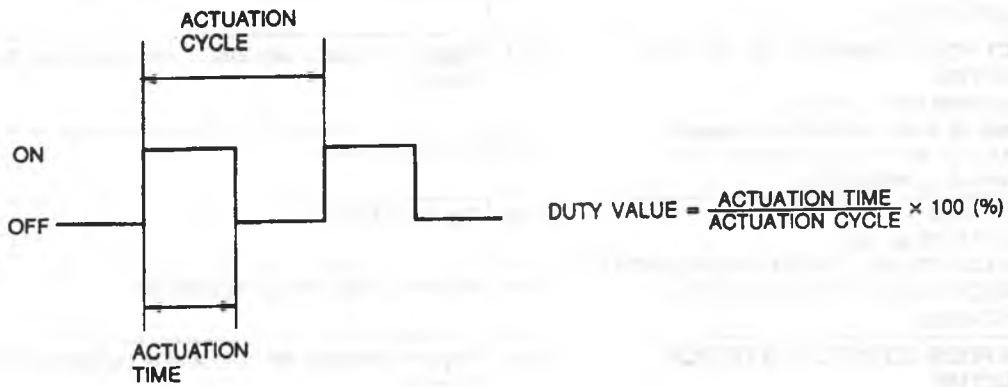
DTC P0505	Idle air control (IAC) system malfunction
DETECTION CONDITION	• PCM cannot control idle speed toward target idle speed.
POSSIBLE CAUSE	• IAC valve malfunction • Air cleaner element clogged • Air intake passage clogged • A/C relay control circuit malfunction • Low engine compression (Over capacity of blow-by gas) • PCM malfunction

Troubleshooting Hint

IAC description

- For the optimum idle speed control, the PCM selects one of several target airflow settings in the PCM according to the engine conditions, and converts the target airflow into IAC valve actuation time and controls the valve opening position.

IAC duty control



Z6U0102W380

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**VERIFY RELATED PENDING OR STORED DTCS** • Turn ignition key to OFF, then ON (Engine OFF). • Verify pending code or stored DTCs using NGS tester. • Is other DTC present?	Yes	Repair applicable DTCs. (See 01-02B-24 DTC TABLE [KL])
		No	Go to next step.
3	**INSPECT IAC VALVE MALFUNCTION** • Start engine. • Disconnect IAC valve connector. • Is engine speed decreased?	Yes	Go to next step.
		No	Replace IAC valve, then go to Step 8.
4	**INSPECT A/C MAGNET CLUTCH OPERATION** • Turn blower motor switch off. • Is magnet clutch still on?	Yes	Refer to "A/C is always on or A/C compressor runs continuously." of ENGINE SYMPTOM TROUBLESHOOTING, then go to Step 8. (See 01-03B-47 NO.24 A/C ALWAYS ON/A/C COMPRESSOR RUNS CONTINUOUSLY [KL])
		No	Go to next step.
5	**INSPECT AIR CLEANER ELEMENT** • Remove air cleaner element with engine running. • Is engine speed increased?	Yes	Replace air cleaner element, then go to Step 9.
		No	Go to next step.
6	**INSPECT THROTTLE BODY PASSAGE** • Is throttle body clogged?	Yes	Clean or replace throttle body passage, then go to Step 9.
		No	Go to next step.
7	**INSPECT ENGINE COMPRESSION** • Inspect engine compression. (See 01-10B-5 COMPRESSION INSPECTION [KL]) • Is engine compression okay?	Yes	Go to next step.
		No	Overhaul engine, then go to next step.
8	**VERIFY TROUBLESHOOTING OF DTC P0505 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Depress brake pedal for **14.1 seconds or more**. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Perform "DTC CONFIRMATION PROCEDURE" (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0603, P0605 [KL]

Z6U010201082W79

DTC P0603 **DTC P0605**	**Internal control module keep alive memory (KAM) error** **Internal control module read only memory (ROM) error**
DETECTION CONDITION	• PCM internal KAM or ROM damaged.
POSSIBLE CAUSE	• PCM internal KAM or ROM damaged.

Troubleshooting Hint

Keep alive memory description

- The PCM stores information in keep alive memory (a memory integrated circuit chip) about vehicle operating conditions, and then uses this information to compensate for component variability. The keep alive memory remains powered when the ignition switch is off so that this information is not lost.

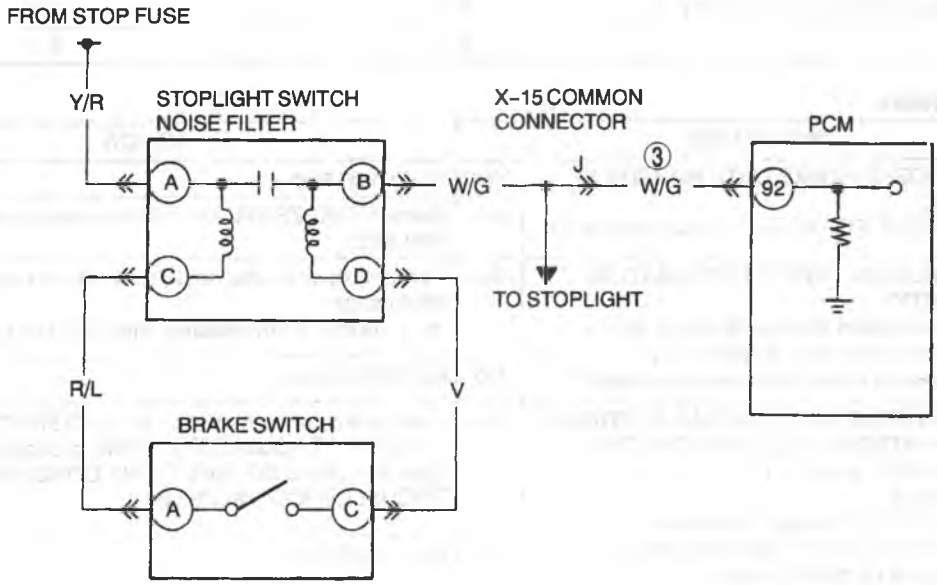
Diagnostic procedure

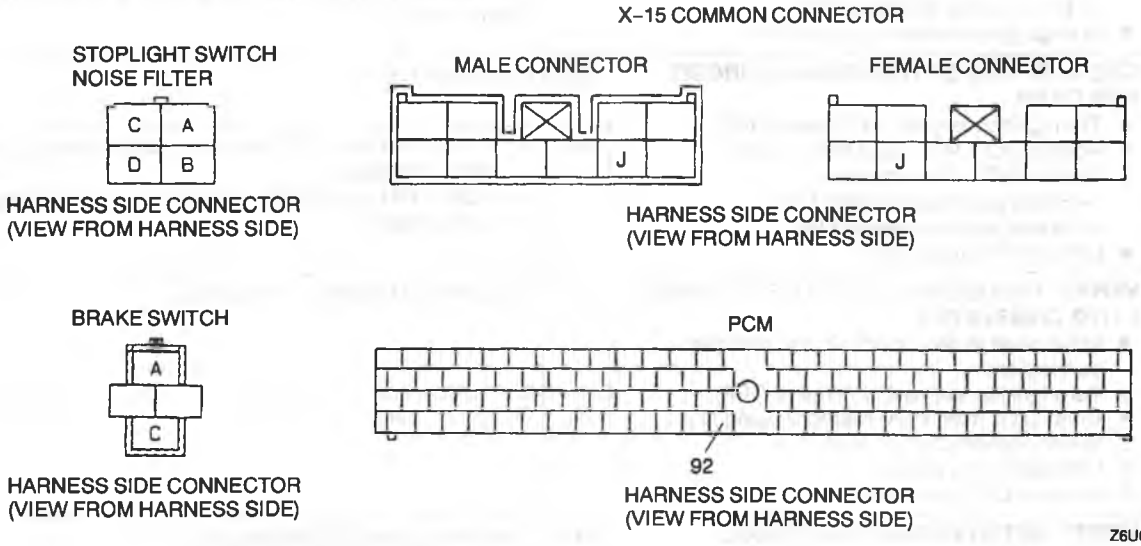
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO Self-Test?	Yes	Replace PCM, then go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0703 [KL]

Z6U010201082W80

DTC P0703	Brake switch circuit input malfunction
DETECTION CONDITION	• If the PCM detects the brake switch voltage at PCM terminal change ON to OFF or OFF to ON, the PCM determines that a circuit has malfunctioned.
POSSIBLE CAUSE	• Brake switch malfunction • Stoplight switch noise filter • Connector or terminal malfunction • Open circuit between STOP fuse and stoplight switch terminal A • Open circuit between stoplight switch noise filter terminal C and brake switch A • Open circuit between stoplight switch noise filter terminal D and brake switch C • Short to power circuit between stoplight switch noise filter terminal D and brake switch C • Open circuit between stoplight switch noise filter terminal B and PCM terminal 92 • Short to ground circuit between stoplight switch noise filter terminal B and PCM terminal 92





Z6U0102W414

Troubleshooting Hint

Brake switch description

- A normally open type brake switch is used. Therefore when depress the brake pedal, the brake switch become ON (continuity), and release the brake pedal, the brake switch become OFF (no continuity).
- The brake switch signal uses the following controls.
  - —Idle air control
  - —Fuel injector control

Brake switch specification

Brake pedal condition	Depressed	Released
Brake switch	ON	OFF
Brake switch terminal C	B+	0 V
BOO PID	ON	OFF
Stoplight switch noise filter terminal D and B	B+	0 V
PCM terminal 92	B+	0 V

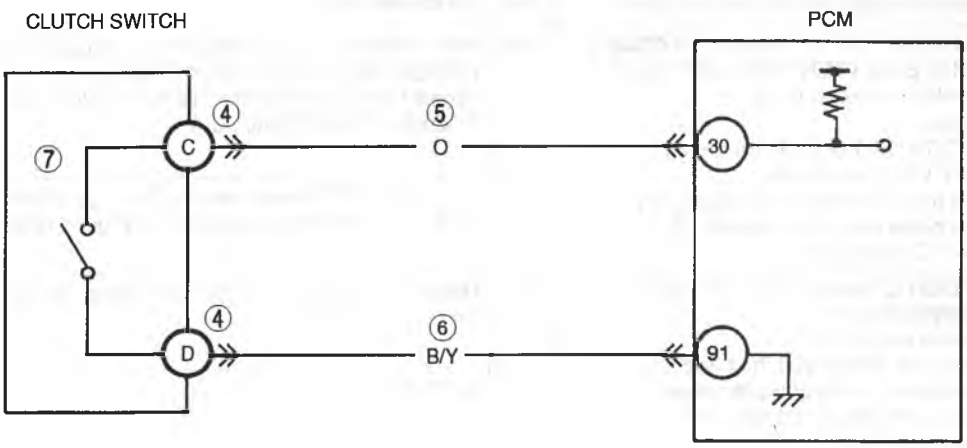
Diagnostic procedure

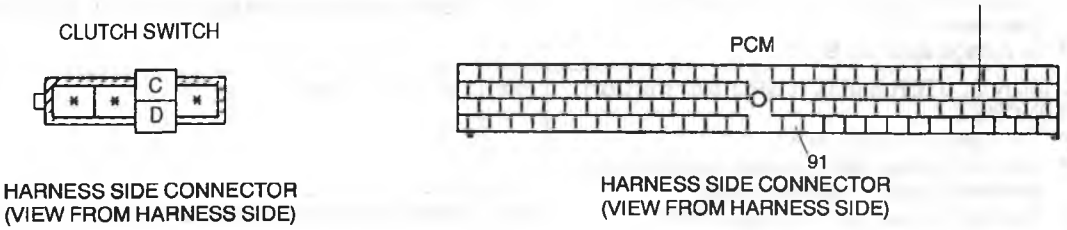
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or online repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS-IS CONCERN INTERMITTENT OR CONSTANT** • Connect NGS tester to DLC. • Start engine. • Access BOO PID using NGS tester. • Does BOO PID switch between ON/OFF while operating brake pedal?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
		No	Go to next step.
4	**CLASSIFY BRAKE SWITCH SIGNAL CIRCUIT OR BRAKE LIGHT SYSTEM MALFUNCTION** • Verify stoplight condition as follows — Brake pedal depressed: ON — Brake pedal released: OFF • Is stoplight as following condition?	Yes	Go to next step.
		No	Malfunction at brake light system. Refer to SIGNAL LIGHTING SYSTEM SYMPTOM TROUBLESHOOTING. Then go to Step 6.
5	**CHECK BRAKE SWITCH SIGNAL CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Access BOO PID using NGS tester. • Verify BOO PID as follows — Brake pedal depressed: ON — Brake pedal released: OFF • Is BOO PID as follows?	Yes	Go to next step.
		No	• If BOO PID stays ON, repair for short to power, then go to next step. • If BOO PID stays OFF, repair for open circuit, then go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P0703, P1703 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Operate brake pedal. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P0704 [KL]

Z6U010201082W81

DTC P0704	Clutch switch circuit malfunction
DETECTION CONDITION	• If the PCM detects the clutch switch voltage at PCM terminal 30 has not been changed during drive the vehicle is **above 26 km/h {16 mph}**, the PCM determines that a clutch switch circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• Clutch switch malfunction • Connector or terminal malfunction • Open circuit between clutch switch terminal A and PCM terminal 30 • Short to ground circuit between clutch switch terminal A and PCM terminal 30 • Open circuit between clutch switch terminal B and PCM terminal 91 • Short to ground circuit between clutch switch terminal B and PCM terminal 91





Z6U0102W381

Troubleshooting Hint

Clutch switch description

- A normally open type clutch switch is used. Therefore when depress the clutch pedal, the clutch switch become ON (continuity), and release the clutch pedal, the clutch switch become OFF (no continuity).
- The brake switch signal uses the following controls.
  - —Idle air control
  - —Fuel injector control

Clutch switch specification

Clutch pedal condition (With KOEO/KOER)	Depressed	Released
Clutch switch	ON	OFF
Clutch switch terminal C	0 V	B+
CLT V PID	0 V	B+
PCM terminal 30	0 V	B+

Diagnostic procedure

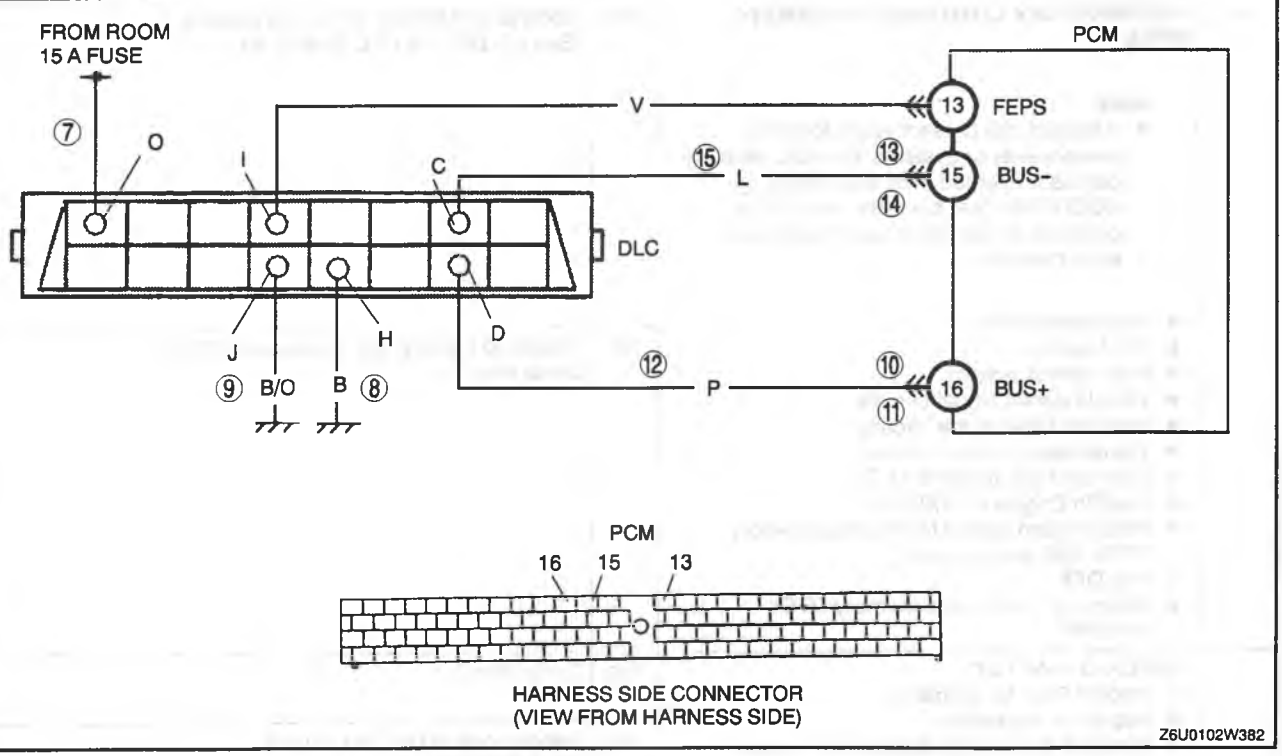
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS-IS CONCERN INTERMITTENT OR CONSTANT** • Connect NGS tester to DLC. • Start engine. • Access CLT V PID using NGS tester. • Verify CLT V PID as follows — Clutch pedal depressed: **approx. 0 V** — Clutch pedal released: **approx. B+** • Is CLT V PID as follows?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
		No	• If CLT V PID stays **approx. B+**, go to next step • If CLT V PID stays **approx. 0 V**, go to Step 6.
4	**INSPECT POOR CONNECTION OF CLUTCH SWITCH CONNECTOR** • Turn ignition key to OFF. • Disconnect the clutch switch connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunctions?	Yes	Repair or replace terminals, then go to Step 8.
		No	Go to next step.
5	**CHECK CLUTCH SWITCH SIGNAL CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Check voltage at clutch switch terminal C (harness-side). • Is voltage **approx. B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go Step 8.
6	**CHECK CLUTCH SWITCH GROUND CIRCUIT FOR OPEN** • Turn ignition key to OFF. • Connect jumper wire between clutch switch terminal C and D (harness-side). • Turn ignition key to ON (Engine OFF). • Access CLT V PID using NGS tester. • Is CLT V PID change from approx. **0 V** to **approx. B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 8.
7	**INSPECT CLUTCH SWITCH** • Turn ignition key to OFF. • Verify continuity between clutch switch connector terminals C and D (part-side) as follows. — Clutch pedal depressed: Continuity — Clutch pedal release: No continuity • Is it okay?	Yes	Go to next step.
		No	Replace clutch switch, then go to next step.

STEP	INSPECTION		ACTION
8	**VERIFY TROUBLESHOOTING OF DTC P0704 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from memory using NGS tester generic OBD-II function. • Drive the vehicle **above 26 km/h {16 mph}**. • Depress and release clutch pedal. • Is any pending code of DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1001 [KL]

Z6U010201083W38

DTC P1001	Data link connector (DLC) malfunction
DETECTION CONDITION	• Unable to access Continuity Memory DTCs. • Unable to activate KOEO or KOER Self-Test. • NGS tester communication problem • DTC displayed by NGS tester not listed. • DTC P1001 KOEO Self-Test cannot be completed.
POSSIBLE CAUSE	• Damaged DLC • Incorrect Self-Test procedure • VREF is not within specification. • Idle RPM is out of specification. • Open in DLC harness circuit • Short in DLC circuit or associated modules • Damaged PCM power relay circuit • Damaged PCM



Z6U0102W382

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY SELF-TEST PROCEDURE** • Key OFF • Disconnect NGS tester from DLC. • Inspect DLC for damage. • Verify that the correct procedure was used to activate Continuous Memory, KOEO or KOER Self-Tests for NGS tester. • Was correct Self-Test procedure used?	Yes	Go to Step 2.
		No	Complete Self-Test using correct procedure. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL])
2	**CHECK FOR VREF AT TP SENSOR** • Key OFF • Throttle position sensor disconnected • Key On Engine Off (KOEO) • Measure voltage between VREF (GY/R) wire and SIG RTN (B/Y) wire at throttle position sensor connector. • Key OFF • Was voltage **4.0—6.0 V.**	Yes	Voltage is within specification. Reconnect sensor. Go to Step 3.
		No	Voltage is not within specification. Reconnect TP sensor. 01-02B-56 DTC P0122 [KL]
3	**ABILITY TO ACCESS CONTINUOUS MEMORY DTCS** • Can Continuous Memory DTCs be accessed?	Yes	Go to Step 4.
		No	Unable to access Continuous Memory DTCs. Go to Step 7.
4	**ABILITY TO ACTIVATE KOEO SELF-TEST** • Can KOEO Self-Test be activated?	Yes	Go to Step 5.
		No	Unable to activate KOEO Self-Test. Go to Step 6.
5	**ABILITY TO ACTIVATE KOER SELF-TEST** • Can KOER Self-Test be activated?	Yes	If here for P1001 and other KOER DTCs are present, repair other DTC first. Begin diagnosis with the first KOER DTC outputted. If the DTC is not listed in the DTC TABLE, CHECK that the correct PCM is installed on the vehicle.
		No	Go to Step 6.
6	**RETRIEVE ANY CONTINUOUS MEMORY DTCS** **Note** • If failures are present in the following components or systems, the EEC strategy can be prevented from completing the KOER Self-Test or cause the PCM to generate a NGS tester communication error message: • Idle speed control • EGR system • Fuel control system • Vehicle speed signal circuits • Mass air flow sensor circuits • Transmission range circuits • Connect NGS tester to DLC. • Key On Engine Off (KOEO) • Retrieve and record Continuous Memory DTCs (MIL and non-MIL). • Key OFF • Were any Continuous Memory DTCs present?	Yes	Continuous Memory DTCs are present. (See 01-02B-24 DTC TABLE [KL])
		No	Unable to retrieve any continuous DTCs. Go to Step 7.
7	**CHECK B+ AT DLC** • Inspect DLC for damage. • Repair as necessary. • Measure the voltage between B+ circuit (terminal O) at DLC and engine block ground. • Was voltage **greater than 10.5 V?**	Yes	Go to Step 8.
		No	Repair open in DLC B+ circuit. Go to Step 18.

STEP	INSPECTION		ACTION
8	**CHECK DLC CHASSIS GROUND RESISTANCE** • Measure the resistance between chassis ground circuit (terminal H) at DLC and chassis ground. • Is resistance **less than 5.0 Ω**?	Yes	Go to Step 9.
		No	Repair open in DLC chassis ground circuit. Go to Step 18.
9	**CHECK DLC POWER GROUND CIRCUIT FOR OPEN** • Measure resistance between PWR GND (terminal J) circuit at the DLC and battery negative post. • Is resistance **less than 5.0 Ω**?	Yes	Data link passed. Go to Step 10.
		No	Repair open circuit. Go to Step 18.
10	**CHECK BUS + FOR SHORT TO GROUND** • Disconnect PCM connector. • Measure resistance of BUS + circuit between PCM test pin 16 and chassis ground. • Is resistance **greater than 5.0 Ω**?	Yes	Go to Step 11.
		No	Repair short circuit. **Note** • Short circuit can exist in harness or associated modules.
11	**CHECK BUS + CIRCUIT FOR SHORT TO B +** • Key On Engine Off (KOEO) • Measure voltage between BUS + circuit at the PCM test pin 16 and chassis ground. • Is voltage **greater than 1.0 V**?	Yes	Repair short circuit. **Note** • Short circuit can exist in harness or associated modules.
		No	Go to Step12.
12	**CHECK DLC BUS + CIRCUIT FOR OPEN** • Key OFF • Disconnect PCM connector. • Measure resistance of BUS + circuit between PCM test pin 16 and DLC terminal D. • Is resistance **greater than 5.0 Ω**?	Yes	Repair open circuit. Go to Step 18.
		No	Go to Step 13.
13	**CHECK BUS– FOR SHORT TO GROUND** • Disconnect PCM connector. • Measure resistance of BUS– circuit between PCM pin 15 and chassis ground. • Is resistance **greater than 5.0 Ω**?	Yes	Go to Step 14.
		No	Repair short circuit. **Note** • Short circuit can exist in harness or associated modules.
14	**CHECK BUS– CIRCUIT FOR SHORT TO B +** • Key On Engine Off (KOEO) • Measure voltage between BUS– circuit at the PCM harness connector pin 15 and chassis ground. • Is voltage **greater than 6.0 V**?	Yes	Repair short circuit. **Note** • Short circuit can exist in harness or associated modules.
		No	Go to Step 15.
15	**CHECK DLC BUS– CIRCUIT FOR OPEN** • Key OFF • Disconnect PCM connector. • Measure resistance of BUS– circuit between PCM test pin 15 and DLC terminal C. • Is resistance **less than 5.0 Ω**?	Yes	Replace PCM. (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL])
		No	Go to next step.
16	**VERIFY AFTER REPAIR PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1100 [KL]

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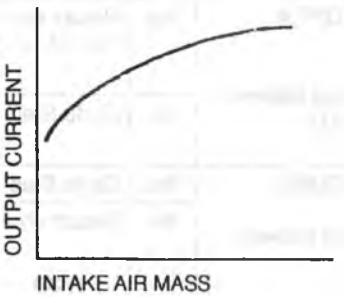
DTC P1100	MAF sensor intermittent
DETECTION CONDITION	• If the PCM detects the MAF sensor voltage at PCM terminal 88 is **below 0.23 V** or **above 4.60 V** while engine is running, the PCM determines that a MAF circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL is not illuminated when detection condition is met. • PCM detects the malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• MAF sensor malfunction

Troubleshooting Hint

MAF sensor description

- A hot wire type mass airflow sensor is used.
- MAF sensor signal is used for following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —Evaporative system monitor
  - —EGR system monitor
- MAF sensor output voltage comes out when the ignition key is turned to ON (Engine OFF).

MAF sensor signal characteristic



Z6U0102W351

MAF sensor specification

Condition	KOEO	KOER
MAF PID	Approx. 0 g/s {0 lb/min}	1.9—3.0 g/s {0.25—0.39 lb/min}
MAF V PID	Approx. 0.02 V	0.5—1.1 V
PCM 88 (Signal)	Approx. 0.02 V	0.6—1.1 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS-IS CONCERN INTERMITTENT OR CONSTANT** • Connect NGS tester to DLC. • Start engine. • Turn ignition key to OFF and ON (Engine OFF). • Is same DTC present?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
		No	Go to next step.

STEP	INSPECTION		ACTION
4	**VERIFY KOER DTC P0103 DETECTED** • Perform KOER Self-Test. (See 01-02B-10 KEY ON ENGINE RUNNING (KOER) SELF-TEST [KL]) • Is DTC P0103 present during KOER Self-Test?	Yes	Refer to DTC P0103. (See 01-02B-35 DTC P0103 [KL])
		No	Go to next step.
5	**VERIFY CONTINUOUS DTC P0102 DETECTED** • Is DTC P0102 present?	Yes	Refer to DTC P0102. (See 01-02B-32 DTC P0102 [KL])
		No	Go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P1100 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from memory using NGS tester generic OBD-II function. • Turn ignition key to OFF and ON (Engine OFF). • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1101 [KL]

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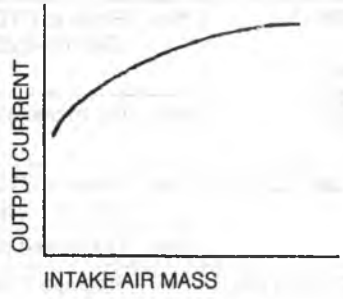
DTC P1101	MAF sensor out of Self-Test range
DETECTION CONDITION	**KOEO Self-Test** • If the PCM detects the MAF sensor voltage at PCM terminal 88 is **above 0.27 V** while performing the KOEO Self-Test, the PCM determines that a MAF circuit has malfunctioned. **KOER Self-Test** • If the PCM detects the MAF sensor voltage at PCM terminal 88 is **below 0.46 V** or **above 2.44 V** while performing the KOER Self-Test, the PCM determines that a MAF circuit has malfunctioned.
POSSIBLE CAUSE	• MAF sensor malfunction • Blocked MAF sensor screen • Intake air leak (near MAF sensor) • PCM malfunction

Troubleshooting Hint

MAF sensor description

- A hot wire type mass airflow sensor is used.
- MAF sensor signal is used for following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —Evaporative system monitor
  - —EGR system monitor
- MAF sensor output voltage comes out when the ignition key is turned to ON (Engine OFF).

MAF sensor signal characteristic



Z6U0102W351

MAF sensor specification

Condition	KOEO	KOER
MAF PID	Approx. 0 g/s {0 lb/min}	1.9—3.0 g/s {0.25—0.39 lb/min}
MAF V PID	Approx. 0.02 V	0.5—1.1 V
PCM 88 (Signal)	Approx. 0.02 V	0.6—1.1 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**VERIFY CONTINUOUS DTC P0103 DETECTED** • Is DTC P0103 present?	Yes	Refer to DTC P0103. (See 01-02B-35 DTC P0103 [KL])
		No	Go to next step.
3	**VERIFY CONTINUOUS DTC P0102 DETECTED** • Is DTC P0102 present?	Yes	Refer to DTC P0102. (See 01-02B-32 DTC P0102 [KL])
		No	Go to next step.
4	**VERIFY KOEO DTC P1101 DETECTED** **Note** • KOEO DTC P1101 can be detected by the garage exhaust ventilation system. Remove the ventilation system while performing the KOEO Self-Test. • Perform KOEO Self-Test. (See 01-02B-9 KEY ON ENGINE OFF (KOEO) SELF-TEST [KL]) • Is DTC P1101 present while performing KOEO Self-Test?	Yes	Go to Step 6.
		No	Go to next step.
5	**CHECK PHYSICAL MALFUNCTION** • Start engine. • Access MAF V PID using NGS tester. • Is MAF V PID **within 0.23—4.60 V**?	Yes	Go to next step.
		No	Check for broken/loose air intake pipe/hose clamps, cracks/holes in air intake pipe/hose. Repair or replace as necessary. Then go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P1101 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from memory using NGS tester generic OBD-II function. • Perform KOEO/KOER Self-Test. • Is same DTC present during KOEO or KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.

STEP	INSPECTION		ACTION
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1112 [KL]

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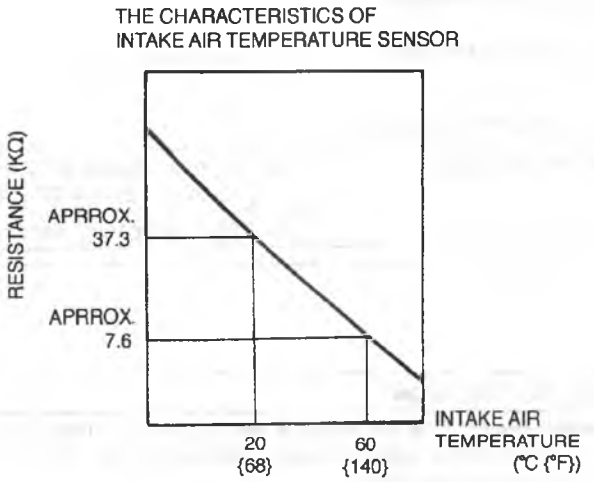
DTC P1112	IAT circuit intermittent malfunction
DETECTION CONDITION	• The PCM monitors IAT sensor signal at PCM terminal 39. If the PCM detected intermittent signal from IAT sensor, the PCM determines that the IAT sensor circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL is not illuminated when detection condition is met. • PCM detects the malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is not available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• IAT sensor malfunction • Connectors or terminals malfunction • Harness malfunction between the IAT sensor and the PCM • PCM malfunction

Troubleshooting Hint

IAT sensor description

- The IAT is in inverse proportion to IAT sensor resistance. Therefore IAT is in inverse proportion to IAT output voltage.
- The IAT sensor signal is used by the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —Purge control
  - —HO2S heater control
  - —Electric cooling fan control
  - —Evaporative system monitor

IAT sensor signal characteristic



Z6U0102W500

IAT sensor specification

IAT temperature	20°C {68°F}	40°C {104°F}	60°C {140°F}	80°C {176°F}	100°C {212°F}	120°C {248°F}
IAT PID	20°C {68°F}	40°C {104°F}	60°C {140°F}	80°C {176°F}	100°C {212°F}	120°C {248°F}
IAT V PID*	3.07 V	2.13 V	1.33 V	0.78 V	0.46 V	0.27 V
IAT resistance	37.3 kΩ	16.15 kΩ	7.70 kΩ	3.84 kΩ	2.07 kΩ	1.18 kΩ

* : Voltage values shown in the table were calculated for Vref = **5.0 V**. These values may vary **15 %** due to the IAT sensor and Vref variations.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CONTINUOUS DTC P0113 DETECTED** • Is DTC P0113 present?	Yes	Refer to DTC P0113. (See01-02B-46 DTC P0113 [KL])
		No	Go to next step.
4	**VERIFY CONTINUOUS DTC P0112 DETECTED** • Is DTC P0112 present?	Yes	Refer to DTC P0112. (See01-02B-44 DTC P0112 [KL])
		No	Go to next step.
5	**INSPECT IAT SENSOR CONNECTOR** • Turn ignition key to ON (Engine OFF). • Access IAT V PID using NGS tester. • Does IAT V PID sudden change while wiggled or tapped IAT sensor connector?	Yes	Go to next step.
		No	Go to Step 8.
6	**INSPECT POOR CONNECTION OF IAT SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect the IAT sensor connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Are there any malfunctions?	Yes	Repair or replace terminals, then go to Step 8.
		No	Go to next step.
7	**INSPECT IAT SENSOR** • Connect IAT sensor connector. • Turn ignition key to ON (Engine OFF). • Access IAT V PID using NGS tester. • Does IAT V PID sudden change while tapped IAT sensor?	Yes	Replace IAT sensor, then go to next step.
		No	Go to next step.
8	**VERIFY TROUBLESHOOTING OF DTC P1112 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Start engine. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1116 [KL]

Z6U010201083W42

DTC P1116	ECT circuit out of Self-Test range
DETECTION CONDITION	• The PCM monitors the ECT sensor signal at the PCM terminal 38 while performing the KOEO/KOER Self-Test. If the PCM sensor signal voltage is **below 0.3 V** or **above 3.7 V**, the PCM determines that ECT signal circuit has malfunctioned.
POSSIBLE CAUSE	• ECT sensor malfunction • Poor connection at ECT sensor or PCM connector • PCM malfunction

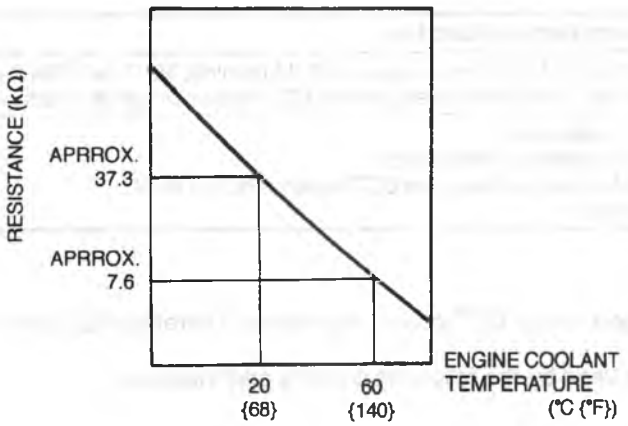
Troubleshooting Hint

ECT sensor description

- The ECT is in inverse proportion to ECT sensor resistance. Therefore ECT is in inverse proportion to ECT output voltage.
- The ECT sensor signal is used by the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —A/C cut-off control
  - —Electric cooling fan control
  - —Evaporative system monitor
  - —EGR system monitor

ECT sensor signal characteristic

THE CHARACTERISTICS OF
ENGINE COOLANT TEMPERATURE SENSOR



Z6U0102W181

ECT sensor specification

ECT temperature	20°C {68°F}	40°C {104°F}	60°C {140°F}	80°C {176°F}	100°C {212°F}	120°C {248°F}
ECT PID	20°C {68°F}	40°C {104°F}	60°C {140°F}	80°C {176°F}	100°C {212°F}	120°C {248°F}
ECT V PID*	3.07 V	2.13 V	1.33 V	0.78 V	0.46 V	0.27 V
ECT resistance	37.3 kΩ	16.15 kΩ	7.70 kΩ	3.84 kΩ	2.07 kΩ	1.18 kΩ

* : Voltage values shown in the table were calculated for Vref = **5.0 V**. These values may vary **15 %** due to the ECT sensor and Vref variations.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**VERIFY CONTINUOUS DTC P0118 DETECTED** • Is DTC P0118 present?	Yes	Refer to DTC P0118. (See01-02B-53 DTC P0118 [KL])
		No	Go to next step.
3	**VERIFY CONTINUOUS DTC P0102 DETECTED** • Is DTC P0117 present?	Yes	Refer to DTC P0117. (See 01-02B-51 DTC P0117 [KL])
		No	Go to next step.
4	**CHECK PHYSICAL MALFUNCTION** • Start engine. • Access ECT V PID using NGS tester. • Is ECT V PID **within 0.3—3.7 V?**	Yes	Go to next step.
		No	Check for overheating condition and low engine coolant. Repair or replace as necessary. Then go to next step.

STEP	INSPECTION		ACTION
5	**VERIFY TROUBLESHOOTING OF DTC P1116 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from memory using NGS tester generic OBD-II function. • Perform KOEO Self-Test. • Is same DTC present during KOEO Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
6	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1117 [KL]

Z6U010201083W43

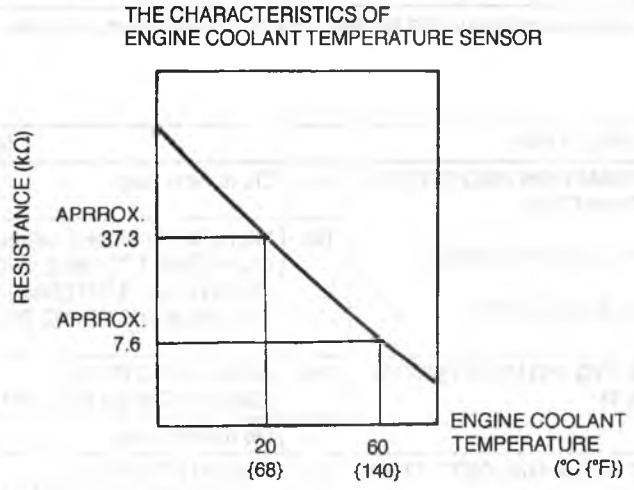
DTC P1117	ECT circuit intermittent malfunction
DETECTION CONDITION	• The PCM monitors ECT sensor signal at PCM terminal 38. If the PCM detected intermittent signal from ECT sensor, the PCM determines that the ECT sensor circuit has malfunctioned.
POSSIBLE CAUSE	• ECT sensor malfunction • Connectors or terminals malfunction • Harness malfunction between the ECT sensor and the PCM • PCM malfunction

Troubleshooting Hint

ECT sensor description

- The ECT is in inverse proportion to ECT sensor resistance. Therefore ECT is in inverse proportion to ECT output voltage.
- The ECT sensor signal is used by the following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —Purge control
  - —HO2S heater control
  - —Electric cooling fan control
  - —Evaporative system monitor

ECT sensor signal characteristic



Z6U0102W181

ECT sensor specification

ECT temperature	20°C {68°F}	40°C {104°F}	60°C {140°F}	80°C {176°F}	100°C {212°F}	120°C {248°F}
ECT PID	20°C {68°F}	40°C {104°F}	60°C {140°F}	80°C {176°F}	100°C {212°F}	120°C {248°F}
ECT V PID*	3.07 V	2.13 V	1.33 V	0.78 V	0.46 V	0.27 V
ECT resistance	37.3 kΩ	16.15 kΩ	7.70 kΩ	3.84 kΩ	2.07 kΩ	1.18 kΩ

* : Voltage values shown in the table were calculated for Vref = **5.0 V**. These values may vary **15 %** due to the ECT sensor and Vref variations.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CONTINUOUS DTC P0118 DETECTED** • Is continuous DTC P0118 present?	Yes	Refer to DTC P0118. (See01-02B-53 DTC P0118 [KL])
		No	Go to next step.
4	**VERIFY CONTINUOUS DTC P0117 DETECTED** • Is continuous DTC P0117 present?	Yes	Refer to DTC P0117. (See01-02B-51 DTC P0117 [KL])
		No	Go to next step.
5	**INSPECT ECT SENSOR CONNECTOR** • Turn ignition key to ON (Engine OFF). • Access ECT V PID using NGS tester. • Does ECT V PID sudden change while wiggled or tapped ECT sensor connector?	Yes	Go to next step.
		No	Go to Step 8.
6	**INSPECT POOR CONNECTION OF ECT SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect the ECT sensor connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunctions?	Yes	Repair or replace terminals and/or connector, then go to Step 8.
		No	Go to next step.
7	**INSPECT ECT SENSOR** • Connect ECT sensor connector. • Turn ignition key to ON (Engine OFF). • Access ECT V PID using NGS tester. • Does ECT V PID sudden change while tapped ECT sensor?	Yes	Replace ECT sensor, then go to next step.
		No	Go to next step.
8	**VERIFY TROUBLESHOOTING OF DTC P1117 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Start engine. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1120 [KL]

Z6U010201083W44

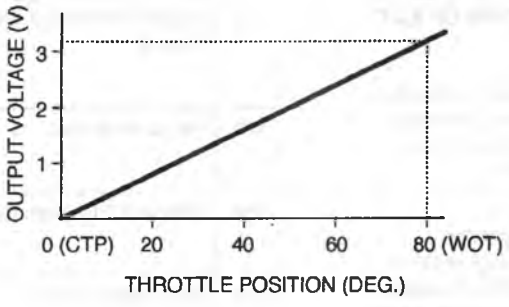
DTC P1120	TP sensor out of range low
DETECTION CONDITION	• If the PCM detects the TP sensor voltage at PCM terminal 89 **below 0.17 V** or **above 0.49 V** while engine running or ignition key ON, the PCM determines that a TP circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycle. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC also detects by KOEO/KOER Self-Test
POSSIBLE CAUSE	• TP sensor malfunction • Connector or terminal malfunction • TP sensor misadjustment

Troubleshooting Hint

TP sensor description

- A liner type throttle sensor is use
- The TP sensor resistance between terminal B and C increases while depressing the accelerator pedal.
- The TP sensor resistance between terminal A and B decreases while depressing the accelerator pedal.
- The TP sensor signal is used for following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —A/C cut-off control
  - —Electric cooling fan control
  - —Evaporative system monitor
  - —EGR system monitor

TP sensor signal characteristic



Z6U0102W404

TP sensor specification

Accelerator pedal position	Closed throttle position	Wide open throttle
TP V PID	0.3—0.7 V	3.4—5.3 V
TP MODE PID	C/T	WOT
PCM 89	0.3—0.7 V	3.4—5.3 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** ● Perform DTC CONFIRMATION PROCEDURE. (See01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) ● Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern is exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**VERIFY KOEO/KOER DTC P0122 DETECTED** ● Is KOEO/KOER DTC P0122 also detected?	Yes	Refer to DTC P0122. (See01-02B-56 DTC P0122 [KL])
		No	Go to step next step.
3	**VERIFY KOEO/KOER DTC P0123 DETECTED** ● Is KOEO/KOER DTC P0123 also detected?	Yes	Refer to DTC P0123. (See01-02B-59 DTC P0123 [KL])
		No	Go to step next step.
4	**VERIFY TP V PID WITHIN SPECIFICATION** ● Turn ignition key to ON (Engine OFF). ● Access TP V PID using NGS tester. ● Is TP V PID **within 0.17— 0.49 V**?	Yes	Go to Step 6.
		No	Perform throttle position sensor adjustment, then go to next step. (See01-40B-34 THROTTLE POSITION SENSOR ADJUSTMENT [KL])
5	**VERIFY TP V PID WITHIN SPECIFICATION** ● Turn ignition key to ON (Engine OFF). ● Access TP V PID using NGS tester. ● Is TP V PID **within 0.17— 0.49 V**?	Yes	Go to next step.
		No	Replace throttle position sensor, then go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P1120 COMPLETED** ● Make sure to reconnect all disconnected connectors. ● Turn ignition key to ON (Engine OFF). ● Clear DTC from PCM memory using NGS tester generic OBD-II function. ● Perform KOEO/KOER Self-Test. ● Is PENDING CODE of same DTC present during KOEO/KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** ● Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1121 [KL]

Z6U010201083W45

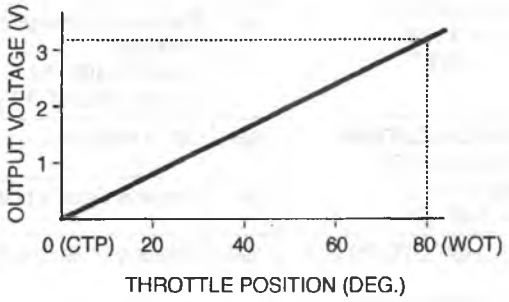
DTC P1121	TP sensor inconsistent with MAF sensor (lower than expected)
DETECTION CONDITION	● The PCM compares the actual input signal from the MAF sensor with the expected input signal from the MAF sensor which the PCM calculates by input voltage from throttle position sensor. If TP sensor and MAF sensor input signal are not consistent with calibrated load values, the PCM determines that detected mass intake air flow amount is too low. **Diagnostic support note** ● This is a continuous monitor (CCM). ● MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycle. ● PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. ● FREEZE FRAME DATA is available. ● DTC is stored in the PCM memory.
POSSIBLE CAUSE	● MAF sensor malfunction ● TP sensor malfunction ● Electrical corrosion in MAF signal circuit ● Voltage drops in MAF signal circuit

Troubleshooting Hint

TP sensor description

- A liner type throttle sensor is used.
- The TP sensor resistance between terminal B and C increases while depressing the accelerator pedal.
- The TP sensor resistance between terminal A and B decreases while depressing the accelerator pedal.
- The TP sensor signal is used for following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —A/C cut-off control
  - —Electric cooling fan control
  - —Evaporative system monitor
  - —EGR system monitor

TP sensor signal characteristic



Z6U0102W404

TP sensor specification

Accelerator pedal position	Closed throttle position	Wide open throttle
TP V PID	0.3—0.7 V	3.4—5.3 V
TP MODE PID	C/T	WOT
PCM 89	0.3—0.7 V	3.4—5.3 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair Information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS-IS CONCERN INTERMITTENT OR CONSTANT** • Connect NGS tester to DLC. • Start the engine. • Access ECT, TP and MAF PIDs. • Warm up the engine until ECT PID is **above 80°C {176°F}**. • Start engine. • Read TP PID while MAF PID is **above 55 %**. • Is TP PID reading **below 4.82 %?**	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
		No	Make sure that throttle position sensor resistance changes smoothly while gradually opens throttle valve. • If not, replace throttle position sensor and go to Step 6. • For others, then go to next step.
4	**INSPECT POOR CONNECTION OF MAF SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect MAF sensor connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunctions?	Yes	Repair or replace suspected terminal or MAF sensor, then go to Step 6
		No	Go to next step.

STEP	INSPECTION		ACTION
5	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection (damaged/pulled-out pins, corrosion, etc.). • Is there any malfunctions?	Yes	Repair terminal, then go to next step.
		No	Replace MAF sensor, then go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P1121 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start the engine. • Warm up the engine. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1124 [KL]

Z6U010201083W46

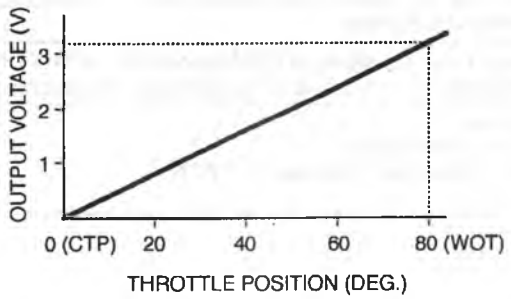
DTC P1124	TP sensor out of self-test range
DETECTION CONDITION	• If the PCM detects the TP sensor voltage at PCM terminal 89 is **below 1.27 V** or **above 4.78 V** while perform KOEO/KOER Self-Test, the PCM determines that a TP circuit has malfunctioned.
POSSIBLE CAUSE	• TP sensor malfunction • Connector or terminal malfunction • PCM malfunction

Troubleshooting Hint

TP sensor description

- A liner type throttle sensor is used.
- The TP sensor resistance between terminal B and C increases while depressing the accelerator pedal.
- The TP sensor resistance between terminal A and B decreases while depressing the accelerator pedal.
- The TP sensor signal is used for following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —A/C cut-off control
  - —Electric cooling fan control
  - —Evaporative system monitor
  - —EGR system monitor

TP sensor signal characteristic



Z6U0102W404

TP sensor specification

Accelerator pedal position	Closed throttle position	Wide open throttle
TP V PID	0.3—0.7 V	3.4—5.3 V
TP MODE PID	C/T	WOT
PCM 89	0.3—0.7 V	3.4—5.3 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**VERIFY KOEO/KOER DTC P0122 DETECTED** • Is KOEO/KOER DTC P0122 also detected?	Yes	Refer to DTC P0122. (See01-02B-56 DTC P0122 [KL])
		No	Go to step next step.
3	**VERIFY KOEO/KOER DTC P0123 DETECTED** • Is KOEO/KOER DTC P0123 also detected?	Yes	Refer to DTC P0123. (See01-02B-59 DTC P0123 [KL])
		No	Go to step next step.
4	**VERIFY TP V PID WITHIN SPECIFICATION** • Turn ignition key to ON (Engine OFF). • Access TP V PID using NGS tester. • Is TP V PID **within 1.27— 4.28 V**?	Yes	Go to Step 6.
		No	Perform throttle position sensor adjustment, then go to next step. (See01-40B-34 THROTTLE POSITION SENSOR ADJUSTMENT [KL])
5	**VERIFY TP V PID WITHIN SPECIFICATION** • Access TP V PID using NGS tester. • Is TP V PID **within 1.27— 4.28 V**?	Yes	Go to next step.
		No	Replace throttle position sensor, then go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P1124 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOEO/KOER Self-Test. • Is same DTC present during KOEO/KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1125 [KL]

Z6U010201083W47

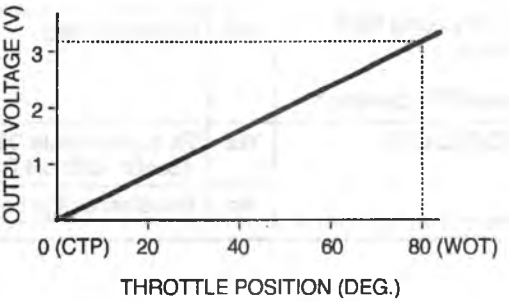
DTC P1125	TP circuit intermittent malfunction
DETECTION CONDITION	• The PCM monitors TP sensor signal at PCM terminal 89. If the PCM detected the intermittent signal from TP sensor, the PCM determines that a TP circuit has malfunctioned.
POSSIBLE CAUSE	• TP sensor malfunction • Connector or terminal malfunction • Harness malfunction between TP sensor and PCM. • PCM malfunction

Troubleshooting Hint

TP sensor description

- A liner type throttle sensor is used.
- The TP sensor resistance between terminal B and C increases while depressing the accelerator pedal.
- The TP sensor resistance between terminal A and B decreases while depressing the accelerator pedal.
- The TP sensor signal is used for following controls and monitors.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control
  - —A/C cut-off control
  - —Electric cooling fan control
  - —Evaporative system monitor
  - —EGR system monitor

TP sensor signal characteristic



Z6U0102W404

TP sensor specification

Accelerator pedal position	Closed throttle position	Wide open throttle
TP V PID	0.3—0.7 V	3.4—5.3 V
TP MODE PID	C/T	WOT
PCM 89	0.3—0.7 V	3.4—5.3 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CONTINUOUS DTC P0122 DETECTED** • Is continuous DTC P0122 present?	Yes	Refer to DTC P0122. (See01-02B-56 DTC P0122 [KL])
		No	Go to next step.
4	**VERIFY CONTINUOUS DTC P0123 DETECTED** • Is continuous DTC P0123 present?	Yes	Refer to DTC P0123. (See01-02B-59 DTC P0123 [KL])
		No	Go to next step.
5	**INSPECT TP SENSOR CONNECTOR** • Turn ignition key to ON (Engine OFF). • Access TP V PID using NGS tester. • Does TP V PID sudden change while wiggled or tapped TP sensor connector?	Yes	Go to next step.
		No	Go to Step 8.

STEP	INSPECTION		ACTION
6	**INSPECT POOR CONNECTION OF TP SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect the TP sensor connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunctions?	Yes	Repair or replace terminals and/or connector, then go to Step 8.
		No	Go to next step.
7	**INSPECT TP SENSOR** • Connect TP sensor connector. • Turn ignition key to ON (Engine OFF). • Access TP V PID using NGS tester. • Does TP V PID sudden change while tapped ECT sensor?	Yes	Replace TP sensor, then go to next step.
		No	Go to next step.
8	**VERIFY TROUBLESHOOTING OF DTC P1125 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Start engine. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1127 [KL]

Z6U010201083W48

DTC P1127	Exhaust not warm enough
DETECTION CONDITION	• If the PCM detects the inferred exhaust temperature is below a minimum calibrated vale while KOER Self-Test, the PCM determines that not enough exhaust temperature for testing the HO2S (rear).
POSSIBLE CAUSE	• Engine not warming enough to performing KOER Self-Test • Exhaust system too cool

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOER Self-Test?	Yes	Go to next step.
		No	Troubleshooting completed.
2	**CHECK HTR11 PID** • Start engine. • Access HTR11 PID using NGS tester. • Is HTR11 PID ON?	Yes	With engine still running, perform KOER Self-Test to verify P1127 is no longer present.
		No	Operate engine until all PIDs indicate ON. Perform KOER Self-Test.

DTC P1157, P1158 [KL]

Z6U010201083W49

DTC P1157 DTC P1158	• Lack of HO2S (Rear: LH) switch sensor indicates lean • Lack of HO2S (Rear: LH) switch sensor indicates rich
DETECTION CONDITION	• DTC P1157 and P1158 can only be retrieved during KOER Self-Test when fuel control is fluctuating between rich and lean, and monitor voltage changes in the HO2S (Rear: LH).
POSSIBLE CAUSE	• Wiring concern • Pinched, shorted, and corroded wiring and pins • Crossed sensor wires • Other concern • Exhaust leaks • Contaminated or damaged sensor

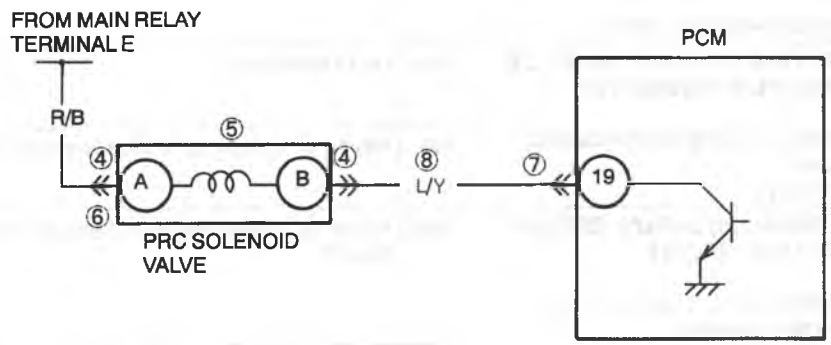
Diagnostic procedure

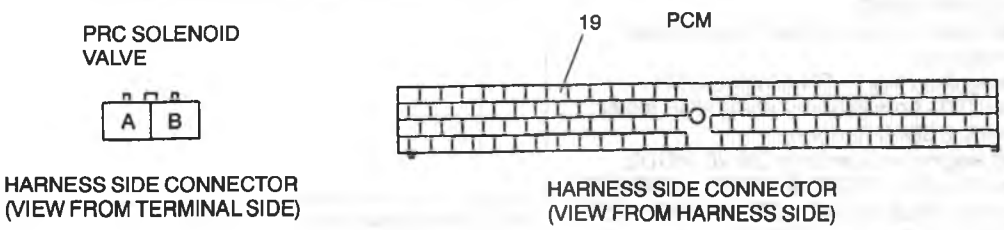
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOER Self-Test? • Is any related repair information available?	Yes	Go to next step.
		No	Intermittent concern is exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**CHECK PID STATUS** • Check for broken/loose air hose clamps, cracks/holes in air hose. If it was damaged, service as necessary. • Check exhaust gas leaks from exhaust system. If it was damaged, service as necessary. • Start engine and bring to normal operating temperature. • Access O2S22 (HO2S (Rear: LH)) with NGS tester. • Is heated oxygen sensor activated?	Yes	Go to Step 7.
		No	Go to next step.
3	**CHECK CONNECTION OF HO2S (REAR: LH) CONNECTOR AND PCM CONNECTOR** • Key off. • Verify connection of HO2S connector and PCM connector. • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and pins then go to next step.
4	**CHECK HO2S (REAR: LH) SIGNAL CIRCUIT SHORTS TO GROUND CIRCUIT** • Key off. • Disconnect HO2S (Rear: LH) connector. • Disconnect PCM connector. • Install breakout box. • Measure resistance between Test pins 61 and 76. • Is their resistance **greater than 10,000 Ω**?	Yes	Repair or replace wiring harness or connector then go to Step 7.
		No	Replace HO2S (Rear: LH).
5	**CHECK HO2S (Rear: LH) GROUND CIRCUIT OPEN** • Key off. • Check continuity between Test pin 61 and 91. • Is their continuity?	Yes	Replace HO2S (Rear: LH).
		No	Repair or replace wiring harness or connector then go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P1157, P1158 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine and perform DRIVE MODE. (See 01-02B-18 OBD II DRIVE MODE [KL]) • Access DIAGNOSTIC MONITORING TEST RESULTS of generic OBD-II function. (See 01-02B-15 Diagnostic Monitoring Test Results Access Procedure) • Verify following TEST ID value: — 10:01:A1 Voltage amplitude between rich and lean (bank LH) — 10:03:82 Switching point (rear HO2S) • Is value within specification?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1250 [KL]

Z6U010201083W50

DTC P1250	Pressure regulator control (PRC) valve circuit malfunction
DETECTION CONDITION	• The PCM monitors the input voltages from PRC solenoid valve control signal. If voltage of PRC solenoid valve control signal is below or above specified, PCM determines that the PRC solenoid valve circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • This DTC also detects KOEO/KOER Self-Test. • PCM detects the above malfunction condition during the first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • MIL is not illuminated when detection condition is met.
POSSIBLE CAUSE	• PRC solenoid valve malfunction • Connector or terminal malfunction • Short to ground in wiring between PRC solenoid valve terminal B and PCM terminal 19 • Open circuit in wiring between main relay terminal E and PRC solenoid valve terminal A • Open circuit in wiring between PRC solenoid valve terminal B and PCM terminal 19 • PCM malfunction





Z6U0102W383

Diagnostic procedure

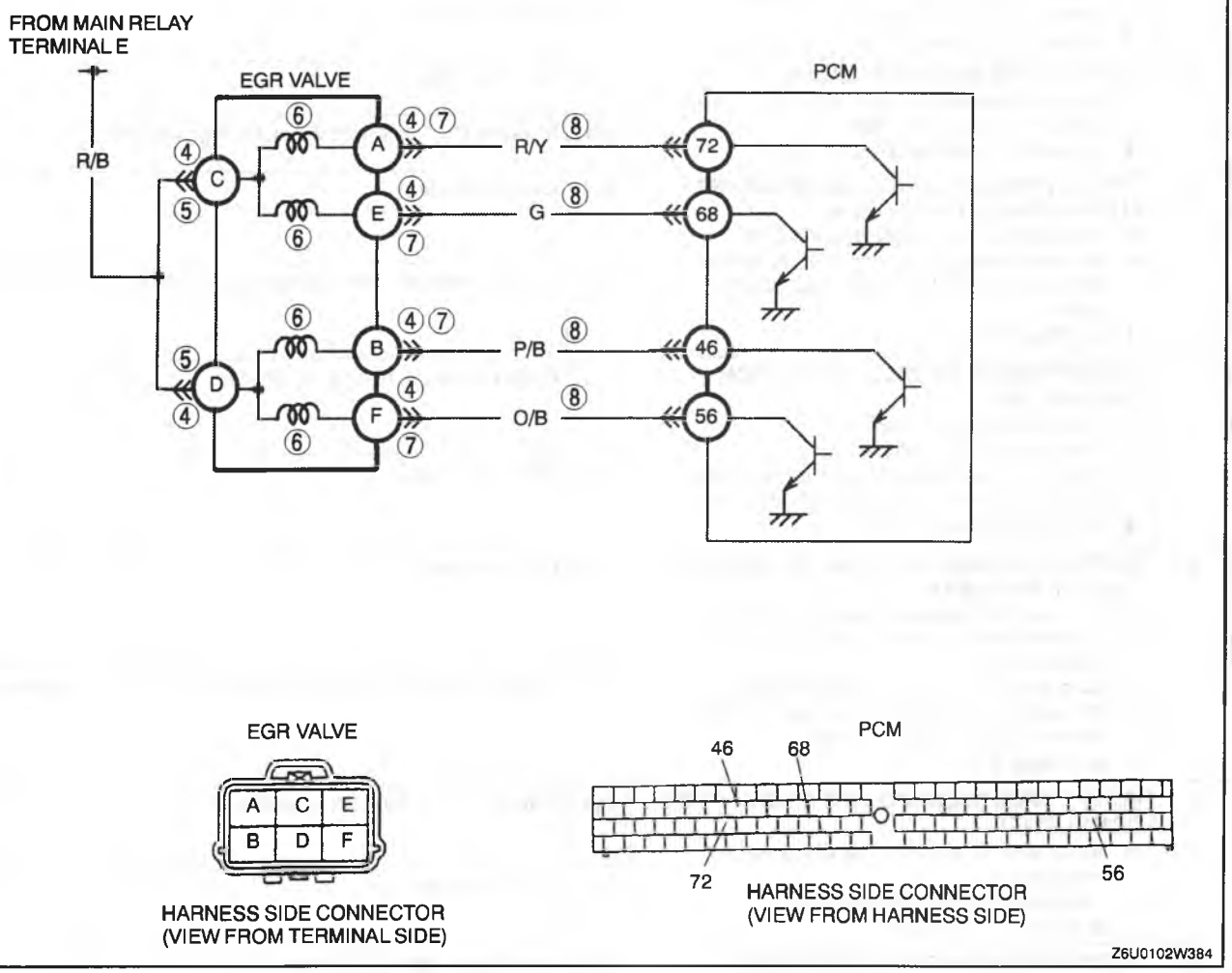
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])

STEP	INSPECTION		ACTION
2	**CLASSIFY OPEN CIRCUIT OR SHORT TO GROUND MALFUNCTION** • Disconnect PRC solenoid valve tube that connects to intake manifold. • Connect vacuum pump to PRC solenoid valve. • Apply vacuum and wait **5 seconds**. • Is vacuum maintained?	Yes	Go to Step 4.
		No	Go to next step.
3	**INSPECT PASSAGE CONTROL OF PRC SOLENOID VALVE** • Turn ignition key to OFF. • Disconnect PRC solenoid valve connector. • Is vacuum maintained?	Yes	Repair or replace harness between PCM terminal 19 and PRC solenoid valve terminal B for short to ground, then go to Step 9.
		No	Replace PRC solenoid valve, then go to Step 9.
4	**INSPECT POOR CONNECTION OF PRC SOLENOID VALVE CONNECTOR** • Turn ignition key to OFF. • Check for poor connection (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunctions?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
5	**INSPECT PRC SOLENOID VALVE** • Measure resistance between PRC solenoid valve terminals (part-side). • Is resistance **within 37 Ω —43 Ω ?**	Yes	Go to next step.
		No	Replace PRC solenoid valve, then go to Step 9.
6	**INSPECT PRC SOLENOID VALVE POWER SUPPLY CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Measure voltage between PRC solenoid valve terminal A (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 9.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 19. (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunction?	Yes	Repair terminal, then go to Step 9.
		No	Go to next step.
8	**INSPECT PRC SOLENOID VALVE CONTROL CIRCUIT FOR OPEN** • Connect PRC solenoid valve connector. • Connect breakout box with PCM disconnected. • Turn ignition key to ON (Engine OFF). • Measure voltage between brake out box terminal 19 and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P1250 COMPLETED** • Make sure to reconnect all disconnected connectors. • Perform KOEO/KOER Self-Test. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1409 [KL]

Z6U010201083W51

DTC P1409	EGR valve (stepper motor) circuit malfunction
DETECTION CONDITION	• The PCM monitors the input voltages from EGR valve control signals. If voltage is below or above specified during KOEO/KOER Self-test, PCM determines that the EGR valve circuit has malfunctioned.
POSSIBLE CAUSE	• EGR valve malfunction • Connector or terminal malfunction • Short to ground circuit in wiring between EGR valve terminal E and PCM terminal 68 • Short to ground circuit in wiring between EGR valve terminal A and PCM terminal 72 • Short to ground circuit in wiring between EGR valve terminal B and PCM terminal 46 • Short to ground circuit in wiring between EGR valve terminal F and PCM terminal 56 • Open circuit in wiring between EGR valve terminal E and PCM terminal 68 • Open circuit in wiring between EGR valve terminal A and PCM terminal 72 • Open circuit in wiring between EGR valve terminal B and PCM terminal 46 • Open circuit in wiring between EGR valve terminal F and PCM terminal 56 • Open circuit in wiring between main relay terminal E and EGR valve terminal C • Open circuit in wiring between main relay terminal E and EGR valve terminal D • PCM malfunction



Z6U0102W384

Troubleshooting Hint
EGR system
See 01-16-13 EGR SYSTEM

EGR valve specification

Item	KOEO	KOER
EGR valve terminal E	B+	B+
EGR valve terminal A	B+	Approx. 0 V
EGR valve terminal B	B+	B+
EGR valve terminal F	B+	Approx. 0 V
EGRCD1	OFF	OFF
EGRCD2	OFF	ON
EGRCD3	OFF	OFF
EGRCD4	OFF	ON
PCM terminal 68	B+	B+
PCM terminal 72	B+	0 V
PCM terminal 46	B+	B+
PCM terminal 56	B+	0 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** ● Perform DTC CONFIRMATION PROCEDURE. (See01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) ● Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**INSPECT POOR CONNECTION OF EGR VALVE** ● Turn ignition key to OFF. ● Disconnect EGR valve connector. ● Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). ● Is there any malfunctions?	Yes	Repair or replace terminals and/or connector, then go to Step 7.
		No	Go to next step.
3	**INSPECT POWER CIRCUIT FOR OPEN CIRCUIT** ● Turn ignition key to ON (Engine OFF). ● Measure following EGR valve power circuit terminal voltage. — EGR valve terminal C and body ground — EGR valve terminal D and body ground ● Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open circuit then go to Step 7.
4	**INSPECT EGR VALVE** ● Measure resistance between following EGR valve terminals (part-side). — C and E — C and A — D and B — D and F ● Is resistance **approx. 22 Ω**?	Yes	Go to next step.
		No	Replace EGR valve, then go to Step 7.
5	**INSPECT FOR CONTROL CIRCUIT FOR SHORT TO GROUND** ● Check continuity following EGR valve control circuit. — EGR valve terminal E and body ground — EGR valve terminal A and body ground — EGR valve terminal B and body ground — EGR valve terminal F and body ground ● Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 7.
		No	Go to next step.

STEP	INSPECTION		ACTION
6	**INSPECT CONTROL CIRCUIT FOR OPEN CIRCUIT** • Connect breakout box with PCM disconnected. • Check continuity following EGR control circuit. — EGR valve terminal E and breakout box terminal 68 — EGR valve terminal A and breakout box terminal 72 — EGR valve terminal B and breakout box terminal 46 — EGR valve terminal F and breakout box terminal 56 • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open circuit then go to Step 7.
7	**VERIFY TROUBLESHOOTING OF DTC P1409 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOEP/KOER Self-Test. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
8	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1410 [KL]

Z6U010201083W52

DTC P1410	EGR boost solenoid valve malfunction (stuck)
DETECTION CONDITION	• PCM detects solenoid valve stuck if detected EGR pressure is still barometric pressure during EGR system testing. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL is not illuminated when detection condition is met. • PCM detects the above malfunction condition in two consecutive drivecycle. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• EGR boost solenoid valve malfunction • Loose of vacuum hose between EGR boost sensor and EGR boost solenoid valve • Loose of vacuum hose between EGR boost sensor and intake manifold • EGR boost sensor malfunction • Vacuum hose misconnection • PCM malfunction

Troubleshooting Hint

EGR boost sensor solenoid control description

- The main relay circuit supplies battery voltage to EGR boost sensor solenoid valve and the PCM completes the ground when EGR monitoring condition are met.

EGR boost sensor solenoid valve specification

Item	Normal	EGR monitor testing
EGR boost sensor solenoid valve terminal B	Approx. 0 V	B+
EGR BARO PID	ON	OFF
PCM terminal 98	Approx. 0 V	B+

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**INSPECT VACUUM HOSE CONNECTION** • Inspect following hose connections. — Between EGR boost sensor and EGR boost solenoid valve — Between EGR boost sensor and intake manifold • Are connections or damages okay?	Yes	Go to next step.
		No	Repair or reconnect vacuum hose, then go to Step 7.
4	**INSPECT EGR BOOST SOLENOID VALVE MALFUNCTION** • Inspect EGR boost solenoid valve. • Is EGR boost solenoid valve okay? (See01-16-17 EGR BOOST SOLENOID VALVE INSPECTION)	Yes	Go to next step.
		No	Replace EGR boost solenoid valve, then go to Step 7.
5	**INSPECT EGR BOOST SENSOR MALFUNCTION** • Inspect EGR boost sensor. • Is EGR boost sensor okay? (See01-40B-40 EGR BOOST SENSOR INSPECTION [KL])	Yes	Go to next step.
		No	Replace EGR boost sensor, then go to Step 7.
6	**VERIFY TROUBLESHOOTING OF DTC P1410 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Depress brake pedal for **14.1 seconds or more.** • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1450 [KL]

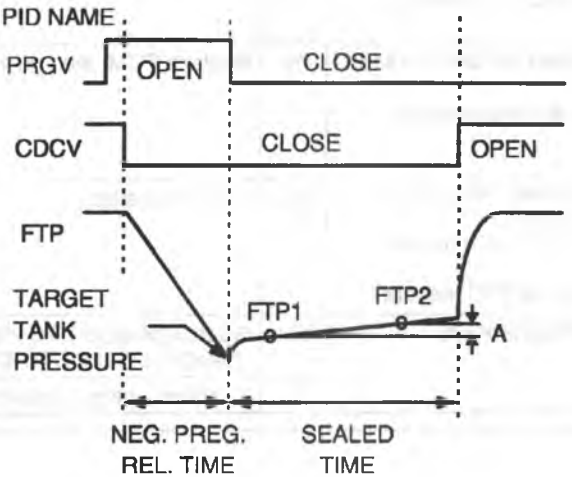
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DTC P1450	Evaporative emission control system malfunction (excessive vacuum)
DETECTION CONDITION	• PCM monitors fuel tank pressure when monitoring conditions are met. If pressure is **below −3.91 kPa {−29.3 mmHg, 1.14 inHg}** for **35 seconds**, PCM determines there is excessive vacuum. **MONITORING CONDITION** — Intake air temperature is **below 38.9°C {102°F}**. — Fuel tank pressure is **within −1.9—10.0 kPa {−14—74 mmHg, −0.55—2.9 inHg}** — Calculated load is **within 15—80 %** — Vehicle speed is **within 40—120 km/h {25—75 mph}** — Fuel tank level is **within 15—85 %** — Atmospheric pressure is **above 76.2 kPa {571 mmHg, 22.5 inHg}** **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Canister drain cut valve malfunction • Air filter clogged • Charcoal canister malfunction • Evaporative drain passage clogged • Fuel tank pressure sensor malfunction • Purge solenoid valve malfunction

Troubleshooting Hint

See 01-16-6 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM.

Fuel tank pressure value at EVAP system monitor



Z6U0102W385

Diagnostic procedure

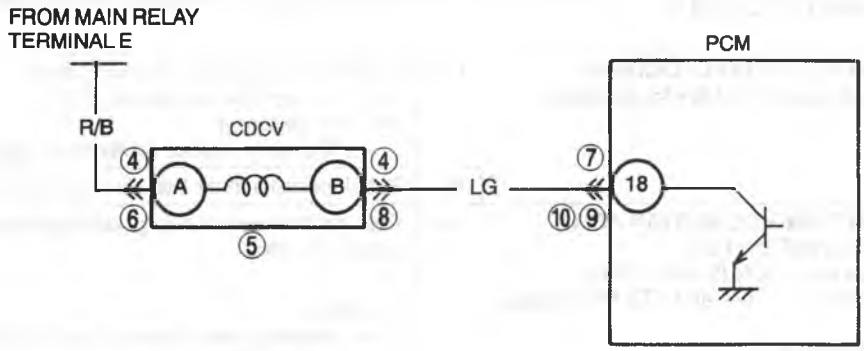
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY RELATED STORED DTCS** • Turn ignition key to OFF then ON (Engine OFF). • Verify stored DTC. • Is DTCs P0443 and/or P1449 present?	Yes	Go to appropriate DTC inspection.
		No	Go to next step.
4	**INSPECT FOR OPERATION SOUND OF CDCV** • Is CDCV operation sound heard when simulating for ON using NGS tester?	Yes	Go to next step.
		No	Inspect CDCV and replace it if necessary. Then, go to Step 9.

STEP	INSPECTION		ACTION
5	**INSPECT PURGE SOLENOID VALVE** • Disconnect vacuum hose that connects to intake manifold from purge solenoid valve. • Connect vacuum pump to purge solenoid valve. • Pump vacuum several times and stop to pump then wait **a few seconds**. • Is vacuum held?	Yes	Disconnect vacuum pump and connect vacuum hose to purge solenoid valve. Go to next step.
		No	Replace purge solenoid valve, then go to Step 9.
6	**INSPECT CHARCOAL CANISTER FOR CLOGGING** • Remove charcoal canister and inspect for clogging. (See01-16-10 CHARCOAL CANISTER INSPECTION) • Is it okay?	Yes	Go to next step.
		No	Replace charcoal canister, then go to Step 9.
7	**INSPECT FUEL TANK PRESSURE** • Inspect fuel tank pressure sensor. (See01-40B-41 FUEL TANK PRESSURE SENSOR INSPECTION [KL]) • Is it okay?	Yes	Go to next step.
		No	Replace fuel tank pressure sensor, then go to Step 9.
8	**INSPECT AIR FILTER FOR CLOGGING** • Remove and inspect air filter for clogging. • Is it okay?	Yes	Inspect for clogging in following area: • From charcoal canister to CDCV • Drain passage — Repair or replace faulty area, then go to next step.
		No	Repair or replace air filter, then go to next step.
9	**VERIFY MONITORING CONDITION FOR EVAPORATIVE SYSTEM TEST** • Turn ignition key to ON (Engine OFF). • Access BARO, ECT, IAT and FTL PIDs using NGS. — IAT: **below 38.9°C {102°F}**. — FTP: **within -1.9—10.0 kPa {-14—74 mmHg, -0.55—2.9 inHg}** — LOAD: **within 15—80 %** — VSS: **within 40—120 km/h {25—75 mph}** — FLI: **within 15—85 %** — BARO: **above 76.2 kPa {571 mmHg, 22.5 inHg}** • Is there any PID that is out of specification?	Yes	Take corrective action (e.g. cool down engine), then repeat this step. **Note** • Readings need to be in the indicated ranges to perform Drive Mode.
		No	Go to next step.
10	**MONITOR EVAP SYSTEM BY DRIVE MODE** • EVAP system repair verification drive mode. (See01-02B-22 EVAP System Repair Verification Drive Mode) • Stop vehicle and access ON BOARD SYSTEM READINESS TESTS menu of GENERIC OBD-II FUNCTIONS to inspect Drive Mode completion status. • Has EVAPORATIVE PURGE SYSTEM monitored?	Yes	Go to next step.
		No	Go back to Step 9.
11	**VERIFY TROUBLESHOOTING OF DTC P1450 COMPLETED** • Make sure to reconnect all disconnected connectors. • Is pending code of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1451 [KL]

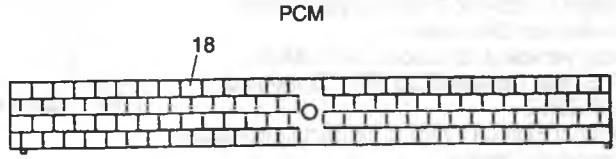
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DTC P1451	Canister drain cut valve (CDCV) circuit malfunction
DETECTION CONDITION	• The PCM monitors the input voltages from CDCV. If the gap of the voltage between CDCV control signal and GND is **above 0.5 V**, the PCM determines that the CDCV circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction during two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is not available. • DTC is stored in the PCM memory. • This DTC also detected by KOEO/KOER Self-Test.
POSSIBLE CAUSE	• CDCV malfunction • Connector or terminal malfunction • Short to power in wiring between CDCV terminal B and PCM terminal 18 • Short to ground in wiring between CDCV terminal B and PCM terminal 18 • Open circuit in wiring between main relay terminal E and CDCV terminal A • Open circuit in wiring between CDCV terminal B and PCM terminal 18 • PCM malfunction





HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Z6U0102W415

Diagnostic procedure

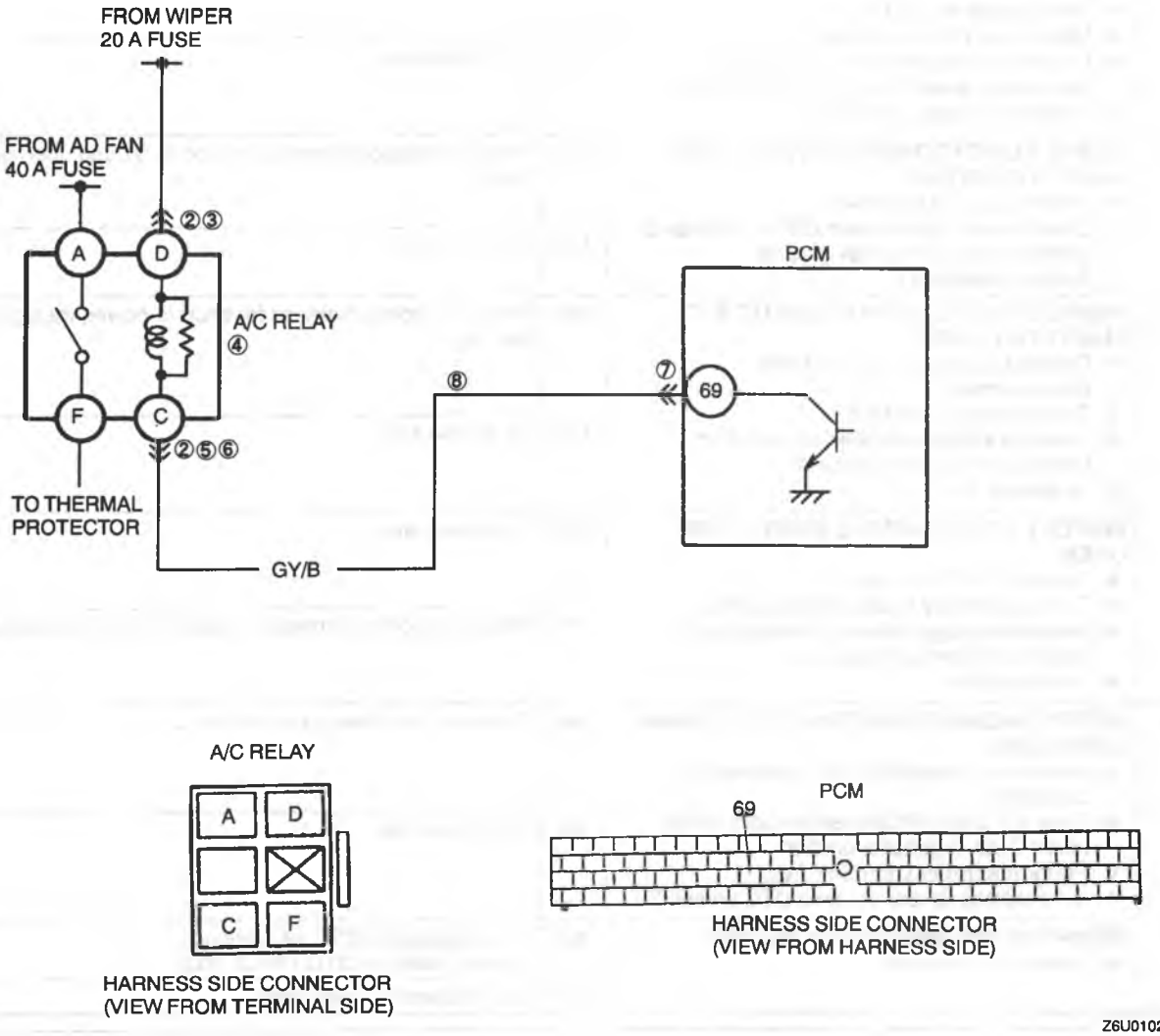
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern is exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Turn ignition key to OFF then ON (Engine OFF). • Is same DTC present?	Yes	Go to next step.
		No	Refer to intermittent concern. (See01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])

STEP	INSPECTION		ACTION
3	**INSPECT POOR CONNECTION OF CDCV CONNECTOR** • Turn ignition key to OFF. • Check for poor connection (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunctions?	Yes	Repair or replace terminal and/or connector, then go to Step 10.
		No	Go to next step.
4	**INSPECT CDCV** • Measure resistance between CDCV terminals (part-side). • Is resistance **within 17 —21 Ω** ?	Yes	Go to next step.
		No	Replace CDCV, then go to Step 10.
5	**INSPECT CDCV POWER SUPPLY CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Measure voltage between CDCV terminal A (harness-side) and body ground. • Is voltage **B+** ?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 10.
6	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 18. (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunctions?	Yes	Repair terminal, then go to Step 10.
		No	Go to next step.
7	**INSPECT CDCV CONTROL CIRCUIT FOR SHORT TO GROUND** • Disconnect PCM connector. • Check continuity between CDCV terminal B (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 10.
		No	Go to next step.
8	**INSPECT CDCV CONTROL CIRCUIT FOR SHORT TO POWER** • Connect breakout box with PCM disconnected. • Turn ignition key to OFF. • Measure voltage between breakout box terminal 18 and body ground. • Is voltage **B+** ?	Yes	Repair or replace harness for short to power, then go to Step 10.
		No	Go to next step.
9	**INSPECT CDCV CONTROL CIRCUIT FOR OPEN** • Connect CDCV connector. • Turn ignition key to ON (Engine OFF). • Measure voltage between breakout box terminal 18 and body ground. • Is voltage **B+** ?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P1451 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from PCM memory using NGS tester OBD-II generic function. • Perform KOEO/KOER Self-Test. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1460, P1464 [KL]

Z6U010201083W55

DTC P1460 **DTC P1464**	**WOT A/C control circuit malfunction** **A/C demand out of self test range**
DETECTION CONDITION	**DTC P1460** ● The PCM monitor the A/C relay control signal at the PCM terminal 69. If the PCM detects the A/C relay control signal does not change during A/C on and WOT (A/C cut-off control), the PCM determine that A/C relay control circuit has malfunctioned. **DTC P1464** ● The PCM monitor the A/C relay control signal at the PCM terminal 69. If the PCM detects the A/C relay control signal does not change during KOER Self-Test, the PCM determines that A/C relay control circuit has malfunctioned.
POSSIBLE CAUSE	● A/C relay malfunction ● Connector or terminal malfunction ● Open circuit between WIPER fuse and A/C relay terminal D ● Open circuit between A/C relay terminal C and PCM terminal 69 ● Short to ground circuit between A/C relay terminal C and PCM terminal 69 ● Short to power circuit between A/C relay terminal C and PCM terminal 69 ● PCM malfunction



Z6U0102W387

Troubleshooting Hint

A/C relay control description

- The battery voltage to the A/C relay and the PCM completes the ground when the following condition are met.
  —A/C switch ON and fun switch ON.
- If the PCM receives the WOT signal from TP sensor while A/C operates and drives the vehicle, the PCM cut-off the A/C relay.

A/C relay specification

Item	A/C OFF	A/C ON	WOT while A/C ON
A/C relay terminal C	B+	Approx. 0 V	B+
WAC PID	OFF	ON	OFF
PCM terminal 69	B+	Approx. 0 V	B+

Diagnostic procedure

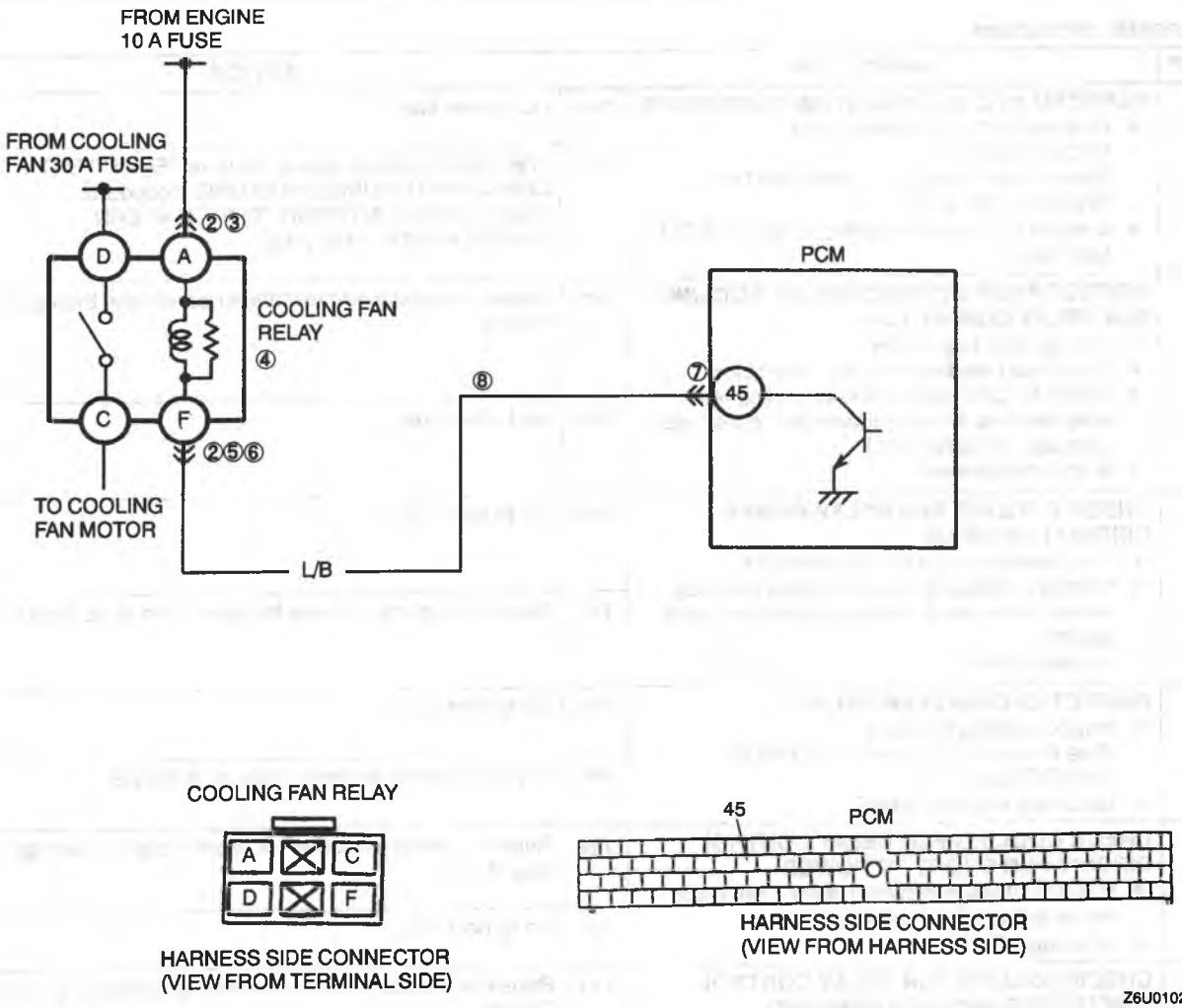
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** ● Perform DTC CONFIRMATION PROCEDURE. (See01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) ● Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**INSPECT POOR CONNECTION OF A/C RELAY CONNECTOR** ● Turn ignition key to OFF. ● Disconnect A/C relay connector. ● Check for poor connection at A/C relay terminal C and D (damaged, pulled-out terminal, corrosion, etc.). ● Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
3	**CHECK A/C RELAY POWER CIRCUIT FOR OPEN** ● Turn ignition key to ON (Engine OFF). ● Measure voltage between A/C relay sensor terminals D (harness-side) and body ground. ● Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 9.
4	**INSPECT A/C RELAY** ● Inspect A/C relay. (See07-40-19 A/C RELAY, BLOWER RELAY, AND CONDENSER FAN RELAY INSPECTION) ● Is A/C relay okay?	Yes	Go to next step.
		No	Replace A/C relay, then go to Step 9.
5	**CHECK A/C RELAY CONTROL CIRCUIT FOR SHORT TO POWER** ● Measure voltage between A/C relay terminal C and body ground. ● Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to Step 9.
		No	Go to next step.
6	**CHECK A/C RELAY CONTROL CIRCUIT FOR SHORT TO GROUND** ● Check for continuity between A/C relay terminal C (harness-side) and body ground. ● Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 9.
		No	Go to next step.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** ● Turn ignition key to OFF. ● Disconnect PCM connector. ● Check for poor connection at PCM terminal 69 (damaged, pulled-out terminal, corrosion, etc.). ● Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
8	**CHECK A/C RELAY CONTROL CIRCUIT FOR OPEN** ● Check for continuity between A/C relay terminal C (harness-side) and breakout box terminal 69. ● Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.

STEP	INSPECTION		ACTION
9	**VERIFY TROUBLESHOOTING OF DTC P1460, P1464 COMPLETED** ● Make sure to reconnect all disconnected connectors. ● Turn ignition key to ON (Engine OFF). ● Clear DTC from PCM memory using NGS tester generic OBD-II function. ● Perform KOEO/KOER Self-Test. ● Is DTC P1464 or is PENDIND CODE P1464 present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** ● Is any KOER DTC present?	Yes	Go to applicable DTC inspection. (See01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1474 [KL]

Z6U010201083W56

DTC P1474	Cooling fan control circuit malfunction
DETECTION CONDITION	• The PCM monitors the cooling fan relay control signal at the PCM terminal 45. If the PCM detects the cooling fan relay control signal does not change when engine coolant temperature is **above 100°C {212°F}**, the PCM determine that cooling fan relay control circuit has malfunctioned. • The PCM monitors the cooling fan relay control signal at the PCM terminal 45. If the PCM detects the cooling fan relay control signal does not change during KOEO, KOER Self-Test, the PCM determines that cooling fan relay control circuit has malfunctioned.
POSSIBLE CAUSE	• Cooling fan relay malfunction • Connector or terminal malfunction • Open circuit between ENGINE fuse and cooling fan relay terminal A • Open circuit between cooling fan relay terminal F and PCM terminal 45 • Short to ground circuit between cooling fan relay terminal C and PCM terminal 45 • Short to power circuit between cooling fan relay terminal C and PCM terminal 45 • PCM malfunction



Z6U0102W388

Troubleshooting Hint

Cooling fan relay control description

- The battery voltage to the cooling fan relay and the PCM complete the ground when the following condition are met.
  - —Engine coolant temperature is **above 100°C {212°F}**
  - —A/C is operating
  - —ECT sensor is malfunction
- If the engine coolant temperature is **below 95.5°C {204°F}** during the cooling fa n operating, the PCM cut-off the cooling fa n relay.

Cooling fan relay specification

Item	ECT is below 95.5°C {204°F}	ECT is above 100°C {212°F}
Cooling fan relay terminal F	B+	Approx. 0 V
LFC PID	OFF	ON
PCM terminal 45	B+	Approx. 0 V

Diagnostic procedure

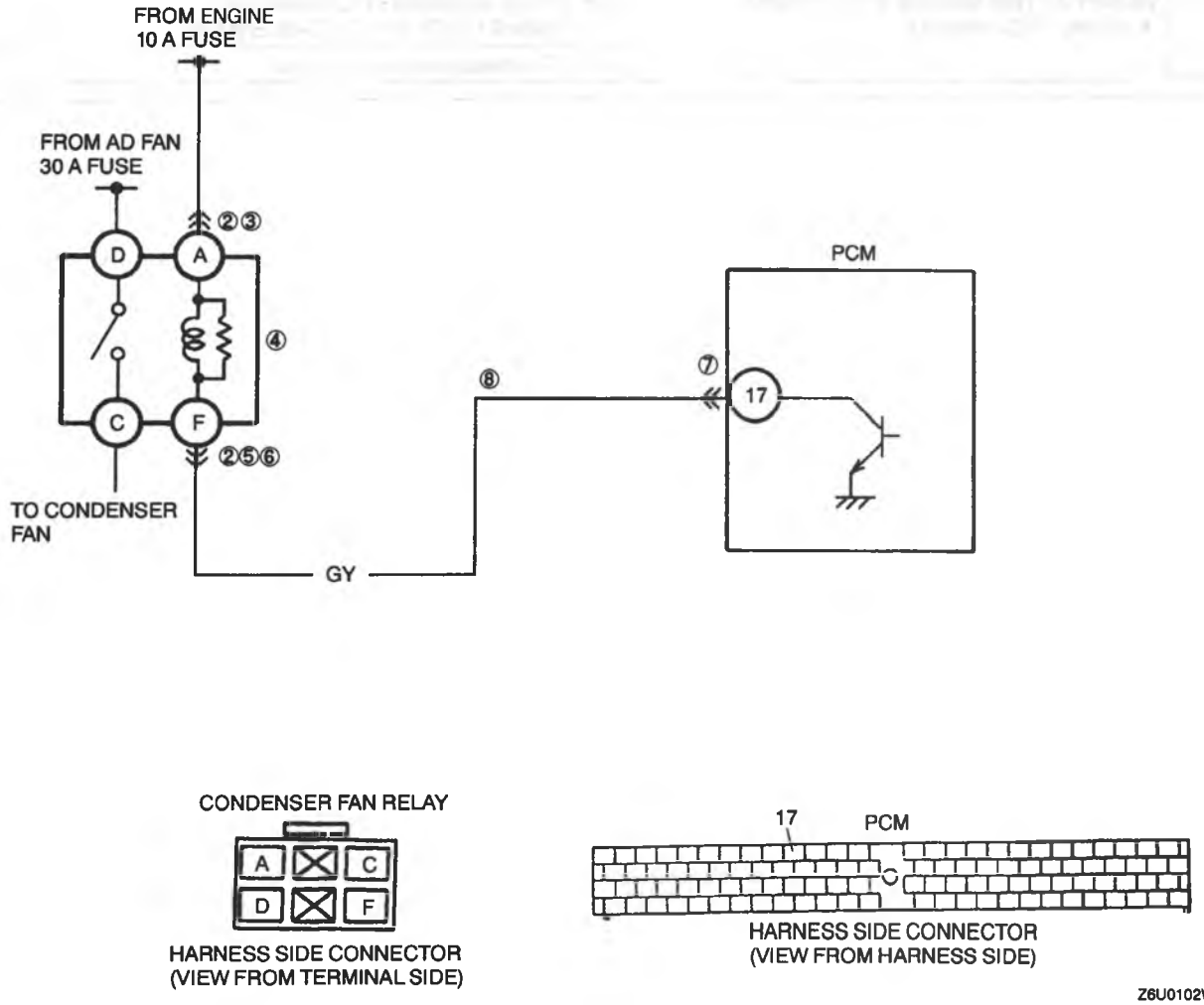
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**INSPECT POOR CONNECTION OF COOLING FAN RELAY CONNECTOR** • Turn ignition key to OFF. • Disconnect cooling fan relay connector. • Check for poor connection at cooling fan relay terminal A and F (damaged, pulled-out terminal, corrosion, etc.). • Is any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
3	**CHECK COOLING FAN RELAY POWER CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Measure voltage between cooling fan relay sensor terminals A (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 9.
4	**INSPECT COOLING FAN RELAY** • Inspect cooling fan relay. (See 01-12-7 COOLING FAN RELAY INSPECTION) • Is cooling fan relay okay?	Yes	Go to next step.
		No	Replace cooling fan relay, then go to Step 9.
5	**CHECK COOLING FAN RELAY CONTROL CIRCUIT FOR SHORT TO POWER** • Measure voltage between cooling fan relay terminal F and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to Step 9.
		No	Go to next step.
6	**CHECK COOLING FAN RELAY CONTROL CIRCUIT FOR SHORT TO GROUND** • Check for continuity between cooling fan relay terminal F (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 9.
		No	Go to next step.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at PCM terminal 45 (damaged, pulled-out terminal, corrosion, etc.). • Is any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.

STEP	INSPECTION		ACTION
8	**CHECK COOLING FAN RELAY CONTROL CIRCUIT FOR OPEN** • Check for continuity between cooling fan relay terminal F (harness-side) and breakout box terminal 45. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P1474 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOEO/KOER Self-Test. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1479 [KL]

Z6U010201083W57

DTC P1479	Condenser fan control circuit malfunction
DETECTION CONDITION	• The PCM monitors the condenser fan relay control signal at the PCM terminal 17. If the PCM detects the condenser fan relay control signal does not change when engine coolant temperature is **above 108°C {226°F}**, the PCM determines that condenser fan relay control circuit has malfunctioned. • The PCM monitors the condenser fan relay control signal at the PCM terminal 17. If the PCM detects the condenser fan relay control signal does not change during KOEO, KOER Self-Test, the PCM determines that condenser fan relay control circuit has malfunctioned.
POSSIBLE CAUSE	• condenser fan relay malfunction • Connector or terminal malfunction • Open circuit between ENGINE fuse and condenser fan relay terminal A • Open circuit between condenser fan relay terminal F and PCM terminal 17 • Short to ground circuit between condenser fan relay terminal F and PCM terminal 17 • Short to power circuit between condenser fan relay terminal F and PCM terminal 17 • PCM malfunction



Z6U0102W389

Troubleshooting Hint

Condenser fan relay control description

- The battery voltage to the condenser fan relay and the PCM complete the ground when the following condition are met.
  - —Engine coolant temperature is **above 100°C {226°F}**
  - —A/C is operating
  - —ECT sensor is malfunction
- If the engine coolant temperature is **below 103°C {217°F}** during the cooling fan operating, the PCM cut-off the condenser fan relay.

Condenser fan relay specification

Item	ECT is below 103°C {217°F}	ECT is above 108°C {226°F}
Condenser fan relay terminal F	B+	Approx. 0 V
HFC PID	OFF	ON
PCM terminal 17	B+	Approx. 0 V

Diagnostic procedure

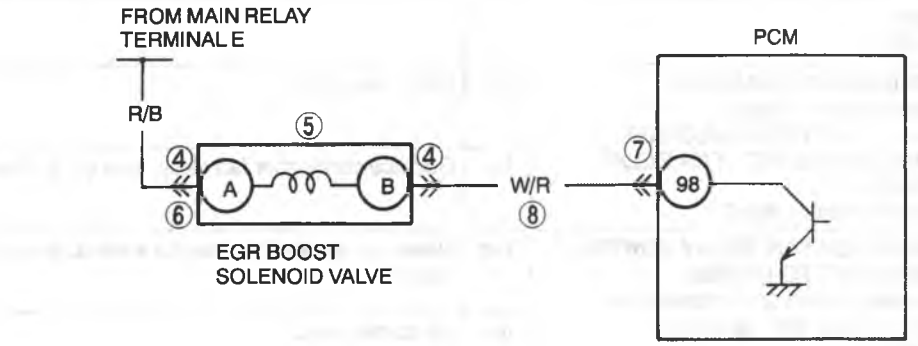
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**INSPECT POOR CONNECTION OF CONDENSER FAN RELAY CONNECTOR** • Turn ignition key to OFF. • Disconnect condenser fan relay connector. • Check for poor connection at condenser fan relay terminal A and F (damaged, pulled-out terminal, corrosion, etc.). • Is any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
3	**CHECK CONDENSER FAN RELAY POWER CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Measure voltage between condenser fan relay sensor terminals A (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 9.
4	**INSPECT CONDENSER FAN RELAY** • Inspect condenser fan relay. (See 07-40-19 A/C RELAY, BLOWER RELAY, AND CONDENSER FAN RELAY INSPECTION) • Is condenser fan relay okay?	Yes	Go to next step.
		No	Replace condenser fan relay, then go to Step 9.
5	**CHECK CONDENSER FAN RELAY CONTROL CIRCUIT FOR SHORT TO POWER** • Measure voltage between condenser fan relay terminal F and body ground. • Is voltage **B+**?	Yes	Repair or replace harness for short to power, then go to Step 9.
		No	Go to next step.
6	**CHECK CONDENSER FAN RELAY CONTROL CIRCUIT FOR SHORT TO GROUND** • Check for continuity between condenser fan relay terminal F (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 9.
		No	Go to next step.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at PCM terminal 17 (damaged, pulled-out terminal, corrosion, etc.). • Is any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 9.
		No	Go to next step.
8	**CHECK CONDENSER FAN RELAY CONTROL CIRCUIT FOR OPEN** • Check for continuity between condenser fan relay terminal F (harness-side) and breakout box terminal 17. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.

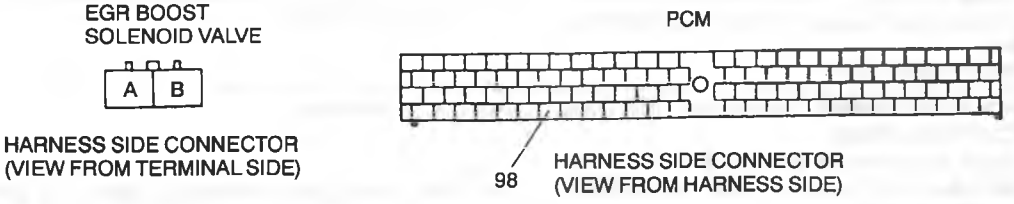
STEP	INSPECTION		ACTION
9	**VERIFY TROUBLESHOOTING OF DTC P1479 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOEO/KOER Self-Test. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1487 [KL]

Z6U010201083W58

DTC P1487	EGR boost sensor solenoid valve circuit malfunction
DETECTION CONDITION	• The PCM monitors the input voltages from EGR boost sensor solenoid valve control signal. If voltage of EGR boost sensor solenoid valve control signal is below or above specified during KOEO/KOER Self-Test, the PCM determines that the EGR boost sensor solenoid valve circuit has malfunctioned.
POSSIBLE CAUSE	• EGR boost sensor solenoid valve malfunction • Connector or terminal malfunction • Short to ground in wiring between EGR boost sensor solenoid valve terminal B and PCM terminal 98 • Open circuit in wiring between main relay terminal E and EGR boost sensor solenoid valve terminal A • Open circuit in wiring between EGR boost sensor solenoid valve terminal B and PCM terminal 98 • PCM malfunction





Z6U0102W390

Diagnostic procedure

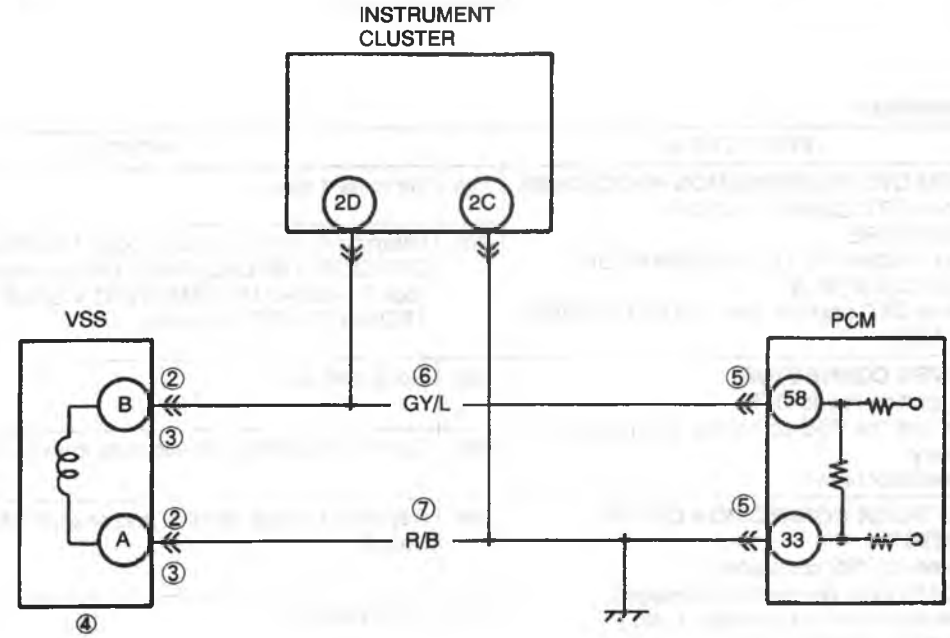
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS-IS CONCERN INTERMITTENT OT CONSTANT** • Connect NGS tester to DLC. • Start engine. • Access EGR PID using NGS tester. • Run drive mode. • Does EGR PID change while running drive mode?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
		No	Go to next step.
4	**CLASSIFY OPEN CIRCUIT OR SHORT TO GROUND MALFUNCTION** • Disconnect EGR boost sensor solenoid valve tube at solenoid side that connects to EGR valve. • Connect vacuum pump to EGR boost solenoid valve. • Apply vacuum. • Wait for **5 seconds**. • Is vacuum maintained?	Yes	Go to Step 6.
		No	Go to next step.
5	**INSPECT PASSAGE CONTROL OF EGR BOOST SENSOR SOLENOID VALVE** • Turn ignition key to OFF. • Disconnect EGR boost sensor solenoid valve connector. • Apply vacuum and wait for **5 seconds**. • Is vacuum maintained?	Yes	Repair or replace harness between solenoid valve terminal B and PCM terminal 98 for short to ground, then go to Step 11.
		No	Replace EGR boost sensor solenoid valve, then go to Step 11.
6	**INSPECT POOR CONNECTION OF EGR BOOST SENSOR SOLENOID VALVE CONNECTOR** • Turn ignition key to OFF. • Check for poor connection (damaged, pulled-out pins, corrosion, etc.). • Is there any malfunctions?	Yes	Repair or replace terminal and/or connector, then go to Step 11.
		No	Go to next step.
7	**INSPECT EGR BOOST SENSOR SOLENOID VALVE** • Measure resistance between EGR boost sensor solenoid valve terminals (part-side). • Is resistance **within 22 Ω —26 Ω** ?	Yes	Go to next step.
		No	Replace EGR boost sensor solenoid valve, then go to Step 11.
8	**INSPECT EGR BOOST SENSOR SOLENOID VALVE POWER SUPPLY CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Measure voltage between EGR boost sensor solenoid valve terminal A (harness-side) and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 11.
9	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection at terminal 98. (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunctions?	Yes	Repair terminal, then go to Step 11.
		No	Go to next step.

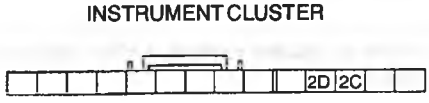
STEP	INSPECTION		ACTION
10	**INSPECT EGR BOOST SENSOR SOLENOID VALVE CONTROL CIRCUIT FOR OPEN** • Connect EGR boost sensor solenoid valve connector. • Connect breakout box with PCM disconnected. • Turn ignition key to ON (Engine OFF). • Measure voltage between breakout box terminal 98 and body ground. • Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P1487 COMPLETED** • Make sure to reconnect all disconnected connectors. • Perform KOEO/KOER Self-Test. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1501 [KL]

Z6U010201083W59

DTC P1501	Vehicle speed sensor (VSS) input signal out of Self-Test range
DETECTION Self-Test CONDITION	DTC P1501 • If the PCM receive the VSS signal while KOER Self-Test, the PCM determines that VSS circuit has malfunctioned.
POSSIBLE CAUSE	• VSS malfunction • Connector or terminal malfunction • Intermittent signal inputs from other sources (Ignition harness) • Open circuit between VSS sensor terminal A and PCM terminal 33 • Short to ground circuit between VSS sensor terminal A and PCM terminal 33 • Open circuit between VSS sensor terminal Band PCM terminal 58 • Short to ground circuit between VSS sensor terminal B and PCM terminal 58

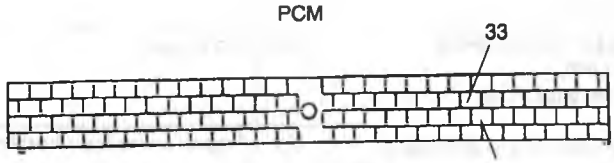




HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

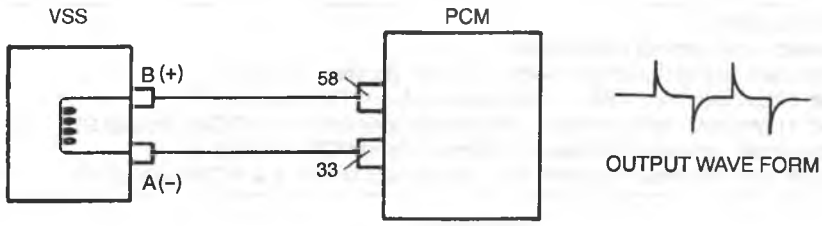


HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Z6U0102W378

Troubleshooting Hint
VSS description

- The VSS generates signals per turn of the sensor rotor and input to the PCM.
- The PCM performs each control based on the VSS signal and throttle position sensor signal.



Z6U0102W379

Diagnostic procedure

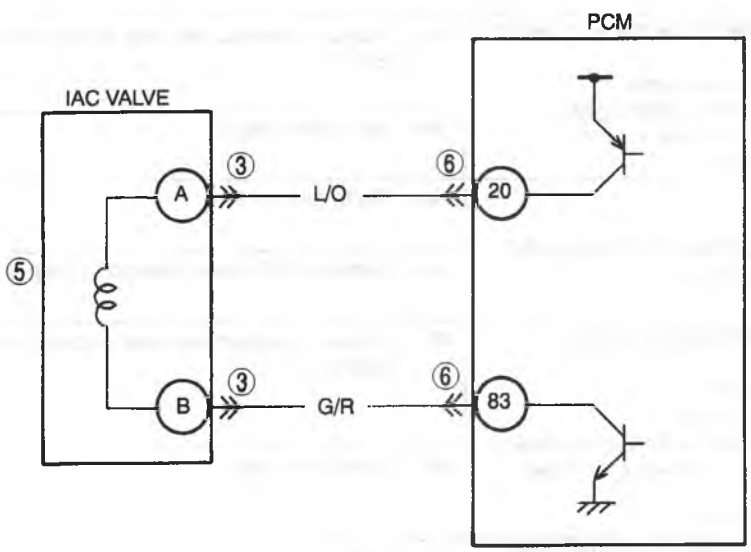
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**CHECK VSS CONNECTOR** • Turn ignition key to OFF. • Verify that the VSS connector is connected securely. • Is connector okay?	Yes	Go to next step.
		No	Connect the connector securely, then go to Step 8.
3	**INSPECT POOR CONNECTION OF VSS CONNECTOR** • Disconnect VSS connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 8.
		No	Go to next step.
4	**INSPECT VSS** • Inspect VSS sensor. (See 05-17B-28 VEHICLE SPEEDOMETER SENSOR INSPECTION [GF4A-EL]) • Is VSS okay?	Yes	Go to next step.
		No	Replace VSS, then go to Step 8.
5	**CHECK POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection of PCM terminals 58 and 33 (damaged, pulled-out terminals, corrosion, etc.) • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 8.
		No	Go to next step.
6	**VERIFY VSS (+) CIRCUIT FOR OPEN** • Turn ignition key to OFF. • Connect breakout box with PCM disconnected. • Check continuity between VSS terminal A (harness-side) and breakout box terminal 33. • Is there continuity?	Yes	Go to next.
		No	Repair or replace harness for open, then go to Step 8.
7	**VERIFY VSS (-) CIRCUIT FOR OPEN** • Check continuity between VSS terminal B (harness-side) and breakout box terminal 58. • Is there continuity?	Yes	Repair or replace harness for short to ground circuit, then go to Step 8.
		No	Go to next step.

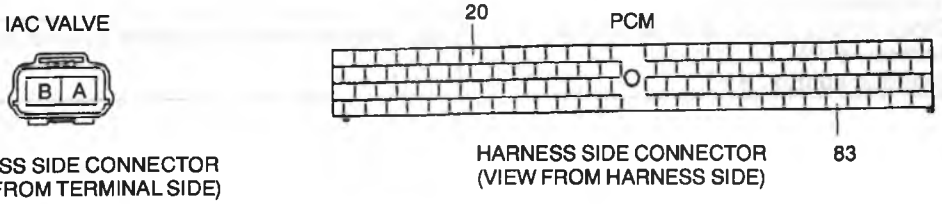
STEP	INSPECTION		ACTION
8	**VERIFY TROUBLESHOOTING OF DTC P1501 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform DTC CONFIRMATION PROCEDURE. • Is same DTC present during KOEO or KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1504 [KL]

Z6U010201083W60

DTC P1504	Idle air control (IAC) valve circuit malfunction
DETECTION CONDITION	• If the PCM detects open, short or over current in IAC valve circuit during engine running. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition for two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory. • This DTC also detects KOEO/KOER Self-Test.
POSSIBLE CAUSE	• IAC valve malfunction • Connector or terminal malfunction • Open circuit between IAC valve terminal B and PCM terminal 20. • Short to ground circuit between IAC valve terminal B and PCM terminal 20. • Open circuit between IAC valve terminal A and PCM terminal 83. • Short to ground circuit between IAC valve terminal A and PCM terminal 83. • PCM malfunction





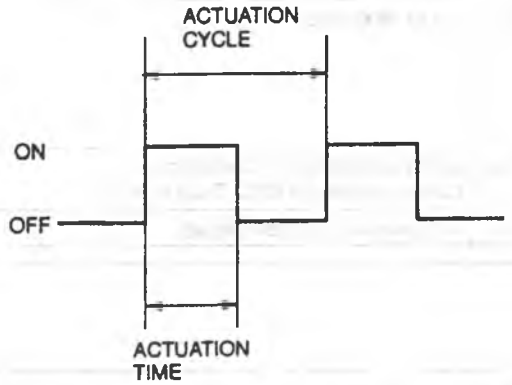
Z6U0102W391

Troubleshooting Hint

IAC description

- For the optimum idle speed control, the PCM selects one of several target airflow settings in the PCM according to the engine conditions, and converts the target airflow into IAC valve actuation time and controls the valve opening position.

IAC duty control



$$\text{DUTY VALUE} = \frac{\text{ACTUATION TIME}}{\text{ACTUATION CYCLE}} \times 100\ (\%)$$

Z6U0102W380

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern is exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**CHECK IAC VALVE CONNECTOR** • Turn ignition key to OFF. • Verify that the IAC valve connector is connected securely. • Is connector okay?	Yes	Go to next step.
		No	Connect the connector securely, then go to Step 8.
3	**INSPECT POOR CONNECTION OF IAC VALVE CONNECTOR** • Disconnect IAC valve connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 8.
		No	Go to next step.
4	**INSPECT IAC VALVE** • Inspect IAC valve. (See 01-13B-8 IDLE AIR CONTROL (IAC) VALVE INSPECTION [KL]) • Is IAC valve okay?	Yes	Go to next step.
		No	Replace IAC valve, then go to Step 8.
5	**CHECK POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection of PCM terminals 20 and 83 (damaged, pulled-out terminals, corrosion, etc.) • Is there any malfunction?	Yes	Repair or replace terminal and/or connector, then go to Step 8.
		No	Go to next step.
6	**VERIFY IAC VALVE (POWER) CIRCUIT FOR OPEN** • Turn ignition key to ON. • Check voltage at IAC valve terminal B (harness-side). • Is voltage **approx. B+**?	Yes	Go to next.
		No	Repair or replace harness for open, then go to Step 8.

STEP	INSPECTION		ACTION
7	**VERIFY IAC VALVE CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Connect break out box with PCM disconnected. • Turn ignition key to ON. • Measure voltage at breakout box terminal 83. • Is voltage **approx. B+**?	Yes	Go to next step.
		No	Repair or replace harness for short to ground, then go to Step 8
8	**VERIFY TROUBLESHOOTING OF DTC P1504 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO/KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1506 [KL]

Z6U010201083W61

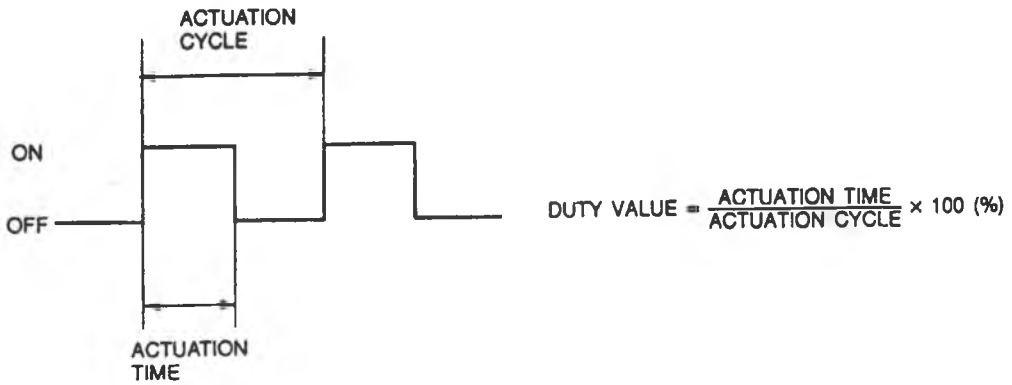
DTC P1506	Idle control system RPM lower than expected
DETECTION CONDITION	• Actual idle speed is lower than expected by **100 rpm** for **14 seconds**, when brake pedal is depressed (brake switch is ON) and steering wheel is held straight ahead (power steering pressure switch is OFF). **Note** • If atmospheric pressure is **less than 72.0 kPa {540 mmHg, 21.3 inHg}** or intake air temperature is **below −10° C {14° F}**, the PCM cancels diagnosis of P1506. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• IAC valve malfunction • Air cleaner element clogged • Air intake passage clogged • A/C relay control circuit malfunction • Low engine compression (Over capacity of blow-by gas) • PCM malfunction

Troubleshooting Hint

IAC description

- For the optimum idle speed control, then PCM selects one of several target airflow settings in the PCM according to the engine conditions, and converts the target airflow into IAC valve actuation time and controls the valve opening position.

IAC duty control



Z6U0102W380

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY RELATED PENDING OR STORED DTCS** • Turn ignition key to OFF, then ON (Engine OFF). • Verify pending code or stored DTCs using NGS tester. • Is other DTC present?	Yes	Repair applicable DTCs. (See 01-02B-24 DTC TABLE [KL])
		No	Go to next step.

STEP	INSPECTION		ACTION
4	**INSPECT IAC VALVE MALFUNCTION** • Start engine. • Simulate IACV PID for **100 %** using NGS tester. • Is engine speed increased?	Yes	Go to next step.
		No	Replace IAC valve, then go to Step **9**.
5	**INSPECT A/C MAGNET CLUTCH OPERATION** • Turn blower motor switch off. • Is magnet clutch still on?	Yes	Refer to "A/C is always on or A/C compressor runs continuously." of ENGINE SYMPTOM TROUBLESHOOTING, then go to Step **9**. (See 01-03B-47 NO.24 A/C ALWAYS ON/A/C COMPRESSOR RUNS CONTINUOUSLY [KL])
		No	Go to next step.
6	**INSPECT AIR CLEANER ELEMENT** • Remove air cleaner element with engine running. • Is engine speed increased?	Yes	Replace air cleaner element, then go to Step **9**.
		No	Go to next step.
7	**INSPECT THROTTLE BODY PASSAGE** • Is throttle body clogged?	Yes	Clean or replace throttle body passage, then go to Step **9**.
		No	Go to next step.
8	**INSPECT ENGINE COMPRESSION** • Inspect engine compression. (See 01-10B-5 COMPRESSION INSPECTION [KL]) • Is engine compression okay?	Yes	Go to next step.
		No	Overhaul engine, then go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P1506 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Depress brake pedal for **14.1 seconds or more**. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1507 [KL]

Z6U010201083W62

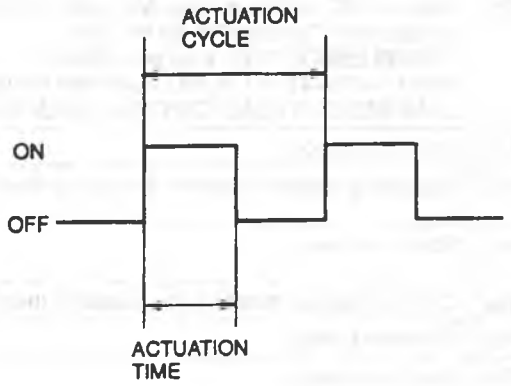
DTC P1507	Idle control system RPM higher than expected
DETECTION CONDITION	• Actual idle speed is higher than expected by **200 rpm** for **14 seconds**, when brake pedal is depressed (brake switch is ON) and steering wheel is held straight ahead (power steering pressure switch is OFF). **Note** • If atmospheric pressure is **less than 72.0 kPa {540 mmHg, 21.3 inHg}** or intake air temperature is **below -10°C {14°F}**, the PCM cancels diagnosis of P1507. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• IAC valve malfunction • Accelerator cable misadjusted • Actuator cable (cruise control) misadjusted • Throttle valve malfunction • Vacuum hose misconnection • PCM malfunction

Troubleshooting Hint

IAC description

- For the optimum idle speed control, the PCM selects one of several target airflows settings in the PCM according to the engine conditions, and converts the target airflow into the IAC valve actuation time and controls the valve opening position.

IAC duty control



$$\text{DUTY VALUE} = \frac{\text{ACTUATION TIME}}{\text{ACTUATION CYCLE}} \times 100\ (\%)$$

Z6U0102W380

Diagnostic procedure

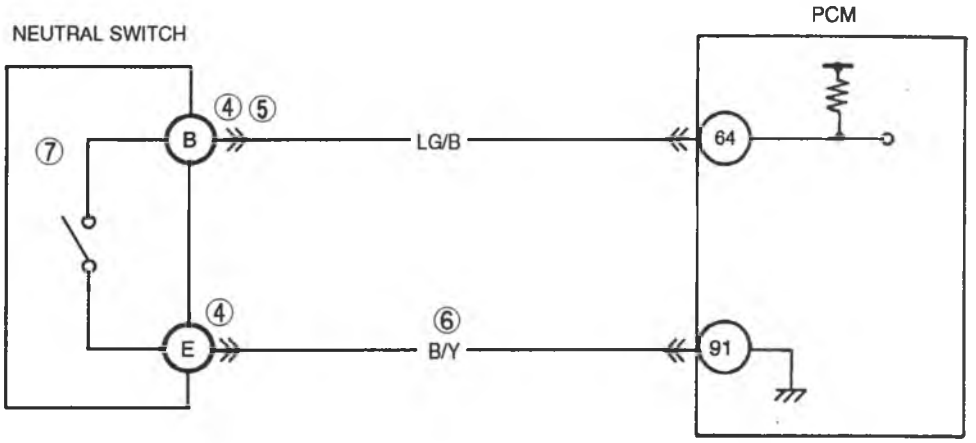
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY RELATED PENDING OR STORED DTCS** • Turn ignition key to OFF, then ON (Engine OFF). • Verify pending code or stored DTCs using NGS tester. • Is other DTC present?	Yes	Repair applicable DTCs. (See 01-02B-24 DTC TABLE [KL])
		No	Go to next step.
4	**INSPECT IAC VALVE MALFUNCTION** • Start engine. • Disconnect IAC connector. • Is engine speed decreased?	Yes	Go to next step.
		No	Replace IAC valve, then go to Step 9.
5	**INSPECT ACCELERATOR CABLE FREE PLAY** • Turn ignition key to OFF. • Is accelerator cable free play okay? (See 01-13B-13 ACCELERATOR CABLE INSPECTION [KL])	Yes	Go to next step.
		No	Adjust accelerator cable free play, then go to Step 9. (See 01-13B-13 ACCELERATOR CABLE ADJUSTMENT [KL])
6	**INSPECT ACTUATOR CABLE FREE PLAY** • Are actuator cable adjustments okay? (See 01-20-6 ACTUATOR CABLE ADJUSTMENT)	Yes	Go to next step.
		No	Adjust actuator cable free play, then go to Step 9.
7	**INSPECT VACUUM HOSE CONNECTION** • Are vacuum hoses connecting accurately? (See 01-13B-3 VACUUM HOSE ROUTING DIAGRAM [KL])	Yes	Go to next step.
		No	Reconnect vacuum hose accurately, then go to step 9.
8	**VISUAL INSPECT THROTTLE VALVE** • Remove throttle body. • Is throttle valve fully closed?	Yes	Go to next step.
		No	Clean or replace throttle body, then go to next step.

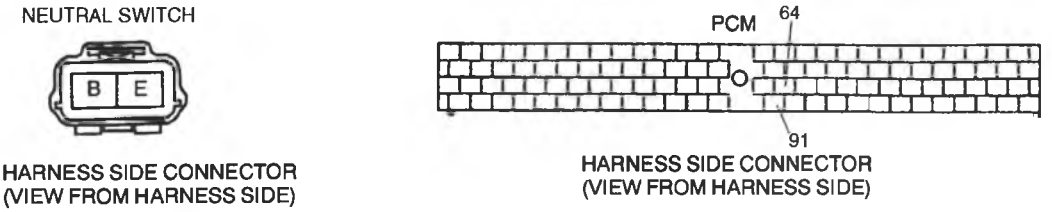
STEP	INSPECTION		ACTION
9	**VERIFY TROUBLESHOOTING OF DTC P1507 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Depress brake pedal for **14.1 seconds or more**. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1516 [KL]

Z6U010201083W63

DTC P1516	Neutral switch circuit malfunction
DETECTION CONDITION	• If the PCM detects the neutral switch voltage at PCM terminal 64 has not been changed during driving the vehicle **below 26 km/h {16 mph}**, the PCM determines that a neutral switch circuit has a malfunction. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• Clutch switch malfunction • Connector or terminal malfunction • Open circuit between neutral switch terminal A and PCM terminal 64 • Short to ground circuit between neutral switch terminal A and PCM terminal 64 • Open circuit between neutral switch terminal B and PCM terminal 91 • Short to ground circuit between neutral switch terminal B and PCM terminal 91





Z6U0102W392

Troubleshooting Hint

Neutral switch description

- A normally open type neutral switch is used. Therefore when the shift lever at the neutral position, the neutral switch become ON (continuity), and the shift lever at some point, the shift switch become OFF (no continuity).
- The shift switch signal is used for the following controls.
  - —Idle air control
  - —Fuel injector control
  - —Fuel pressure regulator control
  - —Electric spark control
  - —EGR control
  - —Purge control

Neutral switch specification

Shift lever position (With KOEO/KOER)	Neutral	Other
Neutral switch	ON	OFF
Neutral switch terminal A	0 V	B+
INDS PID	0 V	B+
NDSFLG PID	ON	OFF
PCM terminal 64	0 V	B+

Diagnostic procedure

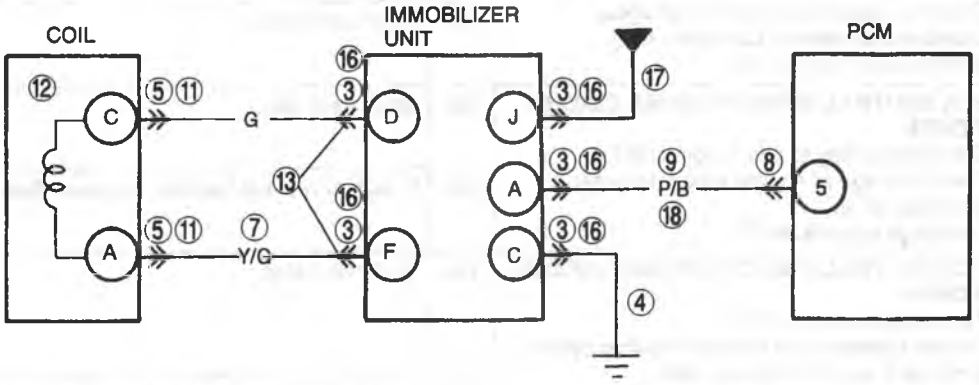
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS-IS CONCERN INTERMITTENT OR CONSTANT** • Connect NGS tester to DLC. • Start engine. • Access NDSFLG V PID using NGS tester. • Verify NDSFLG V PID as follows — Shift lever at neutral: **approx. 0 V** — Shift lever at not neutral: **approx. 5 V** • Is NDSFLG V PID as follows?	Yes	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
		No	• If NDSFLG V PID stays **approx. 5 V**, go to next step • If NDSFLG V PID stays **approx. 0 V**, go to Step 6.
4	**INSPECT POOR CONNECTION OF NEUTRAL SWITCH CONNECTOR** • Turn ignition key to OFF. • Disconnect the neutral switch connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunction?	Yes	Repair or replace terminals and/or connector, then go to Step 8.
		No	Go to next step.
5	**CHECK NEUTRAL SWITCH SIGNAL CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Check voltage at neutral switch terminal A (harness-side). • Is voltage **approx. 5 V**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go Step 8.
6	**CHECK NEUTRAL SWITCH GROUND CIRCUIT FOR OPEN** • Turn ignition key to OFF. • Connect jumper wire between neutral switch terminal A and B (harness-side). • Turn ignition key to ON (Engine OFF). • Access NDSFLG V PID using NGS tester. • Is NDSFLG V PID change from **approx. 0 V** to **approx. 5 V**?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 8.
7	**INSPECT CLUTCH SWITCH** • Turn ignition key to OFF. • Verify continuity between clutch switch connector terminals A and B (part-side) as follows. — Shift lever at neutral: continuity — Shift lever at not neutral: not continuity • Is it okay?	Yes	Go to next step.
		No	Replace neutral switch, then go to next step.

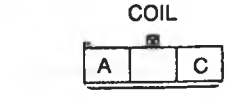
STEP	INSPECTION		ACTION
8	**VERIFY TROUBLESHOOTING OF DTC P1516 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from memory using NGS tester generic OBD-II function. • Drive the vehicle **below 26 km/h {16 mph}**. • Shift shift lever at neutral and other. • Is any pending code of DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1602 [KL]

Z6U010201083W64

DTC P1602	**Immobilizer unit-PCM communication error**
DETECTION CONDITION	• Command transmission from the PCM to the immobilizer unit exceeds limit. • No response from immobilizer unit
POSSIBLE CAUSE	• Immobilizer unit malfunction • Coil (immobilizer system) malfunction • Key (transponder) malfunction • PCM malfunction • Open circuit in wiring between immobilizer unit terminal A and PCM terminal 59 • Open circuit in wiring between immobilizer unit terminal C and body ground • Open circuit in wiring between immobilizer unit terminal F and coil terminal A • Open circuit in wiring between immobilizer unit terminal D and coil terminal C • Short to ground circuit in wiring between immobilizer unit terminal A and PCM terminal 59 • Short to ground circuit in wiring between immobilizer unit terminal F and coil terminal A • Short to ground circuit in wiring between immobilizer unit terminal D and coil terminal C

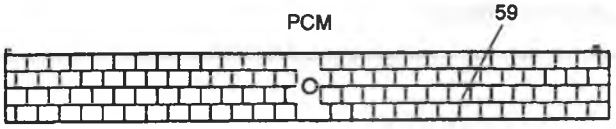




HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Z6U0102W416

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
2	**CLASSIFY NO DTC DETECTED OR SOME DTC DETECTED** • Clear DTC from memory using NGS tester generic OBD-II function. • Turn ignition key to OFF and ON (Engine OFF). • Has DTC P1624 been detected?	Yes	Go to Step 10.
		No	Go to next step.
3	**INSPECT POOR CONNECTION OF IMMOBILIZER UNIT CONNECTOR** • Turn ignition key to OFF. • Disconnect immobilizer unit connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunctions?	Yes	Repair or replace terminals and/or connector, then go to Step 19.
		No	Go to next step.
4	**INSPECT GROUND CIRCUIT OF IMMOBILIZER UNIT FOR OPEN** • Measure resistance between immobilizer unit terminal C (harness-side) and body ground. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 19.
5	**INSPECT COIL TERMINAL** • Disconnect coil connector. • Check for bent terminals. • Is there any malfunctions?	Yes	Repair or replace terminals and/or connector, then go to Step 19.
		No	Go to next step.
6	**INSPECT COIL FOR SHORT CIRCUIT** • Check continuity between coil terminal A (part-side) and body ground. • Is there continuity?	Yes	Replace coil, then go to Step 19.
		No	Go to next step.
7	**INSPECT COIL CIRCUIT FOR SHORT** • Connect coil connector. • Check continuity between immobilizer unit terminal F (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short circuit, then go to Step 19.
		No	Go to next step.
8	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunctions?	Yes	Repair or replace harness, then go to Step 19.
		No	Go to next step.
9	**INSPECT COMMUNICATION LINE FOR OPEN CIRCUIT** • Connect breakout box with PCM disconnected. • Measure continuity between immobilizer unit terminal A (harness-side) and PCM terminal 59. • Is there continuity?	Yes	Go to Step 19.
		No	Repair or replace harness for open circuit, then go to Step 19.
10	**CLASSIFY MALFUNCTION BY ANOTHER DETECTED DTCS** • Has DTC P1602 detected?	Yes	Go to Step 14.
		No	Go to next step.
11	**INSPECT POOR CONNECTION OF COIL CONNECTOR** • Disconnect coil connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunctions?	Yes	Repair or replace harness, then go to Step 19.
		No	Go to next step.

STEP	INSPECTION		ACTION
12	**INSPECT COIL FOR OPEN** ● Disconnect coil connector. ● Measure resistance between coil terminals (part-side). ● Is there continuity?	Yes	Go to next step.
		No	Replace coil, then go to Step 19.
13	**INSPECT COIL CIRCUIT FOR OPEN** ● Connect coil connector. ● Measure the resistance between immobilizer connector F and D (harness-side). ● Is there continuity?	Yes	Go to Step 19.
		No	Repair or replace harness for open circuit, then go to Step 19.
14	**CLASSIFY MALFUNCTION BY ANOTHER DETECTED DTCS.** ● Has immobilizer unit DTC 03 detected?	Yes	Key does not have transponder, change to registered key. Then go to Step 19.
		No	Go to next step.
15	**CLASSIFY MALFUNCTION BY ANOTHER DETECTED DTCS.** ● Has immobilizer unit DTC 01 detected?	Yes	Key that using for ignition is not registered. Reprogram key or using another registered key, then go to next step. (See 09-14-29 IMMOBILIZER SYSTEM REPROGRAMMING PROCEDURE)
		No	Go to next step.
16	**INSPECT POOR CONNECTION OF IMMOBILIZER UNIT CONNECTOR** ● Turn ignition key to OFF. ● Disconnect immobilizer unit connector. ● Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). ● Is there any malfunctions?	Yes	Repair or replace harness, then go to next step.
		No	Go to next step.
17	**INSPECT IMMOBILIZER UNIT POWER CIRCUIT FOR OPEN** ● Turn ignition key to ON (Engine OFF). ● Measure voltage between immobilizer connector J (harness-side) and body ground. ● Is voltage **B+**?	Yes	Go to next step.
		No	Repair or replace harness for open circuit, then go to Step 19.
18	**INSPECT COMMUNICATION LINE FOR SHORT HARNESS** ● Measure resistance between immobilizer unit terminal A (harness-side) and body ground. ● Is there continuity?	Yes	Repair or replace harness for short, then go to next step.
		No	Go to next step.
19	**VERIFY TROUBLESHOOTING OF DTC P1602 COMPLETED** ● Make sure to reconnect all disconnected connectors. ● Clear DTC from memory using NGS tester generic OBD-II function. ● Turn ignition key to OFF, then start engine. ● Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
20	**VERIFY AFTER REPAIR PROCEDURE** ● Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1603 [KL]

Z6U010201083W65

DTC P1603	Code word is not registered in PCM
DETECTION CONDITION	• Code word is not registered in PCM.
POSSIBLE CAUSE	• Immobilizer system reprogram procedure (code word) was not performed after replacing PCM.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service bulletins and/or on-line repair information availability. • Is any repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
2	**VERIFY DTC P1603 DETECTED AGAIN** • Clear DTC from memory using NGS tester generic OBD-II function. • Turn ignition key to OFF, then start engine. • Is same DTC present?	Yes	Perform code word reprogram procedure. (See 09-14-29 IMMOBILIZER SYSTEM REPROGRAMMING PROCEDURE)
		No	Go to next step.
3	**VERIFY TROUBLESHOOTING OF DTC P1603 COMPLETED** • Clear DTC from memory using NGS tester generic OBD-II function. • Turn ignition key to OFF, then start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1604 [KL]

Z6U010201083W66

DTC P1604	Key ID numbers are not registered in PCM
DETECTION CONDITION	• Key ID numbers are not registered in PCM.
POSSIBLE CAUSE	• Immobilizer system reprogram procedure (key IDs) was not performed after replacing PCM.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service bulletins and/or on-line repair information availability. • Is any repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
2	**VERIFY DTC P1604 DETECTED AGAIN** • Clear DTC from memory using NGS tester generic OBD-II function. • Turn ignition key to OFF, then start engine. • Is same DTC present?	Yes	Perform key ID number reprogram procedure. (See 09-14-29 IMMOBILIZER SYSTEM REPROGRAMMING PROCEDURE)
		No	Go to next step.
3	**VERIFY TROUBLESHOOTING OF DTC P1604 COMPLETED** • Clear DTC from memory using NGS tester generic OBD-II function. • Turn ignition key to OFF, then start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1621 [KL]

Z6U010201083W67

DTC P1621	Code word does not match after engine cranking
DETECTION CONDITION	• Code word stored in PCM and Immobilizer unit does not match.
POSSIBLE CAUSE	• Immobilizer system reprogram procedure (code word) was not performed correctly after replacing immobilizer unit or PCM.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service bulletins and/or on-line repair information availability. • Is any repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
2	**VERIFY DTC P1621 DETECTED AGAIN** • Clear DTC from memory using NGS tester generic OBD-II function. • Turn ignition key to OFF, then start engine. • Is same DTC present?	Yes	Perform code word reprogram procedure. (See 09-14-29 IMMOBILIZER SYSTEM REPROGRAMMING PROCEDURE)
		No	Go to next step.
3	**VERIFY TROUBLESHOOTING OF DTC P1621 COMPLETED** • Clear DTC from memory using NGS tester generic OBD-II function. • Turn ignition key to OFF, then start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1622 [KL]

Z6U010201083W68

DTC P1622	Key ID number does not match
DETECTION CONDITION	• ID number stored in immobilizer unit (IU) and PCM does not match. This DTC is indicated only after immobilizer unit is replaced and reprogramming system.
POSSIBLE CAUSE	• Transformation of key ID number stored in PCM.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service bulletins and/or on-line repair information availability. • Is any repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
2	**VERIFY DTC P1622 DETECTED AGAIN** • Clear DTC from memory using NGS tester generic OBD-II function. • Turn ignition key to OFF, then start engine. • Is same DTC present?	Yes	Go to next step.
		No	Go to Step 4.
3	**CHECK ENGINE IS STARTING NORMALLY USING ANOTHER REGISTERED KEY** • Does engine start with another registered key?	Yes	Previous key is defective. Discard it.
		No	Go to next step.
4	**VERIFY TROUBLESHOOTING OF DTC P1622 COMPLETED** • Clear DTC from memory using NGS tester generic OBD-II function. • Turn ignition key to OFF, then start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.

STEP	INSPECTION		ACTION
5	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1623 [KL]

Z6U010201083W69

DTC P1623	Code word or key ID number read/write error in PCM
DETECTION CONDITION	• PCM internal EEPROM damaged.
POSSIBLE CAUSE	• PCM internal EEPROM damaged.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service bulletins and/or on-line repair information availability. • Is any repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
2	**VERIFY DTC P1623 DETECTED AGAIN** • Clear DTC from memory using NGS tester generic OBD-II function. • Turn ignition key to OFF, then start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
3	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1624 [KL]

Z6U010201083W70

DTC P1624	Immobilizer system communication counter = 0
DETECTION CONDITION	• PCM detected immobilizer system communication malfunction more than three times
POSSIBLE CAUSE	• Engine was attempted to start more than three times under malfunction. • Code word mismatch

Diagnostic procedure

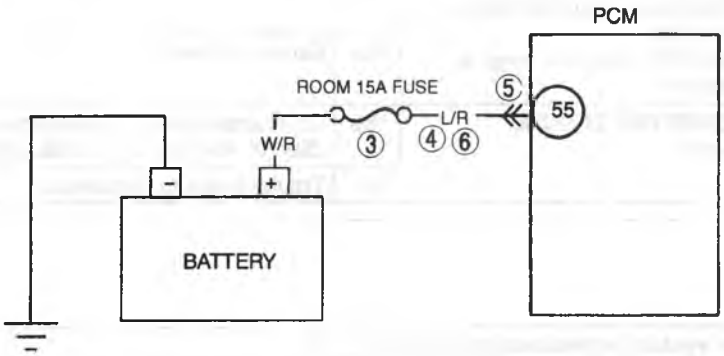
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service bulletins and/or on-line repair information availability. • Is any repair information available?	Yes	Perform repair or diagnostic according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
2	**FOLLOW OTHER DETECTED DTC FIRST** • Turn ignition key to OFF and to START. • Has P1602 been detected?	Yes	Go to DTC P1602 inspection. (See 01-02B-200 DTC P1602 [KL])
		No	Go to next step.
3	**INSPECT POOR CONNECTION OF IMMOBILIZER UNIT CONNECTOR** • Has P1621 been detected?	Yes	Go to DTC P1621 inspection. (See 01-02B-204 DTC P1621 [KL])
		No	Go to next step.
4	**VERIFY TROUBLESHOOTING OF DTC P1624 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Turn ignition key to OFF, then start engine. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.

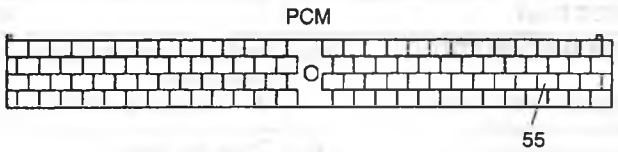
STEP	INSPECTION		ACTION
5	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1633 [KL]

Z6U010201083W71

DTC P1633	KAM voltage low
DETECTION CONDITION	• The PCM monitors the voltage of KAM terminal at PCM terminal 55. If the PCM detected B+ (battery positive terminal voltage) is **below 10 V** for **20 seconds**, the PCM determines that the KAM voltage circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycle. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC also detects KOEO/KOER Self-Test.
POSSIBLE CAUSE	• Meltdown ROOM fuse. • Open circuit in wiring between battery positive terminal and PCM terminal 55 • Poor connection of PCM connector. • PCM malfunction





HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Z6U0102W395

Troubleshooting Hint

Keep alive memory description

- The PCM stores information in keep alive memory (a memory integrated circuit chip) about vehicle operating conditions, and then uses this information to compensate for component variability. The keep alive memory remains powered when the ignition switch is off so that this information is not lost.

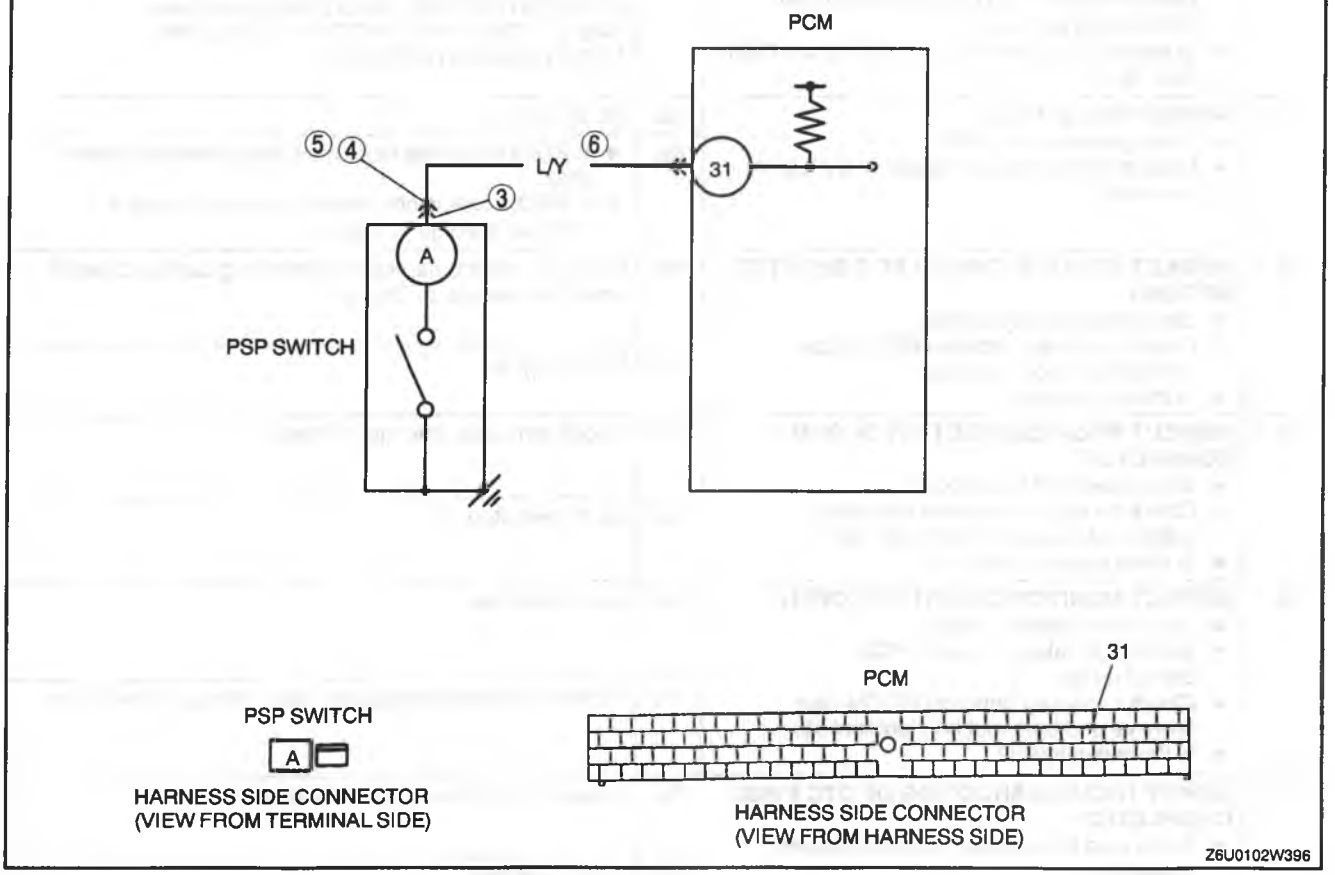
Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern is exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**INSPECT ROOM FUSE** • Turn ignition key to OFF. • Inspect ROOM fuse for failure and proper. • Is it okay?	Yes	Go to Step 4.
		No	• If ROOM fuse has been melt down, then go to next step. • If ROOM fuse is not installed correctly, install it correctly then go to Step 6.
3	**INSPECT MONITOR CIRCUIT FOR SHORT TO GROUND** • Disconnect battery cables. • Check continuity between ROOM fuse terminal and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground and install new fuse, then go to Step 6.
		No	Go to Step 6.
4	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is there any malfunctions?	Yes	Repair terminals, then go to Step 6.
		No	Go to next step.
5	**INSPECT MONITOR CIRCUIT FOR OPEN** • Disconnect battery cables. • Connect breakout box with PCM disconnected. • Check continuity between ROOM fuse terminal and breakout box terminal 55. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P1633 COMPLETED** • Make sure to reconnect all disconnected connectors. • Perform KOEO/KOER Self-Test. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1650 [KL]

Z6U010201083W72

DTC P1650	Power steering pressure (PSP) switch out of Self-Test range
DETECTION CONDITION	• The PCM monitors the input voltages from PSP signal. If voltage of PSP switch signal is below or above specified during KOEO/KOER Self-Test, PCM determines that the PSP switch circuit has malfunctioned.
POSSIBLE CAUSE	• PSP switch malfunction • Connector or terminal malfunction • Short to ground circuit in wiring between PSP switch terminal A and PCM terminal 31 • Short to power circuit in wiring between PSP switch terminal A and PCM terminal 31 • Open circuit In wiring between PSP switch terminal A and PCM terminal 31 • PCM malfunction



Troubleshooting Hint

PSP switch description

- The PSP switch completes the ground, when the steering wheel is turning.

Item	Normal	Steering wheel turning
PSP V PID	Approx. 5 V	Approx. 0 V
PSP PID	LOW	HIGH
PSP switch	OFF	ON
PCM terminal 31	Approx. 5 V	Approx. 0 V

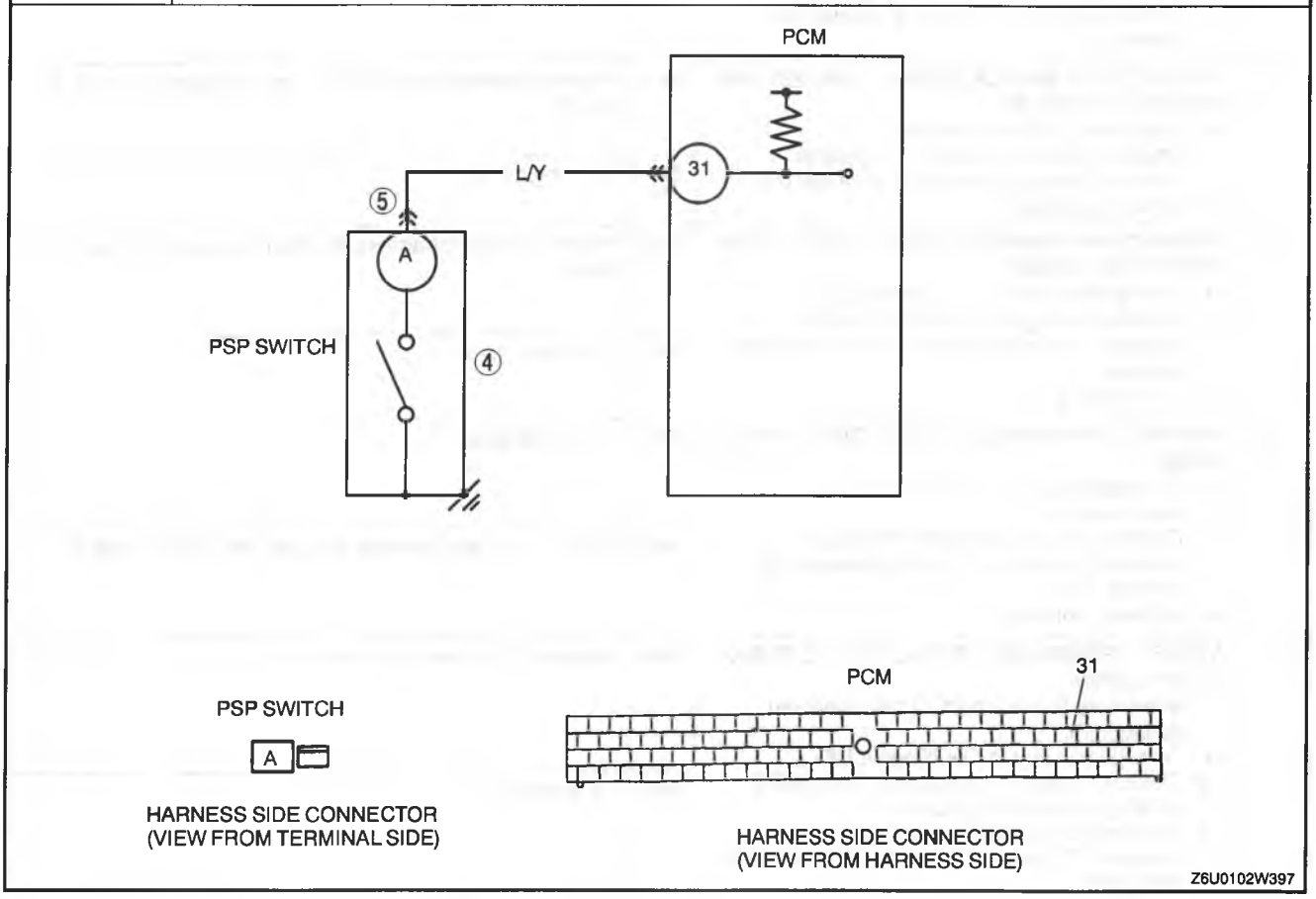
Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern is exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**INSPECT PSP SWITCH** • Turn ignition key to OFF. • Disconnect PSP switch connector. • Start engine and let it at idle. • Check continuity between PSP switch terminal (part-side) and body ground. • Is there any continuity while turning the steering?	Yes	Go to next step.
		No	Replace PSP switch, then go to Step 6.
3	**INSPECT PSP SWITCH SIGNAL CIRCUIT FOR SHORT TO GROUND** • Disconnect PCM connector. • Check continuity between PSP switch terminal (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to Step 6.
		No	Go to next step.
4	**INSPECT PSP SWITCH SIGNAL CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (Engine OFF). • Measure voltage between PSP switch connector terminal (harness-side) and body ground. • Is voltage B+?	Yes	Repair or replace harness for short to power, then go to Step 6.
		No	Go to next step.
5	**INSPECT PSP SWITCH SIGNAL CIRCUIT FOR OPEN** • Connect breakout box with PCM disconnected. • Check continuity between PSP switch terminal (harness-side) and breakout box terminal 31. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness for open, then go to Step 7.
6	**VERIFY TROUBLESHOOTING OF DTC P1650 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOEO/KOER Self-Test. • Is same DTC present during KOEO or KOER Self-Test?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Perform "DTC CONFIRMATION PROCEDURE". (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1652 [KL]

Z6U010201083W73

DTC P1652	PSP switch circuit malfunction
DETECTION CONDITION	• The PCM monitors PSP switch signal at PCM terminal 31. If input voltage is low voltage (switch stays on) for **1 minute** when the VSS is above **60.2 km/h {37.4 mph}** and ECT is above **60°C {140°F}**, the PCM determines that PSP switch circuit has malfunctioned. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during two consecutive drive cycles. • PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• PSP switch malfunction • Short to ground between PSP switch terminal and PCM terminal 31. • PCM malfunction



Z6U0102W397

Diagnostic procedure

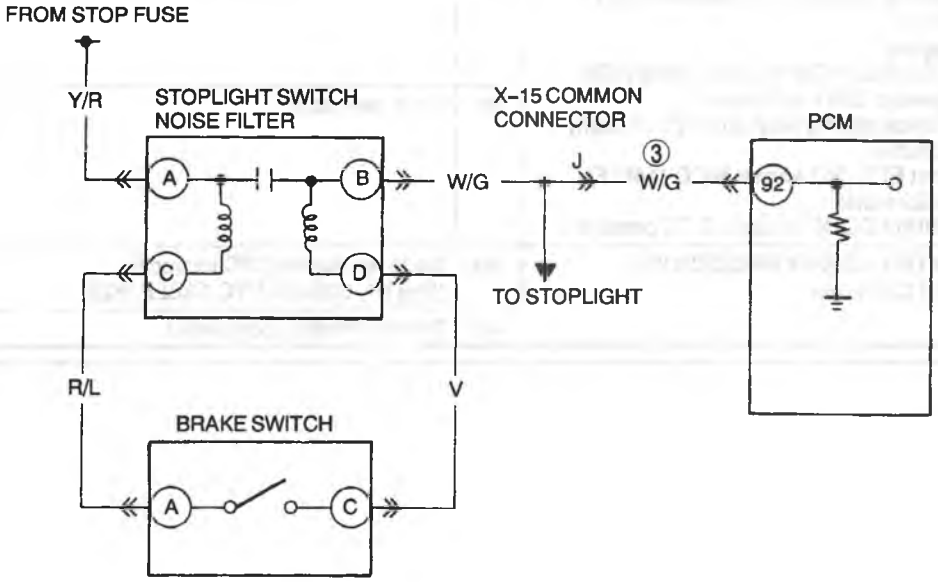
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, then go to next step.
		No	Go to next step.
3	**CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN** • Turn ignition key to ON (Engine OFF). • Access PSP SW PID using NGS tester. • Make sure that steering wheel is straight-ahead. • Is PSP SW PID ON?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])

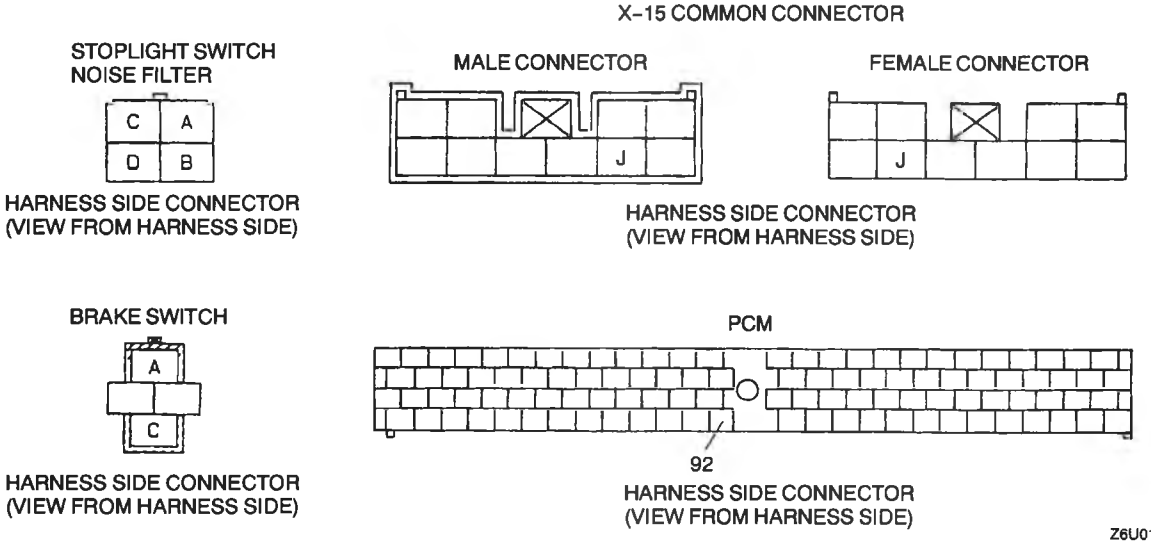
STEP	INSPECTION		ACTION
4	**INSPECT PSP SWITCH** • Turn ignition key to OFF. • Disconnect PSP switch connector. • Turn ignition key to ON (Engine OFF). • Is PSP SW PID OFF?	Yes	Replace the PSP switch, then go to Step 6.
		No	Go to next step.
5	**INSPECT PSP SWITCH SIGNAL CIRCUIT FOR SHORT TO GROUND** • Disconnect PCM connector. • Check continuity between PSP switch terminal (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness for short to ground, then go to next step.
		No	Go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P1652 COMPLETED** • Make sure to reconnect all disconnected connectors. • Start engine. • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Drive vehicle **above 60.2 km/h {37.4 mph}** for **1 minutes**. • Verify that ECT PID **above 60°C {140°F}** using NGS tester. • Is PENDING CODE of same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

DTC P1703 [KL]

Z6U010201083W74

DTC P1703	Brake switch circuit out of self-test range
DETECTION CONDITION	• If the PCM detects the brake switch voltage at PCM terminal change ON to OFF or OFF to ON, the PCM determines that a circuit has malfunctioned.
POSSIBLE CAUSE	• Brake switch malfunction • Stoplight switch noise filter • Connector or terminal malfunction • Open circuit between STOP fuse and stoplight switch terminal A • Open circuit between stoplight switch noise filter terminal C and brake switch A • Open circuit between stoplight switch noise filter terminal D and brake switch C • Short to power circuit between stoplight switch noise filter terminal D and brake switch C • Open circuit between stoplight switch noise filter terminal B and PCM terminal 92 • Short to ground circuit between stoplight switch noise filter terminal B and PCM terminal 92





Z6U0102W414

Troubleshooting Hint

Brake switch description

- A normally open type brake switch is used. Therefore when depress the brake pedal, the brake switch become ON (continuity), and release the brake pedal, the brake switch become OFF (no continuity).
- The brake switch signal uses the following controls.
  —Idle air control
  —Fuel injector control

Brake switch specification

Brake pedal condition	Depressed	Released
Brake switch	ON	OFF
Brake switch terminal C	B+	0 V
BOO PID	ON	OFF
Stoplight switch noise filter terminal D and B	B+	0 V
PCM terminal 92	B+	0 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC CONFIRMATION PROCEDURE. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER Self-Test?	Yes	Go to next step.
		No	Intermittent concern is exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**CLASSIFY BRAKE SWITCH SIGNAL CIRCUIT OR BRAKE LIGHT SYSTEM MALFUNCTION** • Verify stoplight condition as follows — Brake pedal depressed: ON — Brake pedal released: OFF • Is stoplight as following condition?	Yes	Go to next step.
		No	Malfunction at brake light system. Refer to SIGNAL LIGHTING SYSTEM SYMPTOM TROUBLESHOOTING. Then go to Step 4.
3	**CHECK BRAKE SWITCH SIGNAL CIRCUIT FOR OPEN** • Turn ignition key to ON (Engine OFF). • Access BOO PID using NGS tester. • Verify BOO PID as follows — Brake pedal depressed: ON — Brake pedal released: OFF • Is BOO PID as follows?	Yes	Go to next step.
		No	• If BOO PID stays ON, repair for short to power, then go to next step. • If BOO PID stays OFF, repair for open circuit, then go to next step.
4	**VERIFY TROUBLESHOOTING OF DTC P0703, P1703 COMPLETED** • Make sure to reconnect all disconnected connectors. • Turn ignition key to ON (Engine OFF). • Clear DTC from PCM memory using NGS tester generic OBD-II function. • Perform KOER Self-Test. • Is same DTC present?	Yes	Replace PCM, then go to next step.
		No	Go to next step.
5	**VERIFY AFTER REPAIR PROCEDURE** • Is any DTC present?	Yes	Go to applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL])
		No	Troubleshooting completed.

01-03A SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

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CONTROL SYSTEM DEVICE AND CONTROL RELATIONSHIP CHART [FS]

Z6U010318881W01

× : Applicable

	Component	Item												
		Idle air control	Variable tumble control system (VTCS) control*2	Fuel injection control	Fuel pump control	Pressure regulator control (PRC)	Electronic spark advance (ESA) control	EGR control	Purge control	Heated oxygen sensor (HO2S) heater control	A/C cut-off control	Electrical fan control	Monitoring system: Evaporative system monitor	Monitoring system: EGR system monitor
Input	Mass air flow sensor	×		×			×	×	×				×	×
	Camshaft position sensor			×*1			×*1						×*1	×*1
	Crankshaft position sensor	×	×	×*1	×	×	×*1	×	×		×	×	×*1	×*1
	Throttle position sensor	×	×	×		×	×	×	×		×		×	×
	Engine coolant temperature sensor	×	×	×		×	×	×	×		×	×	×	×
	Intake air temperature sensor	×		×		×	×		×	×		×	×	
	Knock sensor			×			×							
	Heated oxygen sensor			×					×					
	Vehicle speed sensor			×				×	×			×	×	×
	EGR boost sensor												×	×
	Fuel gauge sender unit												×	
	Power steering pressure switch	×		×						×				
	Neutral switch (MTX only)	×		×		×	×	×	×					
	Clutch switch (MTX only)	×		×		×	×	×	×					
	Transaxle range switch (ATX only)	×		×		×	×	×	×					
	Brake switch	×		×										
	Ignition switch												×	
	A/C switch, Refrigerant pressure switch (A/C equipped only)	×		×							×	×		
Output	Idle air control valve	×												
	VTCS solenoid valve		×											
	Fuel injector			×										
	Fuel pump relay				×									
	CPU					×								
	Ignition coil						×							
	EGR valve							×						
	Purge solenoid valve								×					
	Heated oxygen sensor heater									×				
	EGR boost sensor solenoid valve													×
	Canister drain cut valve (CDCV)												×	
	A/C relay										×			
	Cooling fan relay											×		
	Condenser fan relay											×		

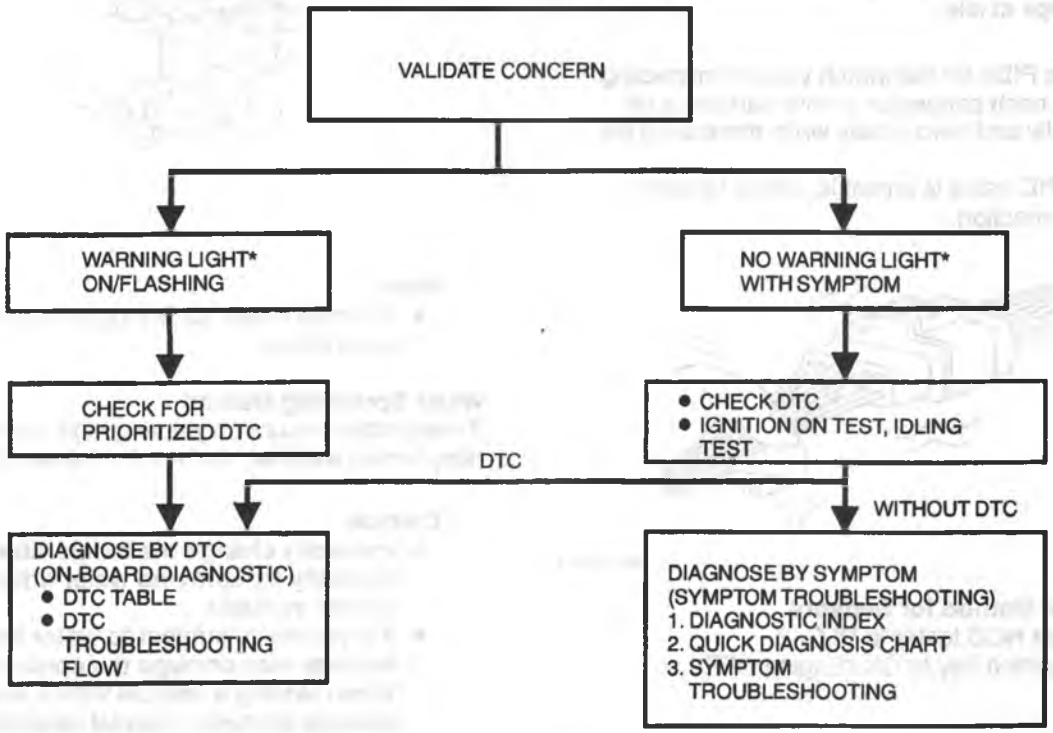
*1 : The crankshaft position sensor signal has priority in the engine speed for these control.

Z6U0103W003

FOREWORD [FS]

Z6U010318881W02

- When the customer reports a vehicle malfunction, check the malfunction indicator light (MIL) indication and diagnostic trouble code (DTC), then diagnose the malfunction according to following flowchart.
  - —If the DTC exists, diagnose the applicable DTC inspection. (See 01-02A-24 DTC TABLE [FS].)
  - —If the DTC does not exist and the MIL does not illuminate or flash, diagnose the applicable symptom troubleshooting. (See 01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS].)



Z6U0102W316

* : Malfunction Indicator Lamp (MIL), Generator Warning Light, Security Light

INTERMITTENT CONCERN TROUBLESHOOTING [FS]

Z6U010318881W03

Vibration Method

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

Note

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

Inspection Method for Switch Connectors or Wires

1. Connect NGS tester to DLC-2.
2. Turn ignition key to ON (Engine OFF).

Note

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

3. Access PIDs for the switch you are inspecting.
4. Turn switch on manually.
5. Shake each connector or wire harness a bit vertically and horizontally while monitoring the PID.
   - If PID value is unstable, check for poor connection.



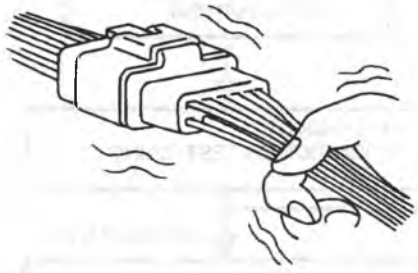
YMU103WC0

Inspection Method for Sensor Connectors or Wires

1. Connect NGS tester to DLC-2.
2. Turn ignition key to ON (Engine OFF).

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

3. Access PIDs for the switch you are inspecting.
4. Shake each connector or wire harness a bit vertically and horizontally while monitoring the PID.
   - If PID value is unstable, check for poor connection.



YMU103WC1

Inspection Method for Sensors

1. Connect NGS tester to DLC-2.
2. Turn ignition key to ON (Engine OFF).

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

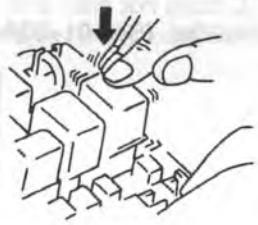
3. Access PIDs for the switch you are inspecting.
4. Vibrate the sensor slightly with your finger.
   - If PID value is unstable or malfunction occurs, check for poor connection and/or poorly mounted sensor.

Inspection Method for Actuators or Relays

1. Turn ignition key to ON (Engine OFF).

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

2. Operate each actuator or relay, referring to PCM terminal voltage table.
3. Vibrate the actuator or relay with your finger.
   - If variable click sound is heard, check for poor connection and/or poorly mounted actuator or relay.



YMU103WC2

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

Water Sprinkling Method

If malfunction occurs only during high humidity or rainy/snowy weather, perform the following steps.

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

1. Connect NGS tester to DLC-2 if you are inspecting sensors or switches.
2. Turn ignition key to ON (Engine OFF).

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

3. Access PIDs for sensor or switch if you are inspecting sensors or switches.
4. If you are inspecting the switch, turn it on manually.
5. Spray water onto the vehicle or run it through a car wash.
   - If PID value is unstable or malfunction occurs, repair or replace part as necessary.



Y6U103WA6

SYMPTOM DIAGNOSTIC INDEX [FS]

Z6U010318881W04

No.	TROUBLESHOOTING ITEM		DESCRIPTION	PAGE
1	Melts of main or other fuses		—	(See 01-03A-13 NO.1 MELTS MAIN OR OTHER FUSE [FS])
2	MIL illuminates		MIL is illuminated incorrectly	(See 01-03A-14 NO.2 MIL ILLUMINATES [FS])
3	Will not crank		Starter does not work	(See 01-03A-14 NO.3 WILL NOT CRANK [FS])
4	Hard start/long crank/erratic start/erratic crank		Starter cranks engine at normal speed but engine requires excessive cranking	(See 01-03A-15 NO.4 HARD START/LONG CRANK/ERRATIC START/ERRATIC CRANK [FS])
5	Engine stalls	After start	Engine stops unexpectedly at idle and/or after start	(See 01-03A-17 NO.5 ENGINE STALLS-AFTER START, AT IDLE [FS])
		At idle		
6	Cranks normally but will not start		Starter cranks engine at normal speed but engine will not run	(See 01-03A-21 NO.6 CRANKS NORMALLY BUT WILL NOT START [FS])
7	Slow return to idle		Engine takes more time than normal to return to idle speed	(See 01-03A-24 NO.7 SLOW RETURN TO IDLE [FS])
8	Engine runs rough/rolling idle		Engine speed fluctuates between specified idle speed and lower speed and excessive engine shakes	(See 01-03A-25 NO.8 ENGINE RUNS ROUGH/ROLLING IDLE [FS])
9	Fast idle/runs on		Engine speed continues at fast idle after warm-up Engine runs after ignition switch is turned off	(See 01-03A-28 NO.9 FAST IDLE/RUNS ON [FS])
10	Low idle/stalls during deceleration		Engine stops unexpectedly at beginning of deceleration or recovery from deceleration	(See 01-03A-28 NO.10 LOW IDLE/STALLS DURING DECELERATION [FS])
11	Engine stalls/quits	Acceleration/ cruise	Engine stops unexpectedly at beginning of acceleration or during acceleration Engine stops unexpectedly while cruising	(See 01-03A-30 NO.11 ENGINE STALLS/QUITS, ENGINE RUNS ROUGH, MISSES, BUCK/JERK, HESITATION/STUMBLE, SURGES [FS])
	Engine runs rough	Acceleration/ cruise	Engine speed fluctuates during acceleration or cruising	
	Misses	Acceleration/ cruise	Engine misses during acceleration or cruising	
	Buck/jerk	Acceleration/ cruise/ deceleration	Vehicle bucks/jerks during acceleration, cruising, or deceleration	
	Hesitation/ stumble	Acceleration	Momentary pause at beginning of acceleration, or during acceleration	
	Surges	Acceleration/ cruise	Momentary minor irregularity in engine output	
12	Lack/loss of power	Acceleration/ cruise	Performance poor under load (i.e., power down when climbing hills)	(See 01-03A-33 NO.12 LACK/LOSS OF POWER-ACCELERATION/CRUISE [FS])
13	Knocking/pinging	Acceleration/ cruise	Sound is produced when air/fuel mixture is ignited by something other than spark plug (i.e., hot spot in combustion chamber)	(See 01-03A-35 NO.13 KNOCKING/PINGING-ACCELERATION/CRUISE [FS])
14	Poor fuel economy		Fuel economy unsatisfactory	(See 01-03A-36 NO.14 POOR FUEL ECONOMY [FS])
15	Emissions compliance		Fails emissions test	(See 01-03A-38 NO.15 EMISSION COMPLIANCE [FS])

No.	TROUBLESHOOTING ITEM		DESCRIPTION	PAGE
16	High oil consumption/leaks		Oil consumption is excessive	(See 01-03A-39 NO.16 HIGH OIL CONSUMPTION/LEAKS [FS])
17	Cooling system concerns	Overheating	Engine runs at higher than normal temperature/overheats	(See 01-03A-40 NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [FS])
18	Cooling system concerns	Runs cold	Engine does not reach normal operating temperature	(See 01-03A-41 NO.18 COOLING SYSTEM CONCERNS-RUNS COLD [FS])
19	Exhaust smoke		Blue, black, or white smoke from exhaust system	(See 01-03A-42 NO.19 EXHAUST SMOKE [FS])
20	Fuel odor (in engine compartment)		Gasoline fuel smell or visible leaks	(See 01-03A-43 NO.20 FUEL ODOR (IN ENGINE COMPARTMENT) [FS])
21	Engine noise		Engine noise from under hood	(See 01-03A-44 NO.21 ENGINE NOISE [FS])
22	Vibration concerns (engine)		Vibration from under hood or driveline	(See 01-03A-45 NO.22 VIBRATION CONCERNS (ENGINE) [FS])
23	A/C does not work		A/C compressor magnetic clutch does not engage when A/C is turned on	(See 01-03A-45 NO.23 A/C DOES NOT WORK [FS])
24	A/C always on/A/C compressor runs continuously		A/C compressor magnetic clutch does not disengage	(See 01-03A-46 NO.24 A/C ALWAYS ON/A/C COMPRESSOR RUNS CONTINUOUSLY [FS])
25	A/C does not cut off under wide open throttle conditions		A/C compressor magnetic clutch does not disengage under wide open throttle	(See 01-03A-47 NO.25 A/C DOES NOT CUT OFF UNDER WIDE OPEN THROTTLE CONDITION [FS])
26	Exhaust sulphur smell		Rotten egg smell (sulphur) from exhaust	(See 01-03A-48 NO.26 EXHAUST SULPHUR SMELL [FS])
27	Fuel refill concerns		Fuel tank does not fill smoothly	(See 01-03A-49 NO.27 FUEL REFILL CONCERNS [FS])
28	Fuel refilling shut off issues		Fuel refill does not shut off properly	(See 01-03A-49 NO.28 FUEL FILLING SHUT OFF ISSUES [FS])
29	Constant voltage		Incorrect reference voltage	(See 01-03A-50 NO.29 CONSTANT VOLTAGE [FS])
30	Spark plug condition		Incorrect spark plug condition	(See 01-03A-52 NO.30 SPARK PLUG CONDITION [FS])
31	ATX concerns	Upshift/downshift/ engagement	ATX concerns not related to engine performance	(See 05-03A-7 Diagnosis Index)

SYMPTOM QUICK DIAGNOSIS CHART [FS]

Z6U010318881W05

× : Applicable

Troubleshooting item			Possible factor	MECHANICAL							LUBRICATION			COOLING SYSTEM						
				Improper engine compression	Improper valve timing	Hydrolocked engine	Base engine malfunction	Drive plate or flywheel is seized.	Improper tension or damaged drive belts	Engine or transaxle mounts improperly installed.	Improper engine oil level	Improper engine oil viscosity	Improper dipstick	Improper engine coolant level	Water and anti-freeze mixture improper.	Cooling system malfunction (Radiator, hoses, overflow system, thermostat, etc.)	Cooling fan system malfunction	Cooling fan or condenser fan seat improper.	Engine overheating	Condenser fan system malfunction
1	Melts main or other fuse																			
2	MIL Illuminates																			
3	Will not crank					×		×												
4	Hard start/long crank/erratic start/erratic crank																			
5	Engine stalls.	After start/at idle		×	×	×													×	×
6	Cranks normally but will not start			×	×	×													×	
7	Slow return to idle															×				
8	Engine runs rough/rolling idle			×	×														×	×
9	Fast idle/runs on																			
10	Low idle/stalls during deceleration																			
11	Engine stalls/quits.	Acceleration/cruise		×	×														×	
	Engine runs rough.	Acceleration/cruise		×	×														×	
	Misses	Acceleration/cruise		×	×															
	Buck/jerk	Acceleration/cruise/ deceleration		×	×														×	
	Hesitation/stumble	Acceleration		×	×														×	
	Surges	Acceleration/cruise		×	×														×	
12	Lack/loss of power	Acceleration/cruise		×	×														×	
13	Knocking/pinging	Acceleration/cruise		×										×		×	×		×	
14	Poor fuel economy			×	×									×		×	×			×
15	Emissions compliance			×	×		×									×				
16	High oil consumption/leakage						×					×	×							
17	Cooling system concerns	Overheating							×					×	×	×	×	×		×
18	Cooling system concerns	Runs cold														×	×			×
19	Exhaust smoke						×									×				
20	Fuel odor (in engine compartment)																			
21	Engine noise						×		×		×									
22	Vibration concerns (engine)								×	×								×		
23	A/C does not work sufficiently																			×
24	A/C always on/A/C compressor runs continuously.																			×
25	A/C does not cut off under wide open throttle conditions.																			
26	Exhaust sulphur smell																			
27	Fuel refill concerns																			
28	Fuel filling shut off issues																			
29	Constant voltage																			
30	Spark plug condition			×			×					×			×					
31	ATX concerns	Upshift/downshift/ engagement		See 05-03A AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [LA4A-EL]																

Z6U0103W005

×: Applicable

Possible factor / Troubleshooting item			INTAKE-AIR SYSTEM							FUEL SYSTEM							
			Accelerator cable free play misadjustment	Air cleaner element clogging or restriction	Air leakage from intake-air system (Loose tubes, cracks, gaskets breakage)	IAC valve improper operation	Throttle body malfunction	VTCS malfunction	Vacuum leakage (Vacuum hose damage, misrouting)	Fuel quality	Fuel pump malfunction (Mechanically or electrically)	Pressure regulator malfunction	Fuel hoses restriction or clogging	Injectors malfunction (Leakage or clogging, inoperative)	Fuel leakage from fuel system (Including insulator, injector O-ring)	Fuel filters restriction or clogging	Improper operation of PRC solenoid valve
1	Melts main or other fuse																
2	MIL illuminates																
3	Will not crank																
4	Hard start/long crank/erratic start/erratic crank			×	×				×	×	×	×	×			×	×
5	Engine stalls.	After start/at idle		×	×	×			×	×	×	×	×	×	×		
6	Cranks normally but will not start			×	×	×			×	×	×	×	×	×	×		
7	Slow return to idle				×		×										
8	Engine runs rough/rolling idle			×	×	×			×	×	×	×	×	×		×	
9	Fast idle/runs on		×				×										
10	Low idle/stalls during deceleration				×	×			×								
11	Engine stalls/quits.	Acceleration/cruise		×	×		×		×	×	×	×	×	×	×	×	
	Engine runs rough.	Acceleration/cruise		×	×		×		×	×	×	×	×	×	×	×	×
	Misses	Acceleration/cruise		×	×		×		×	×	×	×	×	×	×	×	×
	Buck/jerk	Acceleration/cruise/ deceleration		×	×		×		×	×	×	×	×	×	×	×	×
	Hesitation/stumble	Acceleration		×	×		×		×	×	×	×	×	×	×	×	×
	Surges	Acceleration/cruise		×	×		×		×	×	×	×	×	×	×	×	×
12	Lack/loss of power	Acceleration/cruise		×	×			×	×	×	×	×	×			×	×
13	Knocking/pinging	Acceleration/cruise									×	×	×	×	×	×	
14	Poor fuel economy			×				×		×	×	×	×	×		×	×
15	Emissions compliance			×	×				×		×	×	×	×		×	
16	High oil consumption/leakage																
17	Cooling system concerns Overheating																
18	Cooling system concerns	Runs cold															
19	Exhaust smoke			×							×	×	×	×			×
20	Fuel odor (in engine compartment)											×			×		
21	Engine noise				×				×								
22	Vibration concerns (engine)																
23	A/C does not work sufficiently																
24	A/C always on/A/C compressor runs continuously.																
25	A/C does not cut off under wide open throttle conditions.																
26	Exhaust sulphur smell									×		×					
27	Fuel refill concerns																
28	Fuel filling shut off issues																
29	Constant voltage																
30	Spark plug condition			×						×	×	×	×	×	×		
31	ATX concerns	Upshift/downshift/ engagement	See 05-03A AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [LA4A-EL]														

Z6U0103W006

× : Applicable

Troubleshooting item		Possible factor	EXHAUST SYSTEM		EMISSION SYSTEM			CHARGING SYSTEM		IGNITION SYSTEM					STARTING SYSTEM			CRUISE CONTROL SYSTEM	
			Exhaust system restriction or clogging	Catalytic converter malfunction	EGR system malfunction	EVAP control system malfunction	PCV valve malfunction	Low or dead battery	Charging system malfunction	Initial ignition timing misadjustment (CKP and crankshaft pulley misadjustment)	Ignition coil malfunction (e.g. open, short or cracks)	External condenser malfunction	Spark plug malfunction	High-tension leads malfunction (Cracks, open, low resistance)	Starter motor malfunction (Mechanical or electrical)	Starter interlock switch (Open)	Starter circuit including ignition switch open	Cruise control system malfunction	Cruise control cable free play misadjustment
1	Melts main or other fuse																		
2	MIL illuminates																		
3	Will not crank							×	×						×	×	×		
4	Hard start/long crank/erratic start/erratic crank		×		×	×	×						×	×					
5	Engine stalls.	After start/at idle	×	×	×	×	×			×	×	×	×	×					
6	Cranks normally but will not start		×		×	×	×			×	×	×	×	×					
7	Slow return to idle																		
8	Engine runs rough/rolling idle		×		×	×	×			×			×	×					
9	Fast idle/runs on																		×
10	Low idle/stalls during deceleration					×													
11	Engine stalls/quits.	Acceleration/cruise	×	×	×	×	×						×	×				×	
	Engine runs rough.	Acceleration/cruise	×	×	×	×	×				×		×	×				×	
	Misses	Acceleration/cruise	×	×	×	×	×				×		×	×					
	Buck/jerk	Acceleration/cruise/ deceleration	×	×	×	×	×				×		×	×				×	
	Hesitation/stumble	Acceleration	×	×	×	×	×				×		×	×				×	
	Surges	Acceleration/cruise	×	×	×	×	×				×		×	×				×	
12	Lack/loss of power	Acceleration/cruise	×		×	×	×						×	×					
13	Knocking/pinging	Acceleration/cruise																	
14	Poor fuel economy		×				×						×	×					
15	Emissions compliance		×	×	×	×	×						×	×					
16	High oil consumption/leakage						×												
17	Cooling system concerns	Overheating																	
18	Cooling system concerns	Runs cold																	
19	Exhaust smoke						×						×	×					
20	Fuel odor (in engine compartment)					×													
21	Engine noise																		
22	Vibration concerns (engine)																		
23	A/C does not work sufficiently																		
24	A/C always on/A/C compressor runs continuously.																		
25	A/C does not cut off under wide open throttle conditions.																		
26	Exhaust sulphur smell					×													
27	Fuel refill concerns					×													
28	Fuel filling shut off issues					×													
29	Constant voltage																		
30	Spark plug condition												×						
31	ATX concerns	Upshift/downshift/ engagement	See 05-03A AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [LA4A-EL]																

Z6U0103W007

× : Applicable

Possible factor / Troubleshooting item			CONTROL SYSTEM													
			CKP sensor damaged (e.g. open or short circuits).	Crankshaft pulley damaged	Improper gap between CKP sensor and crankshaft pulley	CMP sensor damaged (e.g. open or short circuit).	Camshaft is damaged	Improper gap between CMP sensor and camshaft	Improper air/fuel mixture ratio control	V-reference supply circuit malfunction	Main relay malfunction (Mechanically or electrically)	ECT sensor malfunction	TR switch misadjustment	P/N position switch in TR switch open	Brake switch and related circuit malfunction	Neutral or clutch switch and related circuit malfunction
1	Melts main or other fuse															
2	MIL illuminates															
3	Will not crank												×	×		
4	Hard start/long crank/erratic start/erratic crank		×	×	×	×			×							
5	Engine stalls.	After start/at idle	×	×	×		×	×	×							
6	Cranks normally but will not start		×	×	×	×		×	×	×	×					
7	Slow return to idle											×				
8	Engine runs rough/rolling idle		×	×	×	×	×	×	×							
9	Fast idle/runs on											×				
10	Low idle/stalls during deceleration								×						×	×
11	Engine stalls/quits.	Acceleration/cruise	×	×	×	×	×	×	×							×
	Engine runs rough.	Acceleration/cruise	×	×	×	×	×	×	×							×
	Misses	Acceleration/cruise	×	×	×	×	×	×	×							
	Buck/jerk	Acceleration/cruise/ deceleration	×	×	×	×	×	×	×							×
	Hesitation/stumble	Acceleration	×	×	×	×	×	×	×							×
	Surges	Acceleration/cruise	×	×	×	×	×	×	×							×
12	Lack/loss of power	Acceleration/cruise	×		×	×	×	×	×							×
13	Knocking/pinging	Acceleration/cruise														
14	Poor fuel economy					×	×	×				×				
15	Emissions compliance		×		×	×	×	×	×			×				
16	High oil consumption/leakage															
17	Cooling system concerns Overheating															
18	Cooling system concerns	Runs cold														
19	Exhaust smoke															
20	Fuel odor (in engine compartment)															
21	Engine noise															
22	Vibration concerns (engine)															
23	A/C does not work sufficiently															
24	A/C always on/A/C compressor runs continuously.															
25	A/C does not cut off under wide open throttle conditions.															
26	Exhaust sulphur smell															
27	Fuel refill concerns															
28	Fuel filling shut off issues															
29	Constant voltage															
30	Spark plug condition								×			×				
31	ATX concerns	Upshift/downshift/ engagement	See 05-03A AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [LA4A-EL]													

Z6U0103W008

× : Applicable

Possible factor / Troubleshooting item			CONTROL SYSTEM											CLUTCH	SUSPENSION
			MAF sensor and related circuit malfunction	TP sensor and related circuit malfunction	TP sensor misadjustment (including looseness)	Knock sensor and related circuit malfunction	Immobilizer system malfunction	FEPS circuit malfunction	P/S pressure switch and related circuit malfunction	Improper refrigerant charging amount	A/C relay (A/C control signal) circuit malfunction	Improper load signal input	VSS and related circuit malfunction	Clutch slippage	Suspension malfunction
1	Melts main or other fuse														
2	MIL illuminates														
3	Will not crank														
4	Hard start/long crank/erratic start/erratic crank		×												
5	Engine stalls.	After start/at idle					×			×	×				
6	Cranks normally but will not start						×	×							
7	Slow return to idle											×			
8	Engine runs rough/rolling idle								×	×	×	×			
9	Fast idle/runs on											×			
10	Low idle/stalls during deceleration		×	×	×										
11	Engine stalls/quits.	Acceleration/cruise	×	×	×				×	×	×		×	×	
	Engine runs rough.	Acceleration/cruise	×	×	×				×	×	×		×	×	
	Misses	Acceleration/cruise	×	×	×								×		
	Buck/jerk	Acceleration/cruise/ deceleration	×	×	×				×	×	×		×	×	
	Hesitation/stumble	Acceleration	×	×	×				×	×	×		×	×	
	Surges	Acceleration/cruise	×	×	×				×	×	×		×	×	
12	Lack/loss of power	Acceleration/cruise	×	×	×				×	×	×		×	×	
13	Knocking/pinging	Acceleration/cruise			×	×									
14	Poor fuel economy		×	×	×										
15	Emissions compliance		×	×	×										
16	High oil consumption/leakage														
17	Cooling system concerns	Overheating								×	×				
18	Cooling system concerns	Runs cold									×				
19	Exhaust smoke														
20	Fuel odor (in engine compartment)														
21	Engine noise														
22	Vibration concerns (engine)														×
23	A/C does not work sufficiently								×	×	×				
24	A/C always on/A/C compressor runs continuously.										×				
25	A/C does not cut off under wide open throttle conditions.			×	×	×									
26	Exhaust sulphur smell														
27	Fuel refill concerns														
28	Fuel filling shut off issues														
29	Constant voltage		×	×					×		×				
30	Spark plug condition		×												
31	ATX concerns	Upshift/downshift/ engagement	See 05-03A AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [LA4A-EL]												

Z6U0103W009

×: Applicable

Possible factor / Troubleshooting item			DRIVE-LINE	BRAKE	ATX		OTHERS	
			Drive line malfunction	Brake dragging	ATX related parts malfunction	Improper ATF level	Improper balance of wheels and tires	Loosen parts
1	Melts main or other fuse							
2	MIL illuminates							
3	Will not crank							
4	Hard start/long crank/erratic start/erratic crank							
5	Engine stalls.	After start/at idle						
6	Cranks normally but will not start							
7	Slow return to idle							
8	Engine runs rough/rolling idle							
9	Fast idle/runs on							
10	Low idle/stalls during deceleration				×			
11	Engine stalls/quits.	Acceleration/cruise			×			
	Engine runs rough.	Acceleration/cruise			×			
	Misses	Acceleration/cruise						
	Buck/jerk	Acceleration/cruise/deceleration			×			
	Hesitation/stumble	Acceleration			×			
	Surges	Acceleration/cruise			×			
12	Lack/loss of power	Acceleration/cruise		×	×	×		
13	Knocking/pinging	Acceleration/cruise						
14	Poor fuel economy			×		×		
15	Emissions compliance							
16	High oil consumption/leakage							
17	Cooling system concerns Overheating							
18	Cooling system concerns	Runs cold						
19	Exhaust smoke							
20	Fuel odor (in engine compartment)							
21	Engine noise							×
22	Vibration concerns (engine)		×				×	
23	A/C does not work sufficiently							
24	A/C always on/A/C compressor runs continuously.							
25	A/C does not cut off under wide open throttle conditions.							
26	Exhaust sulphur smell							
27	Fuel refill concerns							
28	Fuel filling shut off issues							
29	Constant voltage				×			
30	Spark plug condition							
31	ATX concerns	Upshift/downshift/engagement	See 05-03A AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [LA4A-EL]					

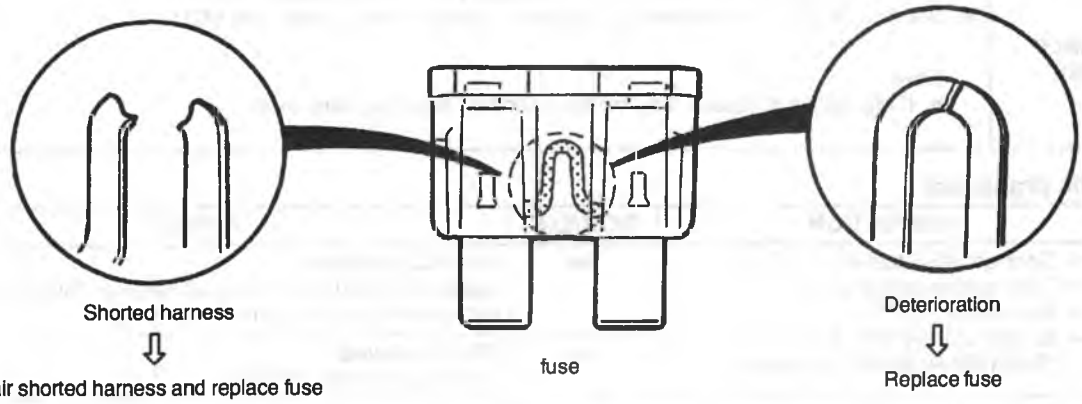
Z6U0103W010

NO.1 MELTS MAIN OR OTHER FUSE [FS]

Z6U010318881W06

1	Melts main or other fuse

[TROUBLESHOOTING HINTS]
Check the condition of the fuse



Damaged Fuse	Related Wiring Harness
MAIN (100 A)	Main fuse — Generator
BTN (40 A)	BTN fuse — ROOM fuse
ROOM (15 A)	ROOM fuse — PCM terminal
EGI INJ (30 A)	Main relay — Fuel injectors Generator EGR boost solenoid valve PRC solenoid valve EGR valve Idle air control valve Purge solenoid valve Tank pressure control valve Mass air flow sensor Fuel pump relay VRIS solenoid valve No.1 VRIS solenoid valve No.2 Heated oxygen sensor heater Solenoid body
ENGINE (10 A)	ENGINE fuse — Main relay Fuel pump relay
METER (15 A)	METER fuse — Transaxle range switch

W6U101WHP

NO.2 MIL ILLUMINATES [FS]

Z6U010318881W07

2	Mil illuminates
DESCRIPTION	• Mil is illuminated incorrectly.
POSSIBLE CAUSE	• PCM illuminates for emission-related concern (DTCs are stored in PCM.) • Short to GND circuit between MIL (located on instrument cluster) and PCM **Note** • If MIL blinks at steady rate, misfire condition could possibly exist.

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Connect NGS tester to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is "NO CODES RECEIVED" or "SYSTEM PASSED" displayed?	Yes	**No DTC displayed:** Inspect for short to GND circuit between MIL (located on instrument cluster) and PCM terminal 2.
		No	**DTC displayed:** Go to appropriate DTC test.
2	• Verify test results. If okay, return to diagnostic index to service any additional symptoms. • If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis. — If vehicle is repaired, troubleshooting is completed. — If vehicle is not repaired or additional diagnostic information is not available, replace or reprogram PCM.		

NO.3 WILL NOT CRANK [FS]

Z6U010318881W08

3	Will not crank
DESCRIPTION	• Starter does not work
POSSIBLE CAUSE	• Open starter circuit between ignition switch and starter • Transaxle range switch malfunction (ATX) • Transaxle range switch misadjustment (ATX) • Starter interlock switch malfunction (MTX) • Starter malfunction • Seized/hydrolocked engine, flywheel or drive plate

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Verify following(s): — Battery connection. — Automatic transaxle in Park or Neutral. — Clutch fully depressed (MTX). — Fuses. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary and repeat Step 1.
2	• Is clicking sound heard from starter when ignition switch is turned to START?	Yes	Go to next step.
		No	Go to Step 3.
3	• Check starting system. (See 01-19-3 STARTER INSPECTION) • Is starting system okay?	Yes	Check for seized/hydrolocked engine, flywheel or drive plate.
		No	Service as required.
4	• Do any other electrical accessories work?	Yes	Go to next step.
		No	Check charging system. (See 01-17-3 GENERATOR INSPECTION)

STEP	INSPECTION		ACTION
5	**Note** • Following test should be performed on automatic transaxles only. For manual transaxles, go to next step. • Connect NGS tester to DLC. • Access CPP/PNP PID. • Turn ignition switch on. • Is CPP/PNP PID indicated ON when selecting P or N range?	Yes	Go to next step.
		No	Check for adjustment of transaxle range switch. If transaxle range switch is adjusted properly, check for open circuit of transaxle range switch and related circuit.
6	• Retrieve and record any continuous memory DTCs. • Is any continuous memory DTC displayed?	Yes	DLC displayed. Go to appropriate DTC test.
		No	No DTC displayed. Go to next step.
7	• Retrieve and record any KOEO DTCs. • Is any DTC displayed during KOEO inspection?	Yes	DTC displayed. Go to appropriate DTC test.
		No	No DTC displayed. Check following: • START circuit in ignition switch. • Open circuit between ignition switch and starter. • Starter interlock switch (MTX).
8	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.4 HARD START/LONG CRANK/ERRATIC START/ERRATIC CRANK [FS]

Z6U010318881W09

4	Hard start/long crank/erratic start/erratic crank
DESCRIPTION	• Starter cranks engine at normal speed but engine requires excessive cranking time before start • Battery in normal condition
POSSIBLE CAUSE	• Spark leak from high tension leads • Poor fuel quality • Spark plug malfunction • Erratic signal from crankshaft position sensor • Positive crankcase ventilation (PCV) valve malfunction • Purge solenoid valve malfunction • Restriction in exhaust system • Vacuum leaks • Starting system malfunction • Air leak from intake air system • Air cleaner restriction • Inadequate fuel pressure • Mass air flow sensor contamination • EGR valve malfunction **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **—Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **—Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Verify follows: — Vacuum leaks — Fuel quality (i.e. proper octane, contamination, winter/summer blend). — Loose bands on intake air system. — Cracks on intake air system parts. — Air cleaner restriction. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary.
2	• Are any DTCs displayed during continuous memory, KOEO and KOER Self-Test?	Yes	DTC displayed. Go to appropriate DTC test.
		No	No DTC displayed. Go to next step.
3	• Is engine overheating?	Yes	Go to flowchart 17 for "COOLING SYSTEM CONCERNS OVERHEATING".
		No	Go to next step.
4	• Check for cracks on high tension leads • Is there any crack on high tension leads?	Yes	Repair suspected high tension lead.
		No	Go to next step.
5	• Check spark plug conditions. • Is spark plug wet, covered with carbon or grayish white?	Yes	If spark plug is wet or covered with carbon, check for fuel leak from fuel injector. If spark plug is grayish white, check for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
6	• Visually inspect crankshaft position (CKP) sensor and teeth of crankshaft pulley. • Is CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning part.
7	• Measure gap between crankshaft position (CKP) sensor and teeth of crankshaft pulley. **Specification** **0.5—1.5 mm {0.02—0.05 in}** • Is gap within specification?	Yes	Go to next step.
		No	Adjust CKP sensor.
8	• Remove PCV valve and check PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
9	• Inspect fuel line pressure. (See 01-14-6 FUEL LINE PRESSURE INSPECTION.) • Is fuel line pressure within specification? **Fuel line pressure** **260—320 kPa {2.6—3.3 kgf/cm^2, 37—46 psi}**	Yes	Go to next step.
		No	**Zero or low:** Check fuel pump circuit. Check for open fuel pump relief valve. Check for fuel leak inside pressure regulator. Check for clogged main fuel line. **High:** Check pressure regulator for high pressure cause. Check for clogged fuel return line.
10	• Is fuel line pressure held after jumper wire is removed? **Fuel line pressure** **More than 150 kPa {1.5 kgf/cm^2, 21 psi}**	Yes	Go to next step.
		No	Check pressure regulator diaphragm condition. If condition is okay, check fuel injector. If condition is not okay, replace pressure regulator.
11	• Disconnect vacuum hose from pressure regulator and plug hose. • Start engine. • Does fuel line pressure remain within ± 20 kPa {0.21 kgf/cm^2, 3 psi} while driving vehicle?	Yes	Go to next step.
		No	Check for clogged fuel filter.

STEP	INSPECTION		ACTION
12	• Connect vacuum hose to pressure regulator. • Install vacuum gauge to intake manifold. • Start engine. • Does fuel pressure gauge reading increase as vacuum gauge reading decreases and/or does fuel pressure gauge reading decreases as vacuum gauge reading increases?	Yes	Go to next step.
		No	Connect vacuum pump to pressure regulator. Start engine and check that fuel pressure reading changed as vacuum changes. If changes, check vacuum line. If no change, replace pressure regulator.
13	• Disconnect vacuum hose from purge solenoid valve and plug opening end of vacuum hose. • Attempt to start engine. • Is starting condition improved?	Yes	Check if purge solenoid valve sticks to open.
		No	Go to next step.
14	• Check for contaminated mass air flow sensor. • Is there any contamination?	Yes	Replace mass airflow sensor.
		No	Go to next step.
15	• Is there restriction in exhaust system?	Yes	Check exhaust system.
		No	Go to next step.
16	• Check engine condition while tapping EGR valve housing. Does engine condition improve?	Yes	Go to next step.
		No	Replace EGR valve.
17	• Check starting system. (See 01-19-3 STARTER INSPECTION) • Is starting system normal?	Yes	Check for loosen connectors or poor terminal contact. If okay, remove EGR valve and visually check for mechanically stuck of EGR valve.
		No	Check continuity of stepping motor coil. If okay, go to next step.
18	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.5 ENGINE STALLS-AFTER START, AT IDLE [FS]

Z6U010318881W10

5	Engine Stalls -after Start, At Idle
DESCRIPTION	• Engine stops unexpectedly.
POSSIBLE CAUSE	• Operation of immobilizer system • Air leak from intake air system parts • Improper operation of IAC valve • No signal from crankshaft position sensor due to sensor, related wire or wrong installation • Spark leak from high-tension leads • PCV valve malfunction • Restriction in exhaust system • Open or short circuit in fuel pump and related harness • Inadequate fuel pressure • Fuel leak from fuel injector • A/C system improperly operation • Purge solenoid valve malfunction • EGR valve malfunction • Low engine compression • Vacuum leak • Poor fuel quality • Air cleaner restriction • Electrical connector disconnection • No battery power supply to PCM or poor ground • Fuel pump mechanical malfunction • Fuel injector clogged

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Note** • Following test should be performed on vehicles equipped with immobilizer system. Skip this test and go to step 12 for non-immobilizer system.	Yes	Go to step 3.
	• Attempt to start engine at least four times. • Then, retrieve and record any continuous memory DTC. • Is following condition appeared? — Engine is not completely started and DTC P1624 is retrieved.	No	Go to next step.
2	• Is engine stalled after approx. 2 seconds since engine is started?	Yes	Go to next step.
		No	Immobilizer system is okay.
3	• Is immobilizer unit connector securely connected to immobilizer unit?	Yes	Go to next step.
		No	Connect immobilizer unit connector securely. Return step 2.
4	• Does immobilizer indicator light flash and indicate following immobilizer DTCs? — DTC: 01, 02, 03, 11, 21	Yes	Go to "09-02-2 DTC TABLE ".
		No	Go to next step.
5	• Does immobilizer indicator light illuminate?	Yes	Go to step 8.
		No	Go to next step.
6	• Does indicator light flush and indicate following immobilizer system DTC after more than 135 seconds after ignition switch turned ON? — DTC: 24, 30	Yes	Go to "09-02-2 DTC TABLE ".
		No	Go to next step.
7	• Turn ignition switch off. • Disconnect immobilizer unit connector. • Connect jumper between immobilizer unit connector terminal M and ground. • Turn ignition switch ON. • Does immobilizer indicator light illuminate?	Yes	Reconnect immobilizer unit connector. Go to next step.
		No	Inspection open circuit between immobilizer unit connector terminal M and instrument cluster. If okay, inspect immobilizer indicator light bulb. Repair or replace if necessary. Reconnect immobilizer unit connector. Then return to step 4.
8	• Connect NGS tester to DLC and retrieve DTC. • Is following DTC displayed? — DTC: P1602, P1603, P1604, P1621, P1622, P1624	Yes	Go to appropriate DTC test.
		No	Go to next step.
9	• Is there continuity between PCM ground terminal 23, 24, 51, 76, 77, 103 and ground?	Yes	Go to next step.
		No	Repair or replace wiring harness.
10	• Turn ignition switch ON. • Access VPWR PID. • Is VPWR PID okay? • VPWR PID: Battery positive voltage	Yes	Go to next step.
		No	Repair or replace wiring harness.
11	• Disconnect immobilizer unit connector. • Turn ignition switch ON. • Is there battery positive voltage at immobilizer unit connector terminal J?	Yes	Check for open circuit between PCM connector terminal 5 and immobilizer unit connector terminal A.
		No	Repair or replace wiring harness between immobilizer unit connector terminal J and fuse panel.

STEP	INSPECTION		ACTION
12	• Verify following: — Vacuum connection. — Air cleaner element. — No air leaks from intake air system. — No restriction of intake air system. — Proper sealing of intake manifold and components attached to intake manifold (i.e., EGR valve, IAC valve.) — Ignition wiring. — Fuel quality; such as proper octane, contamination, winter/summer blend. — Electrical connections. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary and repeat step 12.
13	• Does vehicle now stall at idle in park/neutral with all accessories off?	Yes	Vehicle stalls now. Go to step 15.
		No	Go to next step.
14	• Retrieve and record any continuous memory, KOEO and KOER DTCs. If engine stalls, retrieve continuos memory and KOEO DTCs. • Are there any DTCs displayed?	Yes	DTC displayed. Go to appropriate DTC test.
		No	If communication error message is displayed on NGS tester, check following: • Open circuit between main relay and PCM using breakout box. • Open main relay ground circuit. • Main relay stuck to open. • Open PCM ground circuit. • Poor connection of vehicle body ground. If NGS tester works and no DTCs are displayed, go to step 16.
15	• Retrieve and record any continuous memory and key on engine off diagnostic trouble code. • Is any diagnostic trouble code displayed?	Yes	Diagnostic trouble code displayed. Go to diagnostic trouble code.
		No	If communication error message is displayed on NGS tester, check following: • Open circuit between main relay and PCM using breakout box. • Open main relay ground circuit. • Main relay stuck to open. • Open PCM ground circuit. • Poor connection of vehicle body ground. If NGS tester works and no DTCs are displayed, go to next step.
16	• Attempt to start engine at part throttle. • Does engine run smooth at part throttle?	Yes	Check IAC valve and wiring harness.
		No	Go to next step.
17	• Connect NGS tester to DLC. • Access RPM PID. • Is RPM PID indicating engine speed during cranking of engine?	Yes	Go to next step.
		No	Check following: • Open or short circuit in CKP sensor. • Open or short circuit between CKP sensor and PCM. • Open or short circuit between CKP sensor and harness. If CKP sensor and harness okay, go to next step.
18	• Visually inspect crankshaft position (CKP) sensor and teeth of crankshaft pulley. • Is CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning part.
19	• Measure gap between crankshaft position (CKP) sensor and teeth of crankshaft pulley. **Specification** **0.5—1.5 mm {0.02—0.05 in}** • Is gap within specifications?	Yes	Go to next step.
		No	Adjust CKP sensor.
20	• Check for cracks on high tension leads. • Is there any crack on high tension leads?	Yes	Repair suspected high tension lead.
		No	Go to next step.

STEP	INSPECTION		ACTION
21	• Is strong blue spark visible at each disconnected high-tension lead while cranking engine?	Yes	Go to next step. If symptom occurs with A/C on, go to step 27.
		No	Check following: • Open or short circuit in ignition coil. • High-tension lead(s). • Open or short circuit in wire harness for ignition system. • Malfunction of external condenser for eliminating ignition noise. • Open circuit between ignition switch and ignition coil. • Open circuit between ignition coil and PCM.
22	• Check spark plug conditions. • Is spark plug wet, covered with carbon or grayish white?	Yes	If spark plug is wet or covered with carbon, check for fuel leak from fuel injector. If spark plug is grayish white, check clogged for fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
23	• Remove PCV valve and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
24	• Is there restriction in exhaust system? • Is there any restriction?	Yes	Check exhaust system.
		No	Go to next step.
25	• Inspect fuel line pressure. (See 01-14-6 FUEL LINE PRESSURE INSPECTION.) • Is fuel line pressure within specification? **Fuel line pressure** **260—320 kPa {2.6—3.3 kgf/cm^2, 37—46 psi}**	Yes	Go to next step.
		No	**Zero or low:** Check fuel pump circuit. Check for open fuel pump relief valve. Check for fuel leak inside pressure regulator. Check for clogged main fuel line. **High:** Check pressure regulator for high pressure cause. Check for clogged fuel return line.
26	• Visually check for fuel leakage at fuel injector O-ring, pressure regulator, and fuel line. Service as necessary. Is fuel line pressure held after jumper wire is removed? **Fuel line pressure** **More than 150 kPa {1.5 kgf/cm^2, 21 psi} for 5 minutes**	Yes	Go to next step.
		No	Check pressure regulator diaphragm condition. If condition is okay, check fuel injector. If condition is not okay, replace pressure regulator.
27	**Note** • Following test is for stall concerns with A/C on. If other symptom exists, go to next step. • Connect pressure gauges to A/C low and high pressure side lines. • Turn A/C on and measure low side and high side pressure. Are pressure within specifications? (See 07-10-3 REFRIGERANT PRESSURE CHECK)	Yes	Go to next step.
		No	Check follows: • Refrigerant charging amount. • A/C pressure switches. • Additional fan operation. • A/C relay.
28	• Disconnect vacuum hose between purge solenoid valve and intake manifold from purge solenoid valve side. Plug opening end of vacuum hose. • Start engine. • Is engine stall now eliminated?	Yes	Check if purge solenoid valve sticks to open. Check evaporative emission control system.
		No	Go to next step.
29	• Is air leakage felt or heard at intake air system components while racing engine to higher speed?	Yes	Repair or replace.
		No	Go to next step.
30	• Check engine condition while tapping EGR valve housing. Does engine condition improve?	Yes	Replace EGR valve.
		No	Go to next step.

STEP	INSPECTION		ACTION
31	• Is engine compression correct?	Yes	Check for valve timing.
		No	Check for cause.
32	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.6 CRANKS NORMALLY BUT WILL NOT START [FS]

Z6U010318881W11

6	Cranks normally but will not start
DESCRIPTION	• Starter cranks engine at normal speed but engine will not run • Refer to "ENGINE STALLS" if this symptom appears after engine stall • Fuel in tank • Battery in normal condition
POSSIBLE CAUSE	• Operation of immobilizer system • Air leak from intake air system • Improper operation of IAC valve • No signal from crankshaft position sensor due to sensor, related wire or incorrect installation • Spark leak from high tension leads • PCV valve malfunction • Restriction in exhaust system • Open or short circuit in fuel pump and related harness • Fuel pump mechanical malfunction • Fuel injector clogged • No battery power supply to PCM • Open PCM ground or vehicle body ground • EGR valve malfunction • Low engine compression • Vacuum leak • Poor fuel quality • Air cleaner restriction • Disconnect electrical connector disconnection • Inadequate fuel pressure • Fuel leak from injector • Purge solenoid valve malfunction **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **—Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **—Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Note** • Following test should be performed test vehicles equipped with immobilizer system. Skip this test and go to step 12 for non-immobilizer system. • Is following condition appeared? — Engine is not completely started and DTC P1624 is retrieved.	Yes	Go to step 3.
		No	Go to next step.
2	• Is engine stalled after approx. 2 seconds since engine is started?	Yes	Go to next step.
		No	Immobilizer system is okay.

STEP	INSPECTION		ACTION
3	• Is immobilizer unit connector securely connected to immobilizer unit?	Yes	Go to next step.
		No	Connect immobilizer unit connector securely. Return step 2.
4	• Does immobilizer indicator light flash and indicate following immobilizer DTCs? — DTC: 01, 02, 03, 11, 21	Yes	Go to "09-02-2 DTC TABLE ".
		No	Go to next step.
5	• Does immobilizer indicator light illuminate?	Yes	Go to step 8.
		No	Go to next step.
6	• Does indicator light flush and indicate following immobilizer system DTC after more than 135 seconds after ignition switch turned ON? — DTC: 24, 30	Yes	Go to "09-02-2 DTC TABLE ".
		No	Go to next step.
7	• Turn ignition switch off. • Disconnect immobilizer unit connector. • Connect jumper between immobilizer unit connector terminal M and ground. • Turn ignition switch ON. • Does immobilizer indicator light illuminate?	Yes	Reconnect immobilizer unit connector. Go to next step.
		No	Inspection open circuit between immobilizer unit connector terminal M and instrument cluster. If okay, inspect immobilizer indicator light bulb. Repair or replace if necessary. Reconnect immobilizer unit connector. Then return to step 4.
8	• Connect NGS tester to DLC and retrieve DTC. • Is following DTC displayed? — DTC: P1602, P1603, P1604, P1621, P1622, P1624	Yes	Go to appropriate DTC test.
		No	Go to next step.
9	• Is there continuity between PCM ground terminal 23, 24, 51, 76, 77, 103 and ground?	Yes	Go to next step.
		No	Repair or replace wiring harness.
10	• Turn ignition switch ON. • Access VPWR PID. • Is VPWR PID okay? • VPWR PID: Battery positive voltage	Yes	Go to next step.
		No	Repair or replace wiring harness.
11	• Disconnect immobilizer unit connector. • Turn ignition switch ON. • Is there battery positive voltage at immobilizer unit connector terminal J?	Yes	Check for open circuit between PCM connector terminal 5 and immobilizer unit connector terminal A.
		No	Repair or replace wiring harness between immobilizer unit connector terminal J and fuse panel.
12	• Verify following: — External fuel shut off or accessory (ignition switch, alarm etc.). — Fuel quality: such as proper octane, contamination, winter/summer blend. — No air leaks from intake air system. — Proper sealing of intake manifold and components attached to intake manifold: (i.e., EGR valve, IAC valve.) — Ignition wiring. — Electrical connections. — Fuses. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary and repeat step 12.
13	• Retrieve and record any continuous memory and KOEO DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	If communication error message is displayed on NGS tester, check following: • Open circuit between main relay and PCM using breakout box. • Open main relay ground circuit. • Main relay stuck to open. • Open PCM ground circuit. • Poor connection of vehicle body ground. If NGS tester works and no DTCs are displayed, go to next step.
14	• Does engine start now with throttle closed?	Yes	Go to step 33.
		No	Go to next step.

STEP	INSPECTION		ACTION
15	• Will engine start and run smoothly at part throttle?	Yes	Check IAC valve and wiring harness.
		No	Go to next step.
16	• Connect NGS tester to DLC. • Access RPM PID. • Is RPM PID indicating engine speed when cranking engine?	Yes	Go to next step.
		No	Check following: • Open or short circuit in CKP sensor. • Open or short circuit between CKP sensor and PCM. • Open or short circuit between CKP sensor harnesses. If CKP sensor and harness okay, go to next step.
17	• Visually inspect crankshaft position (CKP) sensor and teeth of crankshaft pulley. • Is CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning part.
18	• Measure gap between crankshaft position (CKP) sensor and teeth of crankshaft pulley. **Specification** **0.5—1.5 mm {0.02—0.05 in}** • Is gap within specification?	Yes	Go to next step.
		No	Adjust CKP sensor.
19	• Check for cracks on high tension leads. • Is there any crack on high tension leads?	Yes	Repair suspected high tension lead.
		No	Go to next step.
20	• Is strong blue spark visible at each disconnected high tension lead while cranking engine?	Yes	Go to next step.
		No	Check following(s): • Open or short circuit in ignition coil. • High tension lead(s). • Open or short circuit in wire harness for ignition system. • Malfunction of external condenser for eliminating ignition noise. • Open circuit between ignition switch and ignition coil. • Open circuit between ignition coil and PCM.
21	• Check spark plug conditions. • Is spark plug wet, covered with carbon or grayish white?	Yes	If spark plug is wet or covered with carbon, check for fuel leak from injector. If spark plug is grayish white, check for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
22	• Disconnect TP sensor connector. • Is there correct voltage at TP sensor connector terminal A with ignition switch ON? **Specification** **4.5—5.5 V**	Yes	Go to next step.
		No	Check short to ground in constant voltage circuit between TP sensor, EGR boost sensor or fuel tank pressure (FTP) sensor and powertrain control module.
23	• Disconnect NGS tester. • Turn ignition switch on. • Check terminal voltage of FEPS at DLC. • Is reading voltage greater than 9 V?	Yes	Check short to power in FEPS line between DLC and PCM.
		No	Go to next step.
24	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
25	• Is there any restriction in exhaust system?	Yes	Check exhaust system.
		No	Go to next step.
26	• Inspect fuel line pressure. (See 01-14-6 FUEL LINE PRESSURE INSPECTION.) • Is fuel line pressure within specification? **Fuel line pressure** **260—320 kPa {2.6—3.3 kgf/cm², 37—46 psi}**	Yes	Go to next step.
		No	**Zero or low:** Check fuel pump circuit. Check for open fuel pump relief valve. Check for fuel leak inside pressure regulator. Check for clogged main fuel line. **High:** Check pressure regulator for high pressure cause. Check for clogged fuel return line.

STEP	INSPECTION		ACTION
27	• Visually check for fuel leakage at fuel injector O-ring, pressure regulator, and fuel line. • Service as necessary. • Is fuel line pressure held after jumper wire is removed? **Fuel line pressure** **More than 150 kPa {1.5 kgf/cm^2, 21 psi} for 5 minutes**	Yes	Go to next step.
		No	Check pressure regulator diaphragm condition. If condition is okay, check fuel injector. If condition is not okay, replace pressure regulator.
28	• Crank engine for five second. • Does pressure drop more than 34 kPa {0.35 kgf/cm^2, 5 psi} by end of five second crank cycle?	Yes	Go to next step.
		No	Check resistance of fuel injector(s). If resistance is okay, check following: • Fuel injector drive signal. • Injection flow rate. • PCM. If resistance is not okay, check following: • Open circuit in fuel injector circuit.
29	• Disconnect vacuum hose between purge control solenoid and intake manifold from purge control solenoid side. Plug opening end of vacuum hose. • Attempt to start engine. • Is starting condition improved?	Yes	Check if purge solenoid valve sticks to open mechanically. Check evaporative emission control system.
		No	Go to next step.
30	• Is air leakage felt or heard at intake air system components while racing engine to higher speed?	Yes	Repair or replace.
		No	Go to next step.
31	• Check engine condition while tapping EGR valve housing. Does engine condition improve?	Yes	Replace EGR control valve.
		No	Go to next step.
32	• Is engine compression correct?	Yes	Check valve timing.
		No	Check for causes.
33	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.7 SLOW RETURN TO IDLE [FS]

Z6U010318881W12

7	Slow return to idle
DESCRIPTION	• Engine takes more time than normal to return to idle speed
POSSIBLE CAUSE	• Malfunction of ECT sensor • Thermostat stuck to open • Throttle body malfunction • Air leak from intake air system

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	No DTC displayed. Go to next step.

STEP	INSPECTION		ACTION
2	• Make sure A/C switch is in OFF position. • Place vehicle in park or neutral. • Connect NGS tester to DLC. • Access ECT V PID. • Start engine and record ECT voltage reading every 60 seconds. **Note** • When ECT voltage reverses direction trend or changes slightly (0.03 volt or less), thermostat has opened. • Is thermostat opening voltage within range?	Yes	Engine coolant temperature and thermostat are okay. Go to next step.
		No	Remove thermostat from engine and verify thermostat operation. If temperature gauge on instrument cluster is normal but ECT V is not same as temperature gauge reading, check ECT sensor.
3	• Is throttle body free of contaminated?	Yes	Check for air leaks from intake air system components while racing engine to higher speed.
		No	Clean or replace throttle body.
4	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.8 ENGINE RUNS ROUGH/ROLLING IDLE [FS]

Z6U010318881W13

8	Engine runs rough/rolling idle
DESCRIPTION	• Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake • Idle speed too slow and excessive engine shake
POSSIBLE CAUSE	• Air leak from intake air system parts • Spark leak from high-tension leads • Improper operation of IAC valve • Erratic or no signal from camshaft position (CMP) sensor • Erratic signal from crankshaft position (CKP) sensor • PCV valve malfunction • Restriction in exhaust system • Inadequate fuel pressure • Fuel leak from fuel injector • Engine overheating • A/C system improperly operation • Purge solenoid valve malfunction • EGR valve malfunction • Low engine compression • Poor fuel quality • Air cleaner restriction • Electrical connector disconnection • Fuel pump mechanical malfunction • Fuel injector clogged • Vacuum leak **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **—Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **—Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Verify following: — External fuel shut off or accessory (ignition switch, alarm etc). — Fuel quality; such as proper octane, contamination, winter/summer blend. — No air leaks from intake air system. — Proper sealing of intake manifold and components attached to intake manifold; such as EGR valve, IAC solenoid. — Ignition wiring. — Electrical connections. — Fuses. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary and repeat step 1.
2	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTC displayed?	Yes	Go to appropriate DTC test.
		No	No DTCs displayed. Go to next step.
3	• Is engine overheating?	Yes	Go to flowchart 17 for "COOLING SYSTEM CONCERNS OVERHEATING".
		No	Go to next step.
4	**Note** • Following test is for engine running rough idle with A/C ON concerns. If other symptoms exist, go to next step.	Yes	Go to next step.
	• Connect pressure gauge to A/C low and high pressure side lines. • Start engine and run it at idle. • Turn A/C ON. • Measure low side and high side pressures. • Are reading pressures within specification? (See 07-10-3 REFRIGERANT PRESSURE CHECK)	No	Check following: • Refrigerant charging amount. • A/C pressure switches. • Additional fan operation. • A/C relay.
5	**Note** • Following test is for engine running rough with P/S ON. If other symptoms exist, go to next step.	Yes	Check power steering pressure switch operation.
	• Disconnect power steering pressure switch connector. • Measure voltage at power steering pressure switch connector. • Is voltage greater than **10 V**?	No	Go to next step.
6	• Visually inspect crankshaft position (CKP) sensor and teeth of crankshaft pulley. • Is CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning part.
7	• Measure gap between crankshaft position (CKP) sensor and teeth of crankshaft pulley. **Specification** **0.5—1.5 mm {0.02—0.05 in}** • Is gap within specifications?	Yes	Go to next step.
		No	Adjust CKP sensor.
8	• Check for cracks on high tension leads. • Is there any crack on high tension leads?	Yes	Repair suspected high tension lead.
		No	Go to next step.

STEP	INSPECTION		ACTION
9	• Check spark plug conditions. • Is spark plug wet, covered with carbon or grayish white?	Yes	If spark plug is wet or covered with carbon, check for fuel leak from injector. If spark plug is grayish white, check for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
10	• Start engine and disconnect IAC valve connector. • Does rpm drop or engine stall?	Yes	Go to next step.
		No	Check IAC valve and wiring harness.
11	• Install fuel pressure gauge between fuel filter and fuel distributor. • Start engine and run it at idle. Measure fuel line pressure at idle. • Is fuel line pressure correct at idle? **Fuel line pressure** **210—260 kPa {2.1—2.6 kgf/cm², 30—37 psi}**	Yes	Go to next step.
		No	**Zero or low:** Check fuel pump circuit. Check for open fuel pump relief valve. Check for fuel leak inside pressure regulator. Check for clogged main fuel line. **High:** Check pressure regulator for high pressure cause. Check for clogged fuel return line.
12	• Visually check for fuel leakage at fuel injector O-ring, pressure regulator, and fuel line. • Service as necessary. • Does fuel line pressure hold after ignition switch is turned off? **Fuel line pressure** **More than 150 kPa {1.5 kgf/cm², 21 psi} for 5 minutes**	Yes	Go to next step.
		No	Check pressure regulator diaphragm condition. If condition is okay, check fuel injector. If condition is not okay, replace pressure regulator.
13	• Connect NGS tester to DLC. • Start engine and run it at idle. • Access LONGFT1 PIDs. • Measure LONGFT1 PID at idle. • Is PID value between 5— -5%?	Yes	Go to next step.
		No	LONGFT1 and LONGFT2 PID is out of specification. **Less than specification (too rich):** Check evaporative emission control system. If system is okay, go to step 15. **Greater than specification (too lean):** Check for air leakage at intake air system components. If system is okay, go to next step.
14	• Disconnect vacuum hose between purge solenoid valve and intake manifold from solenoid valve side. • Plug open end of vacuum hose. • Start engine. • Does engine condition improve?	Yes	Check if purge solenoid valve sticks open mechanically. Check evaporative emission control system.
		No	Go to next step.
15	• Remove PCV valve and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
16	• Is there restriction in exhaust system?	Yes	Check exhaust system.
		No	Go to next step.
17	• Visually inspect camshaft position (CMP) sensor and tooth of camshaft. • Is CMP sensor and tooth of camshaft okay?	Yes	Go to next step.
		No	Replace malfunctioning part.
18	• Check engine condition while tapping EGR valve housing. Does engine condition improve?	Yes	Replace EGR valve.
		No	Go to next step.
19	• Is engine compression correct?	Yes	Check valve timing.
		No	Check for causes.
20	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.9 FAST IDLE/RUNS ON [FS]

Z6U010318881W14

9	Fast idle/runs on
DESCRIPTION	• Engine speed continues at fast idle after warm-up • Engine runs after ignition switch is turned off
POSSIBLE CAUSE	• Engine coolant temperature malfunction • Air leak from intake air system • Throttle body malfunction • Misadjustment of accelerator cable free play • Misadjustment of cruise control cable

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Connect NGS tester to DLC. • Access ECT PID. • Start and warm-up engine to normal operating temperature. • Is ECT PID reading between 112 °C {233.6 °F} and 82 °C {179.6 °F}?	Yes	Go to next step.
		No	If ECT PID is higher than 112 °C {233.6 °F}: Go to flow chart 17 for engine overheating. If ECT PID is less than 82 °C {179.6 °F}: Go to flow chart 18 for runs cold condition.
2	• Retrieve and record any continuous memory. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	No DTC displayed. Go to next step.
3	• Is there air leakage felt or heard at intake air system components while racing engine to higher speed?	Yes	Repair or replace parts as necessary.
		No	Verify accelerator and/or cruise control cable free play.
4	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.10 LOW IDLE/STALLS DURING DECELERATION [FS]

Z6U010318881W15

10	Low idle/stalls during deceleration
DESCRIPTION	• Engine stops unexpectedly at beginning of deceleration or recovery from deceleration
POSSIBLE CAUSE	• Vacuum leaks • IAC valve malfunction • Air leak from intake air system • Throttle position sensor or related circuit malfunction • Mass air flow sensor or related circuit malfunction • Brake switch or related circuit malfunction • Clutch position and/or neutral switch or related circuit malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Does engine idle rough?	Yes	Go to flow chart 7 for "ENGINE RUNS ROUGH/ROLLING IDLE".
		No	Go to next step.
2	• Check following: — Proper routing and no damage of vacuum lines. — IAC valve properly connected. — No air leak from intake air system. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat step 2.
3	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	No DTCs displayed. Go to next step.
4	• Does idle speed drop or stall when disconnecting IAC valve?	Yes	Go to next step.
		No	Check following: • Circuit from idle air control valve to PCM for open and short. • Idle air control valve for sticking. If okay, go to next step.

STEP	INSPECTION		ACTION
5	• Disconnect vacuum hose between purge solenoid valve and intake manifold from solenoid valve side. • Plug opening end of vacuum hose. • Drive vehicle. • Does engine condition improve?	Yes	Check evaporative emission control system.
		No	Go to next step.
6	• Connect NGS tester to DLC. • Access TP V PID, MAF PID, TCC PID, BOO PID and CPP/PNP PID. • Monitor each PID while driving vehicle. — TP V PID (See 01-40A-32 THROTTLE POSITION SENSOR INSPECTION [FS]) — MAF PID (See 01-40A-29 MASS AIR FLOW SENSOR INSPECTION [FS]) — BOO PID (See 04-11-6 BRAKE SWITCH INSPECTION) — CPP/PNP PID (See 01-40A-41 NEUTRAL SWITCH INSPECTION [FS]) (See 01-40A-42 CLUTCH SWITCH INSPECTION [FS]) — TCC PID (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL]) • Are PIDs okay?	Yes	Go to "INTERMITTENT CONCERNS TROUBLESHOOTING".(See 01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
		No	TP V PID: Check for TP sensor. MAF PID: Check for mass air flow sensor. TCC PID: Check TCC solenoid valve. BOO PID: Check brake on/off switch. CPP/PNP PID: Check clutch and neutral switches.
7	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

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

Z6U010318881W16

11	**Engine stalls/quits (acceleration/cruise)** **Engine runs rough (acceleration/cruise)** **Misses (acceleration/cruise)** **Buck/jerk (acceleration/cruise/deceleration)** **Hesitation/stumble (acceleration)** **Surges (acceleration/cruise)**
DESCRIPTION	• Engine stops unexpectedly at beginning of or during acceleration • Engine stops unexpectedly while cruising • Engine speed fluctuates during or cruising • Engine misses during acceleration or cruising • Vehicle bucks/jerks during acceleration, cruising or deceleration • Momentary pause at beginning of acceleration or during acceleration • Momentary minor irregularity in engine output
POSSIBLE CAUSE	• A/C system improperly operation • Air leak from intake air system parts • Improper operation of IAC valve • Erratic signal from crankshaft position sensor • Vacuum leaks • Spark leak from high-tension leads • PCV valve malfunction • Restriction in exhaust system • Inadequate fuel pressure • Fuel leak from injector • Intermittent open or short of mass-airflow sensor, throttle position sensor and vehicle speed sensor • Automatic transaxle malfunction • Erratic signal or no signal from camshaft position sensor • Purge solenoid valve malfunction • EGR valve malfunction • Low engine compression • Poor fuel quality • Air cleaner restriction • Improper valve timing due to jumping out timing belt • Intermittently open/short in fuel pump circuit • Fuel pump mechanical malfunction • Fuel injector clogged • Clutch slippage **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **— Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **— Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See01-14-3 BEFORE REPAIR PROCEDURE** **See01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Verify following: — Vacuum connection. — Air cleaner element. — No air leaks from intake air system. — No restriction of intake air system. — Proper sealing of intake manifold and components attached to intake manifold: EGR valve, IAC valve. — Ignition wiring. — Fuel quality: — Proper octane, contamination, winter/summer blend. — Electrical connections. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary and repeat step 1.

STEP	INSPECTION		ACTION
2	• Retrieve and record any continuous memory, KOEO and KOER DTCs. If stall, condition exists retrieve continuos memory and KOEO DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	No DTCs displayed. Go to next step.
3	• Is engine overheating?	Yes	Go to flowchart 17 for "COOLING SYSTEM CONCERNS OVERHEATING".
		No	Go to next step.
4	• Connect NGS tester to DLC. • Access RPM PID, VPWR PID, MAF PID, TP V PID, and VSS PID. • Drive vehicle while monitoring PIDs. — VPWR PID: Battery positive voltage — PRM PID: Idle speed at idle — MAF PID (See; 01-40A-29 MASS AIR FLOW SENSOR INSPECTION [FS]) — TP V PID (See 01-40A-32 THROTTLE POSITION SENSOR INSPECTION [FS]) — VSS PID (See 05-17A-32 VEHICLE SPEEDOMETER SENSOR INSPECTION [LA4A-EL]) • Are PIDs within specification?	Yes	Go to next step.
		No	RPM PID: Check crankshaft position (CKP) sensor and related harness; such as vibration, intermittent open/short circuit. VPWR PID: Check for open circuit intermittently. MAF PID: Check for open circuit of mass air flow sensor and related wire harness intermittently. TP V PID: Check if output signal from throttle sensor changes smoothly. VSS PID: Check for open circuit of vehicle speedometer sensor and related wire harness intermittently.
5	• Visually inspect crankshaft position (CKP) sensor and teeth of crankshaft pulley. • Is CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning part.
6	• Measure gap between crankshaft position (CKP) sensor and teeth of crankshaft pulley. **Specification** **0.5—1.5 mm {0.02—0.05 in}** • Is gap within specifications?	Yes	Go to next step.
		No	Adjust CKP sensor.
7	• Check spark plug conditions. • Is spark plug wet, covered with carbon or grayish white?	Yes	If spark plug is wet or covered with carbon, check for fuel leak from fuel injector. If spark plug is grayish white, check for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
8	• Remove PCV valve and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
9	• Check that throttle lever is resting on throttle valve stop screw and/or throttle valve orifice plug. • Is lever in correct position?	Yes	Go to next step.
		No	Adjust as necessary.
10	• Are there restrictions in exhaust system?	Yes	Check exhaust system.
		No	Go to next step.
11	• Inspect fuel line pressure. (See 01-14-6 FUEL LINE PRESSURE INSPECTION.) • Is fuel line pressure within specification? **Fuel line pressure** **260—320 kPa {2.6—3.3 kgf/cm^2, 37—46 psi}**	Yes	Go to next step.
		No	**Zero or low:** Check fuel pump circuit. Check for open fuel pump relief valve. Check for fuel leak inside pressure regulator. Check for clogged main fuel line. **High:** Check pressure regulator for high pressure cause. Check for clogged fuel return line.

STEP	INSPECTION		ACTION
12	• Visually check for fuel leakage at fuel injector O-ring, pressure regulator, and fuel line. • Service as necessary. • Is fuel line pressure held after jumper wire is removed? **Fuel line pressure** **More than 150 kPa {1.5 kgf/cm^2, 21 psi} for 5 minutes**	Yes	Go to next step.
		No	Check pressure regulator diaphragm condition. If condition is okay, check fuel injector. If condition is not okay, replace pressure regulator.
13	**Note** • Following test is for engine stalling with A/C on concern. If other symptom exists, go to next step. • Connect pressure gauge to A/C low and high pressure side lines. • Turn A/C on and measure low side and high side pressure. • Are pressure within specifications? (See 01-10A-5 COMPRESSION INSPECTION [FS])	Yes	Go to next step.
		No	Check follows: • Refrigerant charging amount. • A/C pressure switches. • Condenser fan operation. • A/C relay.
14	**Note** • Following test is performed for symptom with cruise control ON. If other symptoms exist, go to next step. • Check cruise control system. • Is cruise control system okay?	Yes	Go to next step.
		No	Repair or replace.
15	• Disconnect vacuum hose between purge solenoid valve and intake manifold from purge solenoid valve side. • Plug opening end of vacuum hose. • Drive vehicle. • Does engine condition improve?	Yes	Check if purge solenoid valve sticks to open mechanically. Check evaporative emission control system.
		No	Go to next step.
16	• Visually inspect camshaft position (CMP) sensor and tooth of camshaft. • Is CMP sensor and tooth of camshaft okay?	Yes	Go to next step.
		No	Replace malfunctioning part.
17	• Is engine compression correct? (See 01-10A-5 COMPRESSION INSPECTION [FS])	Yes	Check following: • Valve timing. • Internal transaxle (ATX only). • Clutch (MTX only).
		No	Check for cause.
18	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.12 LACK/LOSS OF POWER-ACCELERATION/CRUISE [FS]

Z6U010318881W17

12	Lack/loss of power-acceleration/cruise
DESCRIPTION	• Performance poor under load (i.e., power down when climbing hills)
POSSIBLE CAUSE	• Improper A/C system operation • Air leak from intake air system parts • VTCS malfunction(if equipped) • EGR valve malfunction • Erratic signal from crankshaft position sensor • Vacuum leaks • Spark leak from high tension leads • PCV valve malfunction • Restriction in exhaust system • Inadequate fuel pressure • Fuel leak from injector • Intermittent open or short of mass air flow sensor, throttle position sensor and vehicle speed sensor • Automatic transaxle malfunction • Erratic signal or no signal from camshaft position sensor • Purge solenoid valve malfunction • Brake dragging • Low engine compression • Poor fuel quality • Air cleaner restriction • Improper valve timing due to timing belt jump • Intermittent open/short in fuel pump circuit • Fuel pump mechanical malfunction • Fuel injector clogged • Clutch slippage **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **— Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **— Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Verify following: — Vacuum connection. — Air cleaner element. — No air leaks from intake air system. — No restriction of intake air system. — Proper sealing of intake manifold and components attached to intake manifold: such as EGR valve, IAC control. — Fuel quality: Proper octane, contamination, winter/summer blend. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary and repeat step 1.
2	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • If engine stall condition exists, retrieve continuos memory and KOEO DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Go to next step.
3	• Is engine overheating?	Yes	Go to flowchart 17 for "COOLING SYSTEM CONCERNS OVERHEATING".
		No	Go to next step.

STEP	INSPECTION		ACTION
4	• Connect NGS tester to data link connector. • Access RPM PID, MAF PID, TP V PID, and VSS PID. • Drive vehicle with monitoring PIDs. — PRM PID: Engine speed — MAF PID (See 01-40A-29 MASS AIR FLOW SENSOR INSPECTION [FS]) — TP V PID (See 01-40A-32 THROTTLE POSITION SENSOR INSPECTION [FS]) — VSS PID (See 05-17A-32 VEHICLE SPEEDOMETER SENSOR INSPECTION [LA4A-EL]) • Are PIDs within specification?	Yes	Go to next step.
		No	RPM PID: Check CKP sensor and related harness for vibration and/or intermittent open/short circuit. MAF PID: Check for intermittent open circuit of mass air flow sensor and related wire harness. TP V PID: Check if TP sensor output increases smoothly. VSS PID: Check for intermittent open circuit of vehicle speedometer sensor and related wire harness.
5	• Visually inspect crankshaft position (CKP) sensor and teeth of crankshaft pulley. • Is CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning part.
6	• Measure gap between crankshaft position (CKP) sensor and teeth of crankshaft pulley. **Specification** **0.5—1.5 mm {0.02—0.05 In}** • Is gap within specifications?	Yes	Go to next step.
		No	Adjust CKP sensor.
7	• Check spark plug conditions. • Is spark plug wet, covered with carbon or grayish white?	Yes	If spark plug is wet or covered with carbon, check for fuel leak from fuel injector. If spark plug is grayish white, check for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
8	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
9	• Are there restrictions in exhaust system?	Yes	Check exhaust system.
		No	Go to next step.
10	• Inspect fuel line pressure. (See 01-14-6 FUEL LINE PRESSURE INSPECTION.) • Is fuel line pressure within specification? **Fuel line pressure** **260—320 kPa {2.6—3.3 kgf/cm^2, 37—46 psi}**	Yes	Go to next step.
		No	**Zero or low:** Check fuel pump circuit. Check for open fuel pump relief valve. Check for fuel leak inside pressure regulator. Check for clogged main fuel line. **High:** Check pressure regulator for high pressure cause. Check for clogged fuel return line.
11	**Note** • Following test is for engine stalling concern with A/C on concern. If other symptom exists, go to next step. • Connect pressure gauge to A/C low and high side pressure lines. • Turn A/C on and measure low side and high side pressure. • Are pressures within specifications? (See 07-10-3 REFRIGERANT PRESSURE CHECK)	Yes	Go to next step.
		No	Check follows: • Refrigerant charging amount. • A/C pressure switches. • Additional fan operation. • A/C relay.
12	• Check for A/C cut off operation. • Does A/C cut off work properly?	Yes	Go to next step.
		No	Check A/C cut off system.

STEP	INSPECTION		ACTION
13	• Disconnect vacuum hose between purge solenoid valve and intake manifold from purge solenoid valve side. • Plug opening end of vacuum hose. • Drive vehicle. • Does engine condition improve?	Yes	Check if purge solenoid valve sticks to open mechanically. Check evaporative emission control system.
		No	Go to next step.
14	• Visually inspect camshaft position (CMP) sensor and tooth of camshaft. • Is CMP sensor and tooth of camshaft okay?	Yes	Go to next step.
		No	Replace malfunctioning part.
15	**Note** • Following test is for specification vehicle only. For Federal specification vehicle,go to next step. • Vehicle VTCS operation • Is VTCS operation okay?	Yes	Engine coolant temperature and thermostat are okay. Go to next step.
		No	Remove thermostat from engine and verify operation. If temperature gauge on instrument cluster indicates normal operation but ECT V is not same as temperature gauge reading, check engine coolant temperature sensor. If temperature gauge on instrument cluster indicated overheating but ECT V is normal, check temperature gauge and heat gauge unit.
16	• Is engine compression correct? (See 01-10A-5 COMPRESSION INSPECTION [FS])	Yes	Check following: • Valve timing. • Internal transaxle component (ATX only). • Clutch (MTX only). • Brake system for dragging.
		No	Check for cause.
17	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.13 KNOCKING/PINGING-ACCELERATION/CRUISE [FS]

Z6U010318881W18

13	Knocking/pinging-acceleration/cruise
DESCRIPTION	• Sound produced when air/fuel mixture is ignited by something other than spark plug (i.e., hot spot in combustion chamber)
POSSIBLE CAUSE	• Engine overheating due to cooling system malfunction • Inadequate engine compression • Inadequate fuel pressure • Knock sensor and related circuit malfunction **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **—Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **—Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Connect NGS tester to DLC. • Access ECT PID. • Verify ECT PID is less than 116 °C {240.8 °F} during driving. • Is ECT PID less than specification?	Yes	Go to next step.
		No	Inspect cooling system for cause of overheating.
2	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Go to next step.

STEP	INSPECTION		ACTION
3	• Is engine compression correct?	Yes	Go to next step.
		No	Check for cause.
4	• Install fuel pressure gauge between fuel filter and fuel distributor. • Start engine and run at idle. • Measure fuel line pressure at idle. • Is fuel line pressure correct at idle? **Fuel line pressure** **210—260 kPa {2.1—2.6 kgf/cm², 30—37 psi}**	Yes	Go to next step.
		No	**Zero or low:** Check fuel pump circuit. Check for open fuel pump relief valve. Check for fuel leak inside pressure regulator. Check for clogged main fuel line. **High:** Check pressure regulator for high pressure cause. Check for clogged fuel return line.
5	• Measure resistance between knock sensor terminal and knock sensor body. **Specification** **Approx. 560 kΩ [20 °C {68 °F}]** • Is resistance okay?	Yes	Check ignition timing.
		No	Replace knock sensor.
6	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.14 POOR FUEL ECONOMY [FS]

Z6U010318881W19

14	Poor fuel economy
DESCRIPTION	• Fuel economy unsatisfactory
POSSIBLE CAUSE	• Contaminated air cleaner element • VTCS malfunction(If equipped) • Improper transmission fluid level • Poor fuel quality • Improper coolant level • Spark plug malfunction • Brake dragging • Contaminated mass airflow sensor • Exhaust system clogged • Engine cooling system malfunction • Weak spark • Erratic or no signal from camshaft position sensor • Inadequate fuel pressure • PCV valve malfunction • Improper valve timing due to timing belt skip out • Improper engine compression **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **—Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **—Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Check following: — Contaminated air cleaner element. — Transmission fluid level. — Fuel quality. — Coolant level. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat step 1.

STEP	INSPECTION		ACTION
2	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Go to next step.
3	• Connect NGS tester to DLC. • Access ECT PID. • Drive vehicle while monitoring PID. — ECT PID (See 01-40A-34 ENGINE COOLANT TEMPERATURE SENSOR INSPECTION [FS]) • Is PID within specification?	Yes	Go to next step.
		No	Check for coolant leak, cooling fan and condenser fan operations or thermostat operation.
4	• Is strong blue spark visible at each disconnected high-tension lead while cranking engine?	Yes	Check following: • Spark plug(s) malfunction. • CMP sensor improperly installed. • Trigger wheel damage on camshaft. • Open or short circuit on CMP sensor. • Open or short circuit between CMP sensor and PCM. Repair or replace malfunctioning part. If okay, go to next step.
		No	Check following: • High-tension leads. • Ignition coil and connector.
5	• Install fuel pressure gauge between fuel filter and fuel distributor. • Start engine and run at idle. • Measure fuel line pressure at idle. • Is fuel line pressure correct at idle? **Fuel line pressure** **210—260 kPa {2.1—2.6 kgf/cm^2, 30—37 psi}**	Yes	Go to next step.
		No	**Zero or low:** Check fuel pump circuit. Check for open fuel pump relief valve. Check for fuel leak inside pressure regulator. Check for clogged main fuel line. **High:** Check pressure regulator for high pressure cause. Check for clogged fuel return line.
6	**Note** • Following test is for specification vehicle only. For Federal specification vehicle,go to next step. • Vehicle VTCS operation • Is VTCS operation okay?	Yes	Go to next step.
		No	• Check following. — Wrong connection of VTCS solenoid valve connector — Wrong routing of vacuum hoses — Vacuum leakage from vacuum hoses — VTCS actuator is stuck open or close
7	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
8	• Is there restriction in exhaust system?	Yes	Check exhaust system.
		No	Go to next step.
9	• Is brake system functioning properly?	Yes	Go to next step.
		No	Check for cause.
10	• Check for contaminated MAF sensor. • Is there any contamination?	Yes	Replace mass air flow sensor.
		No	Go to next step.
11	• Is engine compression correct?	Yes	Check for valve timing.
		No	Check for cause.
12	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.15 EMISSION COMPLIANCE [FS]

Z6U010318881W20

15	Emission compliance
DESCRIPTION	• Emission compliance test is failed
POSSIBLE CAUSE	• Vacuum lines leaks or blockage • Spark plug malfunction • Erratic or no signal from camshaft position sensor • PCV valve malfunction or incorrect valve installation • Exhaust system clogged • Charcoal canister damage • Improper engine compression • Cooling system malfunction • Leaks from intake manifold • Inadequate fuel pressure • EGR valve malfunction • Fuel tank ventilation system malfunction • Excessive carbon build up in combustion chamber • Improper valve timing **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **— Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **— Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Check following: — Vacuum lines for leaks or blockage. — Electrical connections. — Proper maintenance schedule followed. — Intake air system and air cleaner element concerns; such as obstructions, leaks or dirty. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat step 1.
2	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	Diagnostic trouble code displayed. Go to appropriate DTC test.
		No	Go to next step.
3	• Is any other drivability concern present?	Yes	Go to appropriate flow chart.
		No	Go to next step.
4	• Connect NGS tester to DLC. • Access ECT PID. • Warm-up engine and run it at idle. • Verify ECT PID is correct. • ECT PID (See 01-40A-34 ENGINE COOLANT TEMPERATURE SENSOR INSPECTION [FS]) • Is ECT PID correct?	Yes	Go to next step.
		No	Check cooling system.

STEP	INSPECTION		ACTION
5	• Is strong blue spark visible at each disconnected high-tension lead while cranking engine?	Yes	Check following: • Spark plug(s) malfunction. • CMP sensor improperly installed. • Damage of trigger wheel on camshaft. • Open or short circuit on CMP sensor. • Open or short circuit between CMP sensor and PCM. Repair or replace malfunctioning part. If okay, go to next step.
		No	Check following: • High tension leads. • Ignition coil and connector.
6	• Install fuel pressure gauge between fuel filter and fuel distributor. • Start engine and run it at idle. • Measure fuel line pressure at idle. • Is fuel line pressure correct at idle? **Fuel line pressure** **210—260 kPa {2.1—2.6 kgf/cm^2, 30—37 psi}**	Yes	Go to next step.
		No	**Zero or low:** Check fuel pump circuit. Check for open fuel pump relief valve. Check for fuel leak inside pressure regulator. Check for clogged main fuel line. **High:** Check pressure regulator for high pressure cause. Check for clogged fuel return line.
7	• Does fuel line pressure remain at specification for 60 seconds when ignition switch is turned ON? **Fuel line pressure** **210—260 kPa {2.1—2.6 kgf/cm^2, 30—37 psi}**	Yes	Go to next step.
		No	Check pressure regulator for high pressure cause.
8	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
9	• Check for fuel saturation inside charcoal canister. • Is excess amount of liquid fuel present in canister?	Yes	Replace charcoal canister.
		No	Check fuel tank vent system. Go to next step.
10	• Is there restriction in exhaust system?	Yes	Check exhaust system.
		No	Go to next step.
11	• Check engine condition while tapping EGR valve housing. Does engine condition improve?	Yes	Replace EGR valve.
		No	Go to next step.
12	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.16 HIGH OIL CONSUMPTION/LEAKS [FS]

Z6U010318881W21

16	High oil consumption/leaks
DESCRIPTION	• Oil consumption excessive
POSSIBLE CAUSE	• PCV valve malfunction • Improper engine oil viscosity • Improper dipstick • Engine internal part malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
2	• Check following: — External leaks. — Proper dipstick. — Proper engine oil viscosity. • Are all items okay?	Yes	Check internal engine parts such as valves, valve guides, valve stem seals, cylinder head drain passage, piston rings.
		No	Service as necessary. Repeat step 2.

NO.17 COOLING SYSTEM CONCERNS–OVERHEATING [FS]

Z6U010318881W22

17	Cooling system concerns–overheating
DESCRIPTION	• Engine runs at higher than normal temperature/Overheats
POSSIBLE CAUSE	• Improper coolant level • Coolant leaks • Improper water/anti-freeze mixture • Poor radiator condition • Radiator hose(s) damage • Improper or damaged radiator cap • Malfunction of coolant overflow system • Drive belt damage • Blown fuses • Excessive A/C system pressure • Fans reverse rotation • Thermostat malfunction • Condenser fan inoperative • Main cooling fan inoperative • Improper tension of drive belt

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Check following: — Engine coolant level. — Coolant leaks. — Water and anti-freeze mixture. — Radiator condition. — Collapsed or restricted radiator hoses. — Radiator pressure cap. — Overflow system. — Fan rotational direction. — Fuses. Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat step 1.
2	• Cool down engine. • Turned A/C switch OFF. • Connect NGS tester to DLC. • Access ECT V PID. • Start engine and record ECT voltage reading every 60 seconds. **Note** • When ECT voltage reverses direction trend or changes slightly (0.03 volt or less), thermostat has opened. • Is thermostat opening voltage okay? **Thermostat operating voltage** **Approx. 0.6—0.9 V**	Yes	Engine coolant temperature and thermostat are okay. Go to next step.
		No	Remove thermostat from engine and verify operation. If temperature gauge on instrument cluster indicates normal operation but ECT V is not same as temperature gauge reading, check engine coolant temperature sensor. If temperature gauge on instrument cluster indicated overheating but ECT V is normal, check temperature gauge and heat gauge unit.
3	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any diagnostic trouble code displayed?	Yes	Go to appropriate DTC test.
		No	Go to next step.
4	• Start engine and run at idle. • Turn A/C switch on. • Does A/C compressor engage?	Yes	Go to step 6.
		No	Check following and repair or replace as necessary: • Refrigerant charging amount. • Open circuit between A/C magnet clutch and PCM. • Seized A/C magnet clutch. • A/C magnet clutch malfunction. If all items are okay, go to next step.
5	• Connect NGS tester to DLC. • Access ACCS PID on NGS tester. • Start engine and run at idle. • Turn A/C switch on. • Does ACCS PID read ON?	Yes	Go to next step.
		No	Check follows: • A/C pressure switch(es) operation. • A/C switch stuck open. • Open or short circuit between A/C pressure switch and PCM.

STEP	INSPECTION		ACTION
6	• Start the engine and run it at idle speed. • Turn A/C switch on. • Do condenser fan and cooling fan operate?	Yes	Go to next step.
		No	**If condenser fan does not operate, check following:** Condenser fan relay stuck open. Condenser fan motor malfunction. Condenser fan motor ground open. Open circuit between condenser fan motor and relay. Open circuit between condenser fan relay and PCM. Open battery power circuit for condenser fan relay. **If cooling fan motor does not operate, check following:** Cooling fan relay stuck to open. Cooling fan motor malfunction. Cooling fan motor ground open. Open circuit between cooling fan motor and relay. Open circuit between cooling fan relay and PCM. Open battery power circuit for cooing fan relay.
7	• Is drive belt okay?	Yes	Go to next step.
		No	Replace drive belt.
8	• Are there any leaks around heater unit in passenger compartment?	Yes	Check and service heater unit for leaks.
		No	Go to next step.
9	• Are there any leaks at coolant hoses and/or radiator?	Yes	Check and service heater unit for leaks.
		No	Go to next step.
10	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.18 COOLING SYSTEM CONCERNS–RUNS COLD [FS]

Z6U010318881W23

18	**Cooling system concerns–runs cold**
DESCRIPTION	• Engine takes excessive period for reaching normal operating temperature
POSSIBLE CAUSE	• Thermostat malfunction • Malfunction of cooling fan system • Malfunction of condenser fan system

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is customer's complaint "Lack of passenger compartment heat"?	Yes	Check A/C and heater system.
		No	Go to next step.
2	• Does engine speed continue at fast idle?	Yes	Go to flowchart 8 for "FAST IDLE/RUNS ON".
		No	Go to next step.
3	• Connect NGS tester to DLC. • Access ECT V PID. • Start engine and record ECT voltage reading every 60 seconds. **Note** • When ECT voltage reverses direction trend or changes slightly (0.03 volt or less), thermostat has opened. • Is thermostat opening voltage okay? **Thermostat operating voltage** **Approx. 0.6—0.9 V**	Yes	Check condenser fan and cooling fan operation. If both or either fan operate abnormally, check follows: • Cooling fan relay stuck to close. • Condenser fan relay stuck to close. • Short to ground between cooling fan relay and PCM. • Short to ground between condenser fan relay and PCM. • Circuit between cooling fan relay and fan motor shorts to battery supply line. • Circuit between condenser fan relay and fan motor shorts to battery supply line.
		No	Remove thermostat from engine and verify thermostat operation. If temperature gauge on instrument cluster indicates, normal range but ECT V is not same as temperature gauge reading check ECT sensor. If temperature gauge on instrument cluster indicates range cold but ECT voltage is normal, check temperature gauge and heat gauge unit.
4	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.19 EXHAUST SMOKE [FS]

Z6U010318881W24

19	Exhaust smoke
DESCRIPTION	• Blue, black, or white smoke from exhaust system
POSSIBLE CAUSE	• Blue smoke (Burning oil) — PCV valve malfunction — Internal engine oil leaks • White smoke (Water in combustion) — Malfunction of cooling system (coolant loss) — Internal engine coolant leaks • Black smoke (Rich fuel mixture) — Air cleaner restricted — Fuel return line restricted — Improper engine compression — Ignition system malfunction — Intake air system collapsed or restricted — Excessive fuel pressure — Injector fuel leaks **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **— Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **— Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• What color is smoke coming from exhaust system?	Blue	Burning oil indicated. Go to next step.
		White	Water in combustion indicated. Go to step 3.
		Black	Rich fuel mixture indicated. Go to step 4.
2	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Check following: • Damaged valve guide, stems or valve seals. • Blocked oil drain passage in cylinder head. • Piston rings for not seated, seized or worn. • Damaged cylinder bore. If other driveability symptoms are present, return to diagnostic index to service any additional symptoms.
		No	Replace PCV valve.
3	• Does cooling system hold pressure?	Yes	Check following: • Cylinder head gasket leaks. • Intake manifold gasket leaks. • Engine block cracked or porous. If other driveability symptoms are present, return to diagnostic index to service any additional symptoms.
		No	Check for cause.
4	• Check following: — Air cleaner for restriction. — Collapsed or restricted intake air system. — Restricted fuel return line. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat step 5.
5	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Go to next step.

STEP	INSPECTION		ACTION
6	• Install fuel pressure gauge between fuel filter and fuel distributor. • Start engine and run at idle. • Measure fuel line pressure at idle. • Is fuel line pressure correct at idle? **Fuel line pressure** **210—260 kPa {2.1—2.6 kgf/cm², 30—37 psi}**	Yes	Go to next step.
		No	**Zero or low:** Check fuel pump circuit. Check for open fuel pump relief valve. Check for fuel leak inside pressure regulator. Check for clogged main fuel line. **High:** Check pressure regulator for high pressure cause. Check for clogged fuel return line.
7	• Does fuel line pressure remain at specification for 60 seconds when ignition switch is turned ON? **Fuel line pressure** **210—260 kPa {2.1—2.6 kgf/cm², 30—37 psi}**	Yes	Go to next step.
		No	Check pressure regulator for high pressure cause.
8	• Is strong blue spark visible at each disconnected high-tension lead while cranking engine?	Yes	Check spark plug(s) and CMP sensor.
		No	Check following: • High tension leads. • Ignition coil and connector.
9	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.20 FUEL ODOR (IN ENGINE COMPARTMENT) [FS]

Z6U010318881W25

20	Fuel odor (in engine compartment)
DESCRIPTION	• Gasoline fuel smell or visible leaks
POSSIBLE CAUSE	• Excessive fuel pressure • Fuel tank vent system blockage • Purge solenoid valve malfunction • Charcoal canister malfunction
	Warning • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **—Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **—Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Visually check for fuel leakage at fuel injector O-ring, pressure regulator and fuel line. • Service as necessary. • Install fuel pressure gauge between fuel filter and fuel delivery pipe. • Start engine and run at idle. • Does fuel line pressure remain at specification for 60 seconds when ignition switch is turned ON and OFF? **Fuel line pressure** **More than 150 kPa {1.5 kgf/cm², 21 psi}**	Yes	Go to next step.
		No	Check pressure regulator for high pressure cause.

STEP	INSPECTION		ACTION
2	• Check for blockage/restriction or open between engine vacuum port and charcoal canister. • Check for blockage in fuel tank vent system. • Is fault indicated?	Yes	Replace vacuum hose.
		No	Go to next step.
3	• Check purge solenoid valve. • Is solenoid operating properly?	Yes	Go to next step.
		No	Replace purge solenoid valve.
4	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Check charcoal canister for fuel saturation. If excess amount of liquid fuel present, replace charcoal canister.
5	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.21 ENGINE NOISE [FS]

Z6U010318881W26

21	ENGINE NOISE
DESCRIPTION	• Engine noise from under hood
POSSIBLE CAUSE	• Squeal, click or chirp noise — Improper engine oil level — Improper drive belt tension • Rattle sound noise — Loose parts • Hiss sound noise — Vacuum leaks — Loose spark plug — Air leaks from intake air system • Rumble or grind noise — Improper drive belt tension • Rap or roar sound noise — Exhaust system loose • Other noise — Camshaft friction gear noise — MLA noise

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is squeal, click or chirp sound present?	Yes	Check following: • Engine oil level. • Drive belts.
		No	Go to next step.
2	• Is rumble or grind sound present?	Yes	Check drive belt.
		No	Go to next step.
3	• Is rattle sound present?	Yes	Check location of rattle for loose parts.
		No	Go to next step.
4	• Is hiss sound present?	Yes	Check following: • Vacuum leaks. • Spark plug loose. • Intake air system leaks.
		No	Go to next step.
5	• Is rap or roar sound present?	Yes	Check exhaust system for loose parts.
		No	Go to next step.
6	• Is knock sound present?	Yes	Go to flow chart 12 for "KNOCKING/PINGING".
		No	If noise comes from engine internal, check for friction gear or MLA noise.
7	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.22 VIBRATION CONCERNS (ENGINE) [FS]

Z6U010318881W27

22	Vibration concerns (engine)
DESCRIPTION	• Vibration from under hood or driveline
POSSIBLE CAUSE	• Loose attaching bolts or worn parts • Components malfunctioning such as worn parts

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Check following components for loose attaching bolts or worn parts: — Cooling fan. — Drive belt and pulleys. — Engine mounts. • All items okay?	Yes	Check following systems: • Wheels. • Transaxle. • Driveline. • Suspension.
		No	Readjust or retighten engine mount installation position. Service as necessary for other parts.
2	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.23 A/C DOES NOT WORK [FS]

Z6U010318881W28

23	A/C Does not work
DESCRIPTION	• A/C compressor magnetic clutch does not engage when A/C is turned on
POSSIBLE CAUSE	• Improper refrigerant charging amount • Open A/C magnet clutch • Poor ground of A/C magnet clutch • A/C relay stuck to open • Power steering stuck to short • Open circuit between A/C switch and PCM through both A/C pressure switches • Short to ground circuit between power steering pressure switch and PCM • A/C low pressure switch stuck to open • Open circuit between A/C relay and A/C magnet clutch • A/C high pressure switch stuck open • A/C compressor seized

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Go to next step.
2	• Disconnect power steering pressure switch connector. • Is there continuity between connector terminal and ground?	Yes	Short to ground. Repair or replace wire harness.
		No	Check for short to ground at power steering pressure switch. If switch is okay, go to next step. If short exists, replace switch.
3	• Disconnect A/C compressor connector. • Start the engine and turn A/C switch on. • Is there correct voltage at terminal of A/C compressor magnet clutch connector? **Specification** **More than 10.5 V**	Yes	Check for ground condition of A/C compressor magnet clutch. If ground condition is okay, check for open circuit of magnet clutch.
		No	Go to next step.
4	• Disconnect A/C low pressure switch and A/C high pressure switch connectors. • Connect jumper wires between terminals of harness connectors. • Connect NGS tester to DLC. • Access ACCS PID on NGS tester. • Turn ignition switch ON. • Turn A/C switch on and set blower fan at any speed. • Does ACCS PID read ON?	Yes	Check A/C high pressure switch and low pressure switch operation. Replace malfunctioning switch. If both switches okay, Go to next step.
		No	Check following: • A/C switch stuck open. • Open circuit among both A/C pressure switches and PCM. • Open circuit of blower motor fan switch and resister (if blower motor does not operate).

STEP	INSPECTION		ACTION
5	• Remove jumper wires from switch connectors. • Reconnect connectors to both switches. • Start engine and turn A/C switch on. • Verify fan operation. • Do both fans operate?	Yes	Check for stuck to open A/C relay. Replace as necessary.
		No	Check following and repair or replace as necessary: • Refrigerant charging amount. • Seized A/C compressor.
6	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.24 A/C ALWAYS ON/A/C COMPRESSOR RUNS CONTINUOUSLY [FS]

Z6U010318881W29

24	A/C Always on/A/C compressor runs continuously
DESCRIPTION	• A/C compressor magnetic clutch does not disengage
POSSIBLE CAUSE	• Short to ground between A/C switch and PCM • Short to ground circuit between A/C relay and PCM • A/C relay to magnet clutch circuit shorts to battery power • Stuck engagement • A/C relay stuck closed

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Go to next step.
2	• Start engine and run at idle. • Turn A/C switch on. • Remove A/C relay. • Does A/C magnet clutch disengage?	Yes	Check following: A/C relay stuck closed. Short to ground circuit between A/C relay and PCM. If both items okay, go to next step.
		No	Check if circuit between A/C relay and magnet clutch shorts to battery power circuit. If circuit is okay, check for stuck magnet clutch.
3	• Connect NGS tester to DLC. • Access ACCS PID on NGS tester. • Start engine and turn A/C switch on. • Read ACCS PID while disconnecting high pressure switch connector. **Note** • ACCS PID should read OFF when disconnecting connector. If ACCS PID reading remains ON, short to ground circuit may be present. • Does ACCS PID reading remain on?	Yes	Check for short to ground circuit between high pressure switch and PCM.
		No	Go to next step.
4	• Reconnect high pressure switch connector. • Read ACCS PID while disconnecting low pressure switch connector. **Note** • ACCS PID should read OFF when disconnecting connector. If ACCS PID reading remains ON, short to ground circuit may be present. • Does ACCS PID reading remain on?	Yes	Check for short to ground circuit between low pressure switch and high pressure switch.
		No	Go to next step.

STEP	INSPECTION		ACTION
5	• Reconnect low pressure switch connector. • Read ACCS PID while turning off A/C switch. **Note** • ACCS PID should read OFF when turning the A/C switch OFF. If ACCS PID reading remains ON, short to ground circuit may be present. • Does ACCS PID reading remain on?	Yes	Check for short to ground circuit between low pressure switch and A/C switch.
		No	Check for A/C switch stuck closed.
6	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.25 A/C DOES NOT CUT OFF UNDER WIDE OPEN THROTTLE CONDITION [FS]

Z6U010318881W30

25	A/C Does not cut off under wide open throttle conditions
DESCRIPTION	• A/C compressor magnetic clutch does not disengage under wide open throttle
POSSIBLE CAUSE	• Throttle position (TP) sensor malfunction • Throttle position (TP) sensor misadjustment • Throttle position (TP) sensor loosely installed

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Does A/C turn off when A/C switch is turned off?	Yes	Go to next step.
		No	Go to flowchart 24 for "A/C ALWAYS ON/A/C COMPRESSOR RUNS CONTINUOUSLY".
2	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Check TP sensor for proper adjustment. Readjust TP sensor as necessary.
3	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.26 EXHAUST SULPHUR SMELL [FS]

Z6U010318881W31

26	Exhaust sulphur smell
DESCRIPTION	• Rotten egg smell (sulphur) from exhaust **Note** • Some slight sulphur smell may be normal. Catalyst with less than 8,000—16,000 km {5,000 to 10,000 miles} mileage is likely to have a sulphur smell concern due to the highly active state of new catalysts. Replacing the catalyst if no problem is found may actually make the symptom worse.
POSSIBLE CAUSE	• Electrical connectors disconnected or poor connection • Vacuum lines disconnected or improper connection • Charcoal canister malfunction • Improper fuel pressure **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **— Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **— Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Are any drivability or exhaust smoke concerns present?	Yes	Go to appropriate flow chart.
		No	Go to next step.
2	• Check following: — Electrical connections. — Vacuum lines. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat step 2.
3	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Go to next step.
4	• Install fuel pressure gauge between fuel filter and fuel delivery pipe. • Start engine and run it at idle. • Is fuel line pressure correct at idle? **Fuel line pressure** **210—260 kPa {2.1—2.6 kgf/cm^2, 30—37 psi}**	Yes	Go to next step.
		No	**Zero or low:** Check fuel pump circuit. Check for open fuel pump relief valve. Check for fuel leak inside pressure regulator. Check for clogged main fuel line. **High:** Check pressure regulator for high pressure cause. Check for clogged fuel return line.
5	• Does fuel line pressure remain at specification for 60 seconds when ignition switch is turned ON? **Fuel line pressure** **210—260 kPa {2.1—2.6 kgf/cm^2, 30—37 psi}**	Yes	Go to next step.
		No	Check pressure regulator for high pressure cause.
6	• Check charcoal canister for fuel saturation. • Is excess amount of liquid fuel present in canister?	Yes	Replace charcoal canister.
		No	Check fuel tank vent system. If fuel tank vent system is okay: Since sulphur content can vary in different fuels, suggest trying different brand. If fuel tank vent system is not okay: Repair or replace malfunctioning part.

NO.27 FUEL REFILL CONCERNS [FS]

Z6U010318881W32

27	Fuel refill concerns
DESCRIPTION	• Fuel tank does not fill smoothly
POSSIBLE CAUSE	• Clogged evaporative emission pipes • Non return valve malfunction • Fuel tank pressure control valve malfunction • Improper use of fuel nozzle • Inadequate fuel filling speed **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **—Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **—Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Retrieve and record any continuous memory KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	**DTC displayed:** Go to appropriate DTC test.
		No	**No DTC displayed:** Go to next step.
2	• Remove fuel filler pipe. • Make sure non return valve is installed properly. • Check non return valve operation. • Is non return valve okay? (See 01-14-11 NONRETURN VALVE INSPECTION)	Yes	Check following: • Improper use of fuel nozzle • Inadequate fuel filling speed • Fuel tank pressure control valve

NO.28 FUEL FILLING SHUT OFF ISSUES [FS]

Z6U010318881W33

28	Fuel filling shut off issues
DESCRIPTION	• Fuel does not shut off properly
POSSIBLE CAUSE	• Clogged evaporative emission pipes • Non return valve malfunction • Fuel shut off valve malfunction • Fuel nozzle malfunction • Fuel nozzle does not insert correctly

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Is there any DTC displayed?	Yes,	**DTC displayed:** Go to appropriate DTC test.
		No	**No DTC displayed:** Go to next step.

STEP	INSPECTION		ACTION
2	• Remove fuel filler pipe. • Make sure that non return valve installed properly. • Check non return valve operation. • Is non return valve okay? (See 01-14-11 NONRETURN VALVE INSPECTION)	Yes	Check as following: • Fuel nozzle malfunction • Fuel does not insert correctly • Fuel shut off valve
		No	**If non return valve installed improperly:** Reinstall non return valve to proper position. **If non return valve does not operate properly:** Replace non return valve.

NO.29 CONSTANT VOLTAGE [FS]

Z6U010318881W34

29	Constant voltage
DESCRIPTION	• Incorrect constant voltage
POSSIBLE CAUSE	• Constant voltage circuit malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Was constant voltage greater than 6.0 volts when measured in previous step?	Yes	Go to step 14.
		No	Go to next step.
2	• Key on, engine off. • Is voltage across battery terminals greater than 10.5 volts?	Yes	Go to next step.
		No	Inspect charging system.
3	• Key on, engine off. • Disconnect sensor where constant voltage circuit check failed. • Measure voltage between battery positive terminal and ground circuit at appropriate sensor connector. • Is voltage greater than 10.5 volts and within 1.0 volt of battery voltage?	Yes	Go to next step.
		No	Go to step 9.
4	**Note** • The purpose of this step is to determine if NGS tester is communicating with PCM. • Key on, engine off. • Attempt to access ECT PID. • Can ECT PID be accessed?	Yes	Go to step 8.
		No	Go to next step.
5	• Key off. • Leave TP sensor disconnected. • Disconnect EGR boost sensor connector. • Key on, engine off. • Measure voltage between constant voltage and ground circuits at TP sensor connector. • Is voltage between 4.0 and 6.0 volts?	Yes	Replace EGR boost sensor.
		No	Go to step 6.
6	• Key off. • Disconnect TP sensor connector. • Install breakout box. Leave PCM disconnected. • Key on, engine off. • Measure voltage between Test Pin 71 and Test Pin 77 at breakout box. • Is voltage greater than 10.5 volts?	Yes	Go to next step.
		No	Repair open VPWR circuit between PCM and main relay.
7	• Key off. • Leave TP sensor connector disconnected. • Disconnect NGS tester from DLC. • Measure resistance between Test Pin 90 and Test Pins 51/103 at breakout box. • Is resistance greater than 10,000 ohms?	Yes	Replace PCM.
		No	Repair constant voltage circuit short to ground.

STEP	INSPECTION		ACTION
8	• Key off. • Disconnect sensor connector where constant voltage circuit check failed. • Install breakout box. Leave PCM disconnected. • Is resistance less than 5.0 ohms?	Yes	Replace PCM.
		No	Repair open constant voltage circuit.
9	**Note** • The purpose of this step is to determine if NGS tester is communicating with PCM. • Key on, engine off. • Attempt to access ECT PID. • Can ECT PID be accessed?	Yes	Go to next step.
		No	Go to step 12.
10	• Are KOEO DTCs present for two or more sensors connected to ground circuit? **Sensors connected to ground:** EGR boost sensor, TP sensor, IAT sensor, ECT sensor, FTP sensor, TR sensor, HO2S-11, HO2S-12, clutch switch, PSP switch, TFT sensor.	Yes	Go to next step.
		No	Repair open ground circuit to sensor where constant voltage circuit check failed.
11	• Key off. • Disconnect NGS tester from DLC. • Disconnect sensor connector where constant voltage circuit check failed. • Install breakout box. Leave PCM disconnected. • Measure resistance between ground circuit at appropriate sensor connector and ground Test Pin 91 at breakout box. • Is resistance less than 5.0 ohms?	Yes	Reconnect sensor connector. Go to next step.
		No	Repair open ground circuit.
12	• Key off. • Disconnect NGS tester from DLC. • Install breakout box. Leave PCM disconnected. • Measure resistance between battery negative terminal and ground Test Pins 51/76/77/103 at breakout box. • Is each resistance less than 5.0 ohms?	Yes	Go to next step.
		No	Repair open ground circuit to ground.
13	• Key off. • Connect PCM to breakout box. • Measure resistance between PCM ground test pin 91 and ground Test Pins 51/76/77/103 at breakout box. • Is each resistance less than 5.0 ohms?	Yes	Ground circuits are okay.
		No	Replace PCM.
14	• Key off. • Disconnect sensor connector where constant voltage check failed. • Disconnect TP fuel tank pressure sensor and EGR boost sensor connectors. • Disconnect PCM connector. • Key on, engine off. • Measure voltage between constant voltage circuit at TP sensor connector and battery negative terminal. • Is voltage less than 0.5 volts?	Yes	Replace PCM.
		No	Repair constant voltage circuit short to power in harness.

NO.30 SPARK PLUG CONDITION [FS]

Z6U010318881W35

30	Spark plug condition
DESCRIPTION	• Incorrect spark plug condition
POSSIBLE CAUSE	**Note** • Inspecting spark plugs condition can determine whether problem is related to a specific cylinder or to all cylinders. **Wet/carbon is stuck on specific plug:** • Spark—Weak, not visible • Air/fuel mixture—Excessive fuel injection volume • Compression—No compression, low compression • Faulty spark plug **Grayish white with specific plug:** • Air/fuel mixture—Insufficient fuel injection volume • Faulty spark plug **Wet/carbon is stuck on all plugs:** • Spark—Weak • Air/fuel mixture—Too rich • Compression—Low compression • Clogging in intake/exhaust system **Grayish white with all plugs:** • Air/fuel mixture—Too lean **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **— Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **— Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Remove all spark plugs. • Inspect spark plug condition. • Is spark plug condition okay?	Yes	Troubleshooting completed.
		No	**Specific plug is wet or covered with carbon:** • Go to next step. **Specific plug looks grayish white:** • Go to Step 7. **All plugs are wet or covered with carbon:** • Go to Step 9. **All plugs look grayish white:** • Go to Step 15.
2	• Is spark plug wet/covered with carbon by engine oil?	Yes	Working up and down, inspect all areas related to oil.
		No	Go to next step.
3	• Inspect spark plug for following. — Cracked insulator — Heat range — Air gap — Worn electrode • Is spark plug okay?	Yes	Go to next step.
		No	Replace spark plug.
4	• Inspect compression pressure at suspected faulty cylinder. • Is compression pressure correct? (See 01-10A-5 COMPRESSION INSPECTION [FS])	Yes	Go to next step.
		No	Repair or replace malfunctioning part.
5	• Install all spark plugs. • Carry out spark test at suspected faulty cylinder. • Is strong blue spark visible? (Compare with normal cylinder.)	Yes	Go to next step.
		No	Repair or replace malfunctioning parts.

STEP	INSPECTION		ACTION
6	• Carry out fuel line pressure inspection. (See 01-14-27 PRESSURE REGULATOR INSPECTION) • Is fuel line pressure correct?	Yes	Inspect fuel injector for following: • Open or short circuit in injector • Leakage • Injection volume
		No	**Zero or low:** • Inspect fuel pump circuit. • Inspect for open fuel pump relief valve. • Inspect for fuel leakage inside pressure regulator. • Inspect for clogged main fuel line. • Inspect pulsation damper **High:** • Inspect pressure regulator for high pressure cause. • Inspect for clogged fuel return line.
7	• Inspect spark plug for following. — Heat range — Air gap • Is spark plug okay?	Yes	Go to next step.
		No	Replace spark plug.
8	• Remove suspected fuel injector. • Inspect following: — Resistance (See 01-14-20 FUEL INJECTOR INSPECTION) — Fuel injection volume (See 01-14-20 FUEL INJECTOR INSPECTION) • Are all above items okay?	Yes	Inspect for open circuit between suspected fuel injector connector terminal and PCM connector following terminal: • **For #1 cylinder:** 75 • **For #2 cylinder:** 101 • **For #3 cylinder:** 74 • **For #4 cylinder:** 100
		No	Replace fuel injector.
9	• Is air cleaner element free of restriction?	Yes	Go to next step.
		No	Replace air cleaner element.
10	• Carry out spark test. • Is strong blue spark visible at each cylinder?	Yes	Go to next step.
		No	Repair or replace malfunctioning part.
11	• Carry out fuel line pressure inspection. • Is fuel line pressure correct? **Fuel line pressure** **270—330 kPa {2.7—3.4 kgf/cm^2, 39—48 psi}**	Yes	Go to next step.
		No	**Zero or low:** • Inspect fuel pump circuit. • Inspect for open fuel pump relief valve. • Inspect for fuel leakage inside pressure regulator. • Inspect for clogged main fuel line. **High:** • Inspect pressure regulator for high pressure cause. • Inspect for clogged fuel return line.
12	• Inspect following PIDs. — ECT — ECT V — O2S11 — O2S12 — MAF — MAF V (See 01-40A-15 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [FS]) • Are PIDs okay?	Yes	Go to next step.
		No	Repair or replace malfunctioning parts.
13	• Carry out purge control inspection (when engine can be started). (See 01-03A-58 Purge Control Inspection) • Is purge control correct?	Yes	Go to next step.
		No	Repair or replace malfunctioning part.
14	• Carry out compression inspection. • Is compression correct?	Yes	Inspect for clogging in exhaust system.
		No	Repair or replace malfunctioning part.
15	• When engine cannot be started, inspect intake-air system for air leakage. • When engine can be started, carry out intake manifold vacuum inspection. • Is air sucked in from intake-air system?	Yes	Repair or replace malfunctioning part.
		No	Go to next step.

STEP	INSPECTION		ACTION
16	• Carry out fuel line pressure inspection. • Is fuel line pressure correct? **Fuel line pressure** **260—310 kPa {2.6—3.2 kgf/cm², 37—45 psi}**	Yes	Inspect following PIDs. • ECT • ECT V • FHO2S • MAF • MAF V (See 01-40A-15 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [FS]) Inspect PCM GND condition.
		No	**Zero or low:** • Inspect fuel pump circuit. • Inspect for open fuel pump relief valve. • Inspect for fuel leakage inside pressure regulator. • Inspect for clogged main fuel line. • Inspect pulsation damper. **High:** • Inspect pressure regulator for high pressure cause. • Inspect for clogged fuel return line.
17	• Verify test results. — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, inspect related Service Information and perform repair or diagnosis. • If vehicle is repaired, troubleshooting completed. • If vehicle is not repaired or additional diagnostic information is not available, replace PCM.		

ENGINE CONTROL SYSTEM OPERATION INSPECTION [FS]

Z6U010318881W36

Input Signal System Investigation Procedure

1. Find an unusual signal. (See 01-03A-54 Finding unusual signals.)
2. Locate its source. (See 01-03A-54 Locating the source of unusual signals.)
3. Repair or replace the defective part.
4. Confirm that the unusual signal has been erased.

Finding unusual signals

- While referring to 01-02A-11 ON-BOARD DIAGNOSTIC TEST [FS], use the PID/DATA monitor and record function to inspect the input signal system relating to the problem.

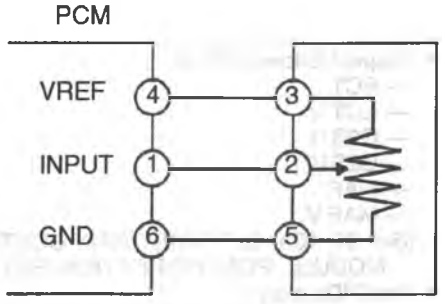
1. Start the engine and idle the vehicle. You can assume that any signals that are out of specifications by a wide margin are unusual.
2. When recreating the problem, any sudden change in monitor input signals that is not consciously created by the driver can be judged as unusual.

Locating the source of unusual signals

Caution

- **Compare the NGS monitor voltage with the measurement voltage using the digital measurement system function. If you use another tester, misreading may occur.**
- **When measuring voltage, attach the tester GND to the GND of the PCM that is being tested, or to the engine itself. If this is not done, the measured voltage and actual voltage may differ.**
- **After connecting the pin to a waterproof coupler, confirming continuity and measuring the voltage, inspect the waterproof connector for cracks. If there are any, use sealant to fix them. Failure to do this may result in deterioration of the harness or terminal from water damage, leading to problems with the vehicle.**

Variable resistance type 1 (TP sensor, fuel tank pressure sensor and EGR boost sensor)



YMU103WA5

Input signal system Inspection

1. When you get an unusual signal, measure the #1 PCM terminal voltage.
   - If the #1 terminal voltage and the NGS monitor voltage are the same, proceed to the next step.
   - If there is a difference of **0.5 V or more**, inspect for the following points concerning the PCM connector.
     — Female terminal opening is loose.
     — Coupler (pin holder) damage
     — Pin discoloration (blackness)
     — Harness/pin crimp is loose or disconnected.

2. Measure the #2 sensor terminal voltage.
   - If there is a **0.5 V or more** difference between the sensor and NGS voltages, inspect the harness for open or short circuits.
   - If the sensor and NGS voltages are the same, inspect for the following points concerning the sensor connector.
   - If there are no problems, proceed to next investigation below.
     — Female terminal opening is loose.
     — Coupler (pin holder) damage
     — Pin discoloration (blackness)

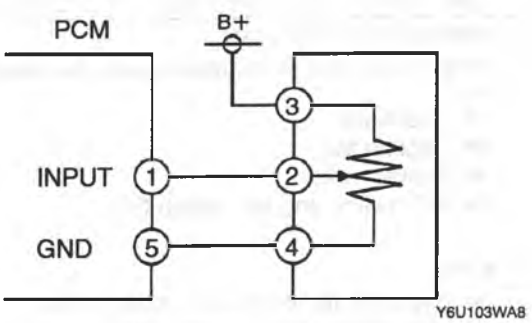
Power supply inspection(reference voltage (Vref))
- Confirm that the #5 terminal is at **5 V**.
  —If the measured voltage on the #3 terminal is **5 V**, inspect the following points on the sensor connector.
  —If there is no problem, inspect for the following.
    - Female terminal opening loose
    - Coupler (pin holder) damage
    - Pin discoloration (blackness)

  —If the #3 terminal measures other than **5 V**, inspect for the following.
    - Open or short circuit in harness
    - Harness/pin crimp is loose or disconnected.

GND circuit inspection
- Measure the #3 terminal voltage.
  —If it is at **0 V**, inspect the sensor.
    - If necessary, replace the sensor.

  —If not, inspect for the following.
    - Open or short circuit in harness
    - Female terminal opening is loose open or short circuit in harness
    - Coupler (pin holder) damage
    - Pin discoloration (blackness)
    - Harness/pin crimp is loose or disconnected.

Variable resistance type 2 (fuel tank level sensor)



Y6U103WA8

GND circuit inspection
- Confirm that terminal sensor #4 is at **0 V**.
  —If it is at **0 V**, inspect the sensor.
    - If necessary, replace the sensor.

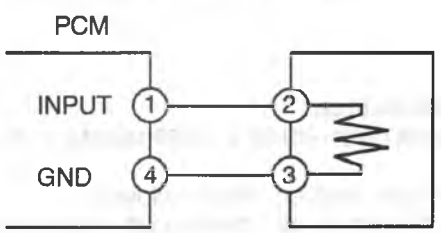
  —If not at **0 V**, inspect for the following.
    - Open circuit in harness
    - Female terminal opening is loose.
    - Coupler (pin holder) damage
    - Pin discoloration (blackness)
    - Harness/pin crimp is loose or disconnected.

Input signal inspection
1. When you get an unusual signal, measure the #1 PCM terminal voltage.
   - If the #1 terminal voltage and the NGS monitor voltage are the same, proceed to the next step.
   - If there is a difference of **0.5 V or more**, inspect for the following points concerning the PCM connector.
     — Female terminal opening is loose.
     — Coupler (pin holder) damage
     — Pin discoloration (blackness)
     — Harness/pin crimp is loose or disconnected.
2. Measure the #2 sensor terminal voltage.
   - If there is a **0.5 V or more** difference between the sensor and NGS voltages, inspect the harness for open or short circuits.
   - If the sensor and NGS voltages are the same, inspect the following points concerning the sensor connector.
     — Female terminal opening is loose.
     — Coupler (pin holder) damage
     — Pin discoloration (blackness)
     — Harness/pin crimp is loose or disconnected.
   - If there are no problems, proceed to next investigation below.

Power supply inspection
- Confirm that the sensor #3 terminal is **B+**.
  —If the measured voltage on the #3 terminal is **B+**, inspect the following points on the sensor connector.
    - Female terminal opening is loose.
    - Coupler (pin holder) damage
    - Pin discoloration (blackness)

  —If the #3 terminal measures other than **B+**, inspect the following.
    - Open or short circuit in harness
    - Harness/pin crimp is loose or disconnected.

Thermistor type (IAT sensor and ECT sensor)



YMU103WA7

Input signal inspection
1. When you get an unusual signal, measure the #1 PCM terminal voltage.
   - If the #1 terminal voltage and the NGS monitor voltage are the same, proceed to the next step.
   - If there is a difference of **0.5 V or more**, inspect the following points concerning the PCM connector.
     — Female terminal opening loose

— Coupler (pin holder) damage
— Pin discoloration (blackness)
— Harness/pin crimp is loose or disconnected.

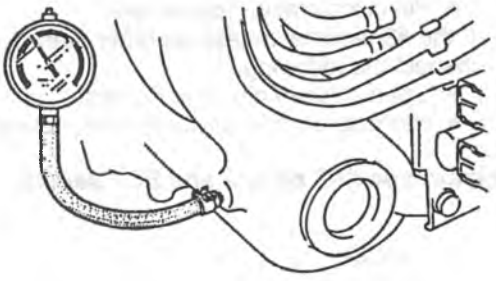
2. Measure the #2 sensor terminal voltage.
   - If there is a **0.5 V or more** difference between the sensor and NGS voltages, inspect the harness for open or short circuits.
   - If the sensor and NGS voltages are the same, inspect the following points concerning the sensor connector.
     — Female terminal opening is loose.
     — Coupler (pin holder) damage
     — Pin discoloration (blackness)
     — Harness/pin crimp is loose or disconnected.
   - If there are no problems, proceed to ground circuit inspection .

Ground circuit inspection

- Confirm that terminal sensor #3 is at **0 V**.
  —If it is at **0 V**, inspect the sensor. If necessary, replace the sensor.
  —If not, inspect for the following.
    - Open circuit in harness
    - Female terminal opening is loose.
    - Coupler (pin holder) damage
    - Pin discoloration (blackness)
    - Harness/pin crimp is loose or disconnected.

Intake Manifold Vacuum Inspection

1. Verify air intake hoses are installed properly.
2. Start the engine and run at idle.
3. Measure the intake manifold vacuum by using a vacuum gauge.



W6U101WAV

Specification
Less than -60 kPa {-450 mmHg, -18 inHg}

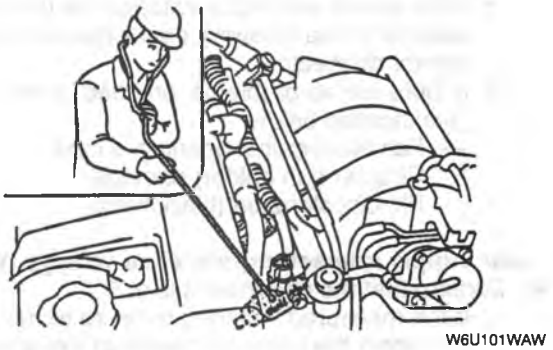
4. If not as specified, check following.
   - Air suction at: Throttle body installation point. Intake manifold installation point. PCV valve installation point.
   - Fuel injector insulator.
   - Accelerator cable free play.
   - Engine compression (See 01-10A-5 COMPRESSION INSPECTION [FS].)

Fuel Injector Operation Inspection

1. Warm up the engine and run at idle (or cranking if it does not start.)
2. Listen for the operational sound of each injector with a soundscope.

Note

- Compare the sound of each injector because of the difficulty of verifying the sound of individual injectors.



W6U101WAW

Idle Air Control Valve Inspection

1. Start the engine and run at idle.
2. Disconnect the IAC valve connector and verify if the engine speed drops or engine stalls.
3. If engine speed does not drop or does not stall, check following.
   - IAC valve. (See 01-13A-8 IDLE AIR CONTROL (IAC) VALVE INSPECTION [FS].)
   - IAC valve air passage.
   - Open or short circuit between IAC valve and PCM.
4. Warm up the engine to normal operating temperature and run it at idle.
5. Turn the electrical loads ON and verify the engine speed is within the specification.

Load condition	Idle speed	
	MTX	ATX
No load	550—850	500—800
A/C ON	625—925	500—800
P/S ON*1	550—850	500—800
E/L ON*2	625—925	525—825

*1 : Steering wheel fully turned.

*2 : When two or more of the following electrical loads are ON.
- Headlight
- Cooling fan
- Blower motor
- A/C switch and fan switch ON

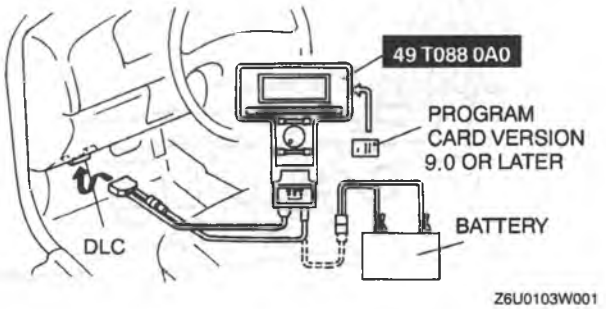
Note

- Excludes temporary idle speed drop immediately after the electrical loads are turned ON.

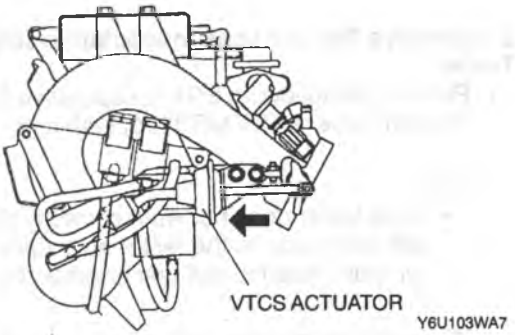
6. If not as specified, check the related switches and wiring harnesses.

Variable Tumble Control System (VTCS) Inspection [FS]

1. Connect the **SSTs** (NGS tester) to the DLC.



2. Access ECT PID.
3. Verify ECT PID is 65 °C {149 °F} or less.
4. Start the engine.
5. Verify that the VTCS actuator rod is pulled.



6. If the rod is not pulled, inspect the following.
   - VTCS shutter valve actuator
   - VTCS delay valve stud
   - VTCS chamber passage clogged
   - Vacuum hose disconnected
   - VTCS swirl control solenoid valve stuck
   - Wiring harness damaged and /or connectors disconnected (Main relay—VTCS solenoid valve —PCM terminal 42)
7. Access RPM and IMRC PIDs.
8. Inspect the rod operation and IMRC PID under the following condition.
   - If the rod operation and IMRC PID are not as specified, inspect for the following:
     — VTCS shutter valve actuator stuck
     — VTCS delay valve stuck
     — VTCS chamber pasage clogged
     — Vacuum hose disconnected
     — VTCS solenoid valve stuck
     — Wiring harness damaged and /or connectors disconnected (Main relay—VTCS solenoid valve —PCM terminal 42)

Rod operation

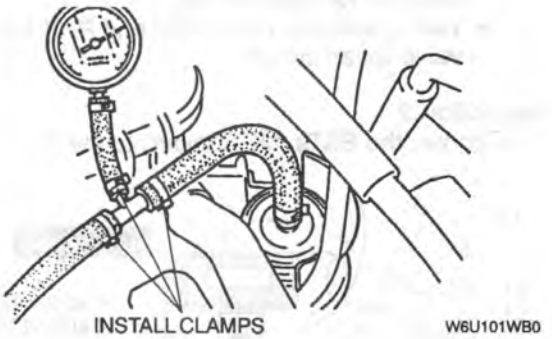
Engine speed (RPM PID) (rpm)	VTCS actuator	IMRC PID
3000or less	Operate	ON
3000 or more	Not operate	OFF

Pressure Regulator Control Inspection

Warning

- **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 the"BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE". (See01-14-3 BEFORE REPAIR PROCEDURE.) (See 01-14-4 AFTER REPAIR PROCEDURE.)**

1. Install the fuel pressure gauge.



2. Measure the fuel pressure under the following conditions:

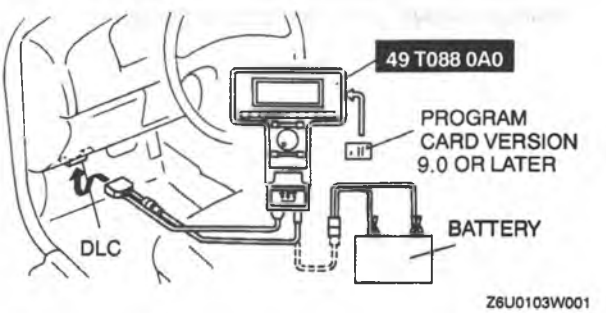
Specifications

	Fuel pressure (kPa {kgf/cm², psi})		
Idling	210—260 {2.1—2.6, 30—37}	210—260 {2.1—2.6, 30—37}	260—310 {2.6—3.2, 37—46}
During 120 sec. of hot start	260—310 {2.6—3.2, 37—46}		
After 120 sec. of hot start	210—260 {2.1—2.6, 37—46}	210—260 {2.1—2.6, 30—37}	260—310 {2.6—3.2, 37—46}
Pressure regulator control condition	Normal	Not normal (Perform Inspection 1)	Not normal (Perform Inspection 2)

3. If the fuel pressure is not within the specification, carry out either Inspection 1 or Inspection 2 as required.

Inspection 1

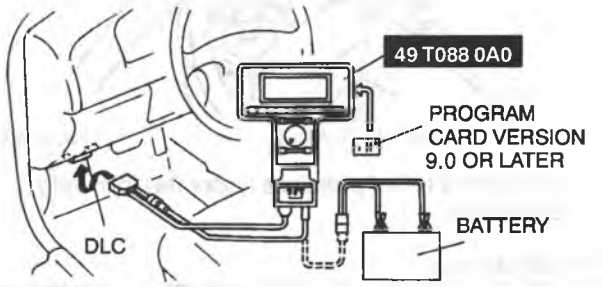
1. Connect the **SSTs** (NGS tester) to the DLC.



2. Access the following PIDs.
   - ECT PID. (See 01-40A-34 ENGINE COOLANT TEMPERATURE SENSOR INSPECTION [FS].)
   - IAT PID. (See 01-40A-35 INTAKE AIR TEMPERATURE SENSOR INSPECTION [FS].)
   - TP V PID. (See 01-40A-32 THROTTLE POSITION SENSOR INSPECTION [FS].)
3. Check PID value.
4. If okay, check:
   - Pressure regulator.
   - PRC solenoid valve.
   - Wiring between PRC solenoid valve and PCM terminal 19 (open circuit).
   - Wiring between main relay and PRC solenoid valve (open circuit).

Inspection 2

1. Connect the **SSTs** (NGS tester) to the DLC.

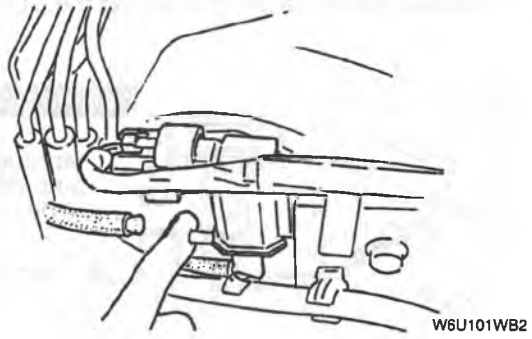


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2. Access the following PIDs.
   - ECT PID. (See 01-40A-34 ENGINE COOLANT TEMPERATURE SENSOR INSPECTION [FS].)
   - IAT PID. (See 01-40A-35 INTAKE AIR TEMPERATURE SENSOR INSPECTION [FS].)
3. Check PID value.
4. If okay, check:
   - Loose or damaged vacuum hose between the pressure regulator, PRC solenoid valve, and intake manifold.
   - PRC solenoid valve.
   - Wiring between PRC solenoid valve and PCM terminal 19 (short circuit).

Purge Control Inspection

1. Start and warm up the engine to the normal operating temperature.
2. Let the engine idle.
3. Disconnect the vacuum hose between the purge solenoid valve and the charcoal canister.
4. Put a finger to the purge solenoid valve and verify there is no vacuum applied.


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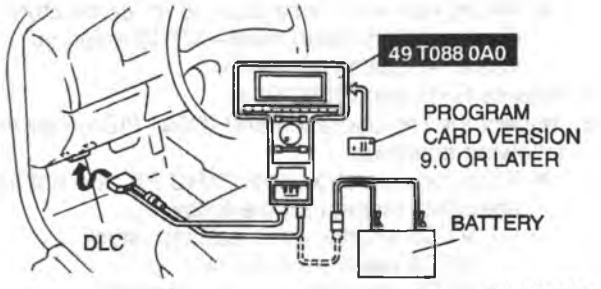
5. If there is vacuum:
   - Check the purge solenoid valve.
   - Check for loose or damaged vacuum hose.
   - Check wiring between purge solenoid valve and PCM terminal 67 (short circuit).

Evaporative System Leak Inspection Using Leak Tester

1. Perform the following **SST** (Evaporative Emission System Tester MZ254AT3641) self-test:

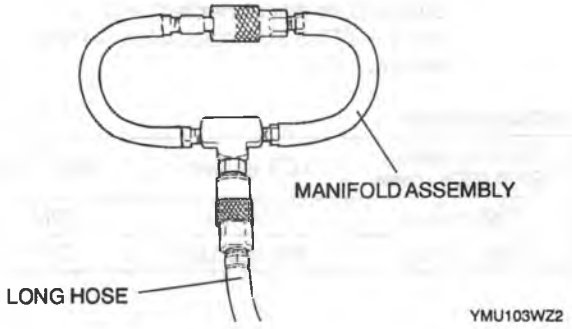
Note
- If the tester does not work correctly during self-test, refer to the tester operators manual for more detailed self test procedures.

(1) Verify the gas cylinder valve is closed and the control valve located on the tester is in the TEST position. All tester displays should be off at this time.
(2) Connect the long hose (part of **SST**) to the tester.



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(3) Connect the manifold assembly (part of **SST**) to the long hose as shown.



YMU103WZ2

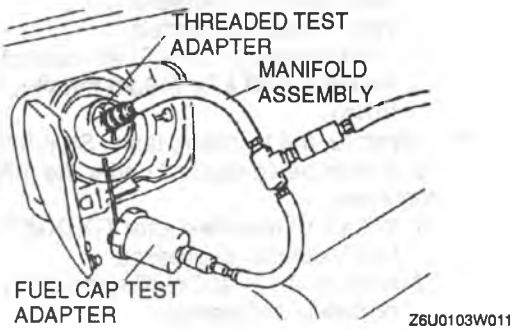
(4) Open the gas cylinder valve and verify the gas cylinder regulator left gauge reads 10 to 12 psi (preset at factory).
- If not, refer to the tester operators manual to contact tester manufacturer.

(5) Press the ON/OFF switch to turn on the **SST** and make sure the left display reads 0.0.
(6) Turn the control valve on the tester to the FILL position.
(7) Verify the left display reading is within 13.9 to 14.0 inches of water.
- If not, adjust the pressure using the regulator knob located on the right side of the tester.

(8) Turn the control valve to TEST position and press the START switch.
(9) After the 2-minute countdown (left display) is completed, the right display shows the total pressure loss for that period. A 0.5 inch of water loss is acceptable on the self-test.
- If the loss is more than 0.5 inch of water, do one or more self-test. If the failed test repeats, check for leak using the ultrasonic leak detector (part of **SST**).

2. Press the RESET switch to set the left display reading to 0.0.
3. Connect the fuel cap test adapter (part of **SST**) to the manifold assembly and fuel-filler cap from the vehicle.
- If the fuel-filler cap is not a genuine part, replace it.

4. Connect the threaded test adapter (part of **SST**) to the manifold assembly and fuel-filler neck.



5. Connect the NGS tester to DLC-2.
6. Turn the ignition key to ON (engine OFF).
7. Select **GENERIC OBD II FUNCTIONS**.
8. Press **CONT** (#8).
9. Select **ON BOARD DEVICE CONTROL**.
10. Press **TRIGGER** to close the canister drain cut valve (CDCV).

Note
- If the CDCV is closed, CMD REVD is displayed.
- The CDCV is closed for **10 minutes** unless the following takes place:
  - — The engine is started.
  - — The ignition key is turned to OFF.
  - — The fuel tank pressure sensor signal exceeds 6.43 kPa {48.3 mmHg, 1.9 inHg}.

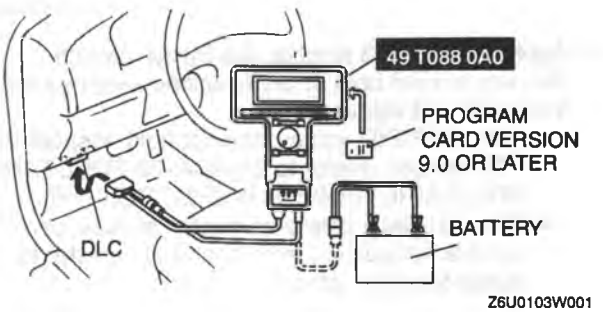
11. Turn the control valve to the FILL position.
12. Wait (maximum 40 seconds) until the left display reads 13.5 to 14 inches of water.
- If the reading is slightly below, adjust it using the regulator knob.
- If the reading is far below, the EVAP system has large leak. Check for leak (using the ultrasonic leak detector if necessary) and repair.

13. Turn the control valve to the TEST position and press the START switch.
14. After the 2-minute countdown (left display) is completed, check the test result (the failed/passed light on the tester).
- If the green light turns on, the EVAP system is OK.
- If the red light turns on, the EVAP system has leakage. Check for leak using the ultrasonic leak detector) and repair.

15. Close the gas cylinder valve.
16. Turn the control valve to the FILL position.
17. Press the ON/OFF switch to turn off the tester.

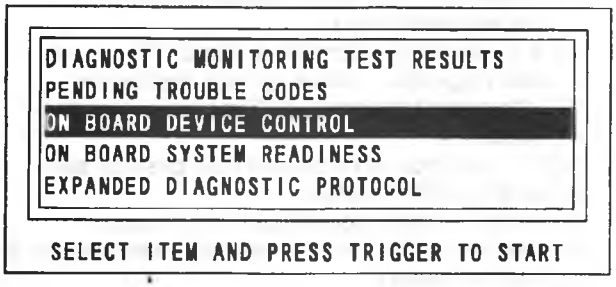
Evaporative System Leak Inspection Using Vacuum Pump
Whole system inspection

1. Disconnect the vacuum hose between the purge solenoid valve and the catch tank from the purge solenoid valve.
2. Insert hose on the vacuum pump.
3. Connect the **SSTs** (NGS tester) to the DLC.



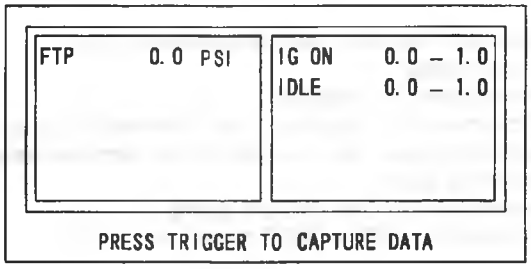
Note
- The following conditions cancel the ON BOARD DEVICE CONTROL function:
  - — Ten minutes after the TRIGGER on the NGS tester is depressed.
  - — When engine is started.
  - — If the pressure in the EVAP control system exceeds **6.43 kPa {48.2 mmHg, 1.9 inHg}**.
- Therefore, the following tests, Step 4 through 9, should be conducted under the following conditions.
  - — Within **10 minutes** after TRIGGER on the NGS tester is depressed.
  - — Without starting the engine.

4. Select the ON BOARD DEVICE CONTROL of the GENERIC OBD-II FUNCTIONS and press TRIGGER.



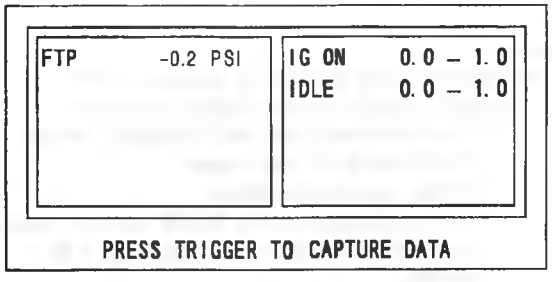
YMU103WB8

5. Press CANCEL two times.
6. Select the PID/DATA MONITOR AND RECORD function on the NGS display.
7. Select the FTP PID.
8. Press the START to view PID.



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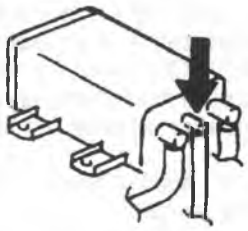
9. Apply **1.7 kPa {13 mmHg, 0.5 inHg}** vacuum. Vacuum should hold at the specified readings for a minimum of **2 minutes**.
   - If the FTP PID value does not hold, inspect the FTP sensor. (Refer to 01-40A-38 FUEL TANK PRESSURE SENSOR INSPECTION [FS].)
   - If the fuel tank pressure sensor is okay, carry out the "Inspection from charcoal canister to purge solenoid valve".



Y6U103WB7

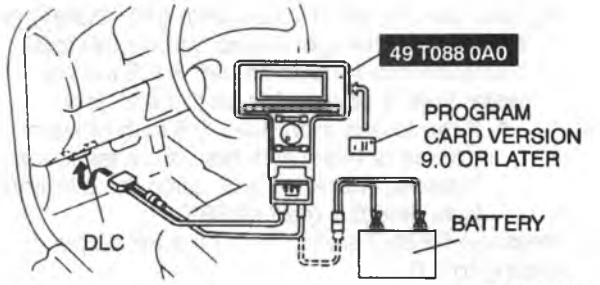
Inspection from charcoal canister to purge solenoid valve

1. Inspect for loose and wrongly connected hoses between the charcoal canister and the purge solenoid valve. (Refer to 01-13A-3 VACUUM HOSE ROUTING DIAGRAM [FS].)
2. Disconnect fuel tank side of the vacuum hose at the charcoal canister.
3. Insert hose on the vacuum pump.



Y6U103WB9

4. Connect the **SSTs** (NGS tester) to the DLC.

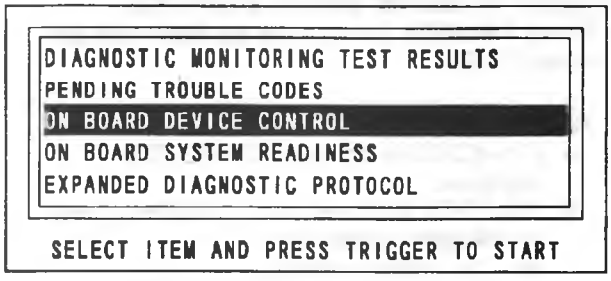


Z6U0103W001

Note

- The following conditions cancel the ON BOARD DEVICE CONTROL function:
  1. Ten minutes after the TRIGGER on the NGS tester is depressed.
  2. When engine is started.
  3. If the pressure in the EVAP control system exceeds **6.43 kPa {48.26 mmHg, 1.9 inHg}**.
- Therefore, the following tests, Step 5 through 10, should be conducted under the following conditions.
  1. Within **10 minutes** after TRIGGER on the NGS tester is depressed.
  2. Ignition key is at ON (Engine OFF), but engine is not started.

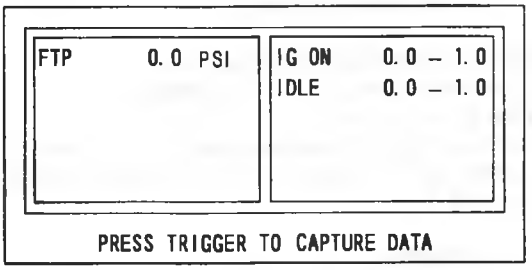
5. Select the ON BOARD DEVICE CONTROL of the GENERIC OBD-II FUNCTIONS and press TRIGGER.



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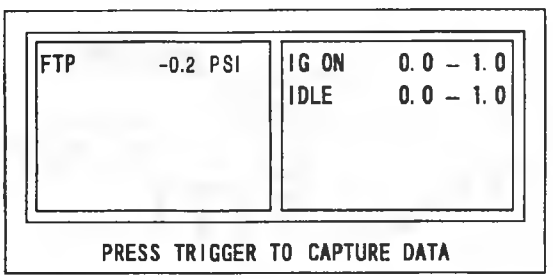
6. Press CANCEL two times.
7. Select the PID/DATA MONITOR AND RECORD function on the NGS display.

8. Select the FTP PID.
9. Press the START to view PID.



Y6U103WB8

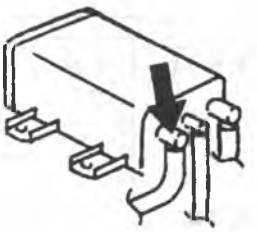
10. Apply **1.7 kPa {13 mmHg, 0.5 inHg}** vacuum. Vacuum should hold at the specified readings for a minimum of **2 minutes**.
    - If the vacuum does not hold, inspect the following.
      - — FTP sensor (Refer to 01-40A-38 FUEL TANK PRESSURE SENSOR INSPECTION [FS].)
      - — Purge solenoid valve (Refer to 01-16-12 PURGE SOLENOID VALVE INSPECTION.)
      - — Catch tank for plugging, damages and pinhole using vacuum pump
      - — Charcoal canister for damage and pinhole (Refer to 01-16-10 CHARCOAL CANISTER INSPECTION.)
      - — CDCV for damage and leakage (Refer to 01-16-11 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION.)
      - — Detached, incorrectly installed or cracked hose from purge solenoid valve to catch tank
      - — Detached, incorrectly Installed or cracked hose from catch tank to charcoal canister
      - — Detached, incorrectly installed or cracked hose from charcoal canister to fuel tank pressure sensor
      - — Detached, incorrectly installed or cracked hose from charcoal canister to CDCV
    - If the FTP PID value holds, carry out the "Inspection from charcoal canister to fuel tank".



Y6U103WB7

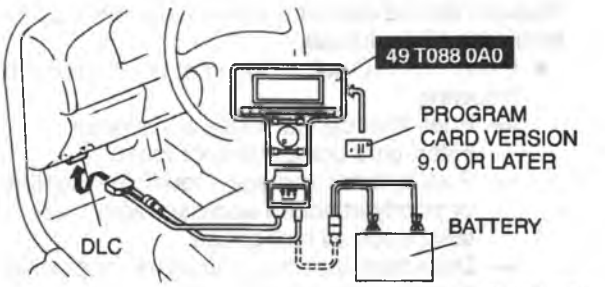
Inspection from charcoal canister to fuel tank

1. Inspect for loose and wrongly connected hoses between the charcoal canister and the fuel tank. (Refer to 01-13A-3 VACUUM HOSE ROUTING DIAGRAM [FS].)
2. Disconnect catch tank side of the vacuum hose at the charcoal canister.
3. Insert hose on the vacuum pump.



Y6U103WBA

4. Connect the **SSTs** (NGS tester) to the DLC.

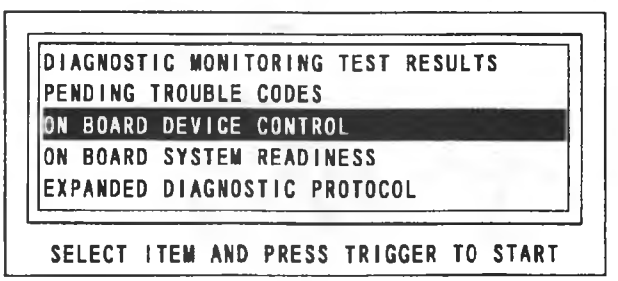


Z6U0103W001

Note

- The following conditions cancel the ON BOARD DEVICE CONTROL function:
  1. Ten minutes after the TRIGGER on the NGS tester is depressed.
  2. When engine is started.
  3. If the pressure in the EVAP control system exceeds **6.43 kPa {48.26 mmHg, 1.9 inHg}**.
- Therefore, the following tests, Step 5 through 10, should be conducted under the following conditions.
  1. Within **10 minutes** after TRIGGER on the NGS tester is depressed.
  2. Ignition key is at ON (Engine OFF), but engine is not started.

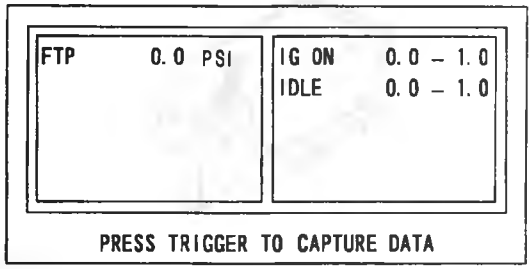
5. Select the ON BOARD DEVICE CONTROL of the GENERIC OBD-II FUNCTIONS and press TRIGGER.



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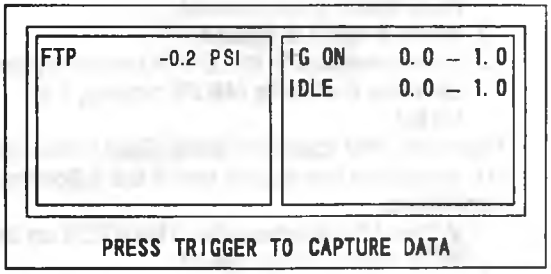
6. Press CANCEL two times.

7. Select the PID/DATA MONITOR AND RECORD function on the NGS display.
8. Select the FTP PID.
9. Press the START to view PID.



Y6U103WB8

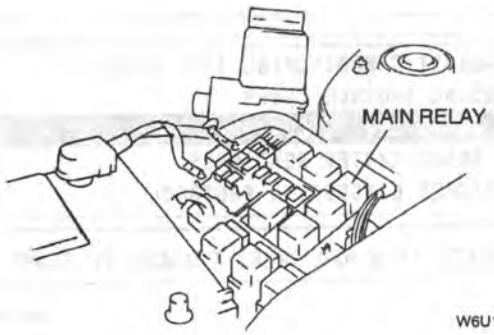
10. Apply **1.7 kPa {13 mmHg, 0.5 inHg}** vacuum. Vacuum should hold at the specified readings for a minimum of **2 minutes**.
    - If the FTP PID value does not hold, inspect the following:
      — Fuel-filler cap for loose or damage
      — Filler-pipe component for leakage
      — Fuel tank for damage, insufficient sealing or poorly attached accessories on fuel tank, such as fuel gauge
      — Detached, incorrectly installed or cracked hose from charcoal canister to fuel tank
      — Detached, incorrectly installed or cracked hose from charcoal canister to vent cut valve
      — Detached, incorrectly installed or cracked hose from vent cut valve to fuel tank



Y6U103WB7

Main Relay Operation Inspection

1. Verify the main relay clicks when the ignition switch is turned to ON and OFF.



W6U101WB3

2. If there is no sound, inspect the following:
   - Main relay.
   - Harness and connector between ignition switch and main relay.

Ignition Timing Control Inspection

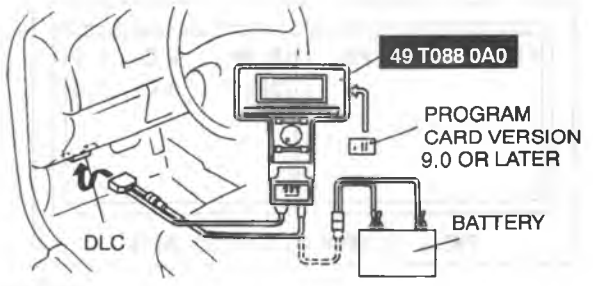
1. Connect a timing light to the engine.
2. Crank the engine.
3. Verify the timing mark (yellow) on the crankshaft pulley and the mark on the timing belt cover are aligned.

   Specification
   BTDC 6—18° (12 ± 6°)

4. Increase engine speed and verify ignition timing is advanced.

A/C Cut Off Control Inspection

1. Start the engine and let it idle.
2. Turn the A/C switch and the fan switch ON.
3. Check if the operation sound of the A/C compressor electromagnetic clutch is heard. (A/C compressor starts to work.)
4. Fully open the throttle valve. Check if the A/C compressor magnetic clutch operation sound is heard. (A/C compressor stops to work.) Then, 3—6 seconds after, check if the operational sound of the A/C compressor electromagnetic clutch is heard.
5. Turn the A/C switch and the fan switch OFF.
6. If the sound is not heard:
   (1) Connect a jumper wire between both terminals of A/C pressure switch connector.
   (2) Turn the ignition switch ON.
   (3) Turn the A/C switch and the fan switch ON. Verify sound is heard from A/C relay.
   (4) If the operation sound is heard, check the TP V PID.
      - TP V PID.
   (5) If the operation sound is not heard, check the following:
      - A/C relay.
      - Open or short to ground circuit in wiring harnesses and connectors (Main relay — A/C relay — PCM terminal 69)
      - A/C related parts.



Z6U0103W001

Spark Test

1. Disconnect the fuel pump relay connector.
2. Verify each high-tension lead and connector is connected properly.
3. Inspect the ignition system using the following procedure.

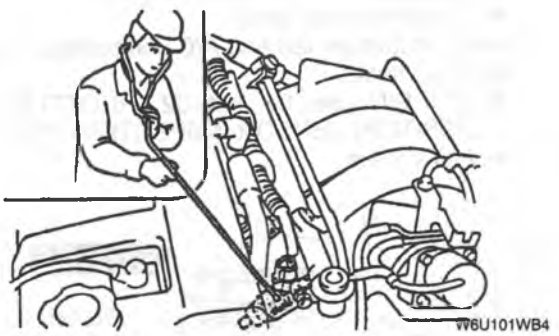
Warning

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

STEP	INSPECTION		ACTION
1	Remove high tension lead from spark plug. Hold high-tension lead with insulated pliers 5—10 mm {0.20—0.39 in} from ground. Turn ignition switch to START and verify that there is a strong blue spark. (Check each cylinder)	Yes	Ignition system okay.
		No	If some cylinders do not spark, go to step 2. If all cylinders do not spark, go to step 3.
2	Is high tension lead resistance correct? **Specification 16 kΩ/m**	Yes	Check for crack or damage of high tension lead and ignition coil.
		No	Replace high tension lead.
3	Does PCM or ignition coil connector have poor connection?	Yes	Repair or replace connector.
		No	Go to next step.
4	Is ignition coil winding resistance okay?	Yes	Go to next step.
		No	Replace ignition coil.
5	Are following parts okay? • CKP sensor and crankshaft pulley (also, check for a gap). **Specification 0.5—1.5 mm {0.020—0.059 in}** • PCM terminal 21/22 voltage **Specification Approx. 1.5 V**	Yes	Check for open or short in wiring harness and connectors of CKP sensor.
		No	Repair or replace.

Fuel Cut Control Inspection

1. Warm up the engine to normal operating temperature and let it idle.
2. Increase the engine speed to 3,000 rpm, then suddenly release the throttle.
3. Check if there is no operational sound from each injector with a screwdriver or a sound scope when the engine speed is above approx. 2,500 rpm on deceleration.



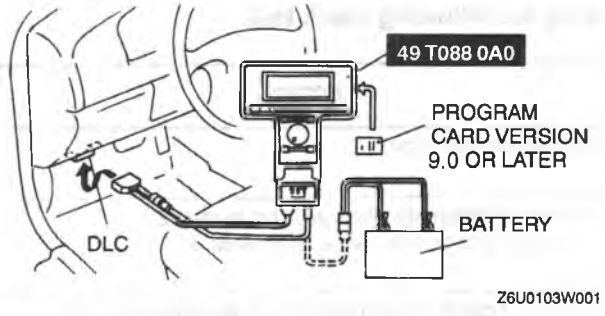
Cooling Fan Control System Inspection

Cooling fan operation

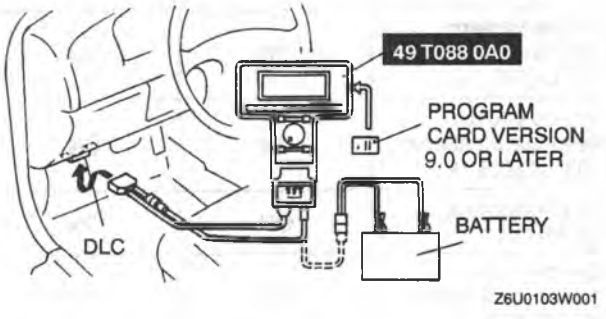
Engine condition	Cooling fan relay	Condenser fan relay
Engine coolant temperature below 97 °C {207 °F}	OFF	OFF
Engine coolant temperature above 97 °C {207 °F}	ON	OFF
Engine coolant temperature above 109 °C {228 °F}	ON	ON
Air conditioning switch ON	ON	ON
Engine coolant temperature sensor malfunction	ON	ON

Cooling fan

1. Verify the engine is cold.
2. Turn the ignition switch ON.
3. Verify the cooling fan is not operating.
4. If the cooling fan is operating:
   (1) Connect the **SSTs** (NGS tester) to the DLC.



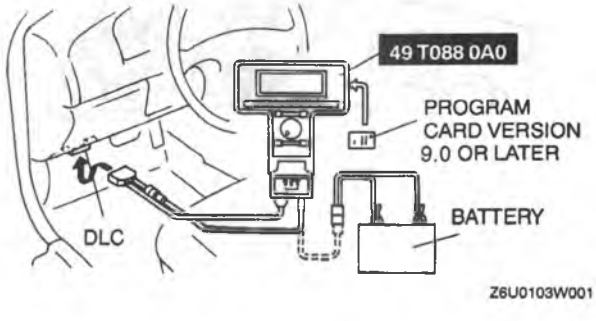
   (2) Select the "ACTIVE COMMAND" then "OUTPUT TEST MODE" function on the NGS tester display.
   (3) Select the "ALL OFF" and verify the cooling fan signal is OFF.
   (4) If the cooling fan control signal is ON check:
      - Cooling fan relay stuck in closed position.
      - Short to ground circuit between cooling fan relay and PCM.
      - Short to power in circuit between cooling fan relay.
      - DTCs for ECT sensor.
      - P0117, P0118, P0125, P1116, P1117.
   (5) If the cooling fan is OFF, check the following.
      - Short to ground circuit between A/C switch and PCM.
      - DTC for ECT sensor.
      - P0117, P0118, P0125, P1116, P1117.
5. Start the engine.
6. Verify that the cooling fan is operating when engine is hot.
7. If the cooling fan does not operate, do as follows.
   (1) Connect the **SSTs** (NGS tester) to the DLC.



   (2) Select "Active Command" mode.
   (3) Select "Output Test Mode".
   (4) Select "ALL ON" mode.
   (5) Press "Start".
   (6) If the cooling fan operates, check the ECT sensor DTCs.
      - P0117, P0118, P0125, P1116, P1117.
   (7) If the cooling fan does not operate, do as follows.
      ① Select "ALL ON". Operate cooling fan by selecting "Start", and verify that operational sound is heard from the cooling fan relay.
      ② If the operational sound is heard, check the wiring harnesses and connectors and cooling fan motor.
      ③ If operational sound is heard, check cooling fan relay and open circuit in wiring harnesses and connectors.
8. Turn the A/C switch and fan switch ON.
9. Verify the cooling fan is operating.
10. If fan does not operate, check A/C system.

Condenser fan relay

1. Verify that A/C switch and fan switch are OFF.
2. Start the engine and let it idle.
3. Verify that the condenser fan is not operating.
4. If condenser fan is operating, check:
   - Condenser fan relay for stuck in closed position.
   - Short to power in circuit between condenser fan relay and condenser fan.
   - Short to ground in circuit between A/C pressure switches and PCM.
   - Short to ground circuit between condenser fan relay and PCM terminal 17 (short circuit).
5. Turn the A/C switch and fan switch ON.
6. Verify that the condenser fan is operating and operating sound of A/C compressor magnetic clutch is heard.
7. Turn the A/C switch and fan switch OFF.
8. If the condenser fan does not operate but operating sound of A/C compressor magnetic clutch is heard, check as follows:
   - Open circuit between ignition switch and condenser fan relay.
   - Open circuit between battery and condenser fan relay.
   - Open circuit between condenser fan relay and PCM.
   - Open circuit between condenser fan relay and condenser fan motor or fan motor ground.
   - Condenser fan relay stuck to open.
   - Condenser fan motor.
9. If both condenser fan and A/C compressor do not operate, check:
   - TP V PID. (See 01-40A-32 THROTTLE POSITION SENSOR INSPECTION [FS].)
   - A/C system.



01-03B SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (KL)]

CONTROL SYSTEM DEVICE AND CONTROL RELATIONSHIP CHART [KL] 01-03B-2
FOREWORD [KL] 01-03B-3
INTERMITTENT CONCERN TROUBLESHOOTING [KL] 01-03B-3
Vibration Method 01-03B-3
Water Sprinkling Method 01-03B-4
SYMPTOM DIAGNOSTIC INDEX [KL] .. 01-03B-5
SYMPTOM QUICK DIAGNOSIS CHART [KL] 01-03B-7
NO.1 MELTS MAIN OR OTHER FUSE [KL] 01-03B-13
NO.2 MIL ILLUMINATES [KL] 01-03B-14
NO.3 WILL NOT CRANK [KL] 01-03B-14
NO.4 HARD START/LONG CRANK/ERRATIC START/ERRATIC CRANK [KL] 01-03B-15
NO.5 ENGINE STALLS-AFTER START, AT IDLE [KL] 01-03B-17
NO.6 CRANKS NORMALLY BUT WILL NOT START [KL] 01-03B-21
NO.7 SLOW RETURN TO IDLE [KL] ... 01-03B-24
NO.8 ENGINE RUNS ROUGH/ROLLING IDLE [KL] 01-03B-25
NO.9 FAST IDLE/RUNS ON [KL] 01-03B-27
NO.10 LOW IDLE/STALLS DURING DECELERATION [KL] 01-03B-28
NO.11 ENGINE STALLS/QUITS, ENGINE RUNS ROUGH, MISSES, BUCK/JERK, HESITATION/STUMBLE, SURGES [KL] 01-03B-30
NO.12 LACK/LOSS OF POWER-ACCELERATION/CRUISE [KL] 01-03B-33
NO.13 KNOCKING/PINGING-ACCELERATION/CRUISE [KL] 01-03B-36
NO.14 POOR FUEL ECONOMY [KL] ... 01-03B-37
NO.15 EMISSION COMPLIANCE [KL] . 01-03B-39
NO.16 HIGH OIL CONSUMPTION/LEAKS [KL] 01-03B-40
NO.17 COOLING SYSTEM CONCERNS OVERHEATING [KL] 01-03B-41
NO.18 COOLING SYSTEM CONCERNS-RUNS COLD [KL] 01-03B-42
NO.19 EXHAUST SMOKE [KL] 01-03B-43
NO.20 FUEL ODOR (IN ENGINE COMPARTMENT) [KL] ... 01-03B-44
NO.21 ENGINE NOISE [KL] 01-03B-45
NO.22 VIBRATION CONCERNS (ENGINE) [KL] 01-03B-46
NO.23 A/C DOES NOT WORK [KL] 01-03B-46
NO.24 A/C ALWAYS ON/A/C COMPRESSOR RUNS CONTINUOUSLY [KL] 01-03B-47
NO.25 A/C DOES NOT CUT OFF UNDER WIDE OPEN THROTTLE CONDITION [KL] 01-03B-48
NO.26 EXHAUST SULPHUR SMELL [KL] 01-03B-49
NO.27 FUEL REFILL CONCERNS [KL] 01-03B-50
NO.28 FUEL FILLING SHUT OFF ISSUES [KL] 01-03B-50
NO.29 CONSTANT VOLTAGE [KL] 01-03B-51
NO.30 SPARK PLUG CONDITION [KL] 01-03B-53
ENGINE CONTROL SYSTEM OPERATION INSPECTION [KL] 01-03B-56
Input Signal Inspection Procedure 01-03B-56
Intake Manifold Vacuum Inspection ... 01-03B-57
Fuel Injector Operation Inspection 01-03B-58
Idle Air Control Valve Inspection 01-03B-58
Pressure Regulator Control Inspection 01-03B-58
Purge Control Inspection 01-03B-59
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Fuel Cut Control Inspection 01-03B-65
Cooling Fan Control System Inspection 01-03B-65

CONTROL SYSTEM DEVICE AND CONTROL RELATIONSHIP CHART [KL]

Z6U010318881W37

× : Applicable

	Component	Item												
													Monitoring system	
		Idle air control	Variable tumble control system (VTCS) control*2	Fuel injection control	Fuel pump control	Pressure regulator control (PRC)	Electronic spark advance (ESA) control	EGR control	Purge control	Heated oxygen sensor (HO2S) heater control	A/C cut-off control	Electrical fan control	Evaporative system monitor	EGR system monitor
Input	Mass air flow sensor	×		×			×	×	×				×	×
	Camshaft position sensor			×*1			×*1						×*1	×*1
	Crankshaft position sensor	×	×	×*1	×	×	×*1	×	×		×	×	×*1	×*1
	Throttle position sensor	×	×	×		×	×	×	×		×		×	×
	Engine coolant temperature sensor	×	×	×		×	×	×	×		×	×	×	×
	Intake air temperature sensor	×		×		×	×		×	×		×	×	
	Knock sensor			×			×							
	Heated oxygen sensor			×					×					
	Vehicle speed sensor			×				×	×			×	×	×
	EGR boost sensor												×	×
	Fuel gauge sender unit												×	
	Power steering pressure switch	×		×						×				
	Neutral switch (MTX only)	×		×		×	×	×	×					
	Clutch switch (MTX only)	×		×		×	×	×	×					
	Transaxle range switch (ATX only)	×		×		×	×	×	×					
	Brake switch	×		×										
	Ignition switch												×	
	A/C switch, Refrigerant pressure switch (A/C equipped only)	×		×							×	×		
Output	Idle air control valve	×												
	VTCS solenoid valve		×											
	Fuel injector			×										
	Fuel pump relay				×									
	CPU					×								
	Ignition coil						×							
	EGR valve							×						
	Purge solenoid valve								×					
	Heated oxygen sensor heater									×				
	EGR boost sensor solenoid valve													×
	Canister drain cut valve (CDCV)												×	
	A/C relay										×			
	Cooling fan relay											×		
	Condenser fan relay											×		

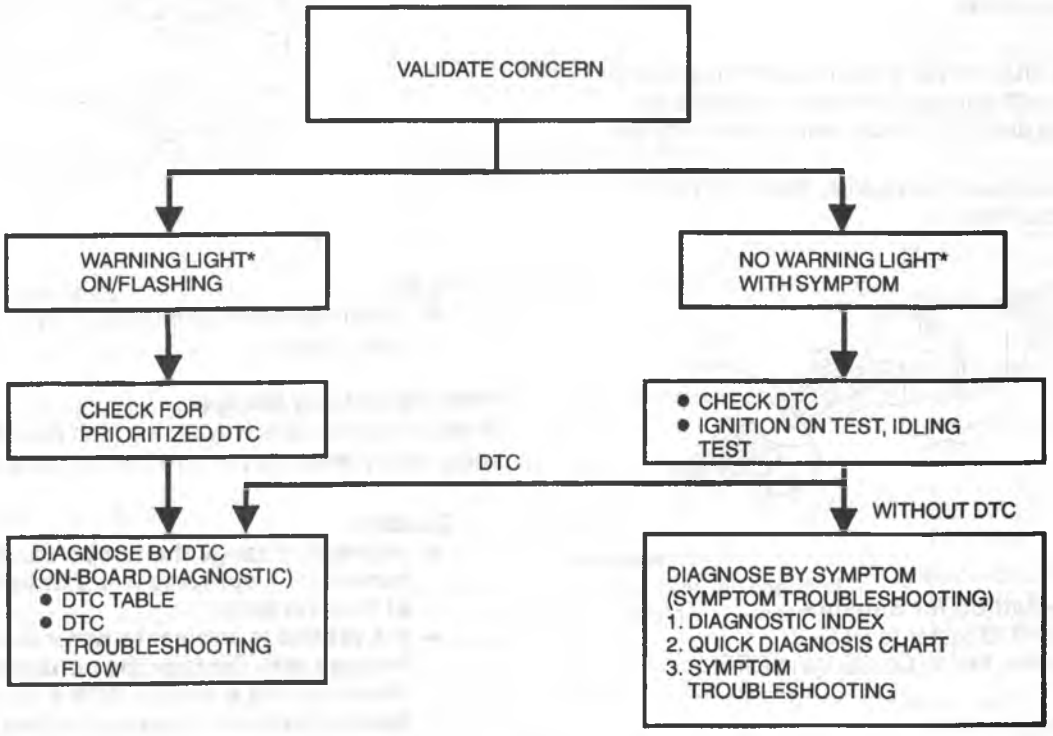
*1 : The crankshaft position sensor signal has priority in the engine speed for these control.

Z6U0103W003

FOREWORD [KL]

Z6U010318881W38

- When the customer reports a vehicle malfunction, check the malfunction indicator light (MIL) indication and diagnostic trouble code (DTC), then diagnose the malfunction according to following flowchart.
  - —If the DTC exists, diagnose the applicable DTC inspection. (See 01-02B-24 DTC TABLE [KL].)
  - —If the DTC does not exist and the MIL does not illuminate or flash, diagnose the applicable symptom troubleshooting. (See 01-03B-5 SYMPTOM DIAGNOSTIC INDEX [KL].)



Z6U0102W316

*: Malfunction Indicator Lamp (MIL), Generator Warning Light, Security Light

INTERMITTENT CONCERN TROUBLESHOOTING [KL]

Z6U010318881W39

Vibration Method

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

Note

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

Inspection Method for Switch Connectors or Wires

1. Connect NGS tester to DLC-2.
2. Turn ignition key to ON (Engine OFF).

Note

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

3. Access PIDs for the switch you are inspecting.
4. Turn switch on manually.
5. Shake each connector or wire harness a bit vertically and horizontally while monitoring the PID.
   - If PID value is unstable, check for poor connection.



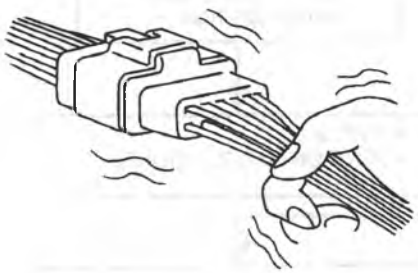
YMU103WC0

Inspection Method for Sensor Connectors or Wires

1. Connect NGS tester to DLC-2.
2. Turn ignition key to ON (Engine OFF).

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

3. Access PIDs for the switch you are inspecting.
4. Shake each connector or wire harness a bit vertically and horizontally while monitoring the PID.
   - If PID value is unstable, check for poor connection.



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Inspection Method for Sensors

1. Connect NGS tester to DLC-2.
2. Turn ignition key to ON (Engine OFF).

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

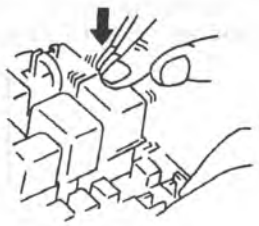
3. Access PIDs for the switch you are inspecting.
4. Vibrate the sensor slightly with your finger.
   - If PID value is unstable or malfunction occurs, check for poor connection and/or poorly mounted sensor.

Inspection Method for Actuators or Relays

1. Turn ignition key to ON (Engine OFF).

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

2. Operate each actuator or relay, referring to PCM terminal voltage table.
3. Vibrate the actuator or relay with your finger.
   - If variable click sound is heard, check for poor connection and/or poorly mounted actuator or relay.



YMU103WC2

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

Water Sprinkling Method

If malfunction occurs only during high humidity or rainy/snowy weather, perform the following steps.

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

1. Connect NGS tester to DLC-2 if you are inspecting sensors or switches.
2. Turn ignition key to ON (Engine OFF).

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

3. Access PIDs for sensor or switch if you are inspecting sensors or switches.
4. If you are inspecting the switch, turn it on manually.
5. Spray water onto the vehicle or run it through a car wash.
   - If PID value is unstable or malfunction occurs, repair or replace part as necessary.



Y6U103WA6

SYMPTOM DIAGNOSTIC INDEX [KL]

Z6U010318881W40

No.	TROUBLESHOOTING ITEM		DESCRIPTION	PAGE
1	Melts of main or other fuses		—	(See 01-03B-13 NO.1 MELTS MAIN OR OTHER FUSE [KL])
2	MIL illuminates		MIL is illuminated incorrectly	(See 01-03B-14 NO.2 MIL ILLUMINATES [KL])
3	Will not crank		Starter does not work	(See 01-03B-14 NO.3 WILL NOT CRANK [KL])
4	Hard start/long crank/erratic start/erratic crank		Starter cranks engine at normal speed but engine requires excessive cranking	(See 01-03B-15 NO.4 HARD START/LONG CRANK/ERRATIC START/ERRATIC CRANK [KL])
5	Engine stalls	After start	Engine stops unexpectedly at idle and/or after start	(See 01-03B-17 NO.5 ENGINE STALLS-AFTER START, AT IDLE [KL])
		At idle		
6	Cranks normally but will not start		Starter cranks engine at normal speed but engine will not run	(See 01-03B-21 NO.6 CRANKS NORMALLY BUT WILL NOT START [KL])
7	Slow return to idle		Engine takes more time than normal to return to idle speed	(See 01-03B-24 NO.7 SLOW RETURN TO IDLE [KL])
8	Engine runs rough/rolling idle		Engine speed fluctuates between specified idle speed and lower speed and excessive engine shakes	(See 01-03B-25 NO.8 ENGINE RUNS ROUGH/ROLLING IDLE [KL])
9	Fast idle/runs on		Engine speed continues at fast idle after warm-up Engine runs after ignition switch is turned off	(See 01-03B-27 NO.9 FAST IDLE/RUNS ON [KL])
10	Low idle/stalls during deceleration		Engine stops unexpectedly at beginning of deceleration or recovery from deceleration	(See 01-03B-28 NO.10 LOW IDLE/STALLS DURING DECELERATION [KL])
11	Engine stalls/quits	Acceleration/ cruise	Engine stops unexpectedly at beginning of acceleration or during acceleration Engine stops unexpectedly while cruising	(See 01-03B-30 NO.11 ENGINE STALLS/QUITS, ENGINE RUNS ROUGH, MISSES, BUCK/JERK, HESITATION/STUMBLE , SURGES [KL])
	Engine runs rough	Acceleration/ cruise	Engine speed fluctuates during acceleration or cruising	
	Misses	Acceleration/ cruise	Engine misses during acceleration or cruising	
	Buck/jerk	Acceleration/ cruise/ deceleration	Vehicle bucks/jerks during acceleration, cruising, or deceleration	
	Hesitation/ stumble	Acceleration	Momentary pause at beginning of acceleration, or during acceleration	
	Surges	Acceleration/ cruise	Momentary minor irregularity in engine output	
12	Lack/loss of power	Acceleration/ cruise	Performance poor under load (i.e., power down when climbing hills)	(See 01-03B-33 NO.12 LACK/LOSS OF POWER-ACCELERATION/CRUISE [KL])
13	Knocking/pinging	Acceleration/ cruise	Sound is produced when air/fuel mixture is ignited by something other than spark plug (i.e., hot spot in combustion chamber)	(See 01-03B-36 NO.13 KNOCKING/PINGING-ACCELERATION/CRUISE [KL])
14	Poor fuel economy		Fuel economy unsatisfactory	(See 01-03B-37 NO.14 POOR FUEL ECONOMY [KL])

No.	TROUBLESHOOTING ITEM		DESCRIPTION	PAGE
15	Emissions compliance		Fails emissions test	(See 01-03B-39 NO.15 EMISSION COMPLIANCE [KL])
16	High oil consumption/leaks		Oil consumption is excessive	(See 01-03B-40 NO.16 HIGH OIL CONSUMPTION/LEAKS [KL])
17	Cooling system concerns	Overheating	Engine runs at higher than normal temperature/overheats	(See 01-03B-41 NO.17 COOLING SYSTEM CONCERNS OVERHEATING [KL])
18	Cooling system concerns	Runs cold	Engine does not reach normal operating temperature	(See 01-03B-42 NO.18 COOLING SYSTEM CONCERNS-RUNS COLD [KL])
19	Exhaust smoke		Blue, black, or white smoke from exhaust system	(See 01-03B-43 NO.19 EXHAUST SMOKE [KL])
20	Fuel odor (in engine compartment)		Gasoline fuel smell or visible leaks	(See 01-03B-44 NO.20 FUEL ODOR (IN ENGINE COMPARTMENT) [KL])
21	Engine noise		Engine noise from under hood	(See 01-03B-45 NO.21 ENGINE NOISE [KL])
22	Vibration concerns (engine)		Vibration from under hood or driveline	(See 01-03B-46 NO.22 VIBRATION CONCERNS (ENGINE) [KL])
23	A/C does not work		A/C compressor magnetic clutch does not engage when A/C is turned on	(See 01-03B-46 NO.23 A/C DOES NOT WORK [KL])
24	A/C always on/A/C compressor runs continuously		A/C compressor magnetic clutch does not disengage	(See 01-03B-47 NO.24 A/C ALWAYS ON/A/C COMPRESSOR RUNS CONTINUOUSLY [KL])
25	A/C does not cut off under wide open throttle conditions		A/C compressor magnetic clutch does not disengage under wide open throttle	(See 01-03B-48 NO.25 A/C DOES NOT CUT OFF UNDER WIDE OPEN THROTTLE CONDITION [KL])
26	Exhaust sulphur smell		Rotten egg smell (sulphur) from exhaust	(See 01-03B-49 NO.26 EXHAUST SULPHUR SMELL [KL])
27	Fuel refill concerns		Fuel tank does not fill smoothly	(See 01-03B-50 NO.27 FUEL REFILL CONCERNS [KL])
28	Fuel refilling shut off issues		Fuel refill does not shut off properly	(See 01-03B-50 NO.28 FUEL FILLING SHUT OFF ISSUES [KL])
29	Constant voltage		Incorrect reference voltage	(See 01-03B-51 NO.29 CONSTANT VOLTAGE [KL])
30	Spark plug condition		Incorrect spark plug condition	(See 01-03B-53 NO.30 SPARK PLUG CONDITION [KL])
31	ATX concerns	Upshift/downshift/ engagement	ATX concerns not related to engine performance	(See 05-03B-7 Diagnosis Index)

SYMPTOM QUICK DIAGNOSIS CHART [KL]

Z6U010318881W41

× : Applicable

	Possible factor / Troubleshooting item		MECHANICAL							LUBRICATION			COOLING SYSTEM						
			Improper engine compression	Improper valve timing	Hydrolocked engine	Base engine malfunction	Drive plate or flywheel is seized.	Improper tension or damaged drive belts	Engine or transaxle mounts improperly installed.	Improper engine oil level	Improper engine oil viscosity	Improper dipstick	Improper engine coolant level	Water and anti-freeze mixture improper .	Cooling system malfunction (Radiator , hoses, overflow system, thermostat, etc.)	Cooling fan system malfunction	Cooling fan or condenser fan seat improper .	Engine overheating	Condenser fan system malfunction
1	Melts main or other fuse																		
2	MIL illuminates																		
3	Will not crank				×		×												
4	Hard start/long crank/erratic start/erratic crank																		
5	Engine stalls.	After start/at idle	×	×	×													×	×
6	Cranks normally but will not start		×	×	×													×	
7	Slow return to idle														×				
8	Engine runs rough/rolling idle		×	×														×	×
9	Fast idle/runs on																		
10	Low idle/stalls during deceleration																		
11	Engine stalls/quits.	Acceleration/cruise	×	×														×	
	Engine runs rough.	Acceleration/cruise	×	×														×	
	Misses	Acceleration/cruise	×	×															
	Buck/jerk	Acceleration/cruise/ deceleration	×	×														×	
	Hesitation/stumble	Acceleration	×	×														×	
	Surges	Acceleration/cruise	×	×														×	
12	Lack/loss of power	Acceleration/cruise	×	×														×	
13	Knocking/pinging	Acceleration/cruise	×										×		×	×		×	
14	Poor fuel economy		×	×									×		×	×			×
15	Emissions compliance		×	×		×									×				
16	High oil consumption/leakage					×					×	×							
17	Cooling system concerns	Overheating						×					×	×	×	×	×		×
18	Cooling system concerns	Runs cold													×	×			×
19	Exhaust smoke					×									×				
20	Fuel odor (in engine compartment)																		
21	Engine noise					×		×		×									
22	Vibration concerns (engine)							×	×								×		
23	A/C does not work sufficiently																		×
24	A/C always on/A/C compressor runs continuously.																		×
25	A/C does not cut off under wide open throttle conditions.																		
26	Exhaust sulphur smell																		
27	Fuel refill concerns																		
28	Fuel filling shut off issues																		
29	Constant voltage																		
30	Spark plug condition		×			×					×			×					
31	ATX concerns	Upshift/downshift/ engagement	See 05-03B AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [GF4A-EL]																

Y6U103WA0

× : Applicable

Possible factor / Troubleshooting item			INTAKE-AIR SYSTEM							FUEL SYSTEM							
			Accelerator cable free play misadjustment	Air cleaner element clogging or restriction	Air leakage from intake-air system (Loose tubes, cracks, gaskets breakage)	IAC valve improper operation	Throttle body malfunction	VRIS malfunction	Vacuum leakage (Vacuum hose damage, misrouting)	Fuel quality	Fuel pump malfunction (Mechanically or electrically)	Pressure regulator malfunction	Fuel hoses restriction or clogging	Injectors malfunction (Leakage or clogging, inoperative)	Fuel leakage from fuel system (Including insulator, injector O-ring)	Fuel filters restriction or clogging	Improper operation of PRC solenoid valve
1	Melts main or other fuse																
2	MIL illuminates																
3	Will not crank																
4	Hard start/long crank/erratic start/erratic crank			×	×				×	×	×	×	×			×	×
5	Engine stalls.	After start/at idle		×	×	×			×	×	×	×	×	×	×		
6	Cranks normally but will not start			×	×	×			×	×	×	×	×	×	×		
7	Slow return to idle				×		×										
8	Engine runs rough/rolling idle			×	×	×			×	×	×	×	×	×		×	
9	Fast idle/runs on		×				×										
10	Low idle/stalls during deceleration				×	×			×								
11	Engine stalls/quits.	Acceleration/cruise		×	×		×		×	×	×	×	×	×	×	×	
	Engine runs rough.	Acceleration/cruise		×	×		×		×	×	×	×	×	×	×	×	×
	Misses	Acceleration/cruise		×	×		×		×	×	×	×	×	×	×	×	×
	Buck/jerk	Acceleration/cruise/ deceleration		×	×		×		×	×	×	×	×	×	×	×	×
	Hesitation/stumble	Acceleration		×	×		×		×	×	×	×	×	×	×	×	×
	Surges	Acceleration/cruise		×	×		×		×	×	×	×	×	×	×	×	×
12	Lack/loss of power	Acceleration/cruise		×	×			×	×	×	×	×	×	×		×	×
13	Knocking/pinging	Acceleration/cruise									×	×	×	×	×	×	
14	Poor fuel economy			×				×		×	×	×	×	×		×	×
15	Emissions compliance			×	×				×		×	×	×	×		×	
16	High oil consumption/leakage																
17	Cooling system concerns Overheating																
18	Cooling system concerns	Runs cold															
19	Exhaust smoke			×							×	×	×	×			×
20	Fuel odor (in engine compartment)											×			×		
21	Engine noise				×				×								
22	Vibration concerns (engine)																
23	A/C does not work sufficiently																
24	A/C always on/A/C compressor runs continuously.																
25	A/C does not cut off under wide open throttle conditions.																
26	Exhaust sulphur smell									×		×					
27	Fuel refill concerns																
28	Fuel filling shut off issues																
29	Constant voltage																
30	Spark plug condition			×						×	×	×	×	×	×		
31	ATX concerns	Upshift/downshift/ engagement	See 05-03B AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [GF4A-EL]														

Z6U0103W012

× : Applicable

Possible factor			EXHAUST SYSTEM		EMISSION SYSTEM			CHARGING SYSTEM		IGNITION SYSTEM					STARTING SYSTEM			CRUISE CONTROL SYSTEM	
Troubleshooting item			Exhaust system restriction or clogging	Catalytic converter malfunction	EGR system malfunction	EVAP control system malfunction	PCV valve malfunction	Low or dead battery	Charging system malfunction	Initial ignition timing misadjustment (CKP and crankshaft pulley misadjustment)	Ignition coil malfunction (e.g. open, short or cracks)	External condenser malfunction	Spark plug malfunction	High-tension leads malfunction (Cracks, open, low resistance)	Starter motor malfunction (Mechanical or electrical)	Starter interlock switch (Open)	Starter circuit including ignition switch open	Cruise control system malfunction	Cruise control cable free play misadjustment
1	Melts main or other fuse																		
2	MIL illuminates																		
3	Will not crank							×	×						×	×	×		
4	Hard start/long crank/erratic start/erratic crank		×		×	×	×						×	×					
5	Engine stalls.	After start/at idle	×	×	×	×	×			×	×	×	×	×					
6	Cranks normally but will not start		×		×	×	×			×	×	×	×	×					
7	Slow return to idle																		
8	Engine runs rough/rolling idle		×		×	×	×			×			×	×					
9	Fast idle/runs on																		×
10	Low idle/stalls during deceleration					×													
11	Engine stalls/quits.	Acceleration/cruise	×	×	×	×	×						×	×				×	
	Engine runs rough.	Acceleration/cruise	×	×	×	×	×				×		×	×				×	
	Misses	Acceleration/cruise	×	×	×	×	×				×		×	×					
	Buck/jerk	Acceleration/cruise/ deceleration	×	×	×	×	×				×		×	×				×	
	Hesitation/stumble	Acceleration	×	×	×	×	×				×		×	×				×	
	Surges	Acceleration/cruise	×	×	×	×	×				×		×	×				×	
12	Lack/loss of power	Acceleration/cruise	×		×	×	×						×	×					
13	Knocking/pinging	Acceleration/cruise																	
14	Poor fuel economy		×				×						×	×					
15	Emissions compliance		×	×	×	×	×						×	×					
16	High oil consumption/leakage						×												
17	Cooling system concerns	Overheating																	
18	Cooling system concerns	Runs cold																	
19	Exhaust smoke						×						×	×					
20	Fuel odor (in engine compartment)					×													
21	Engine noise																		
22	Vibration concerns (engine)																		
23	A/C does not work sufficiently																		
24	A/C always on/A/C compressor runs continuously.																		
25	A/C does not cut off under wide open throttle conditions.																		
26	Exhaust sulphur smell					×													
27	Fuel refill concerns					×													
28	Fuel filling shut off issues					×													
29	Constant voltage																		
30	Spark plug condition												×						
31	ATX concerns	Upshift/downshift/ engagement	See 05-03B AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [GF4A-EL]																

Z6U0103W013

× : Applicable

Possible factor / Troubleshooting item		CONTROL SYSTEM															
		CKP sensor damaged (e.g. open or short circuits).	Crankshaft pulley damaged	Improper gap between CKP sensor and crankshaft pulley	CMP sensor damaged (e.g. open or short circuit).	Camshaft is damaged	Improper gap between CMP sensor and camshaft	Improper air/fuel mixture ratio control	Traction control operation	V-reference supply circuit malfunction	Main relay malfunction (Mechanically or electrically)	ECT sensor malfunction	TR switch misadjustment	P/N position switch in TR switch open	Brake switch and related circuit malfunction	Neutral or clutch switch and related circuit malfunction
1	Melts main or other fuse															
2	MIL illuminates															
3	Will not crank												×	×		
4	Hard start/long crank/erratic start/erratic crank	×	×	×	×			×								
5	Engine stalls. — After start/at idle	×	×	×		×	×	×								
6	Cranks normally but will not start	×	×	×	×		×	×		×	×					
7	Slow return to idle											×				
8	Engine runs rough/rolling idle	×	×	×	×	×	×	×								
9	Fast idle/runs on											×				
10	Low idle/stalls during deceleration							×							×	×
11	Engine stalls/quits. — Acceleration/cruise	×	×	×	×	×	×	×								×
	Engine runs rough. — Acceleration/cruise	×	×	×	×	×	×	×								×
	Misses — Acceleration/cruise	×	×	×	×	×	×	×								
	Buck/jerk — Acceleration/cruise/deceleration	×	×	×	×	×	×	×								×
	Hesitation/stumble — Acceleration	×	×	×	×	×	×	×								×
	Surges — Acceleration/cruise	×	×	×	×	×	×	×								×
12	Lack/loss of power — Acceleration/cruise	×		×	×	×	×	×	×							×
13	Knocking/pinging — Acceleration/cruise															
14	Poor fuel economy				×	×	×					×				
15	Emissions compliance	×		×	×	×	×	×				×				
16	High oil consumption/leakage															
17	Cooling system concerns Overheating															
18	Cooling system concerns — Runs cold															
19	Exhaust smoke															
20	Fuel odor (in engine compartment)															
21	Engine noise															
22	Vibration concerns (engine)															
23	A/C does not work sufficiently															
24	A/C always on/A/C compressor runs continuously.															
25	A/C does not cut off under wide open throttle conditions.															
26	Exhaust sulphur smell															
27	Fuel refill concerns															
28	Fuel filling shut off issues															
29	Constant voltage															
30	Spark plug condition							×				×				
31	ATX concerns — Upshift/downshift/engagement	See 05-03B AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [GF4A-EL]														

Z6U0103W014

× : Applicable

Troubleshooting item		Possible factor	CONTROL SYSTEM											CLUTCH	SUSPENSION
			MAF sensor and related circuit malfunction	TP sensor and related circuit malfunction	TP sensor misadjustment (including looseness)	Knock sensor and related circuit malfunction	Immobilizer system malfunction	FEPS circuit malfunction	P/S pressure switch and related circuit malfunction	Improper refrigerant charging amount	A/C relay (A/C control signal) circuit malfunction	Improper load signal input	VSS and related circuit malfunction	Clutch slippage	Suspension malfunction
1	Melts main or other fuse														
2	MIL illuminates														
3	Will not crank														
4	Hard start/long crank/erratic start/erratic crank		×												
5	Engine stalls.	After start/at idle					×			×	×				
6	Cranks normally but will not start						×	×							
7	Slow return to idle											×			
8	Engine runs rough/rolling idle								×	×	×	×			
9	Fast idle/runs on											×			
10	Low idle/stalls during deceleration		×	×	×										
11	Engine stalls/quits.	Acceleration/cruise	×	×	×				×	×	×		×	×	
	Engine runs rough.	Acceleration/cruise	×	×	×				×	×	×		×	×	
	Misses	Acceleration/cruise	×	×	×								×		
	Buck/jerk	Acceleration/cruise/deceleration	×	×	×				×	×	×		×	×	
	Hesitation/stumble	Acceleration	×	×	×				×	×	×		×	×	
	Surges	Acceleration/cruise	×	×	×				×	×	×		×	×	
12	Lack/loss of power	Acceleration/cruise	×	×	×				×	×	×		×	×	
13	Knocking/pinging	Acceleration/cruise			×	×									
14	Poor fuel economy		×	×	×										
15	Emissions compliance		×	×	×										
16	High oil consumption/leakage														
17	Cooling system concerns	Overheating								×	×				
18	Cooling system concerns	Runs cold									×				
19	Exhaust smoke														
20	Fuel odor (in engine compartment)														
21	Engine noise														
22	Vibration concerns (engine)														×
23	A/C does not work sufficiently								×	×	×				
24	A/C always on/A/C compressor runs continuously.										×				
25	A/C does not cut off under wide open throttle conditions.			×	×	×									
26	Exhaust sulphur smell														
27	Fuel refill concerns														
28	Fuel filling shut off issues														
29	Constant voltage		×	×					×		×				
30	Spark plug condition		×												
31	ATX concerns	Upshift/downshift/engagement	See 05-03B AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [GF4A-EL]												

Z6U0103W015

× : Applicable

Possible factor / Troubleshooting item			DRIVE-LINE	BRAKE	ATX		OTHERS	
			Drive line malfunction	Brake dragging	ATX related parts malfunction	Improper ATF level	Improper balance of wheels and tires	Loosen parts
1	Melts main or other fuse							
2	MIL illuminates							
3	Will not crank							
4	Hard start/long crank/erratic start/erratic crank							
5	Engine stalls.	After start/at idle						
6	Cranks normally but will not start							
7	Slow return to idle							
8	Engine runs rough/rolling idle							
9	Fast idle/runs on							
10	Low idle/stalls during deceleration				×			
11	Engine stalls/quits.	Acceleration/cruise			×			
	Engine runs rough.	Acceleration/cruise			×			
	Misses	Acceleration/cruise						
	Buck/jerk	Acceleration/cruise/ deceleration			×			
	Hesitation/stumble	Acceleration			×			
	Surges	Acceleration/cruise			×			
12	Lack/loss of power	Acceleration/cruise		×	×	×		
13	Knocking/pinging	Acceleration/cruise						
14	Poor fuel economy			×		×		
15	Emissions compliance							
16	High oil consumption/leakage							
17	Cooling system concerns Overheating							
18	Cooling system concerns	Runs cold						
19	Exhaust smoke							
20	Fuel odor (in engine compartment)							
21	Engine noise							×
22	Vibration concerns (engine)		×				×	
23	A/C does not work sufficiently							
24	A/C always on/A/C compressor runs continuously.							
25	A/C does not cut off under wide open throttle conditions.							
26	Exhaust sulphur smell							
27	Fuel refill concerns							
28	Fuel filling shut off issues							
29	Constant voltage				×			
30	Spark plug condition							
31	ATX concerns	Upshift/downshift/ engagement	See 05-03B AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [GF4A-EL]					

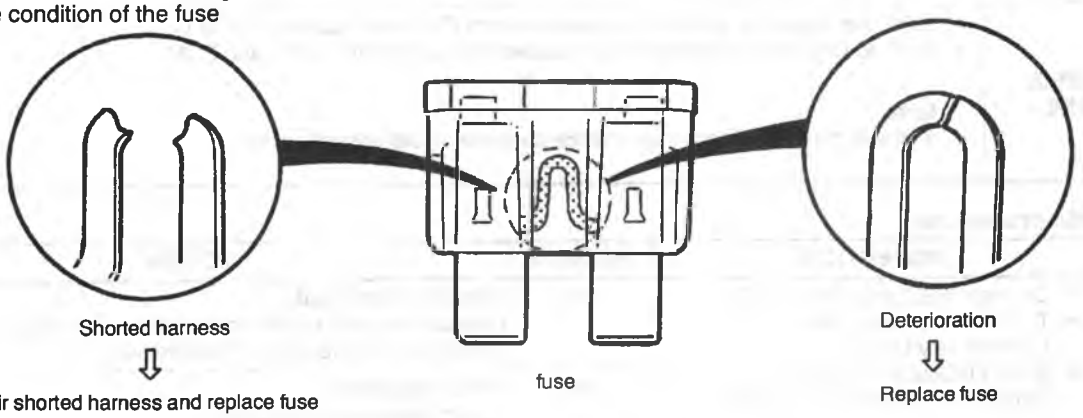
Z6U0103W016

NO.1 MELTS MAIN OR OTHER FUSE [KL]

Z6U010318881W42

1	Melts main or other fuse

[TROUBLESHOOTING HINTS]
Check the condition of the fuse



Damaged Fuse	Related Wiring Harness
MAIN (100 A)	Main fuse — Generator
BTN (40 A)	BTN fuse — ROOM fuse
ROOM (15 A)	ROOM fuse — PCM terminal
EGI INJ (30 A)	Main relay — Fuel injectors Main relay — Generator Main relay — EGR boost solenoid valve Main relay — PRC solenoid valve Main relay — EGR valve Main relay — Idle air control valve Main relay — Purge solenoid valve Main relay — Tank pressure control valve Main relay — Mass air flow sensor Main relay — Fuel pump relay Main relay — VRIS solenoid valve No.1 Main relay — VRIS solenoid valve No.2 Main relay — Heated oxygen sensor heater Main relay — Solenoid body
ENGINE (10 A)	ENGINE fuse — Main relay ENGINE fuse — Fuel pump relay
METER (15 A)	METER fuse — Transaxle range switch

W6U101WHP

NO.2 MIL ILLUMINATES [KL]

Z6U010318881W43

2	Mil illuminates
DESCRIPTION	• Mil is illuminated incorrectly.
POSSIBLE CAUSE	• PCM illuminates for emission-related concern (DTCs are stored in PCM.) • Short to GND circuit between MIL (located on instrument cluster) and PCM **Note** • If MIL blinks at steady rate, misfire condition could possibly exist.

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	• Connect NGS tester to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is "NO CODES RECEIVED" or "SYSTEM PASSED" displayed?	Yes	**No DTC displayed:** Inspect for short to GND circuit between MIL (located on instrument cluster) and PCM terminal 2.
		No	**DTC displayed:** Go to appropriate DTC test.
2	• Verify test results. If okay, return to diagnostic index to service any additional symptoms. • If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis. — If vehicle is repaired, troubleshooting is completed. — If vehicle is not repaired or additional diagnostic information is not available, replace or reprogram PCM.		

NO.3 WILL NOT CRANK [KL]

Z6U010318881W44

3	Will not crank
DESCRIPTION	• Starter does not work
POSSIBLE CAUSE	• Open starter circuit between ignition switch and starter • Transaxle range switch malfunction (ATX) • Transaxle range switch misadjustment (ATX) • Starter interlock switch malfunction (MTX) • Starter malfunction • Seized/hydrolocked engine, flywheel or drive plate

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Verify following(s): — Battery connection. — Automatic transaxle in Park or Neutral. — Clutch fully depressed (MTX). — Fuses. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary and repeat Step 1.
2	• Is clicking sound heard from starter when ignition switch is turned to START?	Yes	Go to next step.
		No	Go to Step 3.
3	• Check starting system. (See 01-19-3 STARTER INSPECTION) • Is starting system okay?	Yes	Check for seized/hydrolocked engine, flywheel or drive plate.
		No	Service as required.
4	• Do any other electrical accessories work?	Yes	Go to next step.
		No	Check charging system. (See 01-17-3 GENERATOR INSPECTION)

STEP	INSPECTION		ACTION
5	**Note** • Following test should be performed on automatic transaxles only. For manual transaxles, go to next step. • Connect NGS tester to DLC. • Access CPP/PNP PID. • Turn ignition switch on. • Is CPP/PNP PID indicated ON when selecting P or N range?	Yes	Go to next step.
		No	Check for adjustment of transaxle range switch. If transaxle range switch is adjusted properly, check for open circuit of transaxle range switch and related circuit.
6	• Retrieve and record any continuous memory DTCs. • Is any continuous memory DTC displayed?	Yes	DLC displayed. Go to appropriate DTC test.
		No	No DTC displayed. Go to next step.
7	• Retrieve and record any KOEO DTCs. • Is any DTC displayed during KOEO inspection?	Yes	DTC displayed. Go to appropriate DTC test.
		No	No DTC displayed. Check following: • START circuit in ignition switch. • Open circuit between ignition switch and starter. • Starter interlock switch (MTX).
8	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.4 HARD START/LONG CRANK/ERRATIC START/ERRATIC CRANK [KL]

Z6U010318881W45

4	Hard start/long crank/erratic start/erratic crank
DESCRIPTION	• Starter cranks engine at normal speed but engine requires excessive cranking time before start • Battery in normal condition
POSSIBLE CAUSE	• Spark leak from high tension leads • Poor fuel quality • Spark plug malfunction • Erratic signal from crankshaft position sensor • Positive crankcase ventilation (PCV) valve malfunction • Purge solenoid valve malfunction • Restriction in exhaust system • Vacuum leaks • Starting system malfunction • Air leak from intake air system • Air cleaner restriction • Inadequate fuel pressure • Mass air flow sensor contamination • EGR valve malfunction **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **—Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **—Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Verify follows: — Vacuum leaks — Fuel quality (i.e. proper octane, contamination, winter/summer blend). — Loose bands on intake air system. — Cracks on intake air system parts. — Air cleaner restriction. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary.
2	• Are any DTCs displayed during continuous memory, KOEO and KOER Self-Test?	Yes	DTC displayed. Go to appropriate DTC test.
		No	No DTC displayed. Go to next step.
3	• Is engine overheating?	Yes	Go to flowchart 17 for "COOLING SYSTEM CONCERNS OVERHEATING".
		No	Go to next step.
4	• Check for cracks on high tension leads • Is there any crack on high tension leads?	Yes	Repair suspected high tension lead.
		No	Go to next step.
5	• Check spark plug conditions. • Is spark plug wet, covered with carbon or grayish white?	Yes	If spark plug is wet or covered with carbon, check for fuel leak from fuel injector. If spark plug is grayish white, check for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
6	• Visually inspect crankshaft position (CKP) sensor and teeth of crankshaft pulley. • Is CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning part.
7	• Measure gap between crankshaft position (CKP) sensor and teeth of crankshaft pulley. **Specification** **0.5—1.5 mm {0.02—0.05 in}** • Is gap within specification?	Yes	Go to next step.
		No	Adjust CKP sensor.
8	• Remove PCV valve and check PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
9	• Inspect fuel line pressure. (See 01-14-6 FUEL LINE PRESSURE INSPECTION.) • Is fuel line pressure within specification? **Fuel line pressure** **270—310 kPa {2.7—3.2 kgf/cm^2, 39—45 psi}**	Yes	Go to next step.
		No	**Zero or low:** Check fuel pump circuit. Check for open fuel pump relief valve. Check for fuel leak inside pressure regulator. Check for clogged main fuel line. **High:** Check pressure regulator for high pressure cause. Check for clogged fuel return line.
10	• Is fuel line pressure held after jumper wire is removed? **Fuel line pressure** **More than 150 kPa {1.5 kgf/cm^2, 21 psi}**	Yes	Go to next step.
		No	Check pressure regulator diaphragm condition. If condition is okay, check fuel injector. If condition is not okay, replace pressure regulator.
11	• Disconnect vacuum hose from pressure regulator and plug hose. • Start engine. • Does fuel line pressure remain within ± 20 kPa {0.21 kgf/cm^2, 3 psi} while driving vehicle?	Yes	Go to next step.
		No	Check for clogged fuel filter.

STEP	INSPECTION		ACTION
12	• Connect vacuum hose to pressure regulator. • Install vacuum gauge to intake manifold. • Start engine. • Does fuel pressure gauge reading increase as vacuum gauge reading decreases and/or does fuel pressure gauge reading decreases as vacuum gauge reading increases?	Yes	Go to next step.
		No	Connect vacuum pump to pressure regulator. Start engine and check that fuel pressure reading changed as vacuum changes. If changes, check vacuum line. If no change, replace pressure regulator.
13	• Disconnect vacuum hose from purge solenoid valve and plug opening end of vacuum hose. • Attempt to start engine. • Is starting condition improved?	Yes	Check if purge solenoid valve sticks to open.
		No	Go to next step.
14	• Check for contaminated mass air flow sensor. • Is there any contamination?	Yes	Replace mass airflow sensor.
		No	Go to next step.
15	• Is there restriction in exhaust system?	Yes	Check exhaust system.
		No	Go to next step.
16	• Check engine condition while tapping EGR valve housing. Does engine condition improve?	Yes	Go to next step.
		No	Replace EGR valve.
17	• Check starting system. (See 01-19-3 STARTER INSPECTION) • Is starting system normal?	Yes	Check for loosen connectors or poor terminal contact. If okay, remove EGR valve and visually check for mechanically stuck of EGR valve.
		No	Check continuity of stepping motor coil. If okay, go to next step.
18	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.5 ENGINE STALLS-AFTER START, AT IDLE [KL]

Z6U010318881W46

5	Engine Stalls-after Start, At Idle
DESCRIPTION	• Engine stops unexpectedly.
POSSIBLE CAUSE	• Operation of immobilizer system • Air leak from intake air system parts • Improper operation of IAC valve • No signal from crankshaft position sensor due to sensor, related wire or wrong installation • Spark leak from high-tension leads • PCV valve malfunction • Restriction in exhaust system • Open or short circuit in fuel pump and related harness • Inadequate fuel pressure • Fuel leak from fuel injector • A/C system improperly operation • Purge solenoid valve malfunction • EGR valve malfunction • Low engine compression • Vacuum leak • Poor fuel quality • Air cleaner restriction • Electrical connector disconnection • No battery power supply to PCM or poor ground • Fuel pump mechanical malfunction • Fuel injector clogged

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Note** • Following test should be performed on vehicles equipped with immobilizer system. Skip this test and go to Step 12 for non-immobilizer system.	Yes	Go to Step 3.
	• Attempt to start engine at least four times. • Then, retrieve and record any continuous memory DTC. • Is following condition appeared? — Engine is not completely started and DTC P1624 is retrieved.	No	Go to next step.
2	• Is engine stalled after approx. 2 seconds since engine is started?	Yes	Go to next step.
		No	Immobilizer system is okay.
3	• Is immobilizer unit connector securely connected to immobilizer unit?	Yes	Go to next step.
		No	Connect immobilizer unit connector securely. Return step 2.
4	• Does immobilizer indicator light flash and indicate following immobilizer DTCs? — DTC: 01, 02, 03, 11, 21	Yes	Go to "09-02-2 DTC TABLE".
		No	Go to next step.
5	• Does immobilizer indicator light illuminate?	Yes	Go to Step 8.
		No	Go to next step.
6	• Does indicator light flush and indicate following immobilizer system DTC after more than 135 seconds after ignition switch turned ON? — DTC: 24, 30	Yes	Go to "09-02-2 DTC TABLE".
		No	Go to next step.
7	• Turn ignition switch off. • Disconnect immobilizer unit connector. • Connect jumper between immobilizer unit connector terminal M and ground. • Turn ignition switch ON. • Does immobilizer indicator light illuminate?	Yes	Reconnect immobilizer unit connector. Go to next step.
		No	Inspection open circuit between immobilizer unit connector terminal M and instrument cluster. If okay, inspect immobilizer indicator light bulb. Repair or replace if necessary. Reconnect immobilizer unit connector. Then return to step 4.
8	• Connect NGS tester to DLC and retrieve DTC. • Is following DTC displayed? — DTC: P1602, P1603, P1604, P1621, P1622, P1624	Yes	Go to appropriate DTC test.
		No	Go to next step.
9	• Is there continuity between PCM ground terminal 24, 51, 76, 77, 103 and ground?	Yes	Go to next step.
		No	Repair or replace wiring harness.
10	• Turn ignition switch ON. • Access VPWR PID. • Is VPWR PID okay? • VPWR PID: Battery positive voltage	Yes	Go to next step.
		No	Repair or replace wiring harness.
11	• Disconnect immobilizer unit connector. • Turn ignition switch ON. • Is there battery positive voltage at immobilizer unit connector terminal J?	Yes	Check for open circuit between PCM connector terminal 5 and immobilizer unit connector terminal A.
		No	Repair or replace wiring harness between immobilizer unit connector terminal J and fuse panel.

STEP	INSPECTION		ACTION
12	• Verify following: — Vacuum connection. — Air cleaner element. — No air leaks from intake air system. — No restriction of intake air system. — Proper sealing of intake manifold and components attached to intake manifold (i.e., EGR valve, IAC valve.) — Ignition wiring. — Fuel quality; such as proper octane, contamination, winter/summer blend. — Electrical connections. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary and repeat step 12.
13	• Does vehicle now stall at idle in park/neutral with all accessories off?	Yes	Vehicle stalls now. Go to Step 15.
		No	Go to next step.
14	• Retrieve and record any continuous memory, KOEO and KOER DTCs. If engine stalls, retrieve continuos memory and KOEO DTCs. • Are there any DTCs displayed?	Yes	DTC displayed. Go to appropriate DTC test.
		No	If communication error message is displayed on NGS tester, check following: • Open circuit between main relay and PCM using breakout box. • Open main relay ground circuit. • Main relay stuck to open. • Open PCM ground circuit. • Poor connection of vehicle body ground. If NGS tester works and no DTCs are displayed, go to Step 16.
15	• Retrieve and record any continuous memory and key on engine off diagnostic trouble code. • Is any diagnostic trouble code displayed?	Yes	Diagnostic trouble code displayed. Go to diagnostic trouble code.
		No	If communication error message is displayed on NGS tester, check following: • Open circuit between main relay and PCM using breakout box. • Open main relay ground circuit. • Main relay stuck to open. • Open PCM ground circuit. • Poor connection of vehicle body ground. If NGS tester works and no DTCs are displayed, go to next step.
16	• Attempt to start engine at part throttle. • Does engine run smooth at part throttle?	Yes	Check IAC valve and wiring harness.
		No	Go to next step.
17	• Connect NGS tester to DLC. • Access RPM PID. • Is RPM PID indicating engine speed during cranking of engine?	Yes	Go to next step.
		No	Check following: • Open or short circuit in CKP sensor. • Open or short circuit between CKP sensor and PCM. • Open or short circuit between CKP sensor and harness. If CKP sensor and harness okay, go to next step.
18	• Visually inspect crankshaft position (CKP) sensor and teeth of crankshaft pulley. • Is CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning part.
19	• Measure gap between crankshaft position (CKP) sensor and teeth of crankshaft pulley. **Specification** **0.5—1.5 mm {0.02—0.05 In}** • Is gap within specifications?	Yes	Go to next step.
		No	Adjust CKP sensor.
20	• Check for cracks on high tension leads. • Is there any crack on high tension leads?	Yes	Repair suspected high tension lead.
		No	Go to next step.

STEP	INSPECTION		ACTION
21	• Is strong blue spark visible at each disconnected high-tension lead while cranking engine?	Yes	Go to next step. If symptom occurs with A/C on, go to Step 27.
		No	Check following: • Open or short circuit in ignition coil. • High-tension lead(s). • Open or short circuit in wire harness for ignition system. • Malfunction of external condenser for eliminating ignition noise. • Open circuit between ignition switch and ignition coil. • Open circuit between ignition coil and PCM.
22	• Check spark plug conditions. • Is spark plug wet, covered with carbon or grayish white?	Yes	If spark plug is wet or covered with carbon, check for fuel leak from fuel injector. If spark plug is grayish white, check clogged for fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
23	• Remove PCV valve and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
24	• Is there restriction in exhaust system? • Is there any restriction?	Yes	Check exhaust system.
		No	Go to next step.
25	• Inspect fuel line pressure. (See 01-14-6 FUEL LINE PRESSURE INSPECTION.) • Is fuel line pressure within specification? **Fuel line pressure** **270—310 kPa {2.7—3.2 kgf/cm^2, 37—46 psi}**	Yes	Go to next step.
		No	**Zero or low:** Check fuel pump circuit. Check for open fuel pump relief valve. Check for fuel leak inside pressure regulator. Check for clogged main fuel line. **High:** Check pressure regulator for high pressure cause. Check for clogged fuel return line.
26	• Visually check for fuel leakage at fuel injector O-ring, pressure regulator, and fuel line. Service as necessary. • Is fuel line pressure held after jumper wire is removed? **Fuel line pressure** **More than 150 kPa {1.5 kgf/cm^2, 21 psi} for 5 minutes**	Yes	Go to next step.
		No	Check pressure regulator diaphragm condition. If condition is okay, check fuel injector. If condition is not okay, replace pressure regulator.
27	**Note** • Following test is for stall concerns with A/C on. If other symptom exists, go to next step. • Connect pressure gauges to A/C low and high pressure side lines. • Turn A/C on and measure low side and high side pressure. Are pressure within specifications? (See 07-10-3 REFRIGERANT PRESSURE CHECK)	Yes	Go to next step.
		No	Check follows: • Refrigerant charging amount. • A/C pressure switches. • Additional fan operation. • A/C relay.
28	• Disconnect vacuum hose between purge solenoid valve and intake manifold from purge solenoid valve side. Plug opening end of vacuum hose. • Start engine. • Is engine stall now eliminated?	Yes	Check if purge solenoid valve sticks to open. Check evaporative emission control system.
		No	Go to next step.
29	• Is air leakage felt or heard at intake air system components while racing engine to higher speed?	Yes	Repair or replace.
		No	Go to next step.
30	• Check engine condition while tapping EGR valve housing. Does engine condition improve?	Yes	Replace EGR valve.
		No	Go to next step.

STEP	INSPECTION		ACTION
31	• Is engine compression correct?	Yes	Check for valve timing.
		No	Check for cause.
32	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.6 CRANKS NORMALLY BUT WILL NOT START [KL]

Z6U010318881W47

6	Cranks normally but will not start
DESCRIPTION	• Starter cranks engine at normal speed but engine will not run • Refer to "ENGINE STALLS" if this symptom appears after engine stall • Fuel in tank • Battery in normal condition
POSSIBLE CAUSE	• Operation of immobilizer system • Air leak from intake air system • Improper operation of IAC valve • No signal from crankshaft position sensor due to sensor, related wire or incorrect installation • Spark leak from high tension leads • PCV valve malfunction • Restriction in exhaust system • Open or short circuit in fuel pump and related harness • Fuel pump mechanical malfunction • Fuel injector clogged • No battery power supply to PCM • Open PCM ground or vehicle body ground • EGR valve malfunction • Low engine compression • Vacuum leak • Poor fuel quality • Air cleaner restriction • Disconnect electrical connector disconnection • Inadequate fuel pressure • Fuel leak from injector • Purge solenoid valve malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Note** • Following test should be performed test vehicles equipped with immobilizer system. Skip this test and go to Step 12 for non-immobilizer system. • Is following condition appeared? — Engine is not completely started and DTC P1624 is retrieved.	Yes	Go to Step 3.
		No	Go to next step.
2	• Is engine stalled after approx. 2 seconds since engine is started?	Yes	Go to next step.
		No	Immobilizer system is okay.
3	• Is immobilizer unit connector securely connected to immobilizer unit?	Yes	Go to next step.
		No	Connect immobilizer unit connector securely. Return step 2.
4	• Does immobilizer indicator light flash and indicate following immobilizer DTCs? — DTC: 01, 02, 03, 11, 21	Yes	Go to DTC TABLE.
		No	Go to next step.
5	• Does immobilizer indicator light illuminate?	Yes	Go to Step 8.
		No	Go to next step.
6	• Does indicator light flush and indicate following immobilizer system DTC after more than 135 seconds after ignition switch turned ON? — DTC: 24, 30	Yes	Go to DTC TABLE.
		No	Go to next step.

STEP	INSPECTION		ACTION
7	• Turn ignition switch off. • Disconnect immobilizer unit connector. • Connect jumper between immobilizer unit connector terminal M and ground. • Turn ignition switch ON. • Does immobilizer indicator light illuminate?	Yes	Reconnect immobilizer unit connector. Go to next step.
		No	Inspection open circuit between immobilizer unit connector terminal M and instrument cluster. If okay, inspect immobilizer indicator light bulb. Repair or replace if necessary. Reconnect immobilizer unit connector. Then return to step 4.
8	• Connect NGS tester to DLC and retrieve DTC. • Is following DTC displayed? — DTC: P1602, P1603, P1604, P1621, P1622, P1624	Yes	Go to appropriate DTC test.
		No	Go to next step.
9	• Is there continuity between PCM ground terminal 24, 51, 76, 77, 103 and ground?	Yes	Go to next step.
		No	Repair or replace wiring harness.
10	• Turn ignition switch ON. • Access VPWR PID. • Is VPWR PID okay? • VPWR PID: Battery positive voltage	Yes	Go to next step.
		No	Repair or replace wiring harness.
11	• Disconnect immobilizer unit connector. • Turn ignition switch ON. • Is there battery positive voltage at immobilizer unit connector terminal J?	Yes	Check for open circuit between PCM connector terminal 5 and immobilizer unit connector terminal A.
		No	Repair or replace wiring harness between immobilizer unit connector terminal J and fuse panel.
12	• Verify following: — External fuel shut off or accessory (ignition switch, alarm etc.). — Fuel quality: such as proper octane, contamination, winter/summer blend. — No air leaks from intake air system. — Proper sealing of intake manifold and components attached to intake manifold: (i.e., EGR valve, IAC valve.) — Ignition wiring. — Electrical connections. — Fuses. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary and repeat step 12.
13	• Retrieve and record any continuous memory and KOEO DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	If communication error message is displayed on NGS tester, check following: • Open circuit between main relay and PCM using breakout box. • Open main relay ground circuit. • Main relay stuck to open. • Open PCM ground circuit. • Poor connection of vehicle body ground. If NGS tester works and no DTCs are displayed, go to next step.
14	• Does engine start now with throttle closed?	Yes	Go to Step 33.
		No	Go to next step.
15	• Will engine start and run smoothly at part throttle?	Yes	Check IAC valve and wiring harness.
		No	Go to next step.
16	• Connect NGS tester to DLC. • Access RPM PID. • Is RPM PID indicating engine speed when cranking engine?	Yes	Go to next step.
		No	Check following: • Open or short circuit in CKP sensor. • Open or short circuit between CKP sensor and PCM. • Open or short circuit between CKP sensor harnesses. If CKP sensor and harness okay, go to next step.
17	• Visually inspect crankshaft position (CKP) sensor and teeth of crankshaft pulley. • Is CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning part.

STEP	INSPECTION		ACTION
18	• Measure gap between crankshaft position (CKP) sensor and teeth of crankshaft pulley. **Specification** **0.5—1.5 mm {0.02—0.05 in}** • Is gap within specification?	Yes	Go to next step.
		No	Adjust CKP sensor.
19	• Check for cracks on high tension leads. • Is there any crack on high tension leads?	Yes	Repair suspected high tension lead.
		No	Go to next step.
20	• Is strong blue spark visible at each disconnected high tension lead while cranking engine?	Yes	Go to next step.
		No	Check following(s): • Open or short circuit in ignition coil. • High tension lead(s). • Open or short circuit in wire harness for ignition system. • Malfunction of external condenser for eliminating ignition noise. • Open circuit between ignition switch and ignition coil. • Open circuit between ignition coil and PCM.
21	• Check spark plug conditions. • Is spark plug wet, covered with carbon or grayish white?	Yes	If spark plug is wet or covered with carbon, check for fuel leak from injector. If spark plug is grayish white, check for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
22	• Disconnect TP sensor connector. • Is there correct voltage at TP sensor connector terminal A with ignition switch ON? **Specification** **4.5—5.5 V**	Yes	Go to next step.
		No	Check short to ground in constant voltage circuit between TP sensor, EGR boost sensor or fuel tank pressure (FTP) sensor and powertrain control module.
23	• Disconnect NGS tester. • Turn ignition switch on. • Check terminal voltage of FEPS at DLC. • Is reading voltage greater than 9 V?	Yes	Check short to power in FEPS line between DLC and PCM.
		No	Go to next step.
24	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
25	• Is there any restriction in exhaust system?	Yes	Check exhaust system.
		No	Go to next step.
26	• Inspect fuel line pressure. (See 01-14-6 FUEL LINE PRESSURE INSPECTION.). • Is fuel line pressure within specification? **Fuel line pressure** **270—310 kPa {2.7—3.2 kgf/cm^2, 39—45 psi}**	Yes	Go to next step.
		No	**Zero or low:** Check fuel pump circuit. Check for open fuel pump relief valve. Check for fuel leak inside pressure regulator. Check for clogged main fuel line. **High:** Check pressure regulator for high pressure cause. Check for clogged fuel return line.
27	• Visually check for fuel leakage at fuel injector O-ring, pressure regulator, and fuel line. • Service as necessary. • Is fuel line pressure held after ignition switch is turned off? **Fuel line pressure** **More than 150 kPa {1.5 kgf/cm^2, 21 psi} for 5 minutes**	Yes	Go to next step.
		No	Check pressure regulator diaphragm condition. If condition is okay, check fuel injector. If condition is not okay, replace pressure regulator.

STEP	INSPECTION		ACTION
28	• Crank engine for five second. • Does pressure drop more than 34 kPa {0.35 kgf/cm^2, 5 psi} by end of five second crank cycle?	Yes	Go to next step.
		No	Check resistance of fuel injector(s). If resistance is okay, check following: • Fuel injector drive signal. • Injection flow rate. • PCM. If resistance is not okay, check following: • Open circuit in fuel injector circuit.
29	• Disconnect vacuum hose between purge control solenoid and intake manifold from purge control solenoid side. Plug opening end of vacuum hose. • Attempt to start engine. • Is starting condition improved?	Yes	Check if purge solenoid valve sticks to open mechanically. Check evaporative emission control system.
		No	Go to next step.
30	• Is air leakage felt or heard at intake air system components while racing engine to higher speed?	Yes	Repair or replace.
		No	Go to next step.
31	• Check engine condition while tapping EGR valve housing. Does engine condition improve?	Yes	Replace EGR control valve.
		No	Go to next step.
32	• Is engine compression correct?	Yes	Check valve timing.
		No	Check for causes.
33	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.7 SLOW RETURN TO IDLE [KL]

Z6U010318881W48

7	Slow return to idle
DESCRIPTION	• Engine takes more time than normal to return to idle speed
POSSIBLE CAUSE	• Malfunction of ECT sensor • Thermostat stuck to open • Throttle body malfunction • Air leak from intake air system

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	No DTC displayed. Go to next step.
2	• Make sure A/C switch is in OFF position. • Place vehicle in park or neutral. • Connect NGS tester to DLC. • Access ECT V PID. • Start engine and record ECT voltage reading every 60 seconds. **Note** • When ECT voltage reverses direction trend or changes slightly (0.03 volt or less), thermostat has opened. • Is thermostat opening voltage within range?	Yes	Engine coolant temperature and thermostat are okay. Go to next step.
		No	Remove thermostat from engine and verify thermostat operation. If temperature gauge on instrument cluster is normal but ECT V is not same as temperature gauge reading, check ECT sensor.
3	• Is throttle body free of contaminated?	Yes	Check for air leaks from intake air system components while racing engine to higher speed.
		No	Clean or replace throttle body.
4	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.8 ENGINE RUNS ROUGH/ROLLING IDLE [KL]

Z6U010318881W49

8	Engine runs rough/rolling idle
DESCRIPTION	• Engine speed fluctuates between specified idle speed and lower speed and excessive engine shake • Idle speed too slow and excessive engine shake
POSSIBLE CAUSE	• Air leak from intake air system parts • Spark leak from high-tension leads • Improper operation of IAC valve • Erratic or no signal from camshaft position (CMP) sensor • Erratic signal from crankshaft position (CKP) sensor • PCV valve malfunction • Restriction in exhaust system • Inadequate fuel pressure • Fuel leak from fuel injector • Engine overheating • A/C system improperly operation • Purge solenoid valve malfunction • EGR valve malfunction • Low engine compression • Poor fuel quality • Air cleaner restriction • Electrical connector disconnection • Fuel pump mechanical malfunction • Fuel injector clogged • Vacuum leak **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **— Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **— Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Verify following: — External fuel shut off or accessory (ignition switch, alarm etc). — Fuel quality; such as proper octane, contamination, winter/summer blend. — No air leaks from intake air system. — Proper sealing of intake manifold and components attached to intake manifold; such as EGR valve, IAC solenoid. — Ignition wiring. — Electrical connections. — Fuses. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary and repeat step 1.
2	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTC displayed?	Yes	Go to appropriate DTC test.
		No	No DTCs displayed. Go to next step.
3	• Is engine overheating?	Yes	Go to flowchart 17 for "COOLING SYSTEM CONCERNS OVERHEATING".
		No	Go to next step.

STEP	INSPECTION		ACTION
4	**Note** • Following test is for engine running rough idle with A/C ON concerns. If other symptoms exist, go to next step. • Connect pressure gauge to A/C low and high pressure side lines. • Start engine and run it at idle. • Turn A/C ON. • Measure low side and high side pressures. • Are reading pressures within specification? (See 07-10-3 REFRIGERANT PRESSURE CHECK)	Yes	Go to next step.
		No	Check following: • Refrigerant charging amount. • A/C pressure switches. • Additional fan operation. • A/C relay.
5	**Note** • Following test is for engine running rough with P/S ON. If other symptoms exist, go to next step. • Disconnect power steering pressure switch connector. • Measure voltage at power steering pressure switch connector. • Is voltage greater than **10 V**?	Yes	Check power steering pressure switch operation.
		No	Go to next step.
6	• Visually inspect crankshaft position (CKP) sensor and teeth of crankshaft pulley. • Is CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning part.
7	• Measure gap between crankshaft position (CKP) sensor and teeth of crankshaft pulley. **Specification** **0.5—1.5 mm {0.02—0.05 in}** • Is gap within specifications?	Yes	Go to next step.
		No	Adjust CKP sensor.
8	• Check for cracks on high tension leads. • Is there any crack on high tension leads?	Yes	Repair suspected high tension lead.
		No	Go to next step.
9	• Check spark plug conditions. • Is spark plug wet, covered with carbon or grayish white?	Yes	If spark plug is wet or covered with carbon, check for fuel leak from injector. If spark plug is grayish white, check for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
10	• Start engine and disconnect IAC valve connector. • Does rpm drop or engine stall?	Yes	Go to next step.
		No	Check IAC valve and wiring harness.
11	• Install fuel pressure gauge between fuel filter and fuel distributor. • Start engine and run it at idle. Measure fuel line pressure at idle. • Is fuel line pressure correct at idle? **Fuel line pressure** **210—260 kPa {2.1—2.6 kgf/cm^2, 30—37 psi}**	Yes	Go to next step.
		No	**Zero or low:** Check fuel pump circuit. Check for open fuel pump relief valve. Check for fuel leak inside pressure regulator. Check for clogged main fuel line. **High:** Check pressure regulator for high pressure cause. Check for clogged fuel return line.

STEP	INSPECTION		ACTION
12	• Visually check for fuel leakage at fuel injector O-ring, pressure regulator, and fuel line. • Service as necessary. • Does fuel line pressure hold after ignition switch is turned off? **Fuel line pressure** **More than 150 kPa {1.5 kgf/cm², 21 psi} for 5 minutes**	Yes	Go to next step.
		No	Check pressure regulator diaphragm condition. If condition is okay, check fuel injector. If condition is not okay, replace pressure regulator.
13	• Connect NGS tester to DLC. • Start engine and run it at idle. • Access LONGFT1 and LONGFT2 PIDs. • Measure LONGFT1 and LONGFT2 PID at idle. • Is PID value between 20— –20%?	Yes	Go to next step.
		No	LONGFT1 and LONGFT2 PID is out of specification. **Less than specification (too rich):** Check evaporative emission control system. If system is okay, go to step 15. **Greater than specification (too lean):** Check for air leakage at intake air system components. If system is okay, go to next step.
14	• Disconnect vacuum hose between purge solenoid valve and intake manifold from solenoid valve side. • Plug open end of vacuum hose. • Start engine. • Does engine condition improve?	Yes	Check if purge solenoid valve sticks open mechanically. Check evaporative emission control system.
		No	Go to next step.
15	• Remove PCV valve and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
16	• Is there restriction in exhaust system?	Yes	Check exhaust system.
		No	Go to next step.
17	• Visually inspect camshaft position (CMP) sensor and tooth of camshaft. • Is CMP sensor and tooth of camshaft okay?	Yes	Go to next step.
		No	Replace malfunctioning part.
18	• Check engine condition while tapping EGR valve housing. Does engine condition improve?	Yes	Replace EGR valve.
		No	Go to next step.
19	• Is engine compression correct?	Yes	Check valve timing.
		No	Check for causes.
20	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.9 FAST IDLE/RUNS ON [KL]

Z6U010318881W50

9	Fast Idle/runs on
DESCRIPTION	• Engine speed continues at fast idle after warm-up • Engine runs after ignition switch is turned off
POSSIBLE CAUSE	• Engine coolant temperature malfunction • Air leak from intake air system • Throttle body malfunction • Misadjustment of accelerator cable free play • Misadjustment of cruise control cable

STEP	INSPECTION		ACTION
1	• Connect NGS tester to DLC. • Access ECT PID. • Start and warm-up engine to normal operating temperature. • Is ECT PID reading between 112 °C {233.6 °F} and 82 °C {179.6 °F}?	Yes	Go to next step.
		No	If ECT PID is higher than 112 °C {233.6 °F}: Go to flow chart 17 for engine overheating. If ECT PID is less than 82 °C {179.6 °F}: Go to flow chart 18 for runs cold condition.
2	• Retrieve and record any continuous memory. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	No DTC displayed. Go to next step.

STEP	INSPECTION		ACTION
3	• Is there air leakage felt or heard at intake air system components while racing engine to higher speed?	Yes	Repair or replace parts as necessary.
		No	Verify accelerator and/or cruise control cable free play.
4	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.10 LOW IDLE/STALLS DURING DECELERATION [KL]

Z6U010318881W51

10	Low idle/stalls during deceleration
DESCRIPTION	• Engine stops unexpectedly at beginning of deceleration or recovery from deceleration
POSSIBLE CAUSE	• Vacuum leaks • IAC valve malfunction • Air leak from intake air system • Throttle position sensor or related circuit malfunction • Mass air flow sensor or related circuit malfunction • Brake switch or related circuit malfunction • Clutch position and/or neutral switch or related circuit malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Does engine idle rough?	Yes	Go to flow chart 7 for "ENGINE RUNS ROUGH/ROLLING IDLE".
		No	Go to next step.
2	• Check following: — Proper routing and no damage of vacuum lines. — IAC valve properly connected. — No air leak from intake air system. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 2.
3	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	No DTCs displayed. Go to next step.
4	• Does idle speed drop or stall when disconnecting IAC valve?	Yes	Go to next step.
		No	Check following: • Circuit from idle air control valve to PCM for open and short. • Idle air control valve for sticking. If okay, go to next step.
5	• Disconnect vacuum hose between purge solenoid valve and intake manifold from solenoid valve side. • Plug opening end of vacuum hose. • Drive vehicle. • Does engine condition improve?	Yes	Check evaporative emission control system.
		No	Go to next step.

STEP	INSPECTION		ACTION
6	• Connect NGS tester to DLC. • Access TP V PID, MAF PID, TCC PID, BOO PID and CPP/PNP PID. • Monitor each PID while driving vehicle. — TP V PID (See 01-40B-33 THROTTLE POSITION SENSOR INSPECTION [KL]) — MAF PID (See 01-40B-29 MASS AIR FLOW SENSOR INSPECTION [KL]) — BOO PID (See 04-11-6 BRAKE SWITCH INSPECTION) — CPP/PNP PID (See 01-40B-45 NEUTRAL SWITCH INSPECTION [KL]) (See 01-40B-46 CLUTCH SWITCH INSPECTION [KL]) — TCC PID (See 05-17B-29 SOLENOID VALVES INSPECTION [GF4A-EL]) • Are PIDs okay?	Yes	Go to "INTERMITTENT CONCERN TROUBLESHOOTING". (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
		No	TP V PID: Check for TP sensor. MAF PID: Check for mass air flow sensor. TCC PID: Check TCC solenoid valve. BOO PID: Check brake on/off switch. CPP/PNP PID: Check clutch and neutral switches.
7	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

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

Z6U010318881W52

11	**Engine stalls/quits (acceleration/cruise)** **Engine runs rough (acceleration/cruise)** **Misses (acceleration/cruise)** **Buck/jerk (acceleration/cruise/deceleration)** **Hesitation/stumble (acceleration)** **Surges (acceleration/cruise)**
DESCRIPTION	• Engine stops unexpectedly at beginning of or during acceleration • Engine stops unexpectedly while cruising • Engine speed fluctuates during or cruising • Engine misses during acceleration or cruising • Vehicle bucks/jerks during acceleration, cruising or deceleration • Momentary pause at beginning of acceleration or during acceleration • Momentary minor irregularity in engine output
POSSIBLE CAUSE	• A/C system improperly operation • Air leak from intake air system parts • Improper operation of IAC valve • Erratic signal from crankshaft position sensor • Vacuum leaks • Spark leak from high-tension leads • PCV valve malfunction • Restriction in exhaust system • Inadequate fuel pressure • Fuel leak from injector • Intermittent open or short of mass-airflow sensor, throttle position sensor and vehicle speed sensor • Automatic transaxle malfunction • Improper VRIS operations • Erratic signal or no signal from camshaft position sensor • Purge solenoid valve malfunction • EGR valve malfunction • Low engine compression • Poor fuel quality • Air cleaner restriction • Improper valve timing due to jumping out timing belt • Intermittently open/short in fuel pump circuit • Fuel pump mechanical malfunction • Fuel injector clogged • Clutch slippage **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **—Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **—Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See01-14-3 BEFORE REPAIR PROCEDURE)** **(See01-14-4 AFTER REPAIR PROCEDURE)**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Verify following: — Vacuum connection. — Air cleaner element. — No air leaks from intake air system. — No restriction of intake air system. — Proper sealing of intake manifold and components attached to intake manifold: EGR valve, IAC valve. — Ignition wiring. — Fuel quality: — Proper octane, contamination, winter/summer blend. — Electrical connections. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary and repeat Step 1.
2	• Retrieve and record any continuous memory, KOEO and KOER DTCs. If stall, condition exists retrieve continuos memory and KOEO DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	No DTCs displayed. Go to next step.
3	• Verify diagnostic trouble code of traction control system. • Is DTC displayed?	Yes	Go to traction control system diagnosis. (See 01-40B-29 MASS AIR FLOW SENSOR INSPECTION [KL])
		No	Go to next step.
4	• Is engine overheating?	Yes	Go to flowchart 17 for "COOLING SYSTEM CONCERNS OVERHEATING".
		No	Go to next step.
5	• Connect NGS tester to DLC. • Access RPM PID, VPWR PID, MAF PID, TP V PID, and VSS PID. • Drive vehicle while monitoring PIDs. — VPWR PID: Battery positive voltage — PRM PID: Idle speed at idle — MAF PID (See 01-40B-29 MASS AIR FLOW SENSOR INSPECTION [KL]) — TP V PID (See 01-40B-33 THROTTLE POSITION SENSOR INSPECTION [KL]) — VSS PID (See 05-17B-28 VEHICLE SPEEDOMETER SENSOR INSPECTION [GF4A-EL]) • Are PIDs within specification?	Yes	Go to next step.
		No	RPM PID: Check crankshaft position (CKP) sensor and related harness; such as vibration, intermittent open/short circuit. VPWR PID: Check for open circuit intermittently. MAF PID: Check for open circuit of mass air flow sensor and related wire harness intermittently. TP V PID: Check if output signal from throttle sensor changes smoothly. VSS PID: Check for open circuit of vehicle speedometer sensor and related wire harness intermittently.
6	• Visually inspect crankshaft position (CKP) sensor and teeth of crankshaft pulley. • Is CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning part.
7	• Measure gap between crankshaft position (CKP) sensor and teeth of crankshaft pulley. **Specification** **0.5—1.5 mm {0.02—0.05 in}** • Is gap within specifications?	Yes	Go to next step.
		No	Adjust CKP sensor.
8	• Check spark plug conditions. • Is spark plug wet, covered with carbon or grayish white?	Yes	If spark plug is wet or covered with carbon, check for fuel leak from fuel injector. If spark plug is grayish white, check for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
9	• Remove PCV valve and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.

STEP	INSPECTION		ACTION
10	• Check that throttle lever is resting on throttle valve stop screw and/or throttle valve orifice plug. • Is lever in correct position?	Yes	Go to next step.
		No	Adjust as necessary.
11	• Are there restrictions in exhaust system?	Yes	Check exhaust system.
		No	Go to next step.
12	• Inspect fuel line pressure. (See 01-14-6 FUEL LINE PRESSURE INSPECTION) • Is fuel line pressure within specification? **Fuel line pressure** **270—310 kPa {2.7—3.2 kgf/cm², 39—45 psi}**	Yes	Go to next step.
		No	**Zero or low:** Check fuel pump circuit. Check for open fuel pump relief valve. Check for fuel leak inside pressure regulator. Check for clogged main fuel line. **High:** Check pressure regulator for high pressure cause. Check for clogged fuel return line.
13	• Visually check for fuel leakage at fuel injector O-ring, pressure regulator, and fuel line. • Service as necessary. • Does fuel line pressure hold after ignition switch is turned off? **Fuel line pressure** **More than 150 kPa {1.5 kgf/cm², 21 psi} for 5 minutes**	Yes	Go to next step.
		No	Check pressure regulator diaphragm condition. If condition is okay, check fuel injector. If condition is not okay, replace pressure regulator.
14	**Note** • Following test is for engine stalling with A/C on concern. If other symptom exists, go to next step. • Connect pressure gauge to A/C low and high pressure side lines. • Turn A/C on and measure low side and high side pressure. • Are pressure within specifications? (See 01-10B-5 COMPRESSION INSPECTION [KL])	Yes	Go to next step.
		No	Check follows: • Refrigerant charging amount. • A/C pressure switches. • Condenser fan operation. • A/C relay.
15	**Note** • Following test is performed for symptom with cruise control ON. If other symptoms exist, go to next step. • Check cruise control system. • Is cruise control system okay?	Yes	Go to next step.
		No	Repair or replace.
16	• Disconnect vacuum hose between purge solenoid valve and intake manifold from purge solenoid valve side. • Plug opening end of vacuum hose. • Drive vehicle. • Does engine condition improve?	Yes	Check if purge solenoid valve sticks to open mechanically. Check evaporative emission control system.
		No	Go to next step.
17	• Verify VRIS operation. • Is VRIS operation okay?	Yes	Go to next step.
		No	Check follows: • Wrong connection of VRIS connectors. • Wrong routing of vacuum hoses. • Vacuum leaks from vacuum hoses. • VRIS actuator No.1 or No.2 stuck to open or close.
18	• Visually inspect camshaft position (CMP) sensor and tooth of camshaft. • Is CMP sensor and tooth of camshaft okay?	Yes	Go to next step.
		No	Replace malfunctioning part.

STEP	INSPECTION		ACTION
19	• Is engine compression correct? (See 01-10B-5 COMPRESSION INSPECTION [KL])	Yes	Check following: • Valve timing. • Internal transaxle (ATX only). • Clutch (MTX only).
		No	Check for cause.
20	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.12 LACK/LOSS OF POWER-ACCELERATION/CRUISE [KL]

Z6U010318881W53

12	Lack/loss of power-acceleration/cruise
DESCRIPTION	• Performance poor under load (i.e., power down when climbing hills)
POSSIBLE CAUSE	• Improper A/C system operation • Air leak from intake air system parts • EGR valve malfunction • Erratic signal from crankshaft position sensor • Vacuum leaks • Spark leak from high tension leads • PCV valve malfunction • Restriction in exhaust system • Inadequate fuel pressure • Fuel leak from injector • Intermittent open or short of mass air flow sensor, throttle position sensor and vehicle speed sensor • Automatic transaxle malfunction • Improper VRIS operations • Erratic signal or no signal from camshaft position sensor • Purge solenoid valve malfunction • Brake dragging • Low engine compression • Poor fuel quality • Air cleaner restriction • Improper valve timing due to timing belt jump • Intermittent open/short in fuel pump circuit • Fuel pump mechanical malfunction • Fuel injector clogged • Clutch slippage **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **— Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **— Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **(See 01-14-3 BEFORE REPAIR PROCEDURE)** **(See 01-14-4 AFTER REPAIR PROCEDURE)**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Verify following: — Vacuum connection. — Air cleaner element. — No air leaks from intake air system. — No restriction of intake air system. — Proper sealing of intake manifold and components attached to intake manifold: such as EGR valve, IAC control. — Fuel quality: — Proper octane, contamination, winter/summer blend. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary and repeat Step 1.

STEP	INSPECTION		ACTION
2	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • If engine stall condition exists, retrieve continuos memory and KOEO DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Go to next step.
3	• Verify DTC of traction control system. • Is diagnostic trouble code displayed?	Yes	Go to traction control diagnosis. (See 04-02-3 ABS AND TCS ON-BOARD DIAGNOSIS)
		No	Go to next step.
4	• Is engine overheating?	Yes	Go to flowchart 17 for "COOLING SYSTEM CONCERNS OVERHEATING".
		No	Go to next step.
5	• Connect NGS tester to data link connector. • Access RPM PID, MAF PID, TP V PID, and VSS PID. • Drive vehicle with monitoring PIDs. — PRM PID: Engine speed — MAF PID (See 01-40B-29 MASS AIR FLOW SENSOR INSPECTION [KL]) — TP V PID (See 01-40B-33 THROTTLE POSITION SENSOR INSPECTION [KL]) — VSS PID (See 05-17B-28 VEHICLE SPEEDOMETER SENSOR INSPECTION [GF4A-EL]) • Are PIDs within specification?	Yes	Go to next step.
		No	RPM PID: Check CKP sensor and related harness for vibration and/or intermittent open/short circuit. MAF PID: Check for intermittent open circuit of mass air flow sensor and related wire harness. TP V PID: Check if TP sensor output increases smoothly. VSS PID: Check for intermittent open circuit of vehicle speedometer sensor and related wire harness.
6	• Visually inspect crankshaft position (CKP) sensor and teeth of crankshaft pulley. • Is CKP sensor and teeth of crankshaft pulley okay?	Yes	Go to next step.
		No	Replace malfunctioning part.
7	• Measure gap between crankshaft position (CKP) sensor and teeth of crankshaft pulley. **Specification** **0.5—1.5 mm {0.02—0.05 in}** • Is gap within specifications?	Yes	Go to next step.
		No	Adjust CKP sensor.
8	• Check spark plug conditions. • Is spark plug wet, covered with carbon or grayish white?	Yes	If spark plug is wet or covered with carbon, check for fuel leak from fuel injector. If spark plug is grayish white, check for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
9	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
10	• Are there restrictions in exhaust system?	Yes	Check exhaust system.
		No	Go to next step.
11	• Inspect fuel pressure. (See 01-14-6 FUEL LINE PRESSURE INSPECTION) • Is fuel line pressure within specification? **Fuel line pressure** **260—310 kPa {2.6—3.2 kgf/cm^2, 37—45 psi}**	Yes	Go to next step.
		No	**Zero or low:** Check fuel pump circuit. Check for open fuel pump relief valve. Check for fuel leak inside pressure regulator. Check for clogged main fuel line. **High:** Check pressure regulator for high pressure cause. Check for clogged fuel return line.

STEP	INSPECTION		ACTION
12	**Note** • Following test is for engine stalling concern with A/C on concern. If other symptom exists, go to next step. • Connect pressure gauge to A/C low and high side pressure lines. • Turn A/C on and measure low side and high side pressure. • Are pressures within specifications? (See 07-10-3 REFRIGERANT PRESSURE CHECK)	Yes	Go to next step.
		No	Check follows: • Refrigerant charging amount. • A/C pressure switches. • Additional fan operation. • A/C relay.
13	• Check for A/C cut off operation. • Does A/C cut off work properly?	Yes	Go to next step.
		No	Check A/C cut off system.
14	• Disconnect vacuum hose between purge solenoid valve and intake manifold from purge solenoid valve side. • Plug opening end of vacuum hose. • Drive vehicle. • Does engine condition improve?	Yes	Check if purge solenoid valve sticks to open mechanically. Check evaporative emission control system.
		No	Go to next step.
15	• Verify VRIS operation. • Is VRIS operation okay?	Yes	Go to next step.
		No	Check following: • Wrong connection of VRIS solenoid valves connectors. • Wrong routing of vacuum hoses. • Vacuum leaks from vacuum hoses. • VRIS actuator No.1 or No.2 stuck to open or close.
16	• Visually inspect camshaft position (CMP) sensor and tooth of camshaft. • Is CMP sensor and tooth of camshaft okay?	Yes	Go to next step.
		No	Replace malfunctioning part.
17	• Is engine compression correct? (See 01-10B-5 COMPRESSION INSPECTION [KL])	Yes	Check following: • Valve timing. • Internal transaxle component (ATX only). • Clutch (MTX only). • Brake system for dragging.
		No	Check for cause.
18	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.13 KNOCKING/PINGING-ACCELERATION/CRUISE [KL]

Z6U010318881W54

13	Knocking/pinging-acceleration/cruise
DESCRIPTION	• Sound produced when air/fuel mixture is ignited by something other than spark plug (i.e., hot spot in combustion chamber)
POSSIBLE CAUSE	• Engine overheating due to cooling system malfunction • Inadequate engine compression • Inadequate fuel pressure • Knock sensor and related circuit malfunction **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **—Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **—Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Connect NGS tester to DLC. • Access ECT PID. • Verify ECT PID is less than 116 °C {240.8 °F} during driving. • Is ECT PID less than specification?	Yes	Go to next step.
		No	Inspect cooling system for cause of overheating.
2	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Go to next step.
3	• Is engine compression correct?	Yes	Go to next step.
		No	Check for cause.
4	• Install fuel pressure gauge between fuel filter and fuel distributor. • Start engine and run at idle. • Measure fuel line pressure at idle. • Is fuel line pressure correct at idle? **Fuel line pressure** **210—260 kPa {2.1—2.6 kgf/cm², 30—37 psi}**	Yes	Go to next step.
		No	**Zero or low:** Check fuel pump circuit. Check for open fuel pump relief valve. Check for fuel leak inside pressure regulator. Check for clogged main fuel line. **High:** Check pressure regulator for high pressure cause. Check for clogged fuel return line.
5	• Measure resistance between knock sensor terminal and knock sensor body. **Specification** **Approx. 560 kΩ [20 °C {68 °F}]** • Is resistance okay?	Yes	Check ignition timing.
		No	Replace knock sensor.
6	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.14 POOR FUEL ECONOMY [KL]

Z6U010318881W55

14	Poor fuel economy
DESCRIPTION	• Fuel economy unsatisfactory
POSSIBLE CAUSE	• Contaminated air cleaner element • VRIS malfunction • Improper transmission fluid level • Poor fuel quality • Improper coolant level • Spark plug malfunction • Brake dragging • Contaminated mass airflow sensor • Exhaust system clogged • Engine cooling system malfunction • Weak spark • Erratic or no signal from camshaft position sensor • Inadequate fuel pressure • PCV valve malfunction • Improper valve timing due to timing belt skip out • Improper engine compression **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **— Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **— Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Check following: — Contaminated air cleaner element. — Transmission fluid level. — Fuel quality. — Coolant level. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat step 1.
2	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Go to next step.
3	• Connect NGS tester to DLC. • Access ECT PID. • Drive vehicle while monitoring PID. — ECT PID (See 01-40B-36 ENGINE COOLANT TEMPERATURE SENSOR INSPECTION [KL]) • Is PID within specification?	Yes	Go to next step.
		No	Check for coolant leak, cooling fan and condenser fan operations or thermostat operation.
4	• Is strong blue spark visible at each disconnected high-tension lead while cranking engine?	Yes	Check following: • Spark plug(s) malfunction. • CMP sensor improperly installed. • Trigger wheel damage on camshaft. • Open or short circuit on CMP sensor. • Open or short circuit between CMP sensor and PCM. Repair or replace malfunctioning part. If okay, go to next step.
		No	Check following: • High-tension leads. • Ignition coil and connector.

STEP	INSPECTION		ACTION
5	• Install fuel pressure gauge between fuel filter and fuel distributor. • Start engine and run at idle. • Measure fuel line pressure at idle. • Is fuel line pressure correct at idle? **Fuel line pressure** **210—260 kPa {2.1—2.6 kgf/cm², 30—37 psi}**	Yes	Go to next step.
		No	**Zero or low:** Check fuel pump circuit. Check for open fuel pump relief valve. Check for fuel leak inside pressure regulator. Check for clogged main fuel line. **High:** Check pressure regulator for high pressure cause. Check for clogged fuel return line.
6	• Verify VRIS operation. • Is VRIS operation okay?	Yes	Go to next step.
		No	Inspect for following: • Wrong connection of VRIS solenoid valve connectors • Wrong routing of vacuum hoses • Vacuum leakage from vacuum hoses • VRIS actuator No.1 and No.2 are stuck open or closed.
7	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
8	• Is there restriction in exhaust system?	Yes	Check exhaust system.
		No	Go to next step.
9	• Is brake system functioning properly?	Yes	Go to next step.
		No	Check for cause.
10	• Check for contaminated MAF sensor. • Is there any contamination?	Yes	Replace mass air flow sensor.
		No	Go to next step.
11	• Is engine compression correct? (See 01-10B-5 COMPRESSION INSPECTION [KL])	Yes	Check for valve timing.
		No	Check for cause.
12	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.15 EMISSION COMPLIANCE [KL]

Z6U010318881W56

15	Emission compliance
DESCRIPTION	• Emission compliance test is failed
POSSIBLE CAUSE	• Vacuum lines leaks or blockage • Spark plug malfunction • Erratic or no signal from camshaft position sensor • PCV valve malfunction or incorrect valve installation • Exhaust system clogged • Charcoal canister damage • Improper engine compression • Cooling system malfunction • Leaks from intake manifold • Inadequate fuel pressure • EGR valve malfunction • Fuel tank ventilation system malfunction • Excessive carbon build up in combustion chamber • Improper valve timing **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **— Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **— Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Check following: — Vacuum lines for leaks or blockage. — Electrical connections. — Proper maintenance schedule followed. — Intake air system and air cleaner element concerns; such as obstructions, leaks or dirty. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat step 1.
2	• Retrieve and record any continuous memory, KOEO and KOEO DTCs. • Are there any DTCs displayed?	Yes	Diagnostic trouble code displayed. Go to appropriate DTC test.
		No	Go to next step.
3	• Is any other drivability concern present?	Yes	Go to appropriate flow chart.
		No	Go to next step.
4	• Connect NGS tester to DLC. • Access ECT PID. • Warm-up engine and run it at idle. • Verify ECT PID is correct. • ECT PID (See 01-40B-36 ENGINE COOLANT TEMPERATURE SENSOR INSPECTION [KL]) • Is ECT PID correct?	Yes	Go to next step.
		No	Check cooling system.

STEP	INSPECTION		ACTION
5	• Is strong blue spark visible at each disconnected high-tension lead while cranking engine?	Yes	Check following: • Spark plug(s) malfunction. • CMP sensor improperly installed. • Damage of trigger wheel on camshaft. • Open or short circuit on CMP sensor. • Open or short circuit between CMP sensor and PCM. Repair or replace malfunctioning part. If okay, go to next step.
		No	Check following: • High tension leads. • Ignition coil and connector.
6	• Install fuel pressure gauge between fuel filter and fuel distributor. • Start engine and run it at idle. • Measure fuel line pressure at idle. • Is fuel line pressure correct at idle? **Fuel line pressure** **210—260 kPa {2.1—2.6 kgf/cm^2, 30—37 psi}**	Yes	Go to next step.
		No	**Zero or low:** Check fuel pump circuit. Check for open fuel pump relief valve. Check for fuel leak inside pressure regulator. Check for clogged main fuel line. **High:** Check pressure regulator for high pressure cause. Check for clogged fuel return line.
7	• Does fuel line pressure remain at specification for 60 seconds when ignition switch is turned ON? **Fuel line pressure** **210—260 kPa {2.1—2.6 kgf/cm^2, 30—37 psi}**	Yes	Go to next step.
		No	Check pressure regulator for high pressure cause.
8	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
9	• Check for fuel saturation inside charcoal canister. • Is excess amount of liquid fuel present in canister?	Yes	Replace charcoal canister.
		No	Check fuel tank vent system. Go to next step.
10	• Is there restriction in exhaust system?	Yes	Check exhaust system.
		No	Go to next step.
11	• Check engine condition while tapping EGR valve housing. Does engine condition improve?	Yes	Replace EGR valve.
		No	Go to next step.
12	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.16 HIGH OIL CONSUMPTION/LEAKS [KL]

Z6U010318881W57

16	High oil consumption/leaks
DESCRIPTION	• Oil consumption excessive
POSSIBLE CAUSE	• PCV valve malfunction • Improper engine oil viscosity • Improper dipstick • Engine internal part malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Remove PCV valve and shake PCV valve. • Does PCV valve rattle?	Yes	Go to next step.
		No	Replace PCV valve.
2	• Check following: — External leaks. — Proper dipstick. — Proper engine oil viscosity. • Are all items okay?	Yes	Check internal engine parts such as valves, valve guides, valve stem seals, cylinder head drain passage, piston rings.
		No	Service as necessary. Repeat step 2.

NO.17 COOLING SYSTEM CONCERNS OVERHEATING [KL]

Z6U010318881W58

17	Cooling system concerns overheating
DESCRIPTION	• Engine runs at higher than normal temperature/Overheats
POSSIBLE CAUSE	• Improper coolant level • Coolant leaks • Improper water/anti-freeze mixture • Poor radiator condition • Radiator hoses damage • Improper or damaged radiator cap • Malfunction of coolant overflow system parts • Drive belt damage • Blown fuses • Excessive pressure of A/C system • Fans reverse rotation • Thermostat malfunction • Condenser fan inoperative • Main cooling fan inoperative • Improper tension of drive belt

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Check following: — Engine coolant level. — Coolant leaks. — Water and anti-freeze mixture. — Radiator condition. — Collapsed or restricted radiator hoses. — Radiator pressure cap. — Overflow system. — Fan rotational direction. — Fuses. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.
2	• Cool down engine. • Turned A/C switch OFF. • Connect NGS tester to DLC. • Access ECT V PID. • Start engine and record ECT voltage reading every 60 seconds. **Note** • When ECT voltage reverses direction trend or changes slightly (0.03 volt or less), thermostat has opened. • Is thermostat opening voltage okay? **Thermostat operating voltage** **Approx. 0.6—0.9 V**	Yes	Engine coolant temperature and thermostat are okay. Go to next step.
		No	Remove thermostat from engine and verify operation. If temperature gauge on instrument cluster indicates normal operation but ECT V is not same as temperature gauge reading, check engine coolant temperature sensor. If temperature gauge on instrument cluster indicated overheating but ECT V is normal, check temperature gauge and heat gauge unit.
3	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Go to next step.
4	• Start engine and run it at idle. • Turn A/C switch on. • Does A/C compressor engage?	Yes	Go to Step 6.
		No	Check following and repair or replace as necessary: • Refrigerant charging amount. • Open circuit between A/C magnet clutch and PCM. • Seized A/C magnet clutch. • A/C magnet clutch malfunction. If all items are okay, go to next step.
5	• Connect NGS tester to DLC. • Access ACCS PID on NGS tester. • Start engine and run it at idle. • Turn A/C switch on. • Does ACCS PID read ON?	Yes	Go to next step.
		No	Check follows: • A/C pressure switch(es) operation. • A/C switch stuck open. • Open or short circuit between A/C pressure switch and PCM.

STEP	INSPECTION		ACTION
6	• Start the engine and run it at idle speed. • Turn A/C switch on. • Do condenser fan and cooling fan operate?	Yes	Go to next step.
		No	**If condenser fan does not operate, check following:** Condenser fan relay stuck to open. Condenser fan motor malfunction. Condenser fan motor ground open. Open circuit between condenser fan motor and relay. Open circuit between condenser fan relay and PCM. Open battery power circuit for condenser fan relay. **If cooling fan motor does not operate, check following:** Cooling fan relay stuck to open. Cooling fan motor malfunction. Cooling fan motor ground open. Open circuit between cooling fan motor and relay. Open circuit between cooling fan relay and PCM. Open battery power circuit for cooing fan relay.
7	• Is drive belt okay?	Yes	Go to next step.
		No	Replace drive belt.
8	• Are there any leaks around heater unit in passenger compartment?	Yes	Check and service heater unit for leaks.
		No	Go to next step.
9	• Are there any leaks at coolant hoses and/or radiator?	Yes	Replace malfunctioning part.
		No	Inspect engine block for leaks or blockage.
10	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.18 COOLING SYSTEM CONCERNS–RUNS COLD [KL]

Z6U010318881W59

18	**Cooling system concerns–runs cold**
DESCRIPTION	• Engine takes excessive period for reaching normal operating temperature
POSSIBLE CAUSE	• Thermostat malfunction • Malfunction of cooling fan system • Malfunction of condenser fan system

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is customer's complaint "Lack of passenger compartment heat"?	Yes	Check A/C and heater system.
		No	Go to next step.
2	• Does engine speed continue at fast idle?	Yes	Go to flowchart 8 for "FAST IDLE/RUNS ON".
		No	Go to next step.
3	• Connect NGS tester to DLC. • Access ECT V PID. • Start engine and record ECT voltage reading every 60 seconds. **Note** • When ECT signal voltage reverses direction trend or changes slightly (0.03 volt or less), thermostat has opened. • Is thermostat opening voltage okay? **Thermostat operating voltage** **Approx. 0.6—0.9 V**	Yes	Check condenser fan and cooling fan operation. If both or either fan operate abnormally, check following: • Cooling fan relay stuck to close. • Condenser fan relay stuck to close. • Short to ground between cooling fan relay and PCM. • Short to ground between condenser fan relay and PCM. • Circuit between cooling fan relay and fan motor shorts to battery supply line. • Circuit between condenser fan relay and fan motor shorts to battery supply line.
		No	Remove thermostat from engine and verify thermostat operation. If temperature gauge on instrument cluster indicates, normal range but ECT V is not same as temperature gauge reading check ECT sensor. If temperature gauge on instrument cluster indicates cold range but ECT signal voltage is normal, check temperature gauge and heat gauge unit.
4	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.19 EXHAUST SMOKE [KL]

Z6U010318881W60

19	Exhaust smoke
DESCRIPTION	• Blue, black, or white smoke from exhaust system
POSSIBLE CAUSE	• Blue smoke (Burning oil) — PCV valve malfunction — Internal engine oil leaks • White smoke (Water in combustion) — Malfunction of cooling system (coolant loss) — Internal engine coolant leaks • Black smoke (Rich fuel mixture) — Air cleaner restricted — Fuel return line restricted — Improper engine compression — Ignition system malfunction — Intake air system collapsed or restricted — Excessive fuel pressure — Fuel injector fuel leaks **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **— Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **— Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• What color is smoke coming from exhaust system?	Blue	Burning oil indicated. Go to next step.
		White	Water in combustion indicated. Go to Step 3.
		Black	Rich fuel mixture indicated. Go to Step 4.
2	• Remove and shake PCV valve. • Does PCV valve rattle?	Yes	Check following: • Damaged valve guide, stems or valve seals. • Blocked oil drain passage in cylinder head. • Piston rings for not seated, seized or worn. • Damaged cylinder bore. If other driveability symptoms are present, return to diagnostic index to service any additional symptoms.
		No	Replace PCV valve.
3	• Does cooling system hold pressure?	Yes	Check following: • Cylinder head gasket leaks. • Intake manifold gasket leaks. • Engine block cracked or porous. If other driveability symptoms are present, return to diagnostic index to service any additional symptoms.
		No	Check for cause.
4	• Check following: — Air cleaner for restriction. — Collapsed or restricted intake air system. — Restricted fuel return line. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 5.
5	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Go to next step.

STEP	INSPECTION		ACTION
6	• Install fuel pressure gauge between fuel filter and fuel distributor. • Start engine and run it at idle. • Measure fuel line pressure at idle. • Is fuel line pressure correct at idle? **Fuel line pressure** **210—260 kPa {2.1—2.6 kgf/cm², 30—37 psi}**	Yes	Go to next step.
		No	**Zero or low:** Check fuel pump circuit. Check for open fuel pump relief valve. Check for fuel leak inside pressure regulator. Check for clogged main fuel line. **High:** Check pressure regulator for high pressure cause. Check for clogged fuel return line.
7	• Does fuel line pressure remain at specification for 60 seconds when ignition switch is turned ON? **Fuel line pressure** **210—260 kPa {2.1—2.6 kgf/cm², 30—37 psi}**	Yes	Go to next step.
		No	Check pressure regulator for high pressure cause.
8	• Is strong blue spark visible at each disconnected high-tension lead while cranking engine?	Yes	Check spark plug(s) and CMP sensor.
		No	Check following: • High-tension leads. • Ignition coil and connector.
9	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.20 FUEL ODOR (IN ENGINE COMPARTMENT) [KL]

Z6U010318881W61

20	Fuel odor (in engine compartment)
DESCRIPTION	• Gasoline fuel smell or visible leaks
POSSIBLE CAUSE	• Excessive fuel pressure • Fuel tank vent system blockage • Purge solenoid valve malfunction • Charcoal canister malfunction **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **—Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **—Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Visually check for fuel leakage at fuel injector O-ring, pressure regulator and fuel line. • Service as necessary. • Install fuel pressure gauge between fuel filter and fuel delivery pipe. • Start engine and run at idle. • Does fuel line pressure remain at specification for 60 seconds when ignition switch is turned ON and OFF? **Fuel line pressure** **More than 150 kPa {1.5 kgf/cm², 21 psi}**	Yes	Go to next step.
		No	Check pressure regulator for high pressure cause.

STEP	INSPECTION		ACTION
2	• Check for blockage/restriction or open between engine vacuum port and charcoal canister. • Check for blockage in fuel tank vent system. • Is fault indicated?	Yes	Replace vacuum hose.
		No	Go to next step.
3	• Check purge solenoid valve. • Is solenoid operating properly?	Yes	Go to next step.
		No	Replace purge solenoid valve.
4	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Check charcoal canister for fuel saturation. If excess amount of liquid fuel present, replace charcoal canister.
5	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.21 ENGINE NOISE [KL]

Z6U010318881W62

21	Engine noise
DESCRIPTION	• Engine noise from under hood
POSSIBLE CAUSE	• Squeal, click or chirp noise — Improper engine oil level — Improper drive belt tension • Rattle sound noise — Loose parts • Hiss sound noise — Vacuum leaks — Loose spark plug — Air leaks from intake air system • Rumble or grind noise — Improper drive belt tension • Rap or roar sound noise — Exhaust system loose • Other noise — Camshaft friction gear noise — MLA noise

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is squeal, click or chirp sound present?	Yes	Check following: • Engine oil level. • Drive belts.
		No	Go to next step.
2	• Is rumble or grind sound present?	Yes	Check drive belt.
		No	Go to next step.
3	• Is rattle sound present?	Yes	Check location of rattle for loose parts.
		No	Go to next step.
4	• Is hiss sound present?	Yes	Check following: • Vacuum leaks. • Spark plug loose. • Intake air system leaks.
		No	Go to next step.
5	• Is rap or roar sound present?	Yes	Check exhaust system for loose parts.
		No	Go to next step.
6	• Is knock sound present?	Yes	Go to flow chart 12 for "KNOCKING/PINGING".
		No	If noise comes from engine internal, check for friction gear or MLA noise.
7	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.22 VIBRATION CONCERNS (ENGINE) [KL]

Z6U010318881W63

22	Vibration concerns (engine)
DESCRIPTION	• Vibration from under hood or driveline
POSSIBLE CAUSE	• Loose attaching bolts or worn parts • Components malfunctioning such as worn parts

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Check following components for loose attaching bolts or worn parts: — Cooling fan. — Drive belt and pulleys. — Engine mounts. • All items okay?	Yes	Check following systems: • Wheels. • Transaxle. • Driveline. • Suspension.
		No	Readjust or retighten engine mount installation position. Service as necessary for other parts.
2	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.23 A/C DOES NOT WORK [KL]

Z6U010318881W64

23	A/C Does not work
DESCRIPTION	• A/C compressor magnetic clutch does not engage when A/C is turned on
POSSIBLE CAUSE	• Improper refrigerant charging amount • Open A/C magnet clutch • Poor ground of A/C magnet clutch • A/C relay stuck to open • Power steering stuck to short • Open circuit between A/C switch and PCM through both A/C pressure switches • Short to ground circuit between power steering pressure switch and PCM • A/C low pressure switch stuck to open • Open circuit between A/C relay and A/C magnet clutch • A/C high pressure switch stuck open • A/C compressor seized

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Go to next step.
2	• Disconnect power steering pressure switch connector. • Is there continuity between connector terminal and ground?	Yes	Short to ground. Repair or replace wire harness.
		No	Check for short to ground at power steering pressure switch. If switch is okay, go to next step. If short exists, replace switch.
3	• Disconnect A/C compressor connector. • Start the engine and turn A/C switch on. • Is there correct voltage at terminal of A/C compressor magnet clutch connector? **Specification** **More than 10.5 V**	Yes	Check for ground condition of A/C compressor magnet clutch. If ground condition is okay, check for open circuit of magnet clutch.
		No	Go to next step.
4	• Disconnect A/C low pressure switch and A/C high pressure switch connectors. • Connect jumper wires between terminals of harness connectors. • Connect NGS tester to DLC. • Access ACCS PID on NGS tester. • Turn ignition switch ON. • Turn A/C switch on and set blower fan at any speed. • Does ACCS PID read ON?	Yes	Check A/C high pressure switch and low pressure switch operation. Replace malfunctioning switch. If both switches okay, Go to next step.
		No	Check following(s): • A/C switch stuck open. • Open circuit among both A/C pressure switches and PCM. • Open circuit of blower motor fan switch and resister (if blower motor does not operate).

STEP	INSPECTION		ACTION
5	• Remove jumper wires from switch connectors. • Reconnect connectors to both switches. • Start engine and turn A/C switch on. • Verify fan operation. • Do both fans operate?	Yes	Check for stuck to open A/C relay. Replace as necessary.
		No	Check following and repair or replace as necessary: • Refrigerant charging amount. • Seized A/C compressor.
6	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.24 A/C ALWAYS ON/A/C COMPRESSOR RUNS CONTINUOUSLY [KL]

Z6U010318881W65

24	A/C always on/A/C compressor runs continuously
DESCRIPTION	• A/C compressor magnetic clutch does not disengage
POSSIBLE CAUSE	• Short to ground between A/C switch and PCM • Short to ground circuit between A/C relay and PCM • A/C relay to magnet clutch circuit shorts to battery power • Stuck engagement • A/C relay stuck closed

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Go to next step.
2	• Start engine and run at idle. • Turn A/C switch on. • Remove A/C relay. • Does A/C magnet clutch disengage?	Yes	Check following: A/C relay stuck closed. Short to ground circuit between A/C relay and PCM. If both items okay, go to next step.
		No	Check if circuit between A/C relay and magnet clutch shorts to battery power circuit. If circuit is okay, check for stuck to engage magnet clutch.
3	• Connect NGS tester to DLC. • Access ACCS PID on NGS tester. • Start engine and turn A/C switch on. • Read ACCS PID while disconnecting high pressure switch connector. **Note** • ACCS PID should read OFF when disconnecting connector. If ACCS PID reading remains ON, short to ground circuit may be present. • Does ACCS PID reading remain on?	Yes	Check for short to ground circuit between high pressure switch and PCM.
		No	Go to next step.
4	• Reconnect high pressure switch connector. • Read ACCS PID while disconnecting low pressure switch connector. **Note** • ACCS PID should read OFF when disconnecting connector. If ACCS PID reading remains ON, short to ground circuit may be present. • Does ACCS PID reading remain on?	Yes	Check for short to ground circuit between low pressure switch and high pressure switch.
		No	Go to next step.

STEP	INSPECTION		ACTION
5	• Reconnect low pressure switch connector. • Read ACCS PID while turning off A/C switch. **Note** • ACCS PID should read OFF when turning A/C switch OFF. If ACCS PID reading remains ON, short to ground circuit may be present. • Does ACCS PID reading remain on?	Yes	Check for short to ground circuit between low pressure switch and A/C switch.
		No	Check for A/C switch stuck closed.
6	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.25 A/C DOES NOT CUT OFF UNDER WIDE OPEN THROTTLE CONDITION [KL]

Z6U010318881W66

25	A/C does not cut off under wide open throttle conditions
DESCRIPTION	• A/C compressor magnetic clutch does not disengage under wide open throttle
POSSIBLE CAUSE	• Throttle position (TP) sensor malfunction • Throttle position (TP) sensor misadjustment • Throttle position (TP) sensor loosely installed

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Does A/C turn off when A/C switch is turned off?	Yes	Go to next step.
		No	Go to flowchart 24 for "A/C ALWAYS ON/A/C COMPRESSOR RUNS CONTINUOUSLY".
2	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Check if TP sensor for proper adjustment. Readjust TP sensor as necessary.
3	• Verify test results. If okay, return to diagnostic index to service any additional symptoms.		

NO.26 EXHAUST SULPHUR SMELL [KL]

Z6U010318881W67

26	Exhaust sulphur smell
DESCRIPTION	• Rotten egg smell (sulphur) from exhaust **Note** • Some slight sulphur smell may be normal. Catalyst with less than 8,000—16,000 km {5,000 to 10,000 miles} mileage is likely to have sulphur smell concern due to highly active state of new catalysts. Replacing the catalyst if no problem is found may actually make symptom worse.
POSSIBLE CAUSE	• Electrical connectors disconnected or poor connection • Vacuum lines disconnected or improper connection • Charcoal canister malfunction • Improper fuel pressure **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **— Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **— Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Are any drivability or exhaust smoke concerns present?	Yes	Go to appropriate flow chart.
		No	Go to next step.
2	• Check following: — Electrical connections. — Vacuum lines. • Are all items okay?	Yes	Go to next step.
		No	Service as necessary. Repeat Step 2.
3	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes	Go to appropriate DTC test.
		No	Go to next step.
4	• Install fuel pressure gauge between fuel filter and fuel delivery pipe. • Start engine and run it at idle. • Is fuel line pressure correct at idle? **Fuel line pressure** **210—260 kPa {2.1—2.6 kgf/cm², 30—37 psi}**	Yes	Go to next step.
		No	**Zero or low:** Check fuel pump circuit. Check for open fuel pump relief valve. Check for fuel leak inside pressure regulator. Check for clogged main fuel line. **High:** Check pressure regulator for high pressure cause. Check for clogged fuel return line.
5	• Does fuel line pressure remain at specification for 60 seconds when ignition switch is turned ON? **Fuel line pressure** **210—260 kPa {2.1—2.6 kgf/cm², 30—37 psi}**	Yes	Go to next step.
		No	Check pressure regulator for high pressure cause.
6	• Check charcoal canister for fuel saturation. • Is excess amount of liquid fuel present in canister?	Yes	Replace charcoal canister.
		No	Check fuel tank vent system. If fuel tank vent system is okay: Since sulphur content can vary in different fuels, suggest trying different brand. If fuel tank vent system is not okay: Repair or replace malfunctioning part.

NO.27 FUEL REFILL CONCERNS [KL]

Z6U010318881W68

27	Fuel refill concerns
DESCRIPTION	• Fuel tank does not refill smoothly
POSSIBLE CAUSE	• Clogged evaporative emission pipes • Non-return valve malfunction • Pressure regulator malfunction • Improper use of fuel gun • Inadequate fuel refilling speed **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **—Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **—Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTCs displayed?	Yes,	Go to appropriate DTC test.
		No	Go to next step.
2	• Remove fuel filler pipe. • Make sure that the non-return valve is installed properly. • Inspect the non-return valve operation. (See 01-14-11 NONRETURN VALVE INSPECTION) • Is the non-return valve okay?	Yes	Check follows: • Improper use of fuel gun. • Inadequate fuel refilling speed. • Fuel tank pressure control valve.
		No	**If the non-return valve is installed improperly:** Reinstall the non-return valve to the proper position. **If the non-return valve does not operate properly:** Replace the non-return valve.

NO.28 FUEL FILLING SHUT OFF ISSUES [KL]

Z6U010318881W69

28	Fuel filling shut off issues
DESCRIPTION	• Fuel refill does not shut off properly
POSSIBLE CAUSE	• Clogged evaporative emission pipes • Non-return valve malfunction • Fuel shut off valve malfunction • Fuel gun malfunction • Fuel gun does not insert correctly **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **—Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **—Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Retrieve and record any continuous memory, KOEO and KOER DTCs. • Are there any DTC displayed?	Yes,	Go to appropriate DTC test.
		No	Go to next step.
2	• Remove fuel filler pipe. • Make sure that non-return valve is installed properly. • Inspect non-return valve operation. (See 01-14-11 NONRETURN VALVE INSPECTION) • Is non-return valve okay?	Yes	Check as follows: • Fuel gun malfunction • Fuel does not insert correctly • Fuel shut off valve
		No	**If non-return valve installed improperly:** Reinstall non-return valve to proper position. **If non-return valve does not operate properly:** Replace non-return valve.

NO.29 CONSTANT VOLTAGE [KL]

Z6U010318881W70

29	Constant voltage
DESCRIPTION	• Incorrect constant voltage
POSSIBLE CAUSE	• Constant voltage circuit malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Was constant voltage greater than 6.0 volts when measured in previous step?	Yes	Go to Step 15.
		No	Go to next step.
2	• Key on, engine off. • Is voltage across battery terminals greater than 10.5 volts?	Yes	Go to next step.
		No	Inspect charging system.
3	• Key on, engine off. • Disconnect sensor where constant voltage circuit check failed. • Measure voltage between battery positive terminal and ground circuit at appropriate sensor connector. • Is voltage greater than 10.5 volts and within 1.0 volt of battery voltage?	Yes	Go to next step.
		No	Go to Step 10.
4	**Note** • Purpose of this step is to determine if NGS tester is able to communicate with PCM. • Key on, engine off. • Attempt to access ECT PID. • Can ECT PID be accessed?	Yes	Go to Step 9.
		No	Go to next step.
5	• Key off. • Disconnect TP sensor connector. • Disconnect VRIS solenoid valve No.1 connector. • Key on, engine off. • Measure voltage between power circuit at VRIS solenoid valve No.1 solenoid connector and battery negative terminal. • Is voltage greater than 10.5 volts?	Yes	Reconnect VRIS solenoid valve No.1 solenoid connector. Go to next step.
		No	Repair open power circuit.
6	• Key off. • Leave TP sensor disconnected. • Disconnect EGR boost sensor connector. • Key on, engine off. • Measure voltage between constant voltage and ground circuits at TP sensor connector. • Is voltage between 4.0 and 6.0 volts?	Yes	Replace EGR boost sensor.
		No	Go to Step 7.

STEP	INSPECTION		ACTION
7	• Key off. • Disconnect TP sensor connector. • Install breakout box. Leave PCM disconnected. • Key on, engine off. • Measure voltage between test pin 71 and test pin 77 at breakout box. • Is voltage greater than 10.5 volts?	Yes	Go to next step.
		No	Repair open power circuit between PCM and main relay.
8	• Key off. • Leave TP sensor connector disconnected. • Disconnect NGS tester from DLC. • Measure resistance between test pin 90 and test pins 51/103 at breakout box. • Is resistance greater than 10,000 ohms?	Yes	Replace PCM.
		No	Repair constant voltage circuit short to ground.
9	• Key off. • Disconnect sensor connector where constant voltage circuit check failed. • Install breakout box. Leave PCM disconnected. • Measure resistance between test pin 90 and constant voltage circuit at appropriate sensor connector. • Is resistance less than 5.0 ohms?	Yes	Replace PCM.
		No	Repair open constant voltage circuit.
10	**Note** • Purpose of this step is to determine if NGS tester is able to communicate with PCM. • Key on, engine off. • Attempt to access ECT PID. • Can ECT PID be accessed?	Yes	Go to next step.
		No	Go to Step 13.
11	• Are KOEO DTCs present for two or more sensors connected to ground circuit? **Sensors connected to ground:** EGR boost sensor, TP sensor, IAT sensor, ECT sensor, FTP sensor, TR switch, HO2S (Front RH), HO2S (Front LH), H2OS (Middle), H2OS (Rear), clutch switch, PSP switch, ATF Temperature sensor.	Yes	Go to next step.
		No	Repair open ground circuit to sensor where constant voltage circuit check failed.
12	• Key off. • Disconnect NGS tester from DLC. • Disconnect sensor connector where constant voltage circuit check failed. • Install breakout box. Leave PCM disconnected. • Measure resistance between ground circuit at appropriate sensor connector and test pin 91 at breakout box. • Is resistance less than 5.0 ohms?	Yes	Reconnect sensor connector. Go to next step.
		No	Repair open ground circuit.
13	• Key off. • Disconnect NGS tester from DLC. • Install breakout box. Leave PCM disconnected. • Measure resistance between battery negative terminal and ground test pins 51/76/77/103 at breakout box. • Is each resistance less than 5.0 ohms?	Yes	Go to next step.
		No	Repair open ground circuit to ground.
14	• Key off. • Connect PCM to breakout box. • Measure resistance between test pin 91 and test pins 51/76/77/103 at breakout box. • Is each resistance less than 5.0 ohms?	Yes	Ground circuits are okay.
		No	Replace PCM.

STEP	INSPECTION		ACTION
15	• Key off. • Disconnect sensor connector where constant voltage check failed. • Disconnect TP sensor, fuel tank pressure sensor and EGR boost sensor connectors. • Disconnect PCM connector. • Key on, engine off. • Measure voltage between constant voltage circuit at TP sensor connector and battery negative terminal. • Is voltage less than 0.5 volts?	Yes	Replace PCM.
		No	Repair constant voltage circuit short to power in harness.

NO.30 SPARK PLUG CONDITION [KL]

Z6U010318881W71

30	Spark plug condition
DESCRIPTION	• Incorrect spark plug condition
POSSIBLE CAUSE	**Note** • Inspecting spark plugs condition can determine whether problem is related to a specific cylinder or possibly to all cylinders. **Wet/carbon is stuck on specific plug:** • Spark—Weak, not visible • Air/fuel mixture—Excessive fuel injection volume • Compression—No compression, low compression • Faulty spark plug **Grayish white with specific plug:** • Air/fuel mixture—Insufficient fuel injection volume • Faulty spark plug **Wet/carbon is stuck on all plugs:** • Spark—Weak • Air/fuel mixture—Too rich • Compression—Low compression • Clogging in intake/exhaust system **Grayish white with all plugs:** • Air/fuel mixture—Too lean **Warning** • **Following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system service:** **—Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.** **—Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.** **See 01-14-3 BEFORE REPAIR PROCEDURE** **See 01-14-4 AFTER REPAIR PROCEDURE**

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Remove all spark plugs. • Inspect spark plug condition. • Is spark plug condition okay?	Yes	Troubleshooting completed.
		No	**Specific plug is wet or covered with carbon:** • Go to next step. **Specific plug looks grayish white:** • Go to Step 7. **All plugs are wet or covered with carbon:** • Go to Step 9. **All plugs look grayish white:** • Go to Step 15.
2	• Is spark plug wet/covered with carbon by engine oil?	Yes	Working up and down, inspect all areas related to oil.
		No	Go to next step.

STEP	INSPECTION		ACTION
3	• Inspect spark plug for following. — Cracked insulator — Heat range — Air gap — Worn electrode • Is spark plug okay?	Yes	Go to next step.
		No	Replace spark plug.
4	• Inspect compression pressure at suspected faulty cylinder. • Is compression pressure correct? (See 01-10B-5 COMPRESSION INSPECTION [KL])	Yes	Go to next step.
		No	Repair or replace malfunctioning part.
5	• Install all spark plugs. • Carry out spark test at suspected faulty cylinder. • Is strong blue spark visible? (Compare with normal cylinder.)	Yes	Go to next step.
		No	Repair or replace malfunctioning parts.
6	• Perform fuel line pressure inspection. (See 01-14-27 PRESSURE REGULATOR INSPECTION) • Is fuel line pressure correct?	Yes	Inspect fuel injector for following: • Open or short circuit in injector • Leakage • Injection volume
		No	**Zero or low:** • Inspect fuel pump circuit. • Inspect for open fuel pump relief valve. • Inspect for fuel leakage inside pressure regulator. • Inspect for clogged main fuel line. • Inspect pulsation damper **High:** • Inspect pressure regulator for high pressure cause. • Inspect for clogged fuel return line.
7	• Inspect spark plug for following. — Heating range — Air gap • Are they okay?	Yes	Go to next step.
		No	Replace spark plug.
8	• Remove suspected fuel injector. • Inspect following: — Resistance (See 01-14-20 FUEL INJECTOR INSPECTION) — Fuel injection volume (See 01-14-20 FUEL INJECTOR INSPECTION) • Are all above items okay?	Yes	Inspect for open circuit between suspected fuel injector connector terminal and PCM connector following terminal: • **For #1 cylinder:** 75 • **For #2 cylinder:** 101 • **For #3 cylinder:** 74 • **For #4 cylinder:** 100 • **For #5 cylinder:** 73 • **For #6 cylinder:** 99
		No	Replace fuel injector.
9	• Is air cleaner element free of restriction?	Yes	Go to next step.
		No	Replace air cleaner element.
10	• Carry out spark test. • Is strong blue spark visible at each cylinder?	Yes	Go to next step.
		No	Repair or replace malfunctioning part.
11	• Carry out fuel line pressure inspection. • Is fuel line pressure correct? **Fuel line pressure** **260—310 kPa {2.6—3.2 kgf/cm^2, 37—45 psi}**	Yes	Go to next step.
		No	**Zero or low:** • Inspect fuel pump circuit. • Inspect for open fuel pump relief valve. • Inspect for fuel leakage inside pressure regulator. • Inspect for clogged main fuel line. **High:** • Inspect pressure regulator for high pressure cause. • Inspect for clogged fuel return line.

STEP	INSPECTION		ACTION
12	• Inspect following PIDs. — ECT — ECT V — O2S11 — O2S12 — O2S21 — O2S22 — MAF — MAF V (See 01-40B-21 PCM Inspection Using the SST (NGS Tester)) • Are PIDs okay?	Yes	Go to next step.
		No	Repair or replace malfunctioning parts.
13	• Carry out purge control inspection (when engine can be started). (See 01-03B-59 Purge Control Inspection) • Is purge control correct?	Yes	Go to next step.
		No	Repair or replace malfunctioning part.
14	• Carry out compression inspection. • Is compression correct?	Yes	Inspect for clogging in exhaust system.
		No	Repair or replace malfunctioning part.
15	• When engine cannot be started, inspect intake-air system for air leakage. • When engine can be started, carry out intake manifold vacuum inspection. • Is air sucked in from intake-air system?	Yes	Repair or replace malfunctioning part.
		No	Go to next step.
16	• Carry out fuel line pressure inspection. • Is fuel line pressure correct? **Fuel line pressure** **260—310 kPa {2.6—3.2 kgf/cm^2, 37—45 psi}**	Yes	Inspect following PIDs. • ECT • ECT V • O2S11 • O2S12 • O2S21 • O2S22 • MAF • MAF V (See 01-40B-21 PCM Inspection Using the SST (NGS Tester)) Inspect PCM GND condition.
		No	**Zero or low:** • Inspect fuel pump circuit. • Inspect for open fuel pump relief valve. • Inspect for fuel leakage inside pressure regulator. • Inspect for clogged main fuel line. • Inspect pulsation damper. **High:** • Inspect pressure regulator for high pressure cause. • Inspect for clogged fuel return line.
17	• Verify test results. If okay, return to diagnostic index to service any additional symptoms. If malfunction remains, inspect related Service Bulletins and /or On-line Repair Information and perform repair or diagnosis. — If vehicle is repaired, troubleshooting completed. — If vehicle is not repaired or additional diagnostic information is not available, replace or reprogram PCM.		

ENGINE CONTROL SYSTEM OPERATION INSPECTION [KL]

Z6U010318881W72

Input Signal Inspection Procedure

1. Find an unusual signal. (See 01-03B-56 Finding unusual signals.)
2. Locate its source. (See 01-03B-56 Locating the source of unusual signals.)
3. Repair or replace the defective part.
4. Confirm that the unusual signal has been erased.

Finding unusual signals

- While referring to 01-02B-11 ON-BOARD DIAGNOSTIC TEST [KL], use the PID/DATA monitor and record function to inspect the input signal system relating to the problem.

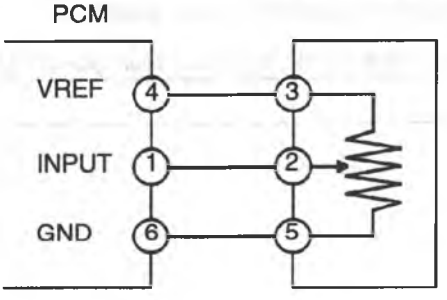
1. Start the engine and idle the vehicle. You can assume that any signals that are out of specifications by a wide margin are unusual.
2. When recreating the problem, any sudden change in monitor input signals that is not consciously created by the driver can be judged as unusual.

Locating the source of unusual signals

Caution

- **Compare the NGS monitor voltage with the measurement voltage using the digital measurement system function. If you use another tester, misreading may occur.**
- **When measuring voltage, attach the tester GND to the GND of the PCM that is being tested, or to the engine itself. If this is not done, the measured voltage and actual voltage may differ.**
- **After connecting the pin to a waterproof coupler, confirm continuity and measuring the voltage, inspect the waterproof connector for cracks. If there are any, use sealant to fix them. Failure to do this may result in deterioration of the harness or terminal from water damage, leading to problems with the vehicle.**

Variable resistance type 1 (TP sensor, fuel tank pressure sensor and EGR boost sensor)



YMU103WA5

Input signal inspection

1. When you get an unusual signal, measure the #1 PCM terminal voltage.
   - If the #1 terminal voltage and the NGS monitor voltage are the same, proceed to the next step.
   - If there is a difference of **0.5 V or more**, inspect for the following points concerning the PCM connector.
     - — Female terminal opening is loose.
     - — Coupler (pin holder) damage
     - — Pin discoloration (blackness)
     - — Harness/pin crimp is loose or disconnected.
2. Measure the #2 sensor terminal voltage.
   - If there is a **0.5 V or more** difference between the sensor and NGS voltages, inspect the harness for open or short circuits.
   - If the sensor and NGS voltages are the same, inspect for the following points concerning the sensor connector.
   - If there are no problems, proceed to next investigation below.
     - — Female terminal opening is loose.
     - — Coupler (pin holder) damage
     - — Pin discoloration (blackness)

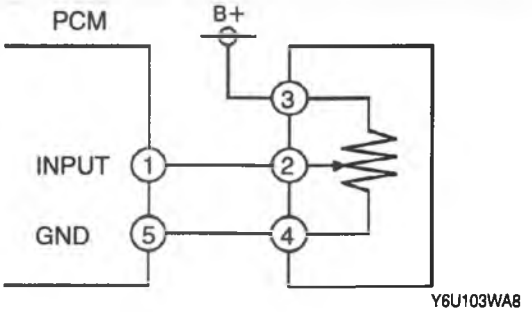
Power supply inspection (reference voltage (Vref))

- Measure the #3 terminal voltage.
  - —If the measured voltage on the #3 terminal is **5 V**, inspect the following points on the sensor connector.
    - Female terminal opening loose
    - Coupler (pin holder) damage
    - Pin discoloration (blackness)
  - —If the #3 terminal measures other than **5 V**, inspect for the following.
    - Open or short circuit in harness
    - Harness/pin crimp is loose or disconnected.

GND circuit inspection

- Measure the #5 terminal voltage.
  - —If it is at **0 V**, inspect the sensor.
    - If necessary, replace the sensor.
  - —If not, inspect for the following.
    - Open or short circuit in harness
    - Female terminal opening is loose open or short circuit in harness
    - Coupler (pin holder) damage
    - Pin discoloration (blackness)
    - Harness/pin crimp is loose or disconnected.

Variable resistance type 2 (fuel tank level sensor)



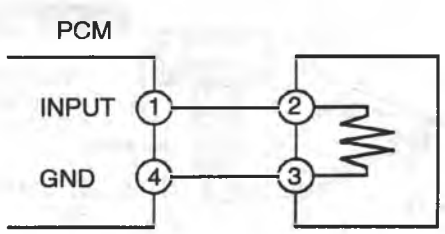
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GND circuit inspection
- Confirm that terminal sensor #4 is at **0 V**.
  - —If it is at **0 V**, inspect the sensor.
    - If necessary, replace the sensor.
  - —If not at **0 V**, inspect for the following.
    - Open circuit in harness
    - Female terminal opening is loose.
    - Coupler (pin holder) damage
    - Pin discoloration (blackness)
    - Harness/pin crimp is loose or disconnected.

Input signal inspection
1. When you get an unusual signal, measure the #1 PCM terminal voltage.
   - If the #1 terminal voltage and the NGS monitor voltage are the same, proceed to the next step.
   - If there is a difference of **0.5 V or more**, inspect for the following points concerning the PCM connector.
     - — Female terminal opening is loose.
     - — Coupler (pin holder) damage
     - — Pin discoloration (blackness)
     - — Harness/pin crimp is loose or disconnected.
2. Measure the #2 sensor terminal voltage.
   - If there is a **0.5 V or more** difference between the sensor and NGS voltages, inspect the harness for open or short circuits.
   - If the sensor and NGS voltages are the same, inspect the following points concerning the sensor connector.
     - — Female terminal opening is loose.
     - — Coupler (pin holder) damage
     - — Pin discoloration (blackness)
     - — Harness/pin crimp is loose or disconnected.
   - If there are no problems, proceed to next investigation below.

Power supply inspection
- Confirm that the #3 sensor terminal is **B+**.
  - —If the measured voltage on the #3 terminal is **B+**, inspect the following points on the sensor connector.
    - Female terminal opening is loose.
    - Coupler (pin holder) damage
    - Pin discoloration (blackness)
  - —If the #3 terminal measures other than **B+**, inspect the following.
    - Open or short circuit in harness
    - Harness/pin crimp is loose or disconnected.

Thermistor type (IAT sensor and ECT sensor)

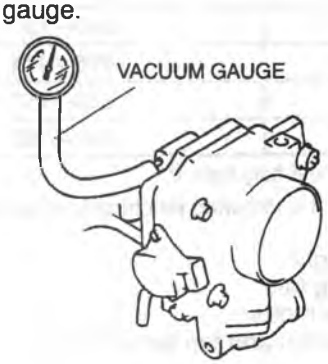


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Input signal inspection
1. When you get an unusual signal, measure the #1 PCM terminal voltage.
   - If the #1 terminal voltage and the NGS monitor voltage are the same, proceed to the next step.
   - If there is a difference of **0.5 V or more**, inspect the following points concerning the PCM connector.
     - — Female terminal opening loose
     - — Coupler (pin holder) damage
     - — Pin discoloration (blackness)
     - — Harness/pin crimp is loose or disconnected.
2. Measure the #2 sensor terminal voltage.
   - If there is a **0.5 V or more** difference between the sensor and NGS voltages, inspect the harness for open or short circuits.
   - If the sensor and NGS voltages are the same, inspect the following points concerning the sensor connector.
     - — Female terminal opening is loose.
     - — Coupler (pin holder) damage
     - — Pin discoloration (blackness)
     - — Harness/pin crimp is loose or disconnected.
   - If there are no problems, proceed to GND circuit inspection.

GND circuit inspection
- Confirm that terminal sensor #3 is at **0 V**.
  - —If it is at **0 V**, inspect the sensor. If necessary, replace the sensor.
  - —If not, inspect for the following.
    - Open circuit in harness
    - Female terminal opening is loose.
    - Coupler (pin holder) damage
    - Pin discoloration (blackness)
    - Harness/pin crimp is loose or disconnected.

Intake Manifold Vacuum Inspection
1. Verify air intake hoses are installed properly.
2. Start the engine and run at idle.
3. Measure the intake manifold vacuum by using a vacuum gauge.



W6U101WHQ

Specification
Less than -60 kPa {-450 mmHg, -18 inHg}

4. If not as specified, check following.
   - Air suction at: Throttle body installation point. Intake manifold installation point. PCV valve installation point.
   - Fuel injector insulator.

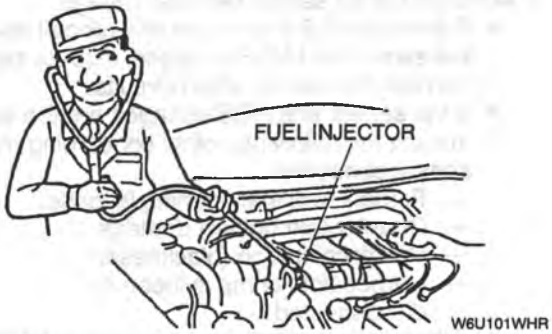
- Accelerator cable free play.
- Engine compression (See 01-10B-5 COMPRESSION INSPECTION [KL].)

Fuel Injector Operation Inspection

1. Warm up the engine and run at idle (or cranking if it does not start.)
2. Listen for the operational sound of each fuel injector with a soundscope.

Note

- Compare the sound of each fuel injector because of the difficulty of verifying the sound of individual fuel injectors.



Idle Air Control Valve Inspection

1. Start the engine and run it at idle.
2. Disconnect the IAC valve connector and verify if the engine speed drops or engine stalls.
3. If engine speed does not drop or does not stall, check followings.
   - Check IAC valve. (See 01-13B-8 IDLE AIR CONTROL (IAC) VALVE INSPECTION [KL].)
   - Check IAC valve air passage.
   - Check open or short circuit between IAC valve and PCM.
4. Warm up the engine to normal operating temperature and run it at idle.
5. Turn the electrical loads ON and verify that the engine speed is within the specification.

Load condition	Idle speed
No load	550—750
A/C ON	675—975
P/S ON*1	550—750
E/L ON*2	550—750

*1 : Steering wheel fully turned.

*2 : When all of the following electrical load conditions are ON.

- Headlight
- Cooling fan
- Blower motor
- A/C switch and fan switch ON

Note

- Excludes temporary idle speed drop immediately after the electrical loads are turned ON.

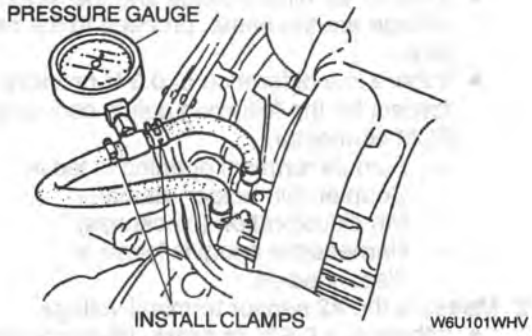
6. If not as specified, check the related switches and wiring harnesses.

Pressure Regulator Control Inspection

Warning

- **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 the "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" (See 01-14-3 BEFORE REPAIR PROCEDURE.) (See 01-14-4 AFTER REPAIR PROCEDURE.)**

1. Install the fuel pressure gauge.



2. Measure the fuel pressure under the following conditions:

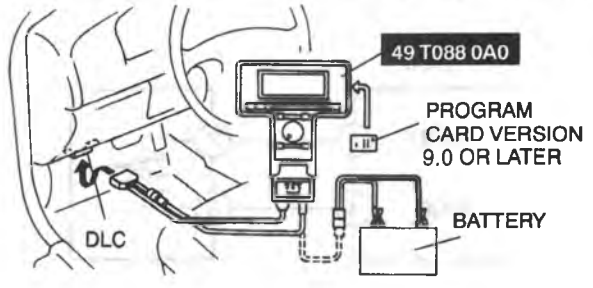
Specifications

	Fuel pressure (kPa {kgf/cm^2, psi})		
Idling	210—260 {2.1—2.6, 30—37}	210—260 {2.1—2.6, 30—37}	260—310 {2.6—3.2, 37—46}
During 120 sec. of hot start	260—310 {2.6—3.2, 37—46}		
After 120 sec. of hot start	210—260 {2.1—2.6, 37—46}	210—260 {2.1—2.6, 30—37}	260—310 {2.6—3.2, 37—46}
Pressure regulator control condition	Normal	Not normal (Perform Inspection 1)	Not normal (Perform Inspection 2)

3. If the fuel pressure is not within the specification, carry out either Inspection 1 or Inspection 2 as required.

Inspection 1

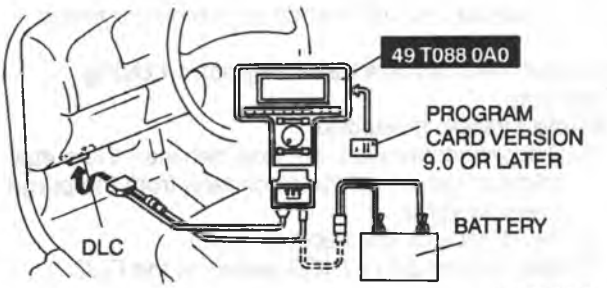
1. Connect the **SSTs** (NGS tester) to the DLC.



2. Access the following PIDs.
   - ECT PID. (See 01-40B-36 ENGINE COOLANT TEMPERATURE SENSOR INSPECTION [KL].)
   - IAT PID. (See 01-40B-37 INTAKE AIR TEMPERATURE SENSOR INSPECTION [KL] .)
   - TP V PID. (See 01-40B-33 THROTTLE POSITION SENSOR INSPECTION [KL].)
3. Check PID value.
4. If okay, check:
   - Pressure regulator.
   - PRC solenoid valve.
   - Wiring between PRC solenoid valve and PCM terminal 19 (Open circuit).
   - Wiring between main relay and PRC solenoid valve (open circuit).

Inspection 2

1. Connect the **SSTs** (NGS tester) to the DLC.

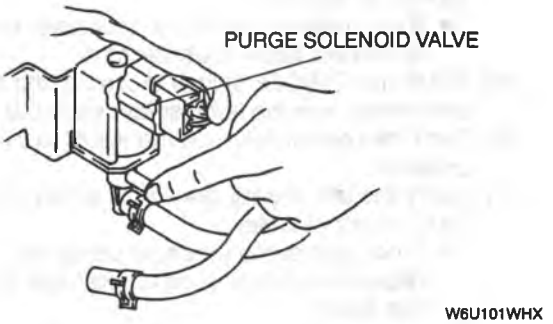


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2. Access the following PIDs.
   - ECT PID. (See 01-40B-36 ENGINE COOLANT TEMPERATURE SENSOR INSPECTION [KL].)
   - IAT PID. (See 01-40B-37 INTAKE AIR TEMPERATURE SENSOR INSPECTION [KL].)
3. Check PID value.
4. If okay, check:
   - Loose or damaged vacuum hose between the pressure regulator, PRC solenoid valve, and intake manifold.
   - PRC solenoid valve.
   - Wiring between PRC solenoid valve and PCM terminal 19 (short circuit).

Purge Control Inspection

1. Start and warm up the engine to the normal operating temperature.
2. Let the engine idle.
3. Disconnect the vacuum hose between the purge solenoid valve and the charcoal canister.
4. Put a finger to the purge solenoid valve and verify there is no vacuum applied.



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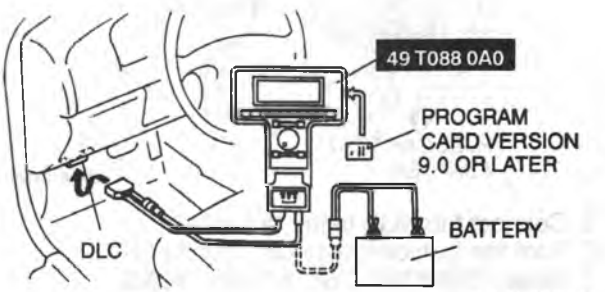
5. If there is vacuum:
   - Check the purge solenoid valve.
   - Check for loose or damaged vacuum hose.
   - Check wiring between purge solenoid valve and PCM terminal 67 (short circuit).

Evaporative System Leak Inspection Using Leak Tester

1. Perform the following **SST** (Evaporative Emission System Tester MZ254AT3641) self-test:

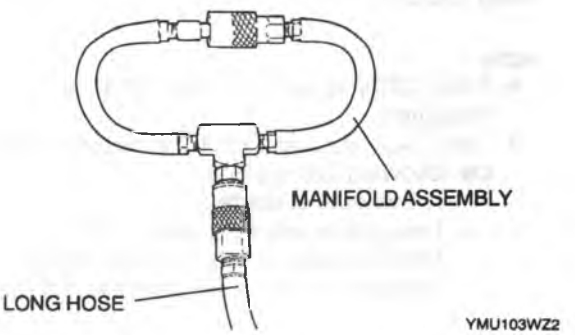
Note
- If the tester does not work correctly during Self-Test, refer to the tester operators manual for more detailed self-test procedures.

(1) Verify the gas cylinder valve is closed and the control valve located on the tester is in the TEST position. All tester displays should be off at this time.
(2) Connect the long hose (part of **SST**) to the tester.



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(3) Connect the manifold assembly (part of **SST**) to the long hose as shown.



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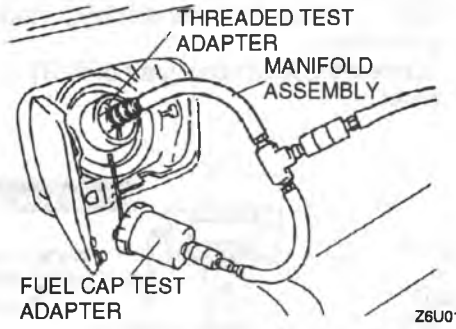
(4) Open the gas cylinder valve and verify the gas cylinder regulator left gauge reads 10 to 12 psi (preset at factory).
- If not, refer to the tester operators manual to contact tester manufacturer.

(5) Press the ON/OFF switch to turn on the **SST** and make sure the left display reads 0.0.
(6) Turn the control valve on the tester to the FILL position.
(7) Verify the left display reading is within 13.9 to 14.0 inches of water.
- If not, adjust the pressure using the regulator knob located on the right side of the tester.

(8) Turn the control valve to TEST position and press the START switch.
(9) After the 2-minute countdown (left display) is completed, the right display shows the total pressure loss for that period. A 0.5 inch of water loss is acceptable on the Self-Test.
- If the loss is more than 0.5 inch of water, do one or more Self-Test. If the failed test repeats, check for leak using the ultrasonic leak detector (part of **SST**).

2. Press the RESET switch to set the left display reading to 0.0.
3. Connect the fuel cap test adapter (part of **SST**) to the manifold assembly and fuel-filler cap from the vehicle.
- If the fuel-filler cap is not a genuine part, replace it.

4. Connect the threaded test adapter (part of **SST**) to the manifold assembly and fuel-filler neck.



5. Connect the NGS tester to DLC-2.
6. Turn the ignition key to ON (engine OFF).
7. Select **GENERIC OBD II FUNCTIONS**.
8. Press **CONT** (#8).
9. Select **ON BOARD DEVICE CONTROL**.
10. Press **TRIGGER** to close the canister drain cut valve (CDCV).

Note
- If the CDCV is closed, CMD REVD is displayed.
- The CDCV is closed for **10 minutes** unless the following takes place:
  - — The engine is started.
  - — The ignition key is turned to OFF.
  - — The fuel tank pressure sensor signal exceeds 6.43 kPa {48.3 mmHg, 1.9 inHg}.

11. Turn the control valve to the FILL position.
12. Wait (maximum 40 seconds) until the left display reads 13.5 to 14 inches of water.
- If the reading is slightly below, adjust it using the regulator knob.
- If the reading is far below, the EVAP system has large leak. Check for leak (using the ultrasonic leak detector if necessary) and repair.

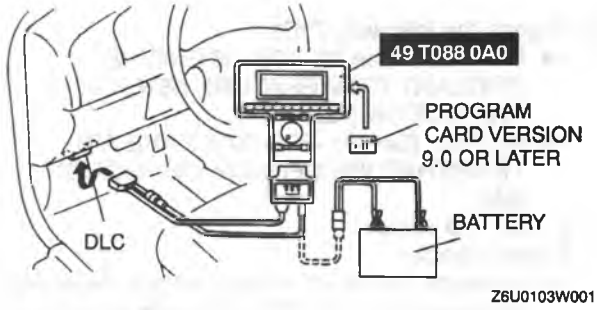
13. Turn the control valve to the TEST position and press the START switch.
14. After the 2-minute countdown (left display) is completed, check the test result (the failed/passed light on the tester).
- If the green light turns on, the EVAP system is OK.
- If the red light turns on, the EVAP system has leakage. Check for leak using the ultrasonic leak detector) and repair.

15. Close the gas cylinder valve.
16. Turn the control valve to the FILL position.
17. Press the ON/OFF switch to turn off the tester.

Evaporative System Leak Inspection Using Vacuum

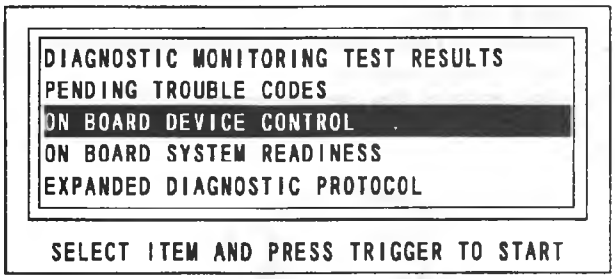
Whole system inspection

1. Disconnect the vacuum hose between the purge solenoid valve and the catch tank from the purge solenoid valve.
2. Insert hose on the vacuum pump.
3. Connect the **SSTs** (NGS tester) to the DLC.



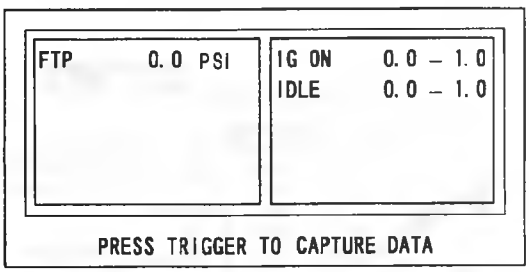
Note
- The following conditions cancel the ON BOARD DEVICE CONTROL function:
  - — Ten minutes after the TRIGGER on the NGS tester is depressed.
  - — When engine is started.
  - — If the pressure in the EVAP control system exceeds **6.43 kPa {48.2 mmHg, 1.9 inHg}**.
- Therefore, the following tests, Step 4 through 9, should be conducted under the following conditions.
  - — Within **10 minutes** after TRIGGER on the NGS tester is depressed.
  - — Without starting the engine.

4. Select the ON BOARD DEVICE CONTROL of the GENERIC OBD-II FUNCTIONS and press TRIGGER.



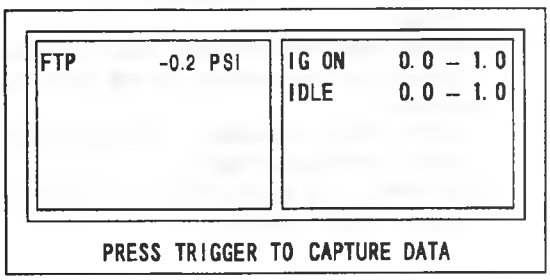
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5. Press CANCEL two times.
6. Select the PID/DATA MONITOR AND RECORD function on the NGS display.
7. Select the FTP PID.
8. Press the START to view PID.



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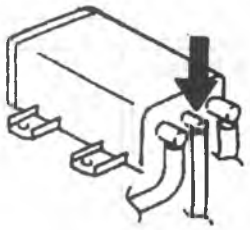
9. Apply **1.7 kPa {13 mmHg, 0.5 inHg}** vacuum. Vacuum should hold at the specified readings for a minimum of **2 minutes**.
   - If the FTP PID value does not hold, inspect the FTP sensor. (See 01-40B-41 FUEL TANK PRESSURE SENSOR INSPECTION [KL].)
   - If the fuel tank pressure sensor is okay, carry out the "Inspection from charcoal canister to purge solenoid valve".



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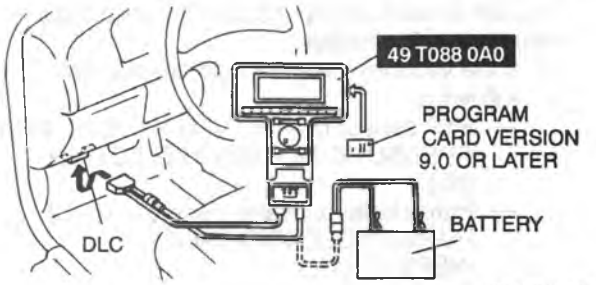
Inspection from charcoal canister to purge solenoid valve

1. Inspect for loose and wrongly connected hoses between the charcoal canister and the purge solenoid valve. (See 01-13B-3 VACUUM HOSE ROUTING DIAGRAM [KL].)
2. Disconnect fuel tank side of the vacuum hose at the charcoal canister.
3. Insert hose on the vacuum pump.



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4. Connect the **SSTs** (NGS tester) to the DLC.

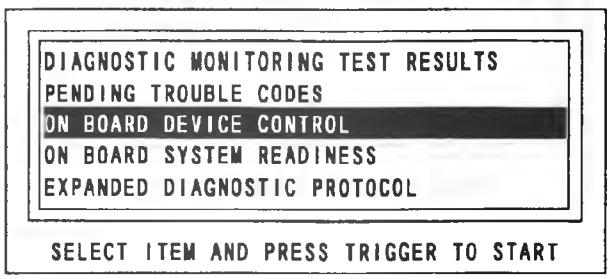


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Note

- The following conditions cancel the ON BOARD DEVICE CONTROL function:
  1. Ten minutes after the TRIGGER on the NGS tester is depressed.
  2. When engine is started.
  3. If the pressure in the EVAP control system exceeds **6.43 kPa {48.26 mmHg, 1.9 inHg}**.
- Therefore, the following tests, Step 5 through 10, should be conducted under the following conditions.
  1. Within **10 minutes** after TRIGGER on the NGS tester is depressed.
  2. Ignition key is at ON (Engine OFF), but engine is not started.

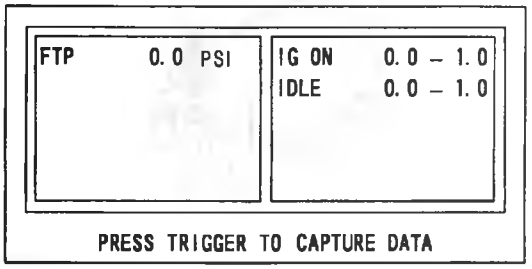
5. Select the ON BOARD DEVICE CONTROL of the GENERIC OBD-II FUNCTIONS and press TRIGGER.



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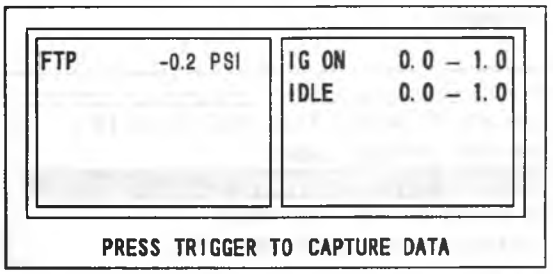
6. Press CANCEL two times.
7. Select the PID/DATA MONITOR AND RECORD function on the NGS display.

8. Select the FTP PID.
9. Press the START to view PID.



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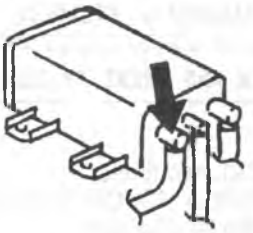
10. Apply **1.7 kPa {13 mmHg, 0.5 inHg}** vacuum. Vacuum should hold at the specified readings for a minimum of **2 minutes**.
    - If the vacuum does not hold, inspect the following.
      - — FTP sensor (See 01-40B-41 FUEL TANK PRESSURE SENSOR INSPECTION [KL].)
      - — Purge solenoid valve (See 01-16-12 PURGE SOLENOID VALVE INSPECTION.)
      - — Catch tank for plugging, damages and pinhole using vacuum pump
      - — Charcoal canister for damage and pinhole (See 01-16-10 CHARCOAL CANISTER INSPECTION.)
      - — CDCV for damage and leakage (See 01-16-11 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION.)
      - — Detached, incorrectly installed or cracked hose from purge solenoid valve to catch tank
      - — Detached, incorrectly installed or cracked hose from catch tank to charcoal canister
      - — Detached, incorrectly installed or cracked hose from charcoal canister to fuel tank pressure sensor
      - — Detached, incorrectly installed or cracked hose from charcoal canister to CDCV
    - If the FTP PID value holds, carry out the "Inspection from charcoal canister to fuel tank".



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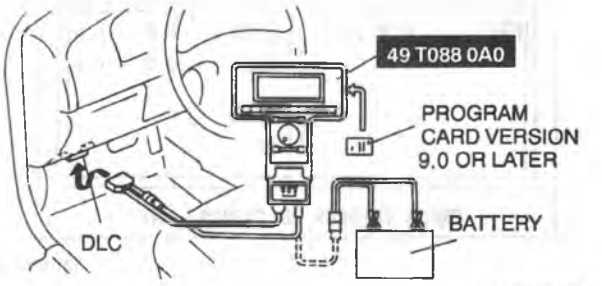
Inspection from charcoal canister to fuel tank

1. Inspect for loose and wrongly connected hoses between the charcoal canister and the fuel tank. (See 01-13B-3 VACUUM HOSE ROUTING DIAGRAM [KL].)
2. Disconnect catch tank side of the vacuum hose at the charcoal canister.
3. Insert hose on the vacuum pump.



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4. Connect the **SSTs** (NGS tester) to the DLC.

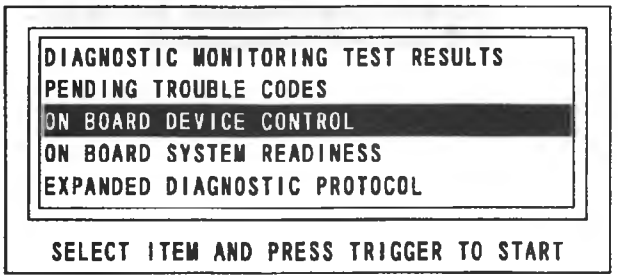


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Note

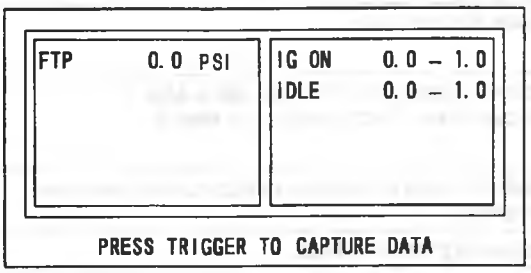
- The following conditions cancel the ON BOARD DEVICE CONTROL function:
  1. Ten minutes after the TRIGGER on the NGS tester is depressed.
  2. When engine is started.
  3. If the pressure in the EVAP control system exceeds **6.43 kPa {48.26 mmHg, 1.9 inHg}**.
- Therefore, the following tests, Step 5 through 10, should be conducted under the following conditions.
  1. Within **10 minutes** after TRIGGER on the NGS tester is depressed.
  2. Ignition key is at ON (Engine OFF), but engine is not started.

5. Select the ON BOARD DEVICE CONTROL of the GENERIC OBD-II FUNCTIONS and press TRIGGER.



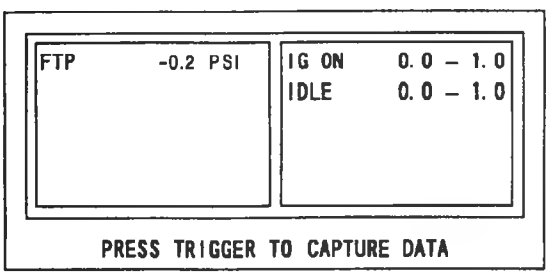
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6. Press CANCEL two times.
7. Select the PID/DATA MONITOR AND RECORD function on the NGS display.
8. Select the FTP PID.
9. Press the START to view PID.



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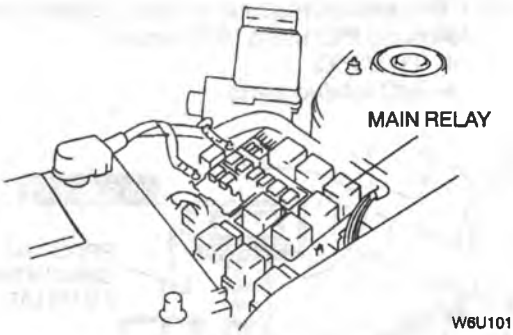
10. Apply **1.7 kPa {13 mmHg, 0.5 inHg}** vacuum. Vacuum should hold at the specified readings for a minimum of **2 minutes**.
    - If the FTP PID value does not hold, inspect the following:
      — Fuel-filler cap for loose or damage
      — Filler-pipe component for leakage
      — Fuel tank for damage, insufficient sealing or poorly attached accessories on fuel tank, such as fuel gauge
      — Detached, incorrectly installed or cracked hose from charcoal canister to fuel tank
      — Detached, incorrectly installed or cracked hose from charcoal canister to vent cut valve
      — Detached, incorrectly installed or cracked hose from vent cut valve to fuel tank



Y6U103WB7

Main Relay Operation Inspection

1. Verify the main relay clicks when the ignition switch is turned to ON and OFF.



W6U101WHY

2. If there is no sound, inspect the following:
   - Main relay.
   - Harness and connector between ignition switch and main relay.

Spark Test

1. Disconnect the fuel pump relay connector.
2. Verify each high-tension lead and connector is connected properly.
3. Inspect the ignition system using the following procedure.

Warning

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

Ignition Timing Control Inspection

1. Connect a timing light to the engine.
2. Crank the engine.
3. Verify that the timing mark (yellow) on the crankshaft pulley and the mark on the timing belt cover are aligned.

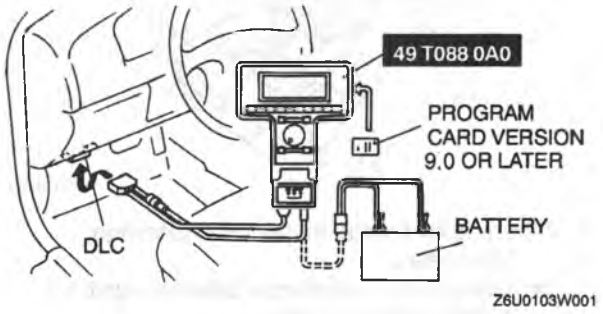
Specification
BTDC 4—16° (10 ± 6°)

4. Increase engine speed and verify ignition timing is advanced.

A/C Cut Off Control Inspection

1. Start the engine and let it idle.
2. Turn the A/C switch and the fan switch ON.
3. Check if the operation sound of the A/C compressor electromagnetic clutch is heard. (A/C compressor starts to work.)
4. Fully open the throttle valve. Check if the operation sound the A/C compressor magnetic clutch is heard. (A/C compressor stops to work.) Then, 3—6 seconds after, check if the operation sound of the A/C compressor electromagnetic clutch is heard.
5. Turn the A/C switch and the fan switch OFF.
6. If the operation sound is not heard, do as follows.
   (1) Connect a jumper wire between both terminals of A/C pressure switch connector.
   (2) Turn the ignition switch ON.

(3) Turn the A/C switch and the fan switch ON. Verify that operation sound is heard from A/C relay.
(4) If the operation sound is heard, check the following PID using NGS tester.
- TP V PID.
- A/C related parts.



(5) If the operation sound is not heard, check the following.
- A/C relay.
- Open or short to ground circuit in wiring harnesses and connectors (Main relay — A/C relay — PCM terminal 69)

STEP	INSPECTION		ACTION
1	Remove high tension lead from spark plug. Hold high-tension lead with insulated pliers 5—10 mm {0.20—0.39 in} from ground. Turn ignition switch to START and verify that there is a strong blue spark. (Check each cylinder)	Yes	Ignition system okay.
		No	If some cylinders do not spark, go to step 2. If all cylinders do not spark, go to step 3.
2	Is high tension lead resistance correct? **Specification 16 kΩ/m**	Yes	Check for crack or damage of high tension lead and ignition coil.
		No	Replace high tension lead.
3	Does PCM or ignition coil connector have poor connection?	Yes	Repair or replace connector.
		No	Go to next step.
4	Is ignition coil winding resistance okay?	Yes	Go to next step.
		No	Replace ignition coil.
5	Are following parts okay? • CKP sensor and crankshaft pulley (also, check for a gap). **Specification 0.5—1.5 mm {0.020—0.059 in}** • PCM terminal 21/22 voltage **Specification Approx. 1.5 V**	Yes	Check for open or short in wiring harness and connectors of CKP sensor.
		No	Repair or replace.

Fuel Cut Control Inspection

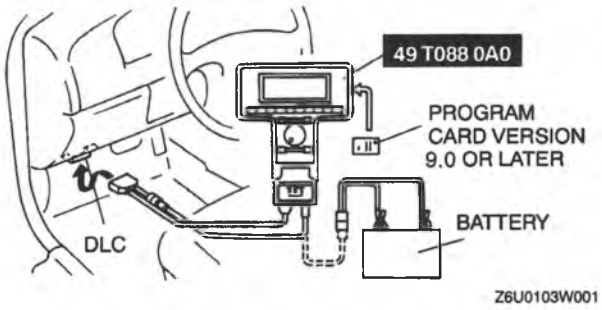
1. Warm up the engine to normal operating temperature and let it idle.
2. Increase the engine speed to 3,000 rpm, then suddenly release the throttle.
3. Check if there is no operational sound from each fuel injector with a screwdriver or a sound scope when the engine speed is above approx. 2,500 rpm on deceleration.

Cooling Fan Control System Inspection
Cooling fan operation

Engine condition	Cooling fan relay	Condenser fan relay
Engine coolant temperature below 97 °C {207 °F}	OFF	OFF
Engine coolant temperature above 100 °C {212 °F}	ON	OFF
Engine coolant temperature above 109 °C {228 °F}	ON	ON
Air conditioning switch ON	ON	ON
Engine coolant temperature sensor malfunction	ON	ON

Cooling fan

1. Verify that the engine is cold.
2. Turn the ignition switch to ON.
3. Verify that the cooling fan is not operating.
4. If the cooling fan is operating:
   (1) Connect the **SSTs** (NGS tester) to the DLC.



   (2) Select the "ACTIVE COMMAND" then "OUTPUT TEST MODE" function on the NGS tester display.
   (3) Select the "ALL OFF" and verify the cooling fan signal is OFF.
   (4) If the cooling fan control signal is ON check:
   - Cooling fan relay stuck in closed position.
   - Short to ground circuit between cooling fan relay and PCM.
   - Short to power in circuit between cooling fan relay.
   - DTCs for ECT sensor.
   - P0117, P0118, P0125, P1116, P1117.

   (5) If the cooling fan is OFF, check the following.
   - Short to ground circuit between A/C switch and PCM.
   - DTC for ECT sensor.
   - P0117, P0118, P0125, P1116, P1117.

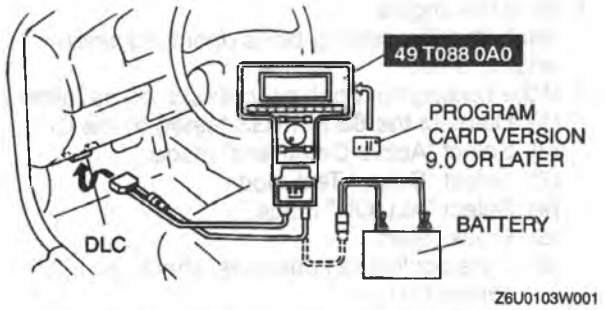
5. Start the engine.
6. Verify that the cooling fan is operating when engine is hot.
7. If the cooling fan does not operate, do as follows.
   (1) Connect the **SSTs** (NGS tester) to the DLC.
   (2) Select "Active Command" mode.
   (3) Select "Output Test Mode".
   (4) Select "ALL ON" mode.
   (5) Press "Start".
   (6) If the cooling fan operates, check the ECT sensor DTCs.
   - P0117, P0118, P0125, P1116, P1117.

   (7) If the cooling fan does not operate, do as follows.
   ① Select "ALL ON". Operate cooling fan by selecting "Start", and verify that operational sound is heard from the cooling fan relay.
   ② If the operational sound is heard, check the wiring harnesses and connectors and cooling fan motor.
   ③ If the operational sound is heard, check the cooling fan relay and open circuit in wiring harnesses and connectors.
8. Turn the A/C switch and fan switch ON.
9. Verify that the cooling fan is operating.
10. If fan does not operate, check A/C system.

Condenser fan relay

1. Verify that the A/C switch and fan switch are off.
2. Start the engine and let it idle.
3. Verify that the condenser fan is not operating.
4. If the condenser fan is operating, check:
   - Condenser fan relay for stuck in closed position.
   - Short to power in circuit between condenser fan relay and condenser fan.
   - Short to ground in circuit between A/C pressure switches and PCM.
   - Short to ground circuit between condenser fan relay and PCM terminal 17.
5. Turn the A/C switch and fan switch ON.
6. Verify that the condenser fan is operating and the operating sound of A/C compressor magnetic clutch is heard.
7. Turn the A/C switch and fan switch off.
8. If the condenser fan does not operate but the operating sound of A/C compressor magnetic clutch is heard, check as follows:
   - Open circuit between ignition switch and condenser fan relay.
   - Open circuit between battery and condenser fan relay.
   - Open circuit between condenser fan relay and PCM.
   - Open circuit between condenser fan relay and condenser fan motor or fan motor ground.
   - Condenser fan relay stuck to open.
   - Condenser fan motor.
9. If both condenser fan and A/C compressor do not operate, check:
   - TP V PID. (See 01-40B-33 THROTTLE POSITION SENSOR INSPECTION [KL].)

- A/C system.


49 T088 0A0
PROGRAM
CARD VERSION
9.0 OR LATER
BATTERY
DLC
Z6U0103W001

01-03C SYMPTOM TROUBLESHOOTING [CRUISE CONTROL SYSTEM]

FOREWORD [CRUISE CONTROL SYSTEM] 01-03C-1
TROUBLESHOOTING INDEX [CRUISE CONTROL SYSTEM] 01-03C-1
NO.1 SET SPEED IS NOT MAINTAINED 01-03C-2
NO.2 CRUISE SET INDICATOR LIGHT DOES NOT ILLUMINATE 01-03C-12
NO.3 CRUISE SPEED IS NOT CONSTANT 01-03C-14
NO.4 SET SPEED CANNOT BE CANCELED 01-03C-14
NO.5 ACCEL SWITCH OPERATION OR RESUME SWITCH OPERATION DOES NOT OPERATE 01-03C-18
NO.6 SET SPEED IS CANCELED 01-03C-18

FOREWORD [CRUISE CONTROL SYSTEM]

Z6U010366350W01

- Thoroughly read and understand the basic flow of troubleshooting in order to properly perform the procedures. (See 00-00-2 HOW TO USE THIS MANUAL.)

TROUBLESHOOTING INDEX [CRUISE CONTROL SYSTEM]

Z6U010366350W02

No.	TROUBLESHOOTING ITEM	DESCRIPTION	PAGE
1	Set speed is not maintained.	Set speed is not maintained even when SET switch is depressed.	(See 01-03C-2 NO.1 SET SPEED IS NOT MAINTAINED)
2	Cruise set indicator light does not illuminate.	Cruise set indicator light does not illuminate while driving at a set speed.	(See 01-03C-12 NO.2 CRUISE SET INDICATOR LIGHT DOES NOT ILLUMINATE)
3	Cruise speed is not constant.	Malfunction in vehicle speedometer sensor, throttle cable or cruise actuator cable.	(See 01-03C-14 NO.3 CRUISE SPEED IS NOT CONSTANT)
4	Set speed cannot be canceled.	Set speed cannot be canceled although the cancel operation has been executed.	(See 01-03C-14 NO.4 SET SPEED CANNOT BE CANCELED)
5	ACCEL switch operation or RESUME switch operation does not operate.	Vehicle does not accelerate even when ACCEL switch is depressed. It does not return to the previous set speed even when RESUME switch is depressed.	(See 01-03C-18 NO.5 ACCEL SWITCH OPERATION OR RESUME SWITCH OPERATION DOES NOT OPERATE)
6	Set speed is canceled.	Set speed is canceled although the cancel operation has not been executed.	(See 01-03C-18 NO.6 SET SPEED IS CANCELED)

NO.1 SET SPEED IS NOT MAINTAINED

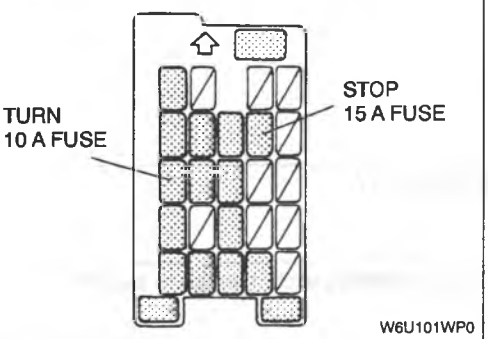
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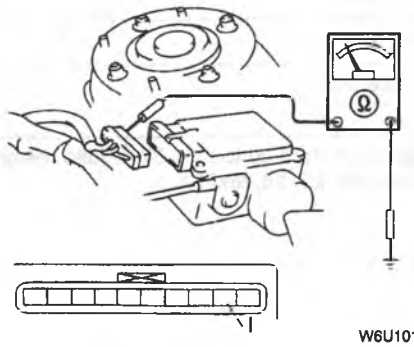
- When performing an asterisked(*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

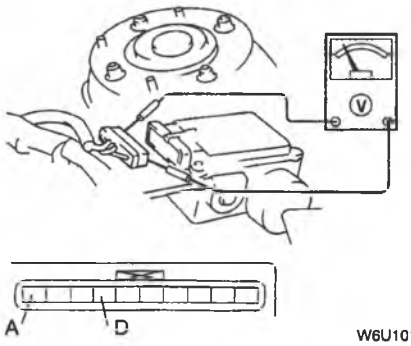
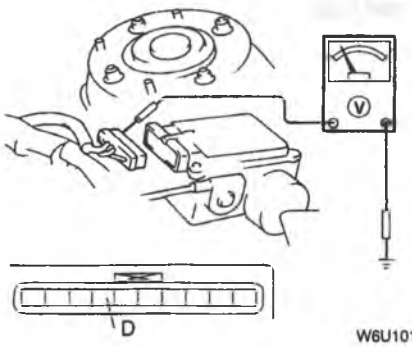
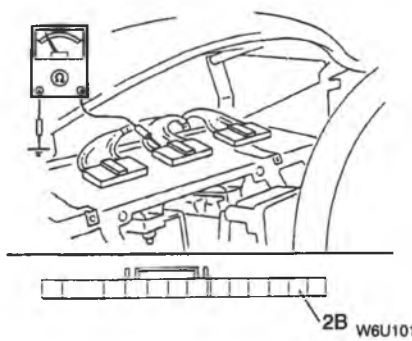
1	Set speed is not maintained
POSSIBLE CAUSE	• Improper operation by customer — Steps 1, and 3 to 5 • Malfunction of clock spring and related parts — Step 6 • Malfunction in DTC related areas which are detected by PCM self diagnosis inspection — Step 7 • Malfunction in power supply circuit for cruise actuator — STOP 15 A fuse or TURN 10 A fuse malfunction • Malfunction of actuator cables and related parts — Actuator cable malfunction • Malfunction of brake pedal and related parts — Step 12 • Malfunction of clutch pedal and related parts on MTX vehicles — Step 13 • Malfunction of clutch switch on/off signal and related parts — Malfunction in wiring harness between cruise actuator and clutch switch — Clutch switch malfunction • Malfunction of selector lever position signal and related parts — Step 16 • Malfunction of cruise actuator ignition 1 and GND signals and related parts — Malfunction in wiring harness between TURN 10 A fuse and cruise actuator — Malfunction in wiring harness between instrument cluster and ground — Malfunction in wiring harness between cruise actuator and instrument cluster — Instrument cluster's base print plate malfunction • Malfunction of cruise control position signal switch and related parts — Malfunction in wiring harness between cruise actuator and clock spring — Short cord on clock spring malfunction: connected to cruise actuator or cruise control switch — Cruise control switch malfunction — Malfunction in wiring harness between TURN 10 A fuse and clock spring — Short cord on clock spring malfunction: connected to TURN 10 A fuse or cruise control switch — Cruise control switch malfunction • Malfunction of brake switch on/off signal and related parts — Malfunction in wiring harness between brake switch and cruise actuator — Malfunction in wiring harness between STOP 15 A fuse and brake switch — Malfunction in wiring harness between vehicle speedometer sensor and ground — Malfunction in wiring harness between cruise actuator and vehicle speedometer sensor — Speed sensor malfunction — Malfunction in wiring harness between STOP 15 A fuse and brake switch — Malfunction in wiring harness between brake switch and cruise actuator — Malfunction in wiring harness between STOP 15 A fuse and brake switch — Brake switch malfunction • Malfunction of vehicle speedometer sensor on signal and related parts — Cruise actuator malfunction

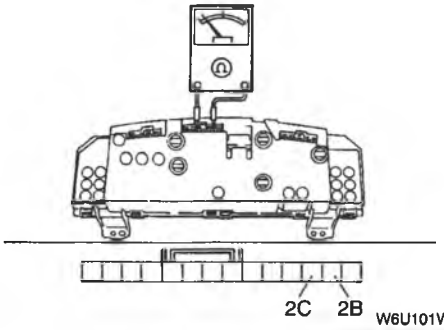
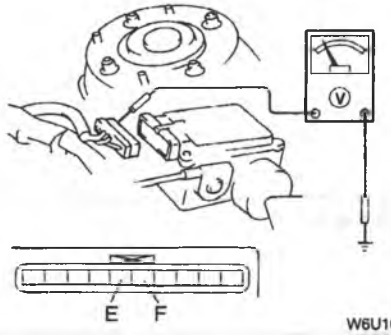
Diagnostic procedure

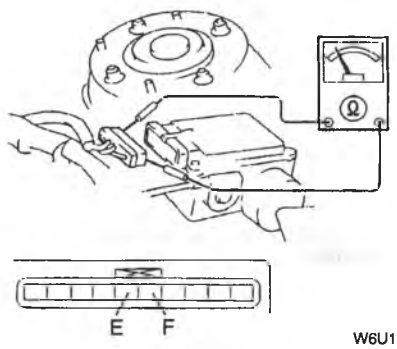
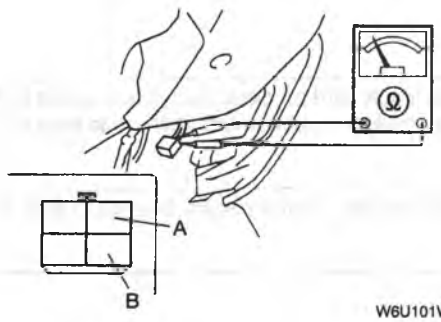
STEP	INSPECTION		ACTION
1	**VERIFY THAT VEHICLE SPEED IS WITHIN THE RANGE OF 40 KM/H {25 MPH} TO 160 KM/H {100 MPH} WHEN THE SET SWITCH IS PRESSED** • Did customer press SET switch within the range of 40 km/h {25 MPH} to 160 km/h {100 MPH}?	Yes	Go to next step.
		No	The vehicle is operating normally. Explain to the customer that the control cannot be set when the vehicle speed is not within 40 km/h {25 MPH} to 160 km/h {100 MPH}.
2	**CHECK TO SEE WHETHER VEHICLE IS ATX OR MTX** • Is it an ATX vehicle?	Yes	Go to step 4.
		No	Go to next step.
3	**CHECK TO SEE IF CLUTCH PEDAL IS BEING DEPRESSED WHEN MALFUNCTION OCCURS** • Did a customer step on the clutch pedal when depressing SET switch?	Yes	The vehicle is operating normally. Explain to the customer that cruise control cannot be set as the system will be canceled while the clutch pedal is depressed.
		No	Go to next step.

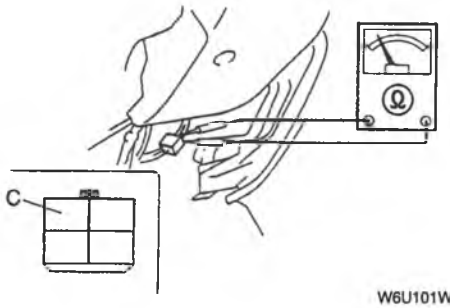
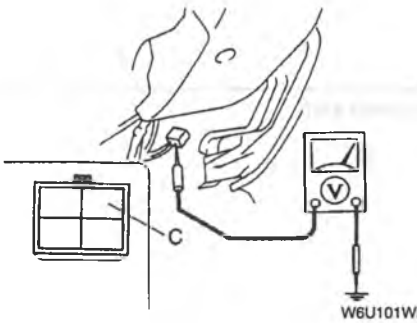
STEP	INSPECTION		ACTION
4	**CHECK TO SEE IF BRAKE PEDAL IS BEING DEPRESSED WHEN MALFUNCTION OCCURS** ● Did a customer step on the brake pedal when depressing SET switch?	Yes	The vehicle is operating normally. Explain to the customer that cruise control cannot be set as the system will be canceled while the brake pedal is depressed.
		No	Go to next step.
5	**CHECK TO SEE IF SELECTOR LEVER IS IN N RANGE WHEN MALFUNCTION OCCURS** ● Was the selector lever at N range when depressing SET switch?	Yes	The vehicle is operating normally. Explain to the customer that cruise control cannot be set as the system will be canceled while the selector lever is at N range.
		No	Go to next step.
6	**INSPECT HORN FOR POOR CLOCK SPRING CONNECTION** ● Inspect horn. ● Does it sound?	Yes	Go to next step.
		No	Inspect connection of clock spring connector (4-pin). If no concern is found, go to next step. If poor connections are found, make sure they are securely connected and then go to step 37.
7	**CHECK FOR DTCS IN PCM** ● Inspect DTC for PCM ON-BOARD DIAGNOSTIC SYSTEM. ● Are any DTCs displayed?	Yes	Repair damaged area by following inspection by applicable DTC of PCM.
		No	Go to next step.
8	**INSPECT STOP 15A FUSE AND TURN 10A FUSE** ● Inspect STOP 15 A fuse and TURN 10 A fuse. Are they okay?  	Yes	Go to next step.
		No	Replace fuse, then go to step 37. If fuse melts immediately, go to step 18, 25, 28, and 31.
9	**VERIFY THAT ACTUATOR CABLE IS CONNECTED** ● Inspect connection of actuator cable to accelerator pedal and cruise actuator link. Are they securely and properly connected?	Yes	Go to next step.
		No	Connect actuator cable securely and properly, then go to step 37.
10	**INSPECT ACTUATOR CABLE** ● Remove actuator cable on cruise actuator side. ● Hold the end of cruise actuator cable by hand. ● Inspect actuator cable operation by depressing and releasing the accelerator pedal. ● Is it okay?	Yes	Reinstall actuator cable. Go to next step.
		No	Replace actuator cable, then go to step 37.
11	**CHECK ACTUATOR CABLE PLAY** ● Inspect actuator cable play. (See 01-20-6 ACTUATOR CABLE ADJUSTMENT) ● Is it okay?	Yes	Go to next step.
		No	Adjust the play, then go to step 37.
12	**INSPECT BRAKE PEDAL HEIGHT AND PLAY** ● Inspect brake pedal height and free play on vehicle. (See 04-11-4 BRAKE PEDAL INSPECTION) ● Is it okay?	Yes	For ATX vehicle, go to step 16. For MTX vehicle, go to next step.
		No	Adjust brake pedal height or brake pedal play, then go to step 37.

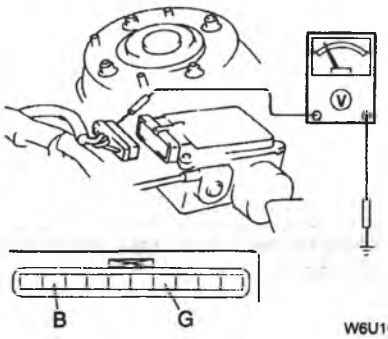
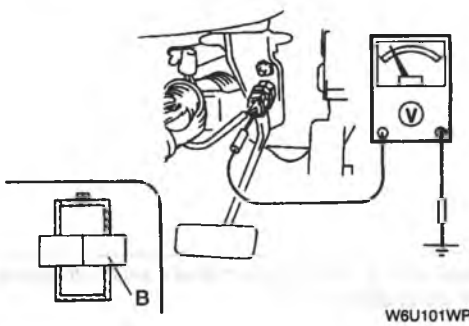
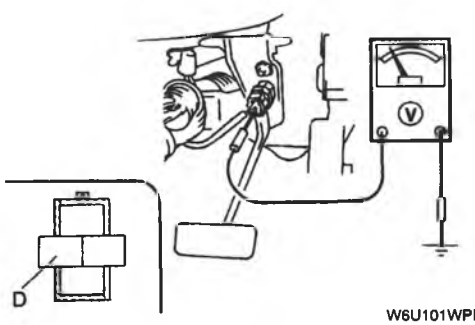
STEP	INSPECTION		ACTION
13	**INSPECT CLUTCH PEDAL HEIGHT AND PLAY** • Inspect clutch pedal height and free play on vehicle. (See 05-10-2 CLUTCH PEDAL ADJUSTMENT) • Is it okay?	Yes	Go to next step.
		No	Adjust clutch pedal height or clutch pedal play, then go to step 37.
14*	**INSPECT WIRING HARNESS BETWEEN CRUISE ACTUATOR AND CLUTCH SWITCH FOR CONTINUITY** • Disconnect cruise actuator connector and clutch switch connector. • Inspect continuity between terminal I (clutch switch on/off signal) of cruise actuator connector of the wiring harness and ground. • Is there continuity?  W6U101WP1	Yes	Repair wiring harness between cruise actuator and clutch switch, then go to step 37.
		No	Go to next step.
15	**INSPECT CLUTCH SWITCH** • Inspect clutch switch. (See 01-40A-42 CLUTCH SWITCH INSPECTION [FS]) (See 01-40B-46 CLUTCH SWITCH INSPECTION [KL]) • Is it okay?	Yes	Go to step 17.
		No	Replace clutch switch, then go to step 37.
16	**INSPECT TRANSAXLE RANGE SWITCH** • Inspect transaxle range switch. (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL]) (See 05-17B-23 TRANSAXLE RANGE SWITCH INSPECTION [GF4A-EL]) • Is it okay?	Yes	Go to next step.
		No	Inspect possible cause, then go to step 37.

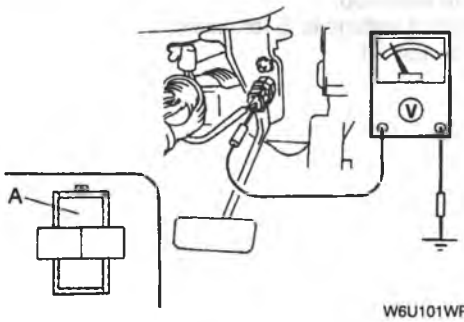
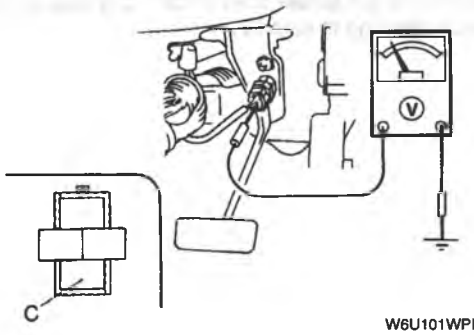
STEP	INSPECTION		ACTION
17*	**CHECK TO SEE WHETHER MALFUNCTION IS IN CRUISE ACTUATOR IG1 SIGNAL AND CRUISE ACTUATOR GROUND SIGNAL OR ELSEWHERE** ● Disconnect cruise actuator connector. ● Turn ignition switch to ON. ● Measure voltage at terminal D (ignition on signal) of cruise actuator connector and terminal A of cruise actuator connector. ● Is voltage **12 V**? 	Yes	Go to step 21.
		No	Go to next step.
18	**INSPECT WIRING HARNESS BETWEEN FUSE BLOCK AND CRUISE ACTUATOR FOR CONTINUITY** ● Measure voltage at terminal D (ignition on signal) of cruise actuator connector of wiring harness. ● Is voltage **12 V**? 	Yes	Go to next step.
		No	Repair wiring harness from TURN 10 A fuse to cruise actuator, then go to step 37.
19*	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND GROUND FOR CONTINUITY** ● Disconnect instrument cluster connector (14-pin). ● Inspect continuity between terminal 2B of instrument cluster (14-pin) connector of the wiring harness and ground. ● Is there continuity? 	Yes	Go to next step.
		No	Repair wiring harness from instrument cluster to ground, then go to step 37.

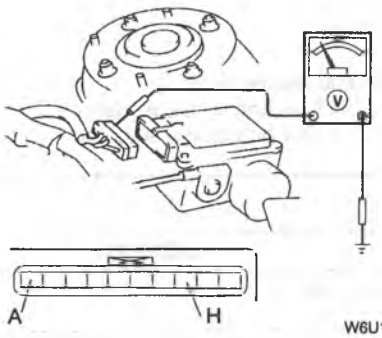
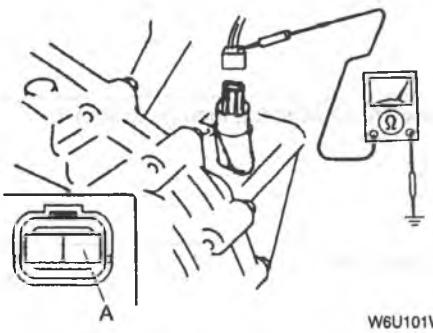
STEP	INSPECTION		ACTION
20	**CHECK TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN PRINT PLATE NO. 1 IN INSTRUMENT CLUSTER OR WIRING HARNESS (BETWEEN CRUISE ACTUATOR TERMINAL A AND INSTRUMENT CLUSTER)** • Remove instrument cluster. • Inspect continuity between terminal 2B of instrument cluster (14-pin) and terminal 2C of instrument cluster (14-pin). • Is there continuity?  W6U101WP5	Yes	Repair wiring harness from cruise actuator to instrument cluster, then go to step 37.
		No	Replace print plate No.1 then go to step 37.
21*	**CHECK TO SEE WHETHER MALFUNCTION IS IN CRUISE CONTROL SWITCH SYSTEM OR ELSEWHERE** • Measure voltage at the following of cruise actuator. — Terminal E (cruise control switch input signal) — Terminal F (cruise control switch output signal) • See 01-20-8 CRUISE CONTROL SWITCH INSPECTION • Is voltage correct?  W6U101WP6	Yes	Go to step 28.
		No	Go to next step.

STEP	INSPECTION		ACTION
22	**CHECK TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN CLOCK SPRING, CRUISE CONTROL SWITCH AND WIRING HARNESS (BETWEEN CRUISE ACTUATOR AND CRUISE CONTROL SWITCH) OR ELSEWHERE** • Hold SET/COAST switch to on position. • Measure resistance between terminal E (cruise control switch input signal) and F (cruise control switch output signal) of cruise actuator. • Is resistance at **228 to 252** Ω?  W6U101WP7	Yes	Go to step 25.
		No	Go to next step.
23*	**CHECK TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN CLOCK SPRING AND CRUISE CONTROL SWITCH OR WIRING HARNESS (BETWEEN CRUISE ACTUATOR AND CLOCK SPRING)** • Disconnect clock spring connectors (4-pins). Hold SET/COAST switch to on position. • Measure resistance between terminal A (cruise control switch output signal) and B (cruise control switch input signal) of clock spring. • Is resistance at **228 to 252** Ω?  W6U101WP8	Yes	Repair wiring harness from cruise actuator to clock spring, then go to step 37.
		No	Go to next step.
24	**CHECK TO SEE WHETHER MALFUNCTION IS IN CLOCK SPRING OR CRUISE CONTROL SWITCH** • Inspect cruise control switch. (See 01-20-8 CRUISE CONTROL SWITCH INSPECTION) • Is it okay?	Yes	Repair short cord on clock spring: connected to cruise actuator or cruise control switch, then go to step 37.
		No	Replace cruise control switch, then go to step 37.

STEP	INSPECTION		ACTION
25*	**CHECK TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN CLOCK SPRING, CRUISE CONTROL SWITCH AND WIRING HARNESS (BETWEEN FUSE BLOCK AND CRUISE CONTROL SWITCH) OR ELSEWHERE** • Measure voltage at terminal C (ignition 1 signal) of clock spring (4-pin) connector. • Is voltage **12 V**?  W6U101WP9	Yes	Go to step 28.
		No	Go to next step.
26	**INSPECT WIRING HARNESS BETWEEN FUSE BLOCK AND CLOCK SPRING FOR CONTINUITY** • Disconnect clock spring connector (4-pin). Measure voltage at terminal C (ignition 1 signal) of clock spring (4-pin) connector of wiring harness. • Is voltage **12 V**?  W6U101WPA	Yes	Go to next step.
		No	Repair wiring harness from TURN 10 A fuse to clock spring, then go to step 37.
27	**CHECK TO SEE WHETHER MALFUNCTION IS IN CLOCK SPRING OR CRUISE CONTROL SWITCH** • Inspect cruise control switch. (See 01-20-8 CRUISE CONTROL SWITCH INSPECTION) • Is it okay?	Yes	Repair short cord on clock spring connected to TURN 10 A fuse or cruise control switch, then go to step 37.
		No	Replace cruise control switch, then go to step 37.

STEP	INSPECTION		ACTION
28*	**CHECK TO SEE WHETHER MALFUNCTION IS IN BRAKE SWITCH AND WIRING HARNESS (BETWEEN FUSE BLOCK, BRAKE SWITCH AND CRUISE ACTUATOR) OR ELSEWHERE** • Measure voltage at terminal B (brake switch on/off signal) and G (brake switch on/off signal) of cruise actuator. (See 01-20-5 CRUISE ACTUATOR INSPECTION) • Is voltage correct?  	Yes	Go to step 34.
		No	Incorrect voltage at B terminals: Go to next step. Incorrect voltage at G terminals: Go to step 31.
29*	**INSPECT WIRING HARNESS BETWEEN FUSE BLOCK AND BRAKE SWITCH (NORMALLY CLOSED SIDE) FOR CONTINUITY** • Measure voltage at terminal B (brake switch on/off signal) of brake switch connector of wiring harness. • Is voltage **12 V**?  	Yes	Go to next step.
		No	Repair wiring harness from STOP 15 A fuse to brake switch, then go to step 37.
30*	**CHECK TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN BRAKE SWITCH OR WIRING HARNESS (BRAKE SWITCH AND CRUISE ACTUATOR)** • Measure voltage at terminal D (brake switch on/off signal) of brake switch connector of wiring harness. • Is voltage **12 V**?  	Yes	Repair wiring harness from brake switch to cruise actuator, then go to step 37.
		No	Inspect brake switch, then go to step 37.

STEP	INSPECTION		ACTION
31*	**INSPECT WIRING HARNESS BETWEEN FUSE BLOCK AND BRAKE SWITCH (NORMALLY OPEN SIDE) FOR CONTINUITY** • Measure voltage at terminal A (brake switch on/off signal) of brake switch connector of wiring harness. • Is voltage **12 V**?  W6U101WPG	Yes	Go to next step.
		No	Repair wiring harness from STOP 15 A fuse to brake switch, then go to step 37.
32*	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN BRAKE SWITCH AND CRUISE ACTUATOR) OR ELSEWHERE** • Measure voltage at terminal C (brake switch on/off signal) of brake switch connector of wiring harness while brake pedal is depressed. • Is voltage **12 V**?  W6U101WPH	Yes	Repair wiring harness from brake switch to cruise actuator, then go to step 37.
		No	Go to next step.
33	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (SHORT TO +B, BRAKE SWITCH OR CRUISE ACTUATOR) OR BRAKE SWITCH** • Inspect brake switch. (See 04-11-6 BRAKE SWITCH INSPECTION) • Is it okay?	Yes	Repair wiring harness from brake switch to cruise actuator, then go to step 37.
		No	Replace brake switch, then go to step 37.

STEP	INSPECTION		ACTION
34*	**CHECK TO SEE WHETHER MALFUNCTION IS IN VEHICLE SPEED SENSOR SYSTEM OR CRUISE ACTUATOR** ● Measure voltage at terminal A (cruise actuator ground signal) and H (vehicle speed signal) of cruise actuator connector of wiring harness. (See 01-20-5 CRUISE ACTUATOR INSPECTION) ● Is voltage correct?  W6U101WPJ	Yes	Replace cruise actuator, then go to step 37.
		No	Go to next step.
35*	**INSPECT WIRING HARNESS BETWEEN VEHICLE SPEED SENSOR AND GROUND FOR CONTINUITY** ● Disconnect vehicle speedometer sensor connector. ● Inspect continuity between terminal A (cruise actuator ground signal) of vehicle speedometer sensor connector of wiring harness and ground. ● Is there continuity?  W6U101WPK	Yes	Go to next step.
		No	Repair wiring harness from vehicle speedometer sensor to ground, then go to step 37.
36	**CHECK TO SEE WHETHER MALFUNCTION IS IN VEHICLE SPEED SENSOR OR WIRING HARNESS (LACK OF CONTINUITY OR SHORT BETWEEN VEHICLE SPEED SENSOR AND CRUISE ACTUATOR)** ● Inspect vehicle speedometer sensor. (See 05-15-2 VEHICLE SPEEDOMETER SENSOR INSPECTION) (See 05-17A-32 VEHICLE SPEEDOMETER SENSOR INSPECTION [LA4A-EL]) (See 05-17B-28 VEHICLE SPEEDOMETER SENSOR INSPECTION [GF4A-EL]) ● Is it okay?	Yes	Repair wiring harness from cruise actuator to vehicle speedometer sensor, then go to next step.
		No	Replace vehicle speedometer sensor, then go to next step.
37	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT REOCCUR AFTER REPAIR** ● Does vehicle go at set speed when SET switch is pressed?	Yes	Troubleshooting completed.
		No	Reconfirm the symptoms of the trouble. If the trouble persists, go back to step 1.

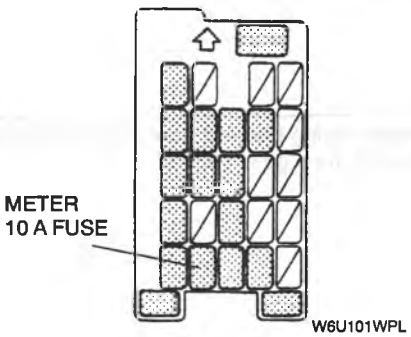
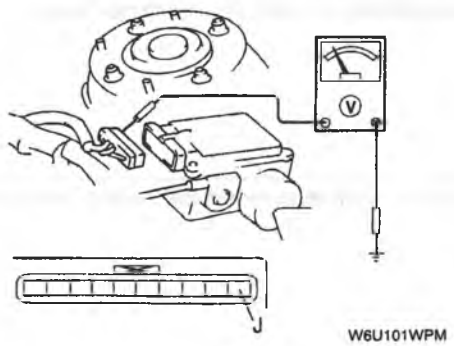
NO.2 CRUISE SET INDICATOR LIGHT DOES NOT ILLUMINATE

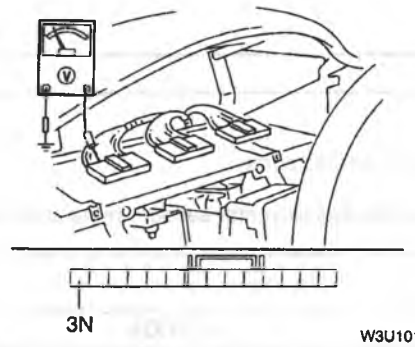
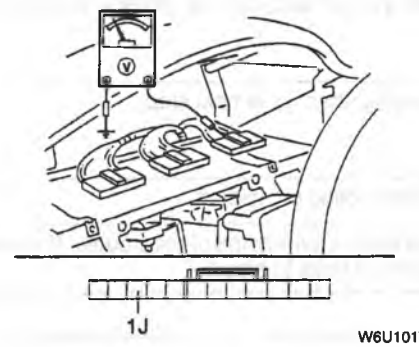
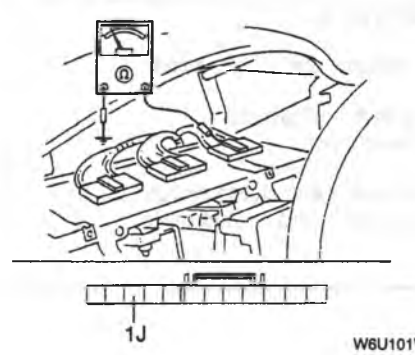
Z6U010366350W04

- When performing an asterisked(*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

2	Cruise set indicator light does not illuminate
POSSIBLE CAUSE	• Malfunction in areas related to power for cruise set indicator light — METER 10 A fuse malfunction • Malfunction of cruise actuator and related parts — Cruise actuator malfunction • Malfunction of cruise set indicator light and related parts — Step 3 • Malfunction of cruise set indicator light output signal and related parts — Malfunction in wiring harness between METER 10 A fuse and cruise actuator — Malfunction in wiring harness between instrument cluster and cruise actuator — Combination meter base malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT METER 10A FUSE** • Inspect METER 10 A fuse. • Is it okay?  W6U101WPL	Yes	Go to next step.
		No	Replace fuse, then go to step 7. If fuse melts immediately, go to next step.
2*	**CHECK TO SEE WHETHER MALFUNCTION IS IN CRUISE ACTUATOR OR ELSEWHERE** • Turn ignition switch to ON. • Disconnect cruise actuator connector. • Measure voltage at terminal J (cruise set indicator light signal) of cruise actuator connector of wiring harness. (See 01-20-5 CRUISE ACTUATOR INSPECTION) • Is voltage correct?  W6U101WPM	Yes	Replace cruise actuator, then go to step 7.
		No	Go to next step.
3	**INSPECT CRUISE CONTROL INDICATOR LIGHT BULB INSTALLATION** • Verify that cruise set indicator light is securely installed to instrument cluster and the bulb is working properly. • Are they okay?	Yes	Go to next step.
		No	Securely install it or replace the bulb, then go to step 7.

STEP	INSPECTION		ACTION
4*	**INSPECT WIRING HARNESS BETWEEN FUSE BLOCK AND INSTRUMENT CLUSTER FOR CONTINUITY** • Remove instrument cluster. • Measure voltage at terminal 3N (IG1 signal) of instrument cluster (14-pin) connector of wiring harness. • Is voltage **12 V**?  W3U101WPN	Yes	Go to next step
		No	Repair wiring harness from METER 10 A fuse to instrument cluster, then go to step 7.
5*	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY, BETWEEN INSTRUMENT CLUSTER AND CRUISE ACTUATOR) OR ELSEWHERE** • Inspect continuity between terminal 1J of instrument cluster connector and J of cruise actuator connector. • Is there continuity?  W6U101WPP	Yes	Repair wiring harness from instrument cluster to cruise actuator, then go to step 7.
		No	Go to next step.
6*	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (SHORT TO GROUND BETWEEN INSTRUMENT CLUSTER AND CRUISE ACTUATOR) OR PRINT PLATE NO. 1 IN INSTRUMENT CLUSTER** • Inspect continuity between terminal 1J of instrument cluster connector of wiring harness and ground. • Is there continuity?  W6U101WPQ	Yes	Repair wiring harness from instrument cluster to cruise actuator, then go to next step.
		No	Replace print plate No.1, then go to next step.

STEP	INSPECTION		ACTION
7	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT REOCCUR AFTER REPAIR** • Does cruise set indicator light illuminate while driving at set speed?	Yes	Troubleshooting completed.
		No	Reconfirm the symptoms of the trouble. If the trouble persists, go back to step 1.

NO.3 CRUISE SPEED IS NOT CONSTANT

Z6U010366350W05

3	Cruise speed is not constant
POSSIBLE CAUSE	• System is misunderstood by customer — Step 1 • Malfunction of fuel and emission control system and related parts — Step 2 • Malfunction of throttle cable, actuator cable, or vehicle speedometer sensor and related parts — Step 3

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY VEHICLE STATUS WHEN TROUBLE OCCURS** • Does trouble occur on a slope or on other conditions besides level roads?	Yes	System operation is normal.
		No	Go to next step.
2	**CHECK TO SEE WHETHER VEHICLE SPEED VARIES OR NOT** • Does vehicle speed vary during normal driving when no speed is set?	Yes	Perform troubleshooting for fuel and emission control system. The cruise control system is not the cause of the trouble.
		No	Go to next step.
3	**INSPECT AMOUNT OF PLAY IN THROTTLE CABLE AND CRUISE ACTUATOR CABLE** • Inspect the free-play of the throttle cable and cruise actuator cable. (See 01-20-6 ACTUATOR CABLE ADJUSTMENT) • Are they okay?	Yes	Inspect vehicle speedometer sensor, then go to next step.
		No	Adjust play, then go to next step.
4	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT REOCCUR AFTER REPAIR** • Does vehicle operate normally?	Yes	Troubleshooting completed.
		No	Reconfirm the symptoms of the trouble. If the trouble persists, go back to step 1.

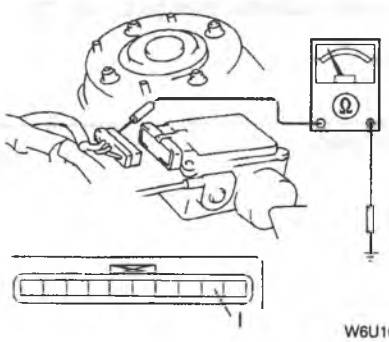
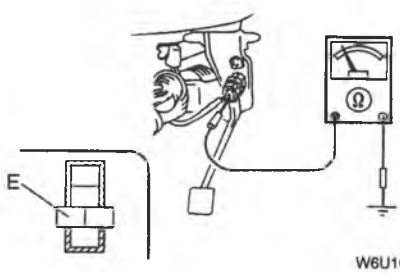
NO.4 SET SPEED CANNOT BE CANCELED

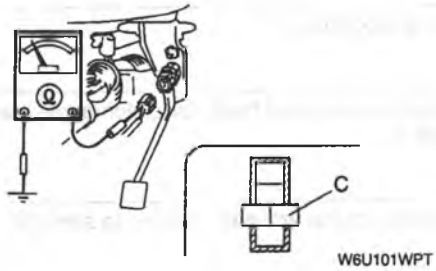
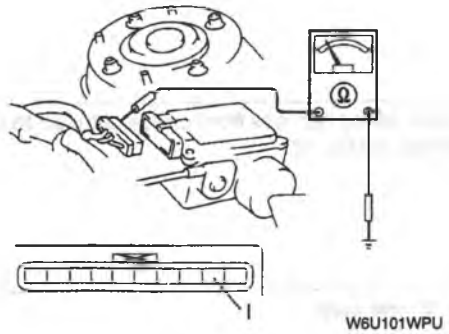
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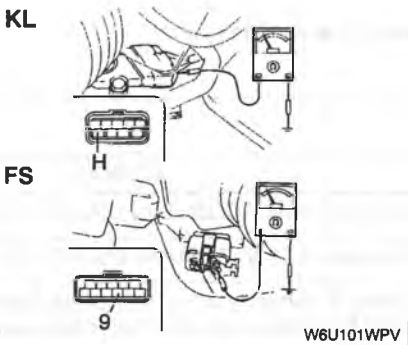
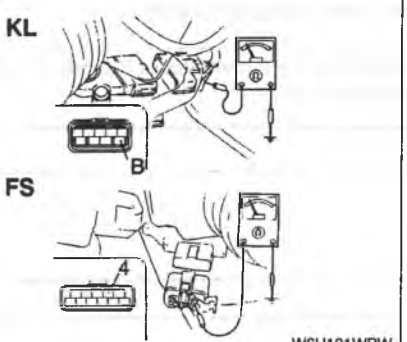
• When performing an asterisked(*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

4	Set speed cannot be canceled
POSSIBLE CAUSE	• Malfunction of clutch switch on/off signal and related parts — Cruise actuator malfunction — Malfunction in wiring harness between cruise actuator and clutch switch — Clutch switch malfunction — Malfunction in wiring harness between clutch switch and ground • Malfunction of selector lever position signal and related parts — Cruise actuator malfunction — Malfunction in wiring harness between cruise actuator and clutch switch • Malfunction of cruise control main switch, cruise actuator, and related parts — Cruise actuator malfunction — Cruise control main switch malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CHECK TO SEE WHETHER VEHICLE IS ATX OR MTX** • Is it an ATX vehicle?	Yes	Go to step 7.
		No	Go to next step.
2	**CHECK TO SEE WHETHER MALFUNCTION IS IN CLUTCH SWITCH SYSTEM OR ELSEWHERE** • Does it cancel when clutch pedal is depressed?	Yes	Go to step 11.
		No	Go to next step.
3	**INSPECT CLUTCH PEDAL HEIGHT AND PLAY** • Inspect clutch pedal height and free-play on vehicle. (See 05-10-2 CLUTCH PEDAL ADJUSTMENT) • Is it okay?	Yes	Go to next step.
		No	Adjust clutch pedal height or clutch pedal play, then go to step 13.
4*	**CHECK TO SEE WHETHER MALFUNCTION IS IN CRUISE ACTUATOR OR ELSEWHERE** • Disconnect cruise actuator. • Inspect continuity between terminal I (clutch switch on/off signal) of cruise actuator connector of wiring harness and ground, while clutch pedal is depressed. • Is there continuity?  W6U101WPR	Yes	Replace cruise actuator, then go to step 13.
		No	Go to next step.
5*	**CHECK TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN CLUTCH SWITCH AND WIRING HARNESS (BETWEEN CLUTCH SWITCH AND GROUND) OR WIRING HARNESS (BETWEEN CRUISE ACTUATOR AND CLUTCH SWITCH)** • Inspect continuity between terminal E (clutch switch on/off signal) of clutch switch connector of wiring harness and ground, while clutch pedal is depressed. • Is there continuity?  W6U101WPS	Yes	Repair wiring harness from cruise actuator to clutch switch, then go to step 13.
		No	Go to next step.

STEP	INSPECTION		ACTION
6*	**CHECK TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN CLUTCH SWITCH OR WIRING HARNESS (BETWEEN CLUTCH SWITCH AND GROUND)** • Disconnect clutch switch connector. • Inspect continuity between terminal C (clutch switch on/off signal) of clutch switch connector of wiring harness and ground. • Is there continuity?  W6U101WPT	Yes	Replace clutch switch, then go to step 13.
		No	Repairing wiring harness from clutch switch to ground, then go to step 13.
7	**CHECK TO SEE WHETHER MALFUNCTION IS IN TRANSAXLE RANGE SWITCH SYSTEM OR ELSEWHERE** • Does it cancel when selector lever is shifted to N range?	Yes	Go to step 11.
		No	Go to next step.
8*	**CHECK TO SEE WHETHER MALFUNCTION IS IN CRUISE ACTUATOR OR ELSEWHERE** • Disconnect cruise actuator connector. • Set selector lever to N. • Inspect continuity between terminal I (selector lever position signal) of cruise actuator connector of wiring harness and ground. • Is there continuity?  W6U101WPU	Yes	Replace cruise actuator, then go to step 13.
		No	Go to next step.

STEP	INSPECTION		ACTION
9*	**CHECK TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN TRANSAXLE RANGE SWITCH AND WIRING HARNESS (BETWEEN STARTER AND TRANSAXLE RANGE SWITCH) OR WIRING HARNESS (BETWEEN CRUISE ACTUATOR AND TRANSAXLE RANGE SWITCH)** ● Inspect continuity between the following transaxle range switch connectors of wiring harness and ground. — KL: H terminal — FS: 9 terminal ● Is there continuity? 	Yes	Repair wiring harness from cruise actuator to transaxle range switch, then go to step 13.
		No	Go to next step.
10*	**CHECK TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN TRANSAXLE RANGE SWITCH OR WIRING HARNESS (BETWEEN STARTER AND TRANSAXLE RANGE SWITCH)** ● Disconnect transaxle range switch. ● Inspect continuity between the following transaxle range switch connectors of wiring harness and ground. — KL: B terminal — FS: 4 terminal ● Is there continuity? 	Yes	Inspect transaxle range switch, then go to step 13.
		No	Inspect starter and wiring harness from starter to transaxle range switch, then go to step 13.
11	**VERIFY THAT MAIN CRUISE CONTROL SWITCH IS OKAY** ● Press cruise control main switch. ● Does it cancel?	Yes	The system is normal.
		No	Go to next step.
12	**CHECK TO SEE WHETHER MALFUNCTION IS IN CRUISE ACTUATOR OR MAIN CRUISE CONTROL SWITCH** ● Inspect cruise control main switch. (See 01-20-8 CRUISE CONTROL SWITCH INSPECTION) ● Is it okay?	Yes	Replace cruise actuator, then go to next step.
		No	Replace cruise control main switch, then go to next step.

STEP	INSPECTION		ACTION
13	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT REOCCUR AFTER REPAIR** • Cancel set speed while driving at set speed. Does it work?	Yes	Troubleshooting completed.
		No	Reconfirm the symptoms. If the trouble persists, go back to step 1.

NO.5 ACCEL SWITCH OPERATION OR RESUME SWITCH OPERATION DOES NOT OPERATE

Z6U010366350W07

5	ACCEL switch operation or RESUME switch operation does not operate
POSSIBLE CAUSE	• Customer misunderstood the system function — Step 2 • Malfunction of cruise control switch, cruise actuator and related parts — Cruise actuator malfunction — Cruise control switch malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY THAT RESUME FUNCTION WORKS CORRECTLY** • Does RESUME only operate?	Yes	Go to next step. ACCEL only does not operate.
		No	Go to step 3. Both RESUME and ACCEL do not operate.
2	**CHECK TO SEE IF BOTH THE RESUME ACCEL SWITCH AND SET/COAST SWITCH ARE BEING PRESSED AT THE SAME TIME WHEN MALFUNCTION OCCURS** • Did customer press RESUME/ACCEL switch and SET/COAST switch at the same time?	Yes	System is normal. Explain to the customer the following. COAST has higher priority than others when SET/COAST switches is pressed earlier or at the same time. Also, the system will be canceled when RESUME/ACCEL switch is pressed earlier.
		No	Reconfirm the symptoms of trouble.
3	**CHECK TO SEE WHETHER MALFUNCTION IS IN CRUISE ACTUATOR OR CRUISE CONTROL SWITCH** • Inspect cruise control switch. (See 01-20-8 CRUISE CONTROL SWITCH INSPECTION) • Is it okay?	Yes	Replace cruise actuator, then go to next step.
		No	Replace cruise control switch, then go to next step.
4	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT REOCCUR AFTER REPAIR** • Do RESUME and ACCEL operate normally?	Yes	Troubleshooting completed.
		No	Reconfirm the symptoms of trouble. If the trouble persists, go back to step 1.

NO.6 SET SPEED IS CANCELED

Z6U010366350W08

6	Set speed is canceled
POSSIBLE CAUSE	• Customer misunderstood the system function — Step 1 to 3 • Malfunction of cruise actuator and related parts — Cruise actuator malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CHECK TO SEE WHETHER SET SELECTOR LEVER IS IN N RANGE OR NOT WHEN TROUBLE OCCURS** • Did customer set the selector lever to N range while driving the set speed?	Yes	System is normal. Explain to the customer that system will cancel the set speed when selector lever is on N range.
		No	Go to next step.

STEP	INSPECTION		ACTION
2	**CHECK TO SEE IF VEHICLE IS BEING DRIVEN 15 KM/H {10 MPH} SLOWER THAN SET SPEED WHEN MALFUNCTION OCCURS** • Did customer drive 15 km/h {10 MPH} slower than set speed while driving on a slope?	Yes	System is normal. Explain to the customer that system will cancel the set speed when vehicle is driven 15 km/h {10 MPH} slower than set speed.
		No	Go to next step.
3	**CHECK TO SEE IF VEHICLE INCURRED A SUDDEN IMPACT WHEN MALFUNCTION OCCURRED** • Did customer drive over a bump or did vehicle incur a sudden impact such as from an accident?	Yes	System is normal. Explain to the customer that system will cancel the set speed when the vehicle incurs a sudden impact which is greater than a certain G force and the sudden speed change is input to the cruise actuator.
		No	Go to next step.
4	**VERIFY THAT VEHICLE SPEED IS BETWEEN 40 KM/H {25 MPH} AND 160 KM/H {100 MPH} WHEN SET SWITCH IS DEPRESSED** • Verify that vehicle is being driven within the range of 40 km/h {25 MPH} to 160 km/h {100 MPH} every time when SET switch is depressed. • Is it okay?	Yes	Replace cruise actuator, then go to next step.
		No	Perform the malfunction symptom No.1.
5	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT REOCCUR AFTER REPAIR** • Inspect cruise control system operation. • Is it okay?	Yes	Troubleshooting completed.
		No	Reconfirm the symptoms. If the trouble persists, go back to step 1.

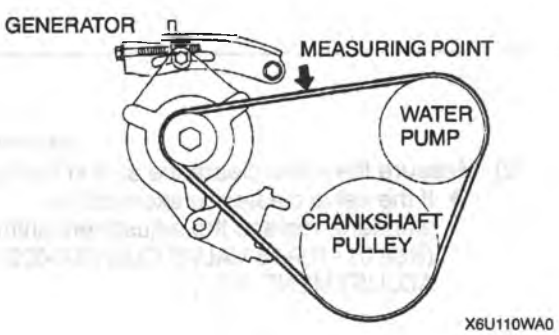
01-10A MECHANICAL [FS]

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Drive Belt Tension Check 01-10A-2
DRIVE BELT ADJUSTMENT [FS] 01-10A-2
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DRIVE BELT INSPECTION [FS]

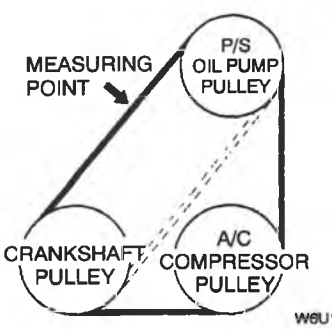
Drive Belt Deflection Check

1. Verify the drive belt deflection when the engine is cold, or **at least 30 minutes** after the engine has stopped. Apply moderate pressure **98 N {10 kgf, 22 lbf}** midway between the specified pulleys.
   - If the deflection is not within the specification, adjust it. (See 01-10A-2 DRIVE BELT ADJUSTMENT [FS].)



X6U110WA0

P/S, P/S+A/C



W6U110WA1

Z6U011015800W01

Deflection

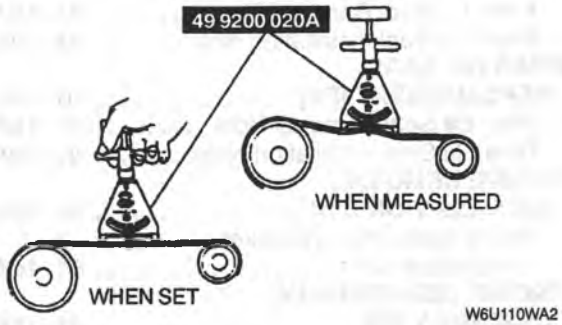
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Drive belt	*New	Used	Limit
Generator	6.5—7.0 {0.26—0.27}	7.0—9.0 {0.28—0.35}	10.0 {0.39}
P/S	7.5—9.0 {0.30—0.35}	8.0—9.5 {0.31—0.37}	11.0 {0.43}
P/S + A/C	5.5—6.5 {0.22—0.25}	6.5—7.5 {0.26—0.29}	8.0 {0.31}

* : A belt that has been on a running engine for less than 5 minutes.

Drive Belt Tension Check

1. Belt tension can be verified in place of belt deflection. Verify the drive belt tension when the engine is cold, or **at least 30 minutes** after the engine has stopped. Using the **SST**, verify the belt tension between any two pulleys.
   - If the tension is not within the specification, adjust it. (See 01-10A-2 DRIVE BELT ADJUSTMENT [FS].)



W6U110WA2

Tension

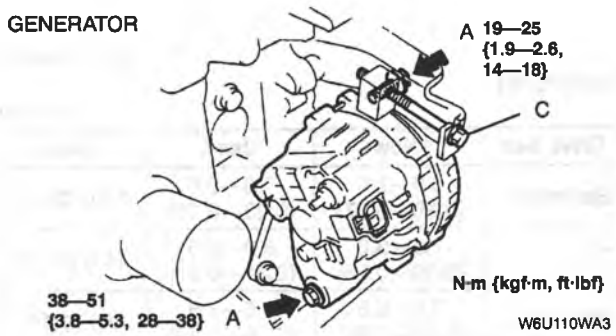
N {kgf, lbf}

Drive belt	*New	Used	Limit
Generator	736—833 {75—85, 165—187}	491—686 {50—70, 110—154}	392 {40, 88}
P/S	589—784 {60—80, 132—176}	491—686 {50—70, 110—154}	392 {40, 88}
P/S + A/C	687—882 {70—90, 154—198}	491—686 {50—70, 110—154}	441 {45, 99}

* : A belt that has been on a running engine for less than 5 minutes.

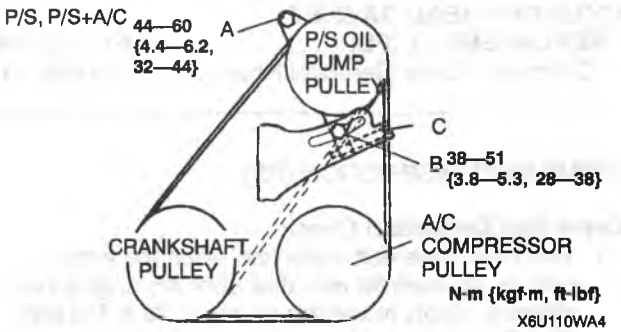
DRIVE BELT ADJUSTMENT [FS]

1. Loosen mounting bolts A and nut B.
2. Adjust the belt deflection or tension by turning the adjusting bolt C. (See 01-10A-1 DRIVE BELT INSPECTION [FS].)
3. Tighten mounting bolts A and nut B.



W6U110WA3

Z6U011015800W02

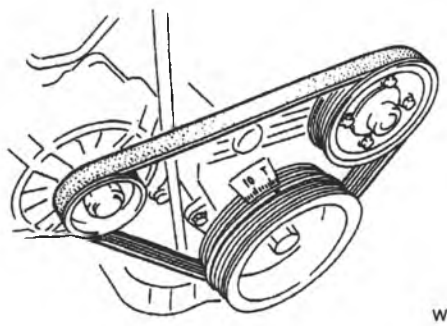


X6U110WA4

4. Verify the belt deflection or tension. (See 01-10A-1 DRIVE BELT INSPECTION [FS].)

VALVE CLEARANCE INSPECTION [FS]

1. Remove the cylinder head cover.
2. Verify that the engine is cold.
3. Measure the valve clearance.
   (1) Turn the crankshaft clockwise so that the No.1 piston is at TDC of the compression stroke.

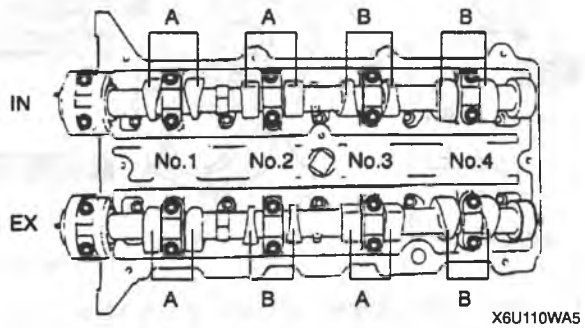


W6U110WC4

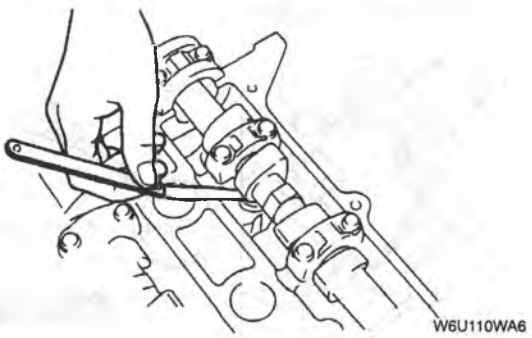
Z6U011012010W01

   (2) Measure the valve clearance at A in the figure.
   - If the valve clearance exceeds the standard, replace the adjustment shim. (See 01-10A-3 VALVE CLEARANCE ADJUSTMENT [FS].)

Standard [Engine cold]
0.225—0.295 mm {0.0089—0.0116 in}



X6U110WA5


W6U110WA6

(3) Turn the crankshaft **360°** clockwise so that the No.4 piston is at TDC of the compression stroke.
(4) Measure the valve clearance at B in the figure.
- If the valve clearance exceeds the standard, replace the adjustment shim. (See 01-10A-3 VALVE CLEARANCE ADJUSTMENT [FS].)

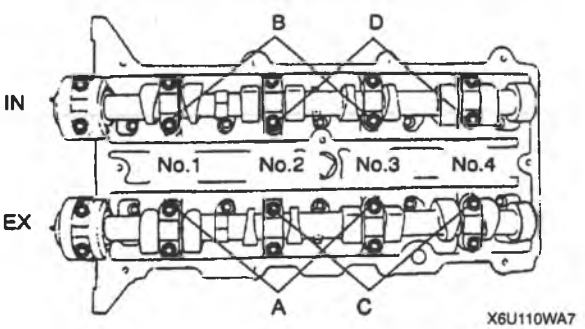
Standard [Engine cold]
0.225—0.295 mm {0.0089—0.0116 in}

4. Install the cylinder head cover. (See 01-10A-8 Cylinder Head Cover Installation Note.)

VALVE CLEARANCE ADJUSTMENT [FS]

Perform this same procedure for all camshafts requiring valve clearance adjustment.

1. Turn the crankshaft clockwise so that the cams on the camshaft requiring valve clearance adjustment are positioned straight up.
2. Remove the camshaft cap bolts where necessary. Remove only one pair of cap bolts at a time. Install the cap bolts before removing the next pair.
   - EX side No.1, 2, 3 cylinder adjustment shim removal: A
   - IN side No.1, 2, 3 cylinder adjustment shim removal: B
   - EX side No.2, 3, 4 cylinder adjustment shim removal: C
   - IN side No.2, 3, 4 cylinder adjustment shim removal: D



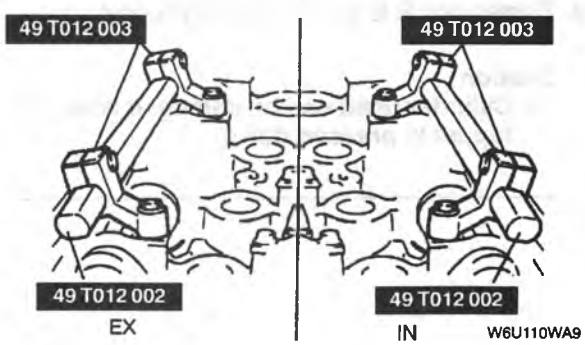
X6U110WA7

Z6U011012010W02

Note
- For EX side No.2, 3 cylinder adjustment shim removal, remove bolts either A or C.
- For IN side No.2, 3 cylinder adjustment shim removal, remove bolts either B or D.

3. Install the **SSTs** on the camshaft using the camshaft cap bolt holes.

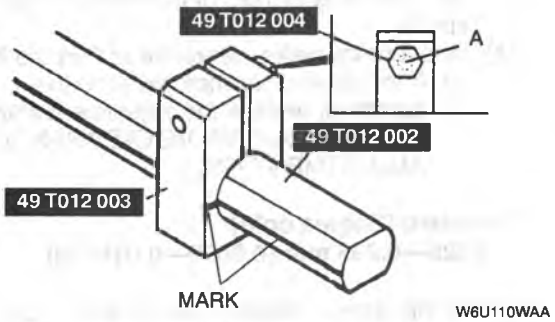
Tightening torque
11.3—14.2 N·m
{115—145 kgf·cm, 100—125 in·lbf}



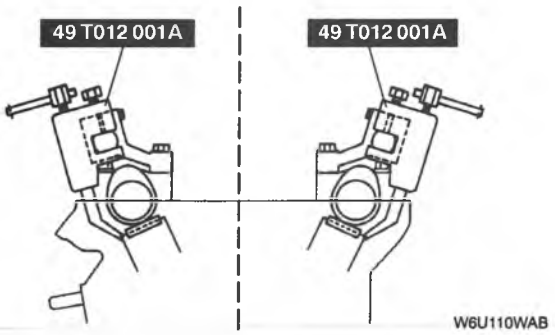
W6U110WA9

4. Align the marks on the **SSTs** (shaft and shaft clamp).

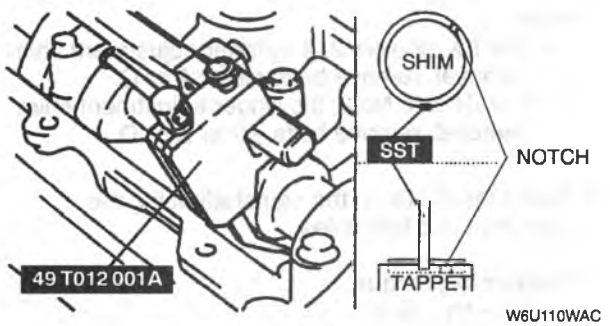
5. Tighten bolts A to secure the **SST** (shaft).



6. Face the **SST** (body) outside of the cylinder head, and mount it on the **SST** (shaft) at the point of the adjustment shim to be replaced.



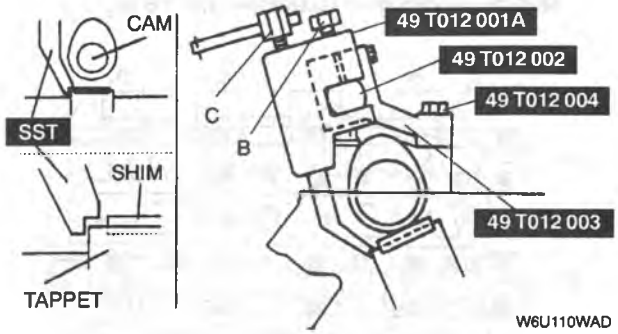
7. Face the notch of the tappet so that a small screwdriver can be inserted.



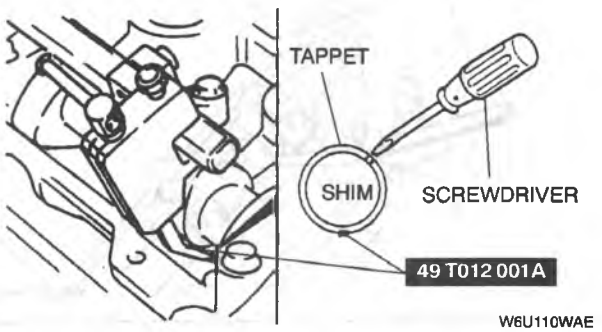
8. Set the **SST** on the tappet by its notch.
9. Tighten bolt B to secure the **SST** (body).

Caution
- **Cylinder head can be damaged when the tappet is pressed down.**

10. Tighten bolt C, and press down the tappet.



11. Using a fine screwdriver, pry up the adjustment shim through the notch on the tappet. Remove the shim using a magnet.



12. Select proper adjustment shim.

New adjustment shim
= Removed shim thickness + Measured valve clearance - Standard valve clearance (0.26 mm {0.010 in})

13. Push the selected shim into the tappet.
14. Loosen bolt C to allow the tappet to move up.
15. Loosen bolt B and remove the **SST** (body).
16. Remove the **SSTs** and tighten the camshaft cap bolts.

Tightening torque
11.3—14.2 N·m
{115—145 kgf·cm, 100—125 in·lbf}

17. Verify the valve clearance. (See 01-10A-2 VALVE CLEARANCE INSPECTION [FS].)

COMPRESSION INSPECTION [FS]

Z6U011001001W01

Warning

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

1. Verify that the battery is fully charged. Charge it again if necessary. (See 01-17-1 BATTERY INSPECTION.)
2. Warm up the engine to the normal operating temperature.
3. Stop the engine and allow it to cool off for about 10 minutes.
4. Perform "Fuel Line Safety Procedures". Leave the fuel pump relay removed. (See 01-14-3 BEFORE REPAIR PROCEDURE.)
5. Remove the spark plugs.
6. Disconnect the ignition coil connector.
7. Connect a compression gauge into the No.1 spark plug hole.
8. Fully depress the accelerator pedal and crank the engine.
9. Record the maximum gauge reading.
10. Inspect each cylinder as indicated above.
    - If the compression in one or more cylinders is low or the compression difference between cylinders exceeds the maximum, pour a small amount of clean engine oil into the cylinder and check the compression again.
      - — If the compression increases, the piston, piston rings, or cylinder wall may be worn and overhaul is required.
      - — If the compression stays low, a valve may be stuck or improperly seated and overhaul is required.
      - — If the compression in adjacent cylinders stays low, the cylinder head gasket may be damaged or the cylinder head is distorted and overhaul is required.

Compression

Item	Specification(kPa {kgf/cm^2, psi})
Standard	1,177 {12.0, 171} [300 rpm]
Minimum	824 {8.4, 119} [300 rpm]
Maximum difference between cylinders	196 {2.0 , 28 }

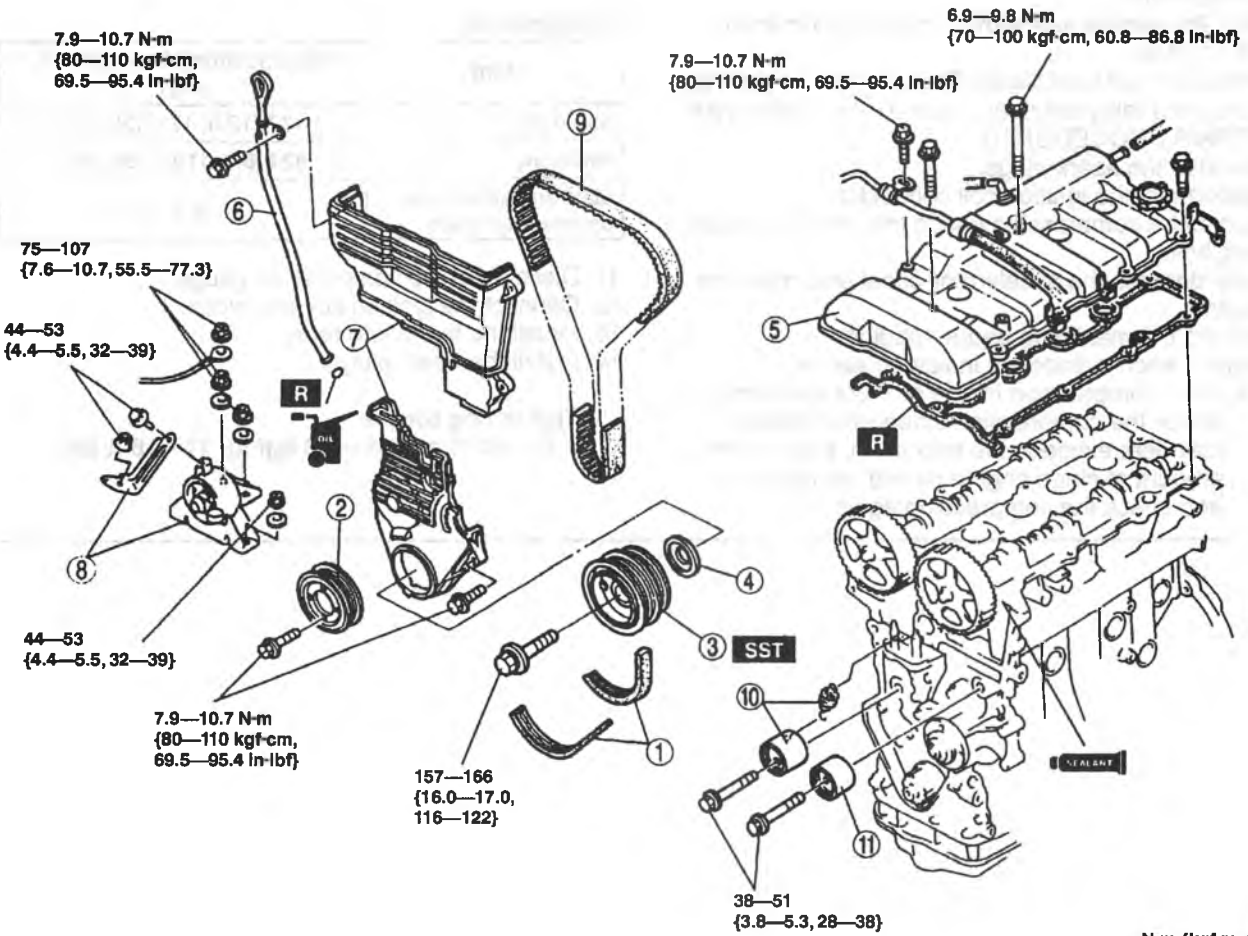
11. Disconnect the compression gauge.
12. Connect the ignition coil connector.
13. Install the fuel pump relay.
14. Install the spark plugs.

Tightening torque
15—22 N·m {1.5—2.3 kgf·m, 11—16 ft·lbf}

TIMING BELT REMOVAL/INSTALLATION [FS]

Z6U011012040W01

1. Disconnect the negative battery cable.
2. Remove the camshaft position sensor and crankshaft position sensor.
3. Remove the spark plugs.
4. Remove the P/S oil pump and bracket with the oil hose still connected.
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.
7. Verify the air gap. (See 01-40A-31 CRANKSHAFT POSITION SENSOR INSPECTION [FS].)
8. Start the engine and
   (1) Inspect the pulleys and drive belt for runout and contact.
   (2) Verify the ignition timing. (See 01-10A-17 Ignition Timing Inspection.)

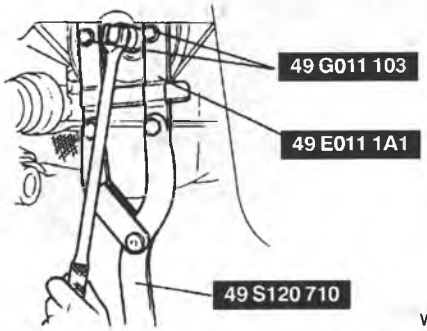


1	Drive belt (See 01-10A-2 DRIVE BELT ADJUSTMENT [FS])
2	Water pump pulley
3	Crankshaft pulley (See01-10A-7 Crankshaft Pulley Removal Note) (See 01-10A-9 Crankshaft Pulley Installation Note)
4	Guide plate
5	Cylinder head cover (See 01-10A-7 Cylinder Head Cover Removal Note) (See 01-10A-8 Cylinder Head Cover Installation Note)

6	Dipstick and pipe
7	Timing belt cover
8	No.3 engine mount rubber (See 01-10A-7 No.3 Engine Mount Rubber Removal Note)
9	Timing belt (See 01-10A-7 Timing Belt Removal Note) (See 01-10A-8 Timing Belt Installation Note)
10	Tensioner, tensioner spring (See 01-10A-7 Tensioner, Tensioner Spring Installation Note)
11	Idler

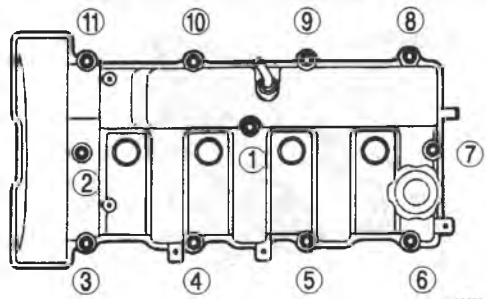
Crankshaft Pulley Removal Note
- Hold the crankshaft using the **SST**.

Caution
- **The crankshaft position sensor rotor is on the rear of the crankshaft pulley, and can be damaged easily.**



W6U110WAG

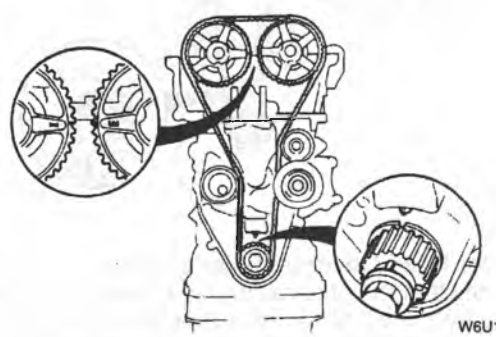
Cylinder Head Cover Removal Note
- Loosen the cylinder head cover bolts in two or three steps in the order shown.



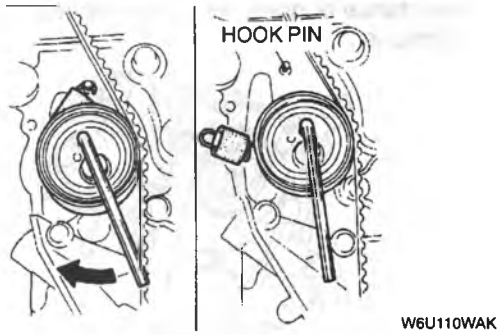
W6U110WAH

No.3 Engine Mount Rubber Removal Note
1. Suspend the engine using the chain block.
2. Remove the No.3 engine mount rubber.

Timing Belt Removal Note
1. Install the pulley lock bolt.
2. Turn the crankshaft clockwise and align the timing marks.


W6U110WAJ

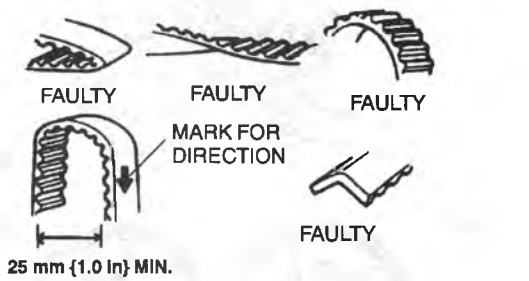
3. Turn the tensioner clockwise using an Allen wrench.
4. Disconnect the tensioner spring from the hook pin.



W6U110WAK

Caution
- **Forcefully twisting the belt, turning it inside out, or allowing oil or grease on it will damage the belt and shorten its life.**

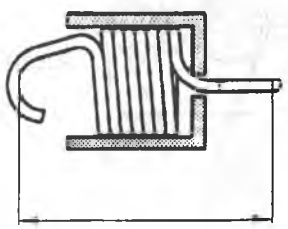
Note
- Mark the timing belt rotation on the belt for proper reinstallation.



W6U110WAL

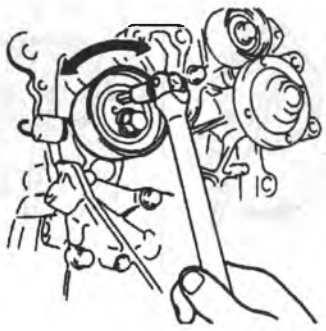
Tensioner, Tensioner Spring Installation Note
1. Measure the tensioner spring free length. If not within the specification, replace the tensioner spring.

Free length
36.6 mm {1.44 in}


W6U110WAM

2. Install the tensioner.

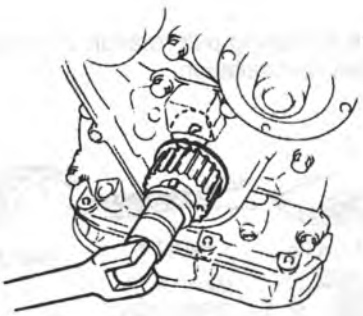
3. Rotate the tensioner. If tensioner rotates with no resistance or does not rotate, replace the tensioner.



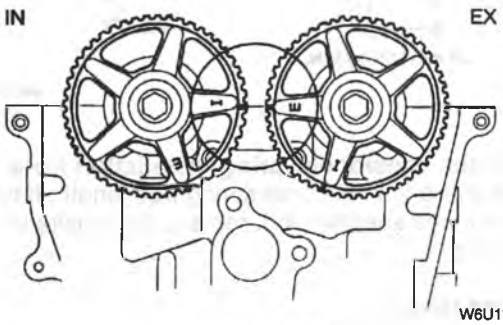
W6U110WAN

Timing Belt Installation Note

1. Verify that the timing belt pulley mark and camshaft pulley marks are aligned with the timing marks as shown.

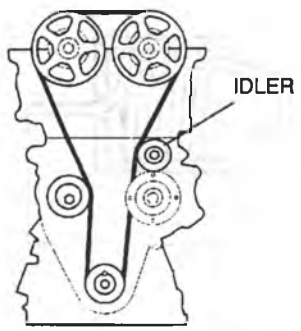


W6U110WAP



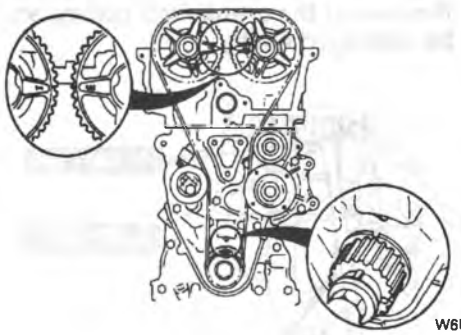
W6U110WAQ

2. Install the timing belt so that there is no looseness at the idler side.



W6U110WAR

3. Turn the crankshaft clockwise twice, and align the timing marks.
4. Verify that all timing marks are correctly aligned. If not aligned, remove the timing belt and repeat from Step 1.

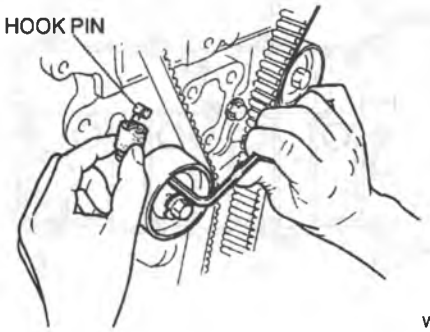


W6U110WAS

Caution

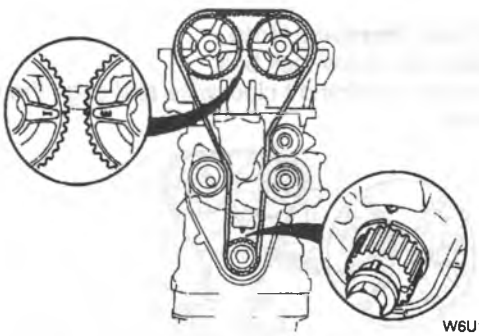
- **Be sure not to apply tension other than that of the tensioner spring.**

5. Turn the tensioner clockwise using an Allen wrench.
6. Connect the tensioner to the hook pin.



W6U110WAT

7. Turn the crankshaft clockwise twice, and verify that all timing marks are aligned. If not aligned, repeat from Step 1.

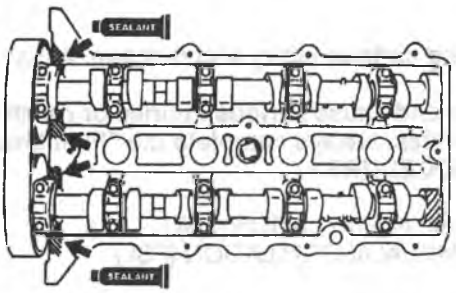


W6U110WAU

Cylinder Head Cover Installation Note

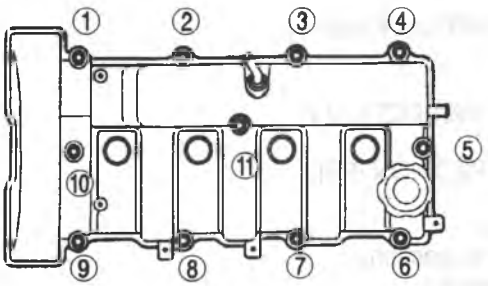
1. Verify that the grooves on the cylinder head cover are free of oil, water and other foreign material.
2. Install the cylinder head cover gasket into the cylinder head cover.

3. Apply silicone sealant to the cylinder head as shown.



W6U110WAV

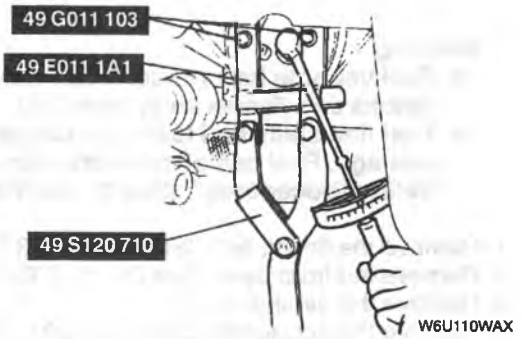
4. Tighten the cylinder head cover bolts in two or three steps in the order shown.



W6U110WAW

Crankshaft Pulley Installation Note

- Hold the crankshaft using the **SSTs**.



W6U110WAX

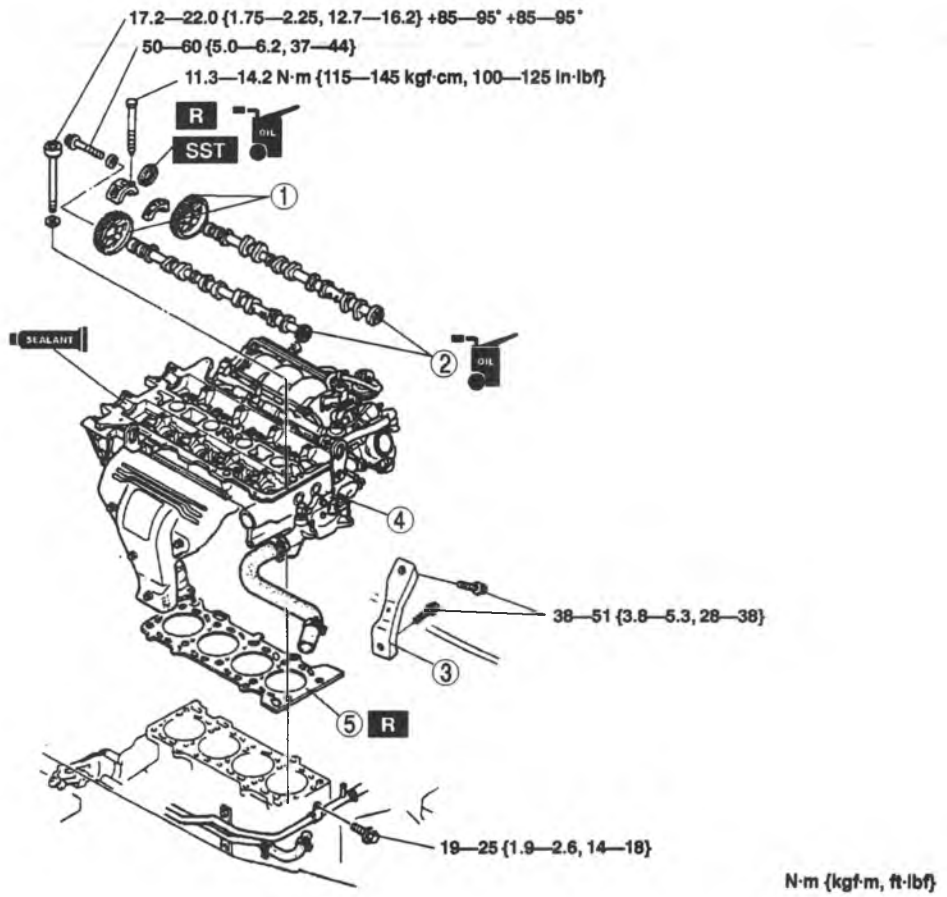
CYLINDER HEAD GASKET REPLACEMENT [FS]

Z6U011010271W01

Warning

- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and 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 the "Fuel Line Safety Procedures". (See 01-14-3 BEFORE REPAIR PROCEDURE.)**

1. Remove the timing belt. (See 01-10A-6 TIMING BELT REMOVAL/INSTALLATION [FS].)
2. Remove the front pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [FS].)
3. Remove the air cleaner.
4. Remove the accelerator cable. (See 01-13A-14 ACCELERATOR CABLE ADJUSTMENT [FS].) (See 01-13A-14 ACCELERATOR CABLE INSPECTION [FS].)
5. Disconnect the fuel hose. (See 01-14-3 BEFORE REPAIR PROCEDURE.) (See 01-14-4 AFTER REPAIR PROCEDURE.)
6. Remove the ignition coil.
7. Drain the engine coolant. (See 01-12-2 ENGINE COOLANT REPLACEMENT.)
8. Remove in the order indicated in the table.
9. Install in the reverse order of removal.
10. Verify the engine oil level. (See 01-11-1 ENGINE OIL LEVEL INSPECTION.)
11. Inspect for the engine oil, engine coolant, and fuel leakage.
12. Verify the compression. (See 01-10A-5 COMPRESSION INSPECTION [FS].)
13. Start the engine and
    (1) Inspect the pulleys and the drive belt for runout and contact.
    (2) Verify the ignition timing. (See 01-10A-17 Ignition Timing Inspection.)
    (3) Verify the idle speed. (See 01-10A-18 Idle Speed Adjustment.)

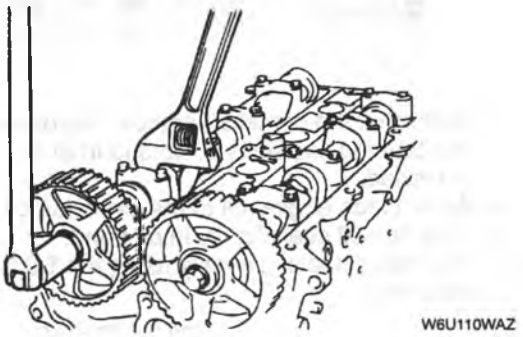


W6U110WAY

1	Camshaft pulley (See 01-10A-11 Camshaft Pulley Removal Note) (See 01-10A-12 Camshaft Pulley Installation Note)
2	Camshaft (See 01-10A-11 Camshaft Removal Note) (See 01-10A-12 Camshaft Installation Note)
3	Intake manifold bracket
4	Cylinder head (See01-10A-11 Cylinder Head Removal Note) (See 01-10A-11 Cylinder Head Installation Note)
5	Cylinder head gasket

Camshaft Pulley Removal Note

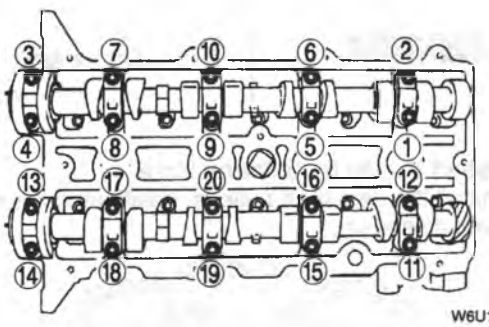
- Hold the camshaft using a wrench on the cast hexagon as shown, and loosen the camshaft pulley lock bolt.



W6U110WAZ

Camshaft Removal Note

1. Loosen the camshaft cap bolts in two or three steps in the order shown.
2. Arrange the removed camshaft caps to ensure correct placement during installation.

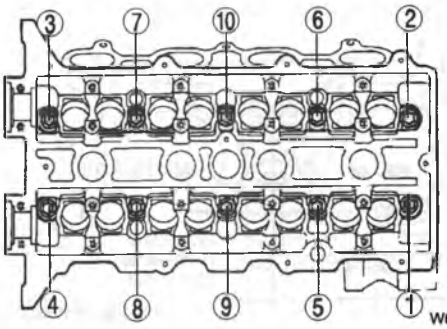


W6U110WB0

Cylinder Head Removal Note

1. Temporarily install the No.3 engine mount rubber to support the engine.

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

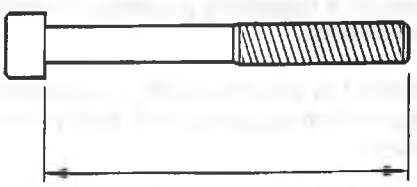


W6U110WB1

Cylinder Head Installation Note

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

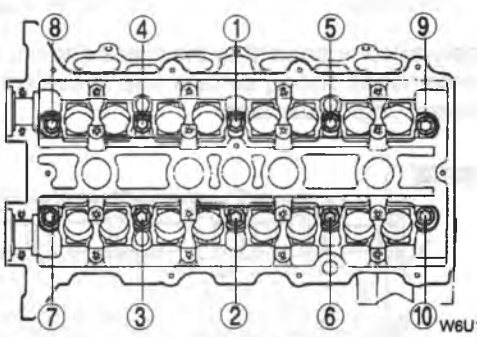
Standard length
104.2—104.8 mm {4.103—4.125 in}
Maximum length
105.5 mm {4.154 in}



W6U110WB2

2. Tighten the cylinder head bolts in two or three steps in the order shown.

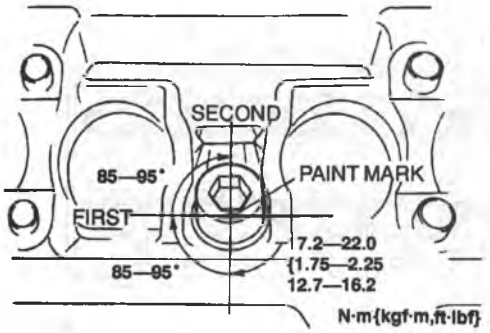
Tightening torque
17.2—22.0 N·m
{1.75—2.25 kgf·m, 12.7—16.2 ft·lbf}



W6U110WB3

3. Put a paint mark on each bolt head.
4. Using the marks as a reference, tighten the bolts by turning each **85—95°** in the sequence shown.

5. Further tighten each bolt by turning another **85—95°** in the sequence as shown.



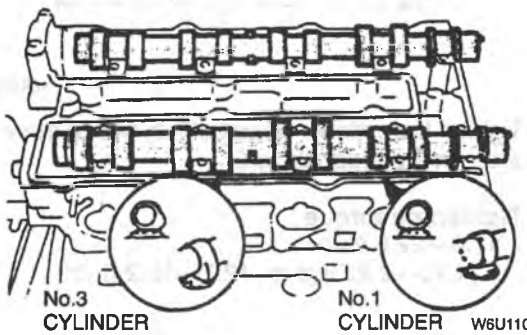
W6U110WB4

6. Support the engine using the chain block.
7. Remove the No.3 engine mount rubber.

Camshaft Installation Note

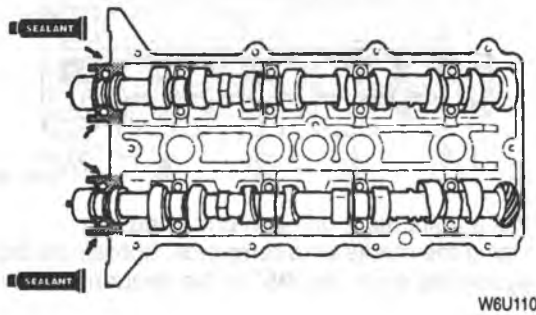
Caution
- **Because there is little camshaft thrust clearance, the camshaft must be held horizontally while it is installed. Otherwise, excessive force will be applied to the thrust area, causing burr on the thrust receiving area of the cylinder head journal. To avoid this, the following procedure must be observed.**

1. Assemble the camshaft onto the cylinder head, facing the cam noses at No.1 and No.3 cylinders as shown.



W6U110WB5

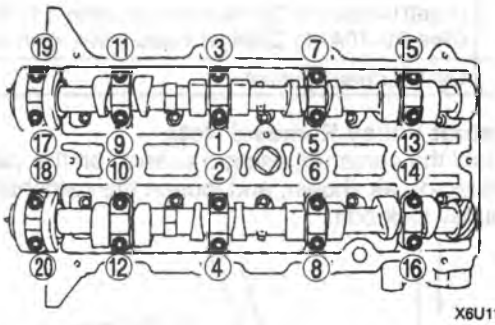
2. Apply silicone sealant to the areas shown. Keep the camshaft sliding surface free of sealant to prevent engine damage.



W6U110WB6

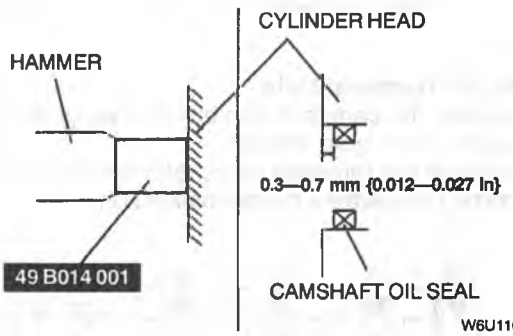
3. Apply engine oil to the camshaft and the cylinder head journals.
4. Install the camshaft caps in the same position and direction from which they were removed.
5. Hand tighten the camshaft cap bolts marked 5, 7, 2, and 4.
6. Tighten the camshaft cap bolts in two or three steps in the order shown.

Tightening torque
11.3—14.2 N·m
{115—145 kgf·cm, 100—125 in·lbf}



X6U110WB7

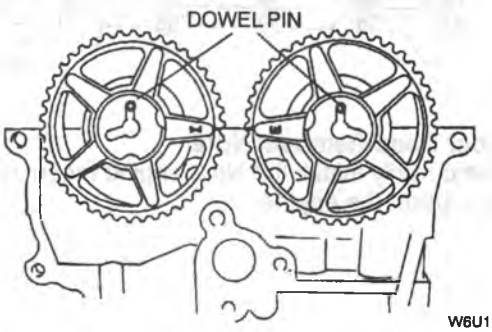
7. Verify that the camshaft settles horizontally when two bearing cap bolts at No.3 journal are tightened.
8. Apply clean engine oil to the camshaft oil seal.
9. Push the oil seal slightly in by hand.
10. Tap the oil seals in evenly using the **SST** and a hammer.



W6U110WB8

Camshaft Pulley Installation Note

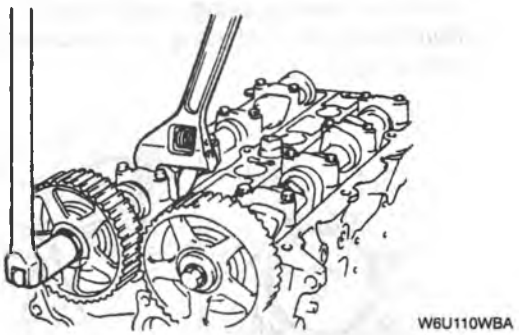
1. Install the camshaft pulleys, positioning the dowel pins as shown.



W6U110WB9

2. Hand tighten the camshaft pulley bolts.
3. Hold the camshaft using a wrench on the cast hexagon as shown, and tighten each bolt.

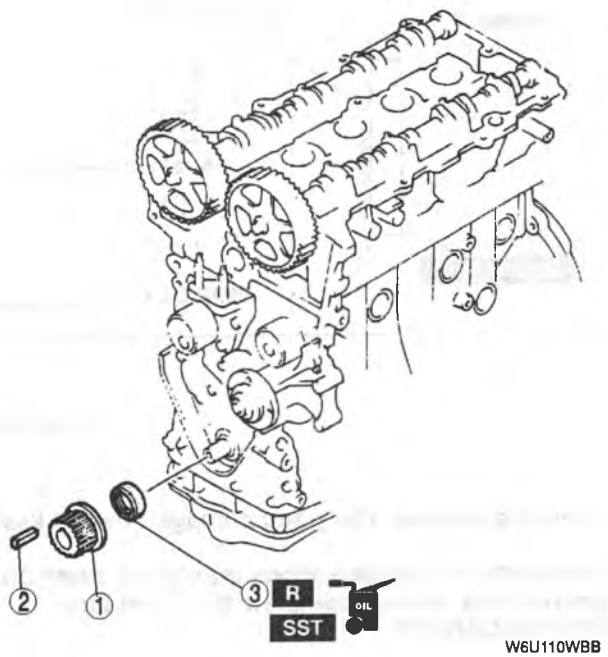
Tightening torque
50—60 N·m {5.0—6.2 kgf·m, 37—44 ft·lbf}


W6U110WBA

FRONT OIL SEAL REPLACEMENT [FS]

Z6U011010602W01

1. Remove the timing belt. (See 01-10A-6 TIMING BELT REMOVAL/INSTALLATION [FS].)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

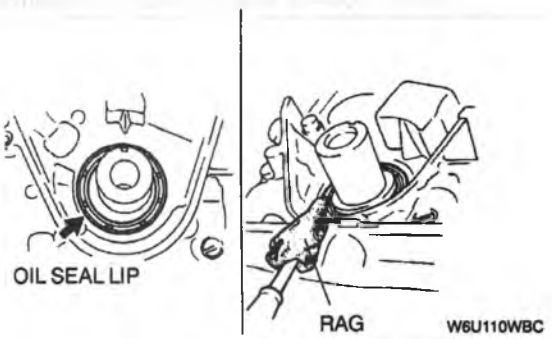


W6U110WBB

1	Timing belt pulley
2	Key
3	Front oil seal (See 01-10A-13 Front Oil Seal Removal Note) (See 01-10A-13 Front Oil Seal Installation Note)

Front Oil Seal Removal Note

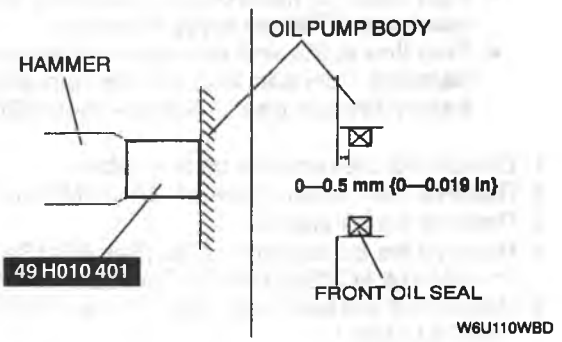
1. Cut the oil seal lip using a razor knife.
2. Remove the oil seal using a screwdriver protected with a rag.



W6U110WBC

Front Oil Seal Installation Note

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

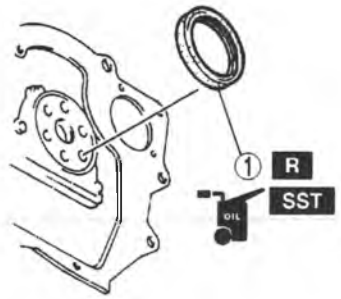


W6U110WBD

REAR OIL SEAL REPLACEMENT [FS]

Z6U011011399W01

1. Remove the flywheel. (MTX) (See 05-10-7 CLUTCH UNIT REMOVAL/INSTALLATION.)
2. Remove the drive plate. (ATX) (See 05-17A-50 DRIVE PLATE REMOVAL/INSTALLATION [LA4A-EL].)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

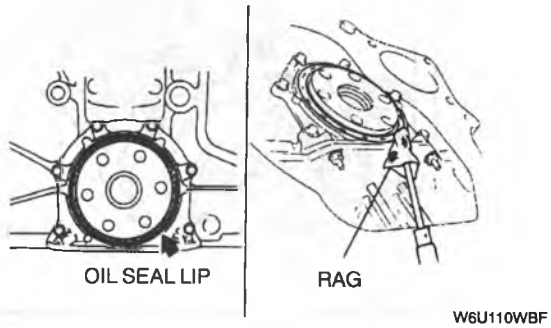


W6U110WBE

1	Rear oil seal (See 01-10A-14 Rear Oil Seal Removal Note) (See 01-10A-14 Rear Oil Seal Installation Note)

Rear Oil Seal Removal Note

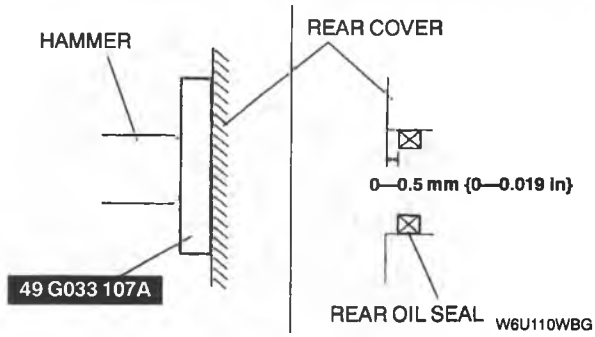
1. Cut the oil seal lip using a razor knife.
2. Remove the oil seal using a screwdriver protected with a rag.



W6U110WBF

Rear Oil Seal Installation Note

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



W6U110WBG

ENGINE REMOVAL/INSTALLATION [FS]

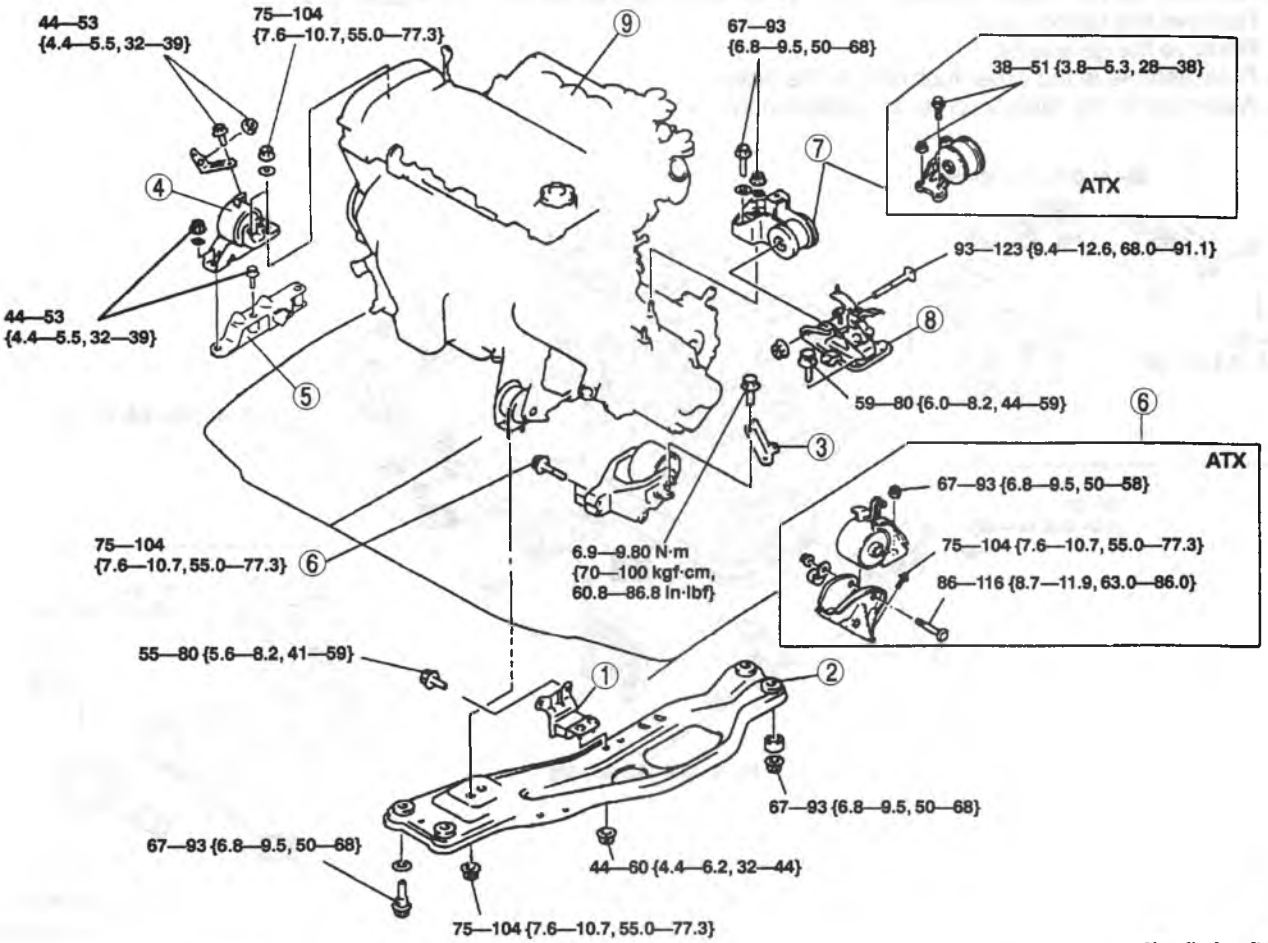
Z6U011002000W01

Warning

- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures". (See 01-14-3 BEFORE REPAIR PROCEDURE.)**

1. Disconnect the negative battery cable.
2. Remove the radiator. (See 01-12-4 RADIATOR REMOVAL/INSTALLATION.)
3. Remove the air cleaner.
4. Remove the accelerator cable. (See 01-13A-14 ACCELERATOR CABLE ADJUSTMENT [FS].) (See 01-13A-14 ACCELERATOR CABLE INSPECTION [FS].)
5. Disconnect the fuel hose. (See 01-14-3 BEFORE REPAIR PROCEDURE.) (See 01-14-4 AFTER REPAIR PROCEDURE.)
6. Remove the front pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [FS].)
7. Remove the rods, cables and pipes related to the transaxle.
8. Remove the battery.
9. Remove the fuse box.
10. Remove the P/S oil pump with the oil hose still connected. Position the P/S oil pump so that it is out of the way.
11. Remove the A/C compressor with the pipe still connected. Position the A/C compressor so that it is out of the way.
12. Remove the cruise actuator. (See 01-20-4 CRUISE ACTUATOR REMOVAL/INSTALLATION.)
13. Remove the drive shaft. (See 03-13-7 DRIVE SHAFT REMOVAL/INSTALLATION.)

14. Remove in the order indicated in the table.
15. Install in the reverse order of removal.
16. Start the engine and
    (1) Inspect for the engine oil, engine coolant, transaxle oil and fuel leakage.
    (2) Verify the ignition timing, idle speed, and idle mixture. (See 01-10A-17 Ignition Timing Inspection.) (See 01-10A-18 Idle Speed Adjustment.) (See 01-10A-18 Idle Mixture Inspection.)
17. Perform a road test.

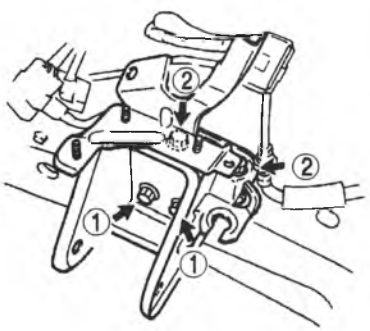


1	No.5 engine mount rubber
2	Engine mount member
3	No.1 engine mount stay bracket
4	No.3 engine mount rubber
5	No.3 engine bracket

6	No.1 engine mount bolt and nut
7	No.4 engine mount rubber
8	No.4 engine mount bracket (See 01-10A-15 No.4 Engine Mount Bracket Installation Note)
9	Engine, transaxle

No.4 Engine Mount Bracket Installation Note

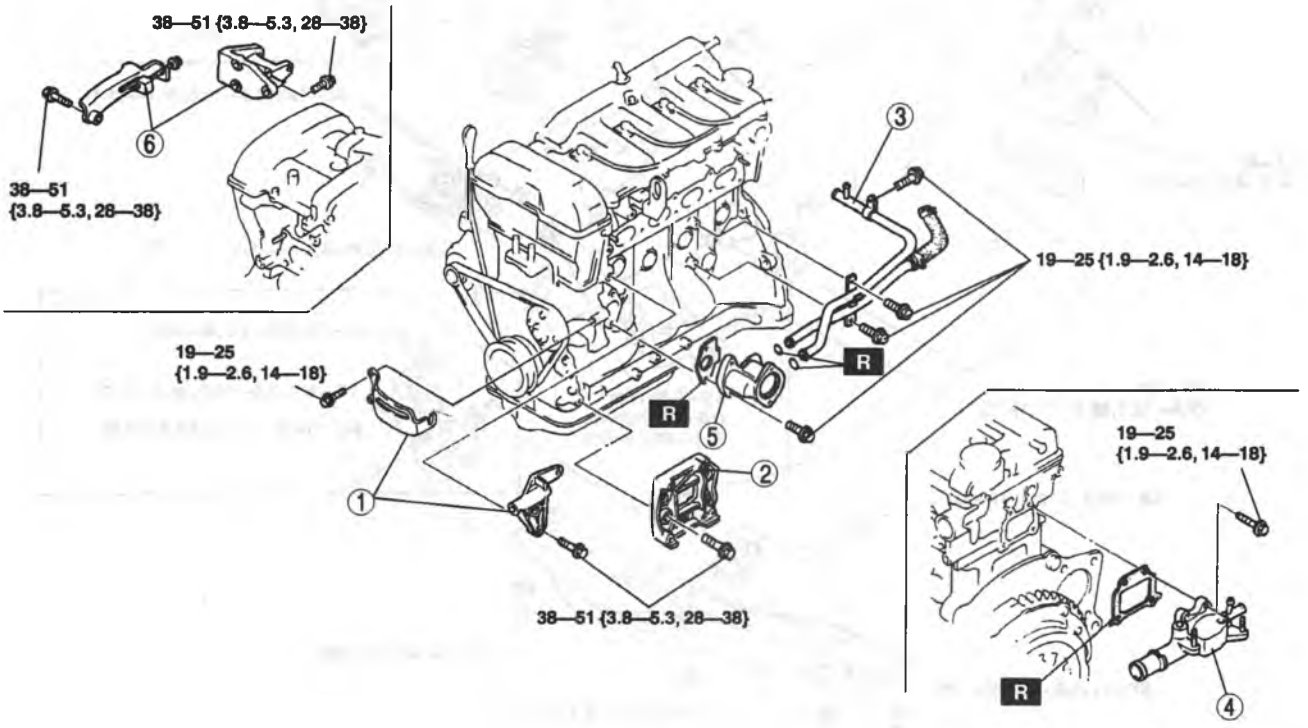
- Tighten the bolts in the order shown.



ENGINE DISASSEMBLY/ASSEMBLY [FS]

Z6U011002000W02

1. Disconnect the engine and transaxle. (See 05-15-4 MANUAL TRANSAXLE REMOVAL/INSTALLATION.) (See 05-17A-34 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [LA4A-EL].)
2. Remove the intake-air system.
3. Remove the exhaust system.
4. Remove the oil filter. (See 01-11-2 OIL FILTER REPLACEMENT.)
5. Remove the thermostat. (See 01-12-4 THERMOSTAT REMOVAL/INSTALLATION.)
6. Remove the ignition coil.
7. Remove the generator.
8. Disassemble in the order indicated in the table.
9. Assemble in the reverse order of disassembly.



1	P/S oil pump bracket
2	A/C compressor bracket
3	Water bypass pipe

4	Water outlet
5	Thermostat housing
6	Generator bracket

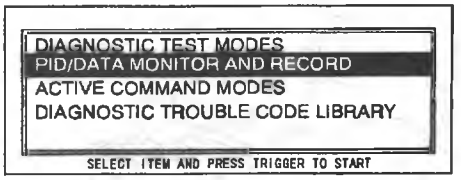
ENGINE TUNE-UP [FS]

Z6U011002000W03

Engine Tune-up Preparation

1. Warm up the engine to the normal operating temperature.
2. Shift transaxle into Neutral (MTX) or P position (ATX).
3. Turn off all electrical loads.
   - Headlight
   - Blower motor
   - Rear window defroster
   - Power steering
4. Verify that the battery is fully charged. (See 01-17-1 BATTERY INSPECTION.)

5. Connect the **SSTs** (NGS tester) to the data link connector and select the "PID/DATA MONITOR AND RECORD" function and press TRIGGER.



W6U110WDX

6. Select "RPM" and press TRIGGER.
7. Wait until the electrical fan stops.
8. Select "START" to begin.

Ignition Timing Inspection

1. Perform "Engine Tune-up Preparation".
2. Verify that the idle speed is within the specification.
   - If not as specified, adjust the idle speed. (See 01-10A-18 Idle Speed Adjustment.)

Specification
MTX: 550—850 (700 ± 150) rpm
ATX: 500—800 (650 ± 150) rpm

3. Connect a timing light to the high-tension lead of the No.1 cylinder.
4. Verify that the timing mark (yellow) is within the specification.
   - If not as specified, inspect the following.
     a. Camshaft position sensor
     b. Crankshaft position sensor
     c. Throttle position sensor
     d. Engine coolant temperature sensor
     e. Neutral switch (MTX)
     f. Clutch switch (MTX)
     g. Transaxle range switch (ATX)
   - If the devices are normal, replace the PCM.

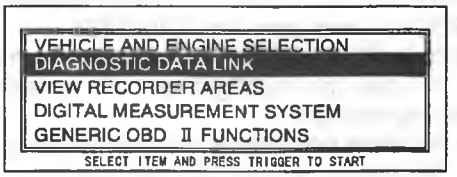


W6U110WDY

Specification
MTX: BTDC 6—18° (12 ± 6°)/550—850 rpm
ATX: BTDC 6—18° (12 ± 6°)/500—800 rpm

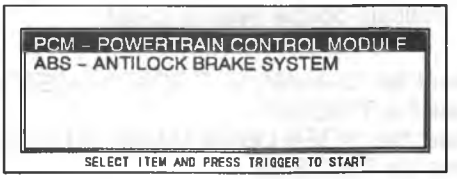
Idle Speed Inspection

1. Warm up the engine to normal operating temperature.
2. Shift the transaxle into Neutral (MTX) or P position (ATX).
3. Turn off all loads.
   - Blower motor
   - Power steering
   - Electrical loads (e.g, headlight, rear window defroster)
4. Verify that the battery is fully charged. (See 01-17-1 BATTERY INSPECTION.)
5. Connect the **SSTs** (NGS tester) to data link connector.
6. Select the "DIAGNOSTIC DATA LINK" and press the TRIGGER.



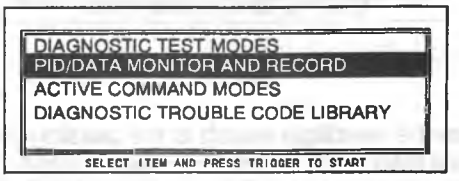
W6U110WZ0

7. Select the "PCM-POWERTRAIN CONTROL MODULE" and press the TRIGGER.



W6U110WZ1

8. Select "PID/DATA MONITOR AND RECORD" and press the TRIGGER.



W6U110WZ2

9. Select the "RPM" and press the TRIGGER.
10. Wait until the electrical fans stop.
11. Verify that the idle speed is within specifications.
    - If not within specifications, adjust the idle speed as follows.

Specifications
MTX: 550—850 (700 ± 150) rpm
ATX: 500—800 (650 ± 150) rpm

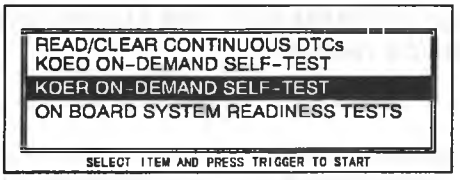
Caution
- **The air adjusting screw (AAS) must not be adjusted when the headlight HIGH system is malfunctioning. Any improper adjustment may affect engine performance.**

Note
- In order to activate the "KOER ON-DEMAND SELF-TEST" after completion of the following procedure, turn off the ignition switch at once, then operate the "KOER ON-DEMAND SELF-TEST".

Idle Speed Adjustment
1. Select "HDLMP" in the "PID/DATA MONITOR AND RECORD" and press the TRIGGER.
2. Verify that the "HDLMP" status changes from OFF to ON when the headlight switch is turned to the passing position.
   - If it does not change, inspect following harnesses, connectors and terminals of the headlight signal circuit.
     a. From battery to combination switch
     b. From combination switch to PCM
3. Connect the inductive pick-up type tachometer to the high-tension lead.

Note
- The inductive pick-up type tachometer may indicate double engine speed.

4. Select the "DIAGNOSTIC TEST MODES" and press the TRIGGER.
5. Select the "KOER ON-DEMAND SELF-TEST" and press the TRIGGER.

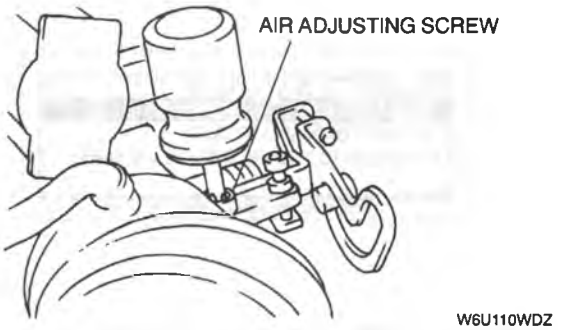


W6U110WZ3

6. Turn the headlight switch to the passing position more than three times while each "passing" for 2 seconds after the "FOR EXAMPLE BOO, PSP AND TCS" is displayed.
7. Make sure the engine speed is fixed.

Caution
- **The throttle adjusting screw is set at the factory and must not be adjusted. Any adjustment may affect engine performance.**

8. Adjust the idle speed to the following specifications by turning the air adjusting screw within 2 minutes after the headlight switch is turned to passing position more than three times.



W6U110WDZ

Specifications
MTX: 550—850 (700 ± 150) rpm
ATX: 500—800 (650 ± 150) rpm

Idle-up Speed Inspection
1. Perform "Engine Tune-up Preparation".
2. Verify that the idle speed is normal.
3. Verify that the idle-up speed is within the specification.
   - If not as specified with all load conditions, inspect the idle air control valve.
   - If not as specified with some load conditions, inspect related input switches, harnesses and connectors.

Load condition	Idle-up speed (rpm)*1		
	MTX	ATX	
		N, P position	D range
E/L ON*2	625—925	500—800	500—800
A/C ON*3	625—925	500—800	500—800
P/S ON*4	550—850	550—850	550—850

*1 : Excludes temporary idle speed drop just after the electrical loads (E/L) are turned on.
*2 : Headlight is on, Fan switch (3rd or higher) and Cooling fan are operating.
*3 : A/C switch and fan switch are on.
*4 : Steering wheel is fully turned.

Idle Mixture Inspection
1. Perform "Engine Tune-up Preparation".
2. Verify that the idle speed and ignition timing are within the specification.
3. Insert an exhaust gas analyzer to the tailpipe.
4. Verify that the CO and HC concentrations are within the regulation.
   - If not, inspect the following.
     a. On-board diagnostic system
     b. Heated oxygen sensor (Front, Rear)
     c. Intake manifold vacuum
     d. Fuel line pressure
     e. Ignition timing control
   - If the systems are normal, replace the three way catalytic converter.

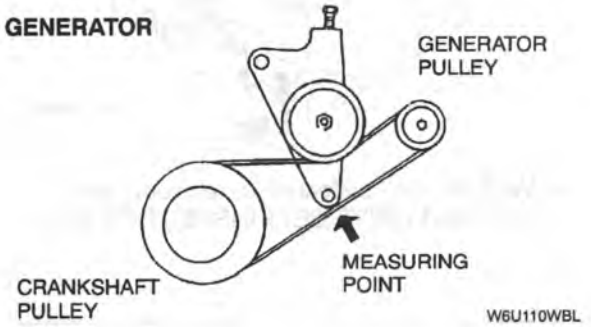
01-10B MECHANICAL [KL]

DRIVE BELT INSPECTION [KL] 01-10B-1
Drive Belt Deflection Check 01-10B-1
Drive Belt Tension Check 01-10B-2
DRIVE BELT ADJUSTMENT [KL] 01-10B-2
VALVE CLEARANCE INSPECTION [KL] 01-10B-3
VALVE CLEARANCE ADJUSTMENT [KL] 01-10B-4
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Front Oil Seal Installation Note 01-10B-15
REAR OIL SEAL REPLACEMENT [KL] 01-10B-15
Rear Oil Seal Removal Note 01-10B-16
Rear Oil Seal Installation Note 01-10B-16
ENGINE REMOVAL/ INSTALLATION [KL] 01-10B-16
No.4 Engine Mount Bracket Installation Note 01-10B-17
ENGINE DISASSEMBLY/ ASSEMBLY [KL] 01-10B-18
ENGINE TUNE-UP [KL] 01-10B-19
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Idle Speed Inspection 01-10B-19
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Idle-up Speed Inspection 01-10B-21
Idle Mixture Inspection 01-10B-21

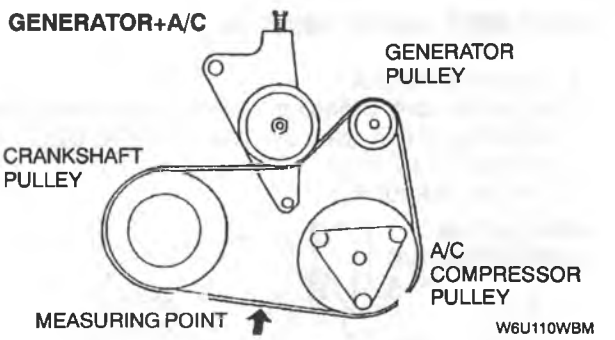
DRIVE BELT INSPECTION [KL]

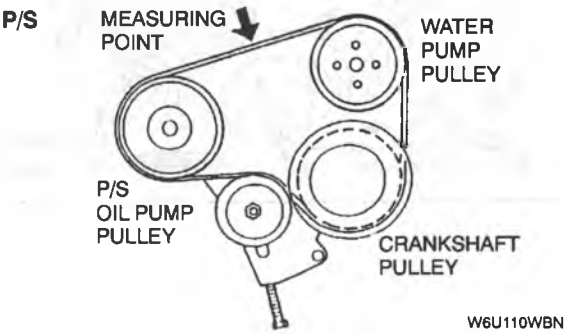
Drive Belt Deflection Check

1. Verify the drive belt deflection when the engine is cold, or **at least 30 minutes** after the engine has stopped. Apply moderate pressure **98 N {10 kgf, 22 lbf}** midway between the specified pulleys.
   - If the deflection is not within the specification, adjust it. (See 01-10B-2 DRIVE BELT ADJUSTMENT [KL].)



Z6U011015800W03





Deflection

mm {in}

Drive belt	*New	Used	Limit
Generator	6.0—7.0 {0.24—0.27}	7.0—8.0 {0.28—0.31}	10.0 {0.39}
Generator + A/C	5.5—6.5 {0.22—0.25}	6.5—7.5 {0.26—0.29}	9.0 {0.35}
P/S	6.0—7.0 {0.24—0.27}	7.0—8.0 {0.28—0.31}	9.0 {0.35}

* : A belt that has been on a running engine for less than 5 minutes.

Tension

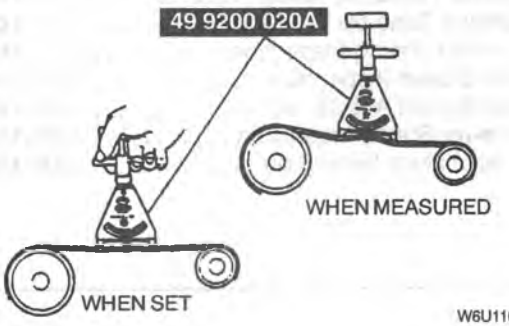
N {kgf, lbf}

Drive belt	*New	Used	Limit
Generator	687—882 {70—90, 154—198}	491—686 {50—70, 110—154}	294 {30, 66}
Generator + A/C	687—882 {70—90, 154—198}	491—686 {50—70, 110—154}	294 {30, 66}
P/S	540—686 {55—70, 121—154}	393—539 {40—55, 88—121}	343 {35, 77}

* : A belt that has been on a running engine for less than 5 minutes.

Drive Belt Tension Check

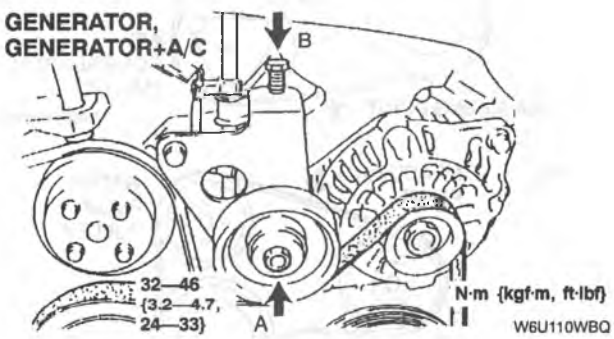
1. Belt tension can be verified in place of belt deflection. Verify the drive belt tension when the engine is cold, or **at least 30 minutes** after the engine has stopped. Using the **SST**, verify the belt tension between any two pulleys.
   - If the tension is not within the specification, adjust it. (See 01-10B-2 DRIVE BELT ADJUSTMENT [KL].)



W6U110WBP

DRIVE BELT ADJUSTMENT [KL]

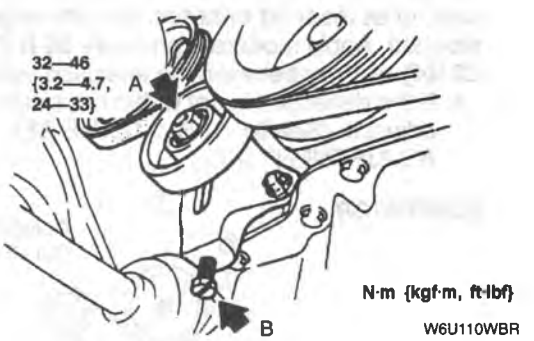
1. Loosen locknut A.
2. Adjust the belt deflection or tension by turning the adjusting bolt B. (See 01-10B-1 DRIVE BELT INSPECTION [KL].)
3. Tighten locknut A.



W6U110WBQ

Z6U011015800W04

P/S

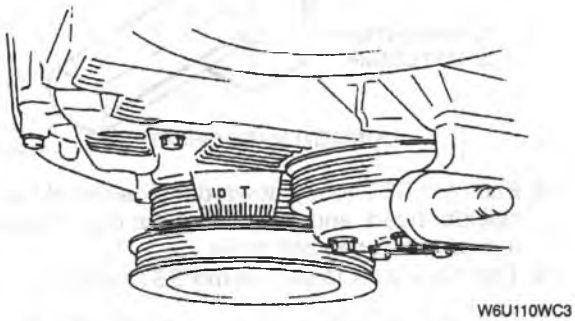


W6U110WBR

4. Verify the belt deflection or tension. (See 01-10B-1 DRIVE BELT INSPECTION [KL].)

VALVE CLEARANCE INSPECTION [KL]

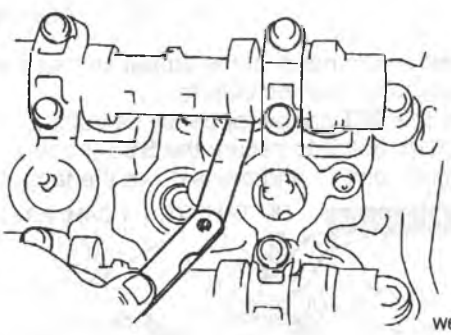
1. Remove the intake manifold. (See 01-13B-4 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [KL].)
2. Remove the cylinder head cover.
3. Verify that the engine is cold.
4. Measure the valve clearance.
   (1) Turn the crankshaft clockwise so that the No.1 piston is at TDC of the compression stroke.

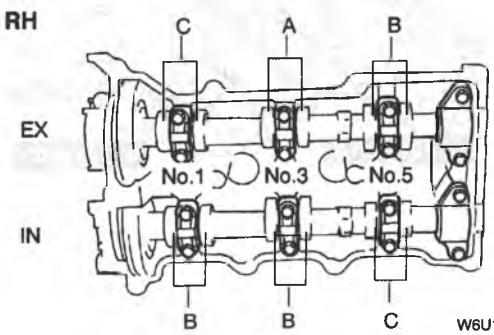


W6U110WC3

   (2) Measure the valve clearances at A in the figure.
   - If the valve clearance exceeds the standard, replace the adjustment shim.

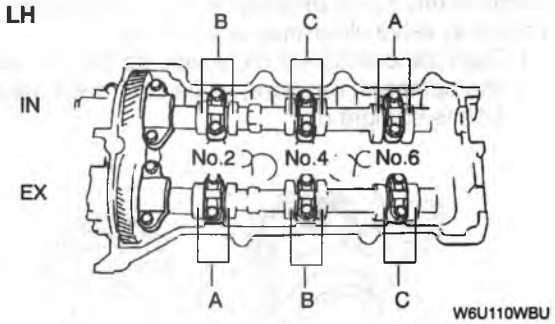
Standard [Engine cold]
IN: 0.245—0.315 mm {0.0097—0.0124 in}
EX: 0.265—0.335 mm {0.0105—0.0131 in}


W6U110WBS



W6U110WBT

Z6U011012010W03



W6U110WBU

   (3) Turn the crankshaft **approx. 240°** clockwise so that the No.3 piston is at TDC of the compression stroke.
   (4) Measure the valve clearances at B in the figure.
   - If the valve clearance exceeds the standard, replace the adjustment shim.

Standard [Engine cold]
IN: 0.245—0.315 mm {0.0097—0.0124 in}
EX: 0.265—0.335 mm {0.0105—0.0131 in}

   (5) Turn the crankshaft **approx. 240°** clockwise so that the No.5 piston is at TDC of the compression stroke.
   (6) Measure the valve clearances at C in the figure.
   - If the valve clearance exceeds the standard, replace the adjustment shim. (See 01-10B-4 VALVE CLEARANCE ADJUSTMENT [KL].)

Standard [Engine cold]
IN: 0.245—0.315 mm {0.0097—0.0124 in}
EX: 0.265—0.335 mm {0.0105—0.0131 in}

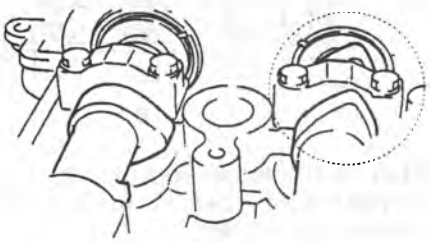
5. Install the cylinder head cover. (See 01-10B-14 Cylinder Head Cover Installation Note.)
6. Install the intake manifold.

VALVE CLEARANCE ADJUSTMENT [KL]

Z6U011012010W04

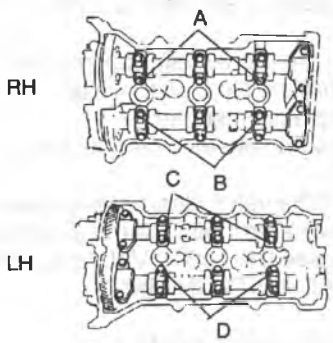
Perform this same procedure for all camshafts requiring valve clearance adjustment.

1. Turn the crankshaft clockwise so that the cams on the camshaft requiring valve clearance adjustment points straight up.



W6U110WBV

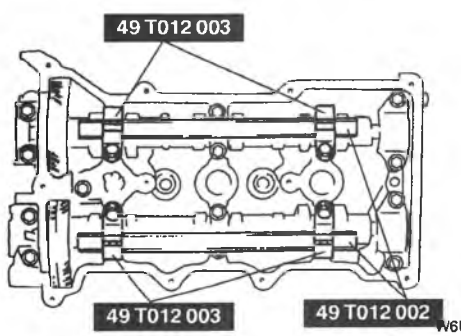
2. Remove the camshaft cap bolts where necessary.
   - RH exhaust side adjustment shim removal: A
   - RH intake side adjustment shim removal: B
   - LH intake side adjustment shim removal: C
   - LH exhaust side adjustment shim removal: D



W6U110WBW

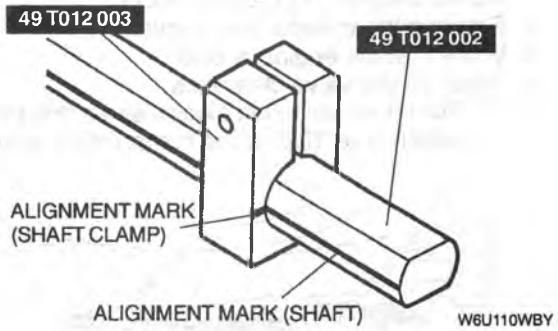
3. Install the **SSTs** as shown.

Tightening torque
11.3—14.2 N·m
{115—145 kgf·cm, 100—125 In·lbf}



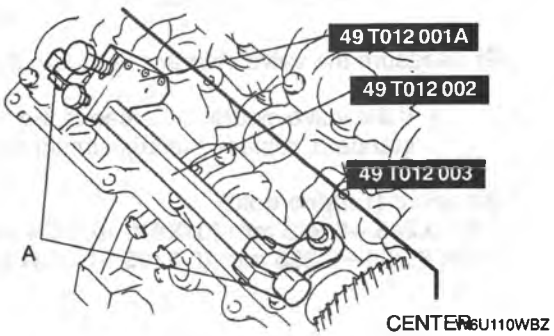
W6U110WBX

4. Align the marks on the **SSTs** (shaft and shaft clamp).



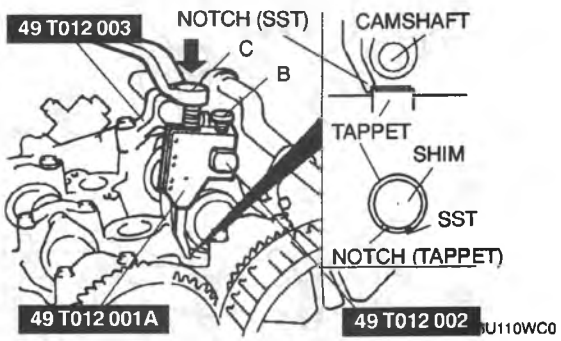
W6U110WBY

5. Face the **SST** (body) toward the center of the cylinder head, and mount it on the camshaft using the camshaft cap bolt holes.
6. Tighten bolts A to secure the **SST** (shaft).



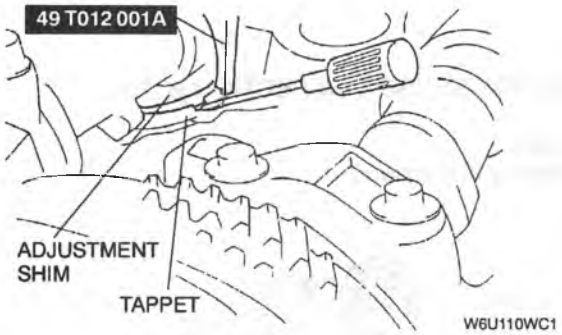
W6U110WBZ

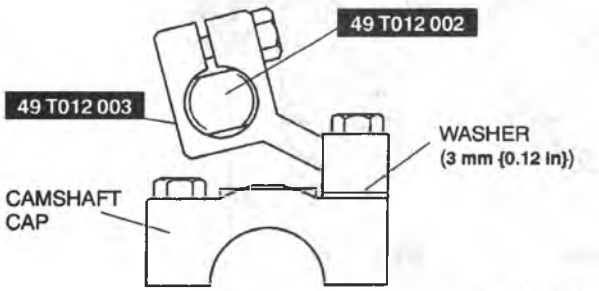
7. Position the notch of the tappet so that a small screwdriver can be inserted.
8. Set the **SST** on the tappet by its notch.
9. Tighten bolt B to secure the **SST** (body).
10. Tighten bolt C, and press down the tappet.



W6U110WC0

11. Using a fine screwdriver, pry up the adjustment shim through the notch on the tappet. Remove the shim using a magnet. If the adjustment shim is not removed easily, install a washer (**3 mm {0.12 in}**) under the **SST** (49 T012 003).





12. Select proper adjustment shim.

    New adjustment shim
    = Removed shim thickness + Measured valve clearance – Standard valve clearance (0.28 mm {0.011 in} (IN), 0.30 mm {0.012 in} (EX))

13. Push the selected shim into the tappet.
14. Loosen bolt C to allow the tappet to move up.
15. Loosen bolt B and remove the **SST** (body).
16. Remove the **SSTs** and tighten the camshaft cap bolts.

    Tightening torque
    11.3—14.2 N·m
    {115—145 kgf·cm, 100—125 in·lbf}

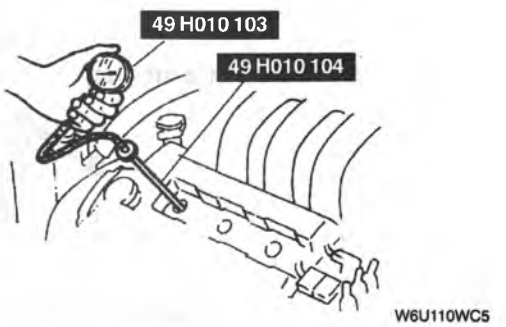
17. Verify the valve clearance.

    Standard [Engine cold]
    IN: 0.245—0.315 mm {0.0097—0.0124 in}
    EX: 0.265—0.335 mm {0.0105—0.0131 in}

COMPRESSION INSPECTION [KL]

1. Verify that the battery is fully charged. Charge it again if necessary. (See 01-17-1 BATTERY INSPECTION.)
2. Warm up the engine to the normal operating temperature.
3. Stop the engine and allow it to cool for about 10 minutes.
4. Perform "Fuel Line Safety Procedures". Leave the fuel pump relay removed. (See 01-14-3 BEFORE REPAIR PROCEDURE.)
5. Remove the spark plugs.
6. Disconnect the ignition coil connector.
7. Install the **SSTs** into the No.1 spark plug hole.
8. Fully depress the accelerator pedal and crank the engine.
9. Record the maximum gauge reading.
10. Inspect each cylinder as indicated above.
    - If the compression in one or more cylinders is low, pour a small amount of clean engine oil into the cylinder and check the compression again.
      a. If the compression increases, the piston, piston rings, or cylinder wall may be worn.
      b. If the compression stays low, a valve may be stuck or improperly seated.
      c. If the compression in adjacent cylinders stays low, the cylinder head gasket may be damaged or the cylinder head is distorted.

Z6U011001001W02



Compression

Item	Specification(kPa {kgf/cm², psi})
Standard	1,393 {14.2, 202} [250 rpm]
Minimum	971 {9.9, 141} [250 rpm]
Maximum difference between cylinders	196 {2.0 , 28}

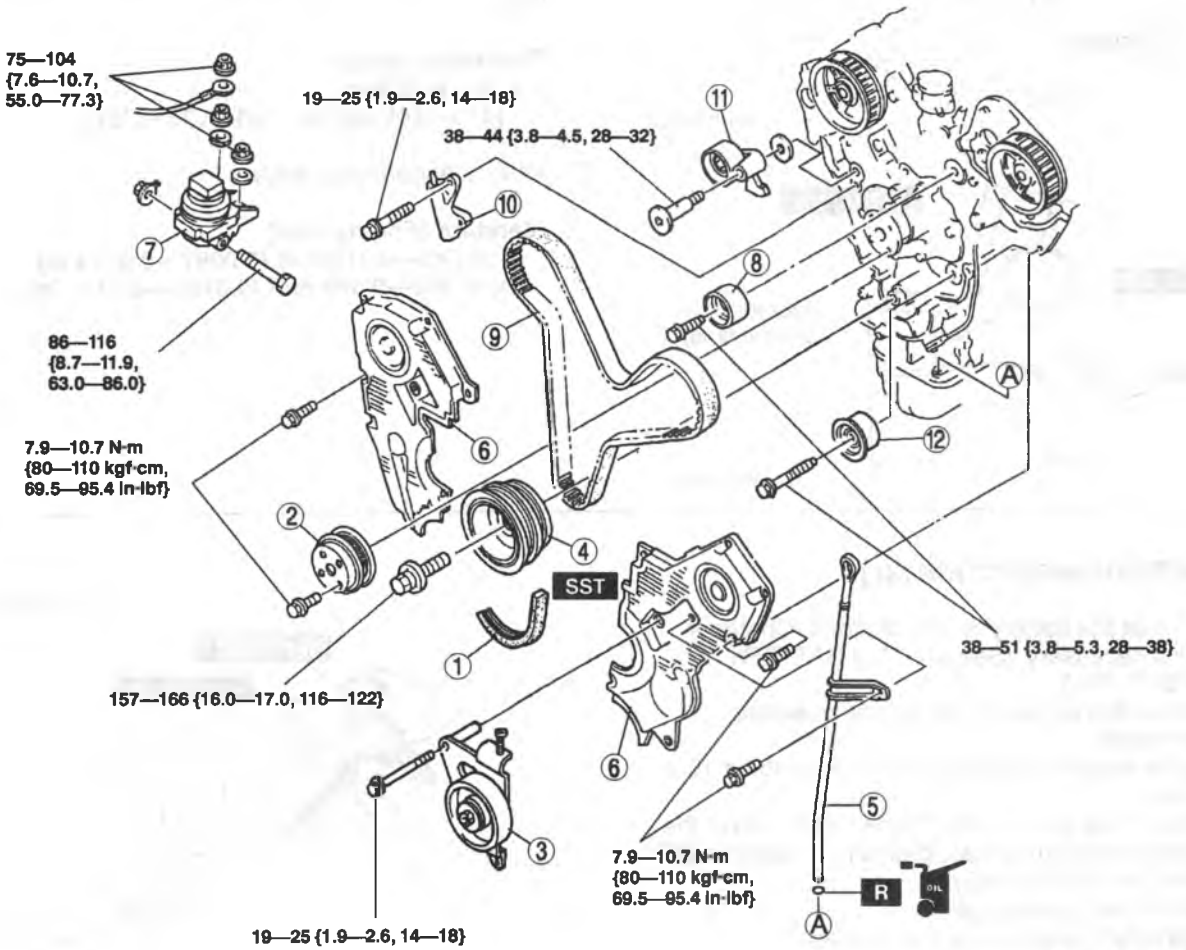
11. Remove the **SST**.
12. Connect the ignition coil connector.
13. Install the fuel pump relay.
14. Install the spark plugs.

    Tightening torque
    15—22 N·m {1.5—2.3 kgf·m, 11—16 ft·lbf}

TIMING BELT REMOVAL/INSTALLATION [KL]

Z6U011012040W03

1. Disconnect the negative battery cable.
2. Remove the crankshaft position sensor.
3. Remove the P/S oil pump with the pipe still connected.
4. Remove the spark plugs.
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.
7. Verify the air gap. (See 01-40B-33 CRANKSHAFT POSITION SENSOR INSPECTION [KL].)
8. Start the engine and
   (1) Inspect the pulleys and drive belt for runout and contact.
   (2) Verify the ignition timing. (See 01-10B-19 Ignition Timing Inspection.)



N·m {kgf·m, ft·lbf}
W6U110WC6

1	Drive belt (See 01-10B-2 DRIVE BELT ADJUSTMENT [KL])
2	Water pump pulley
3	Idler pulley bracket
4	Crankshaft pulley (See 01-10B-7 Crankshaft Pulley Removal Note) (See 01-10B-9 Crankshaft Pulley Installation Note)
5	Dipstick and pipe
6	Timing belt cover
7	No.3 engine mount rubber (See 01-10B-7 No.3 Engine Mount Rubber Removal Note)

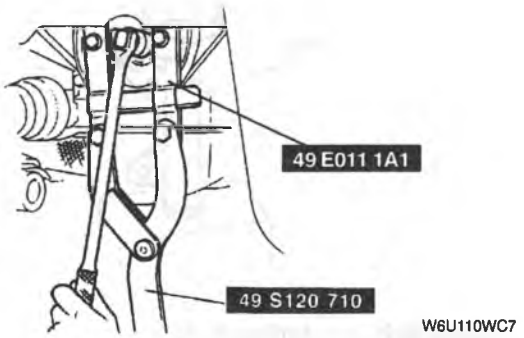
8	No.1 idler (See 01-10B-7 No.1 Idler Removal Note)
9	Timing belt (See 01-10B-7 Timing Belt Removal Note) (See 01-10B-8 Timing Belt Installation Note)
10	Timing belt auto tensioner (See 01-10B-8 Timing Belt Auto Tensioner Installation Note)
11	Tensioner
12	No.2 idler

Crankshaft Pulley Removal Note

- Hold the crankshaft using the **SSTs**.

Caution

- **The crankshaft position sensor rotor is on the rear of the crankshaft pulley, and can be damaged easily.**

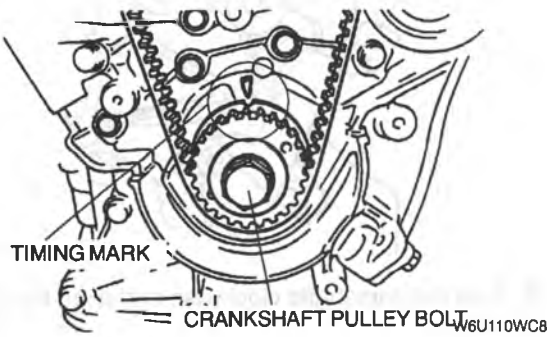


No.3 Engine Mount Rubber Removal Note

1. Support the engine using the chain block.
2. Remove the No.3 engine mount rubber.

No.1 Idler Removal Note

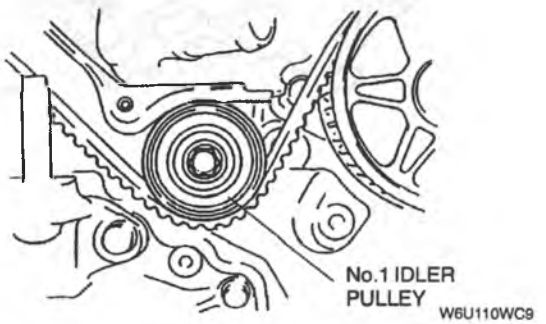
1. Install the crankshaft pulley bolt.
2. Turn the crankshaft clockwise and align the timing marks. (No.1 piston is at TDC of the compression stroke.)



Caution

- **When removing the pulley bolt, hold the pulley so that the bolt holes are aligned, otherwise the threads can be damaged.**

3. Remove the No.1 idler pulley.

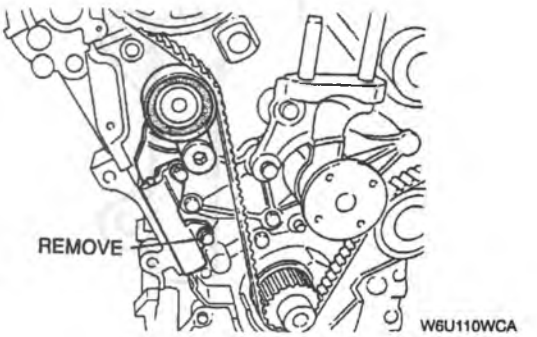


Timing Belt Removal Note

Caution

- **When removing the bolt, hold the tensioner so that the bolt holes are aligned, otherwise the threads can be damaged.**

- Loosen the auto tensioner bolts and remove the lower bolt.

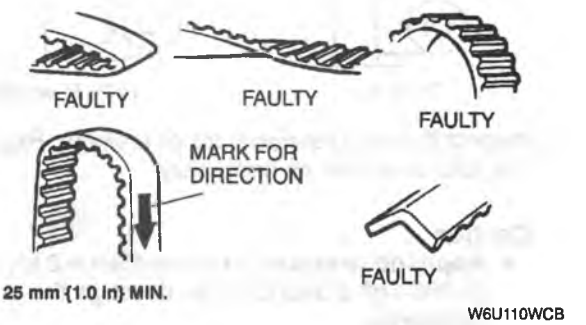


Caution

- **Forcefully twisting the belt, turning it inside out, bending it, or allowing oil or grease on it will damage the belt and shorten its life.**

Note

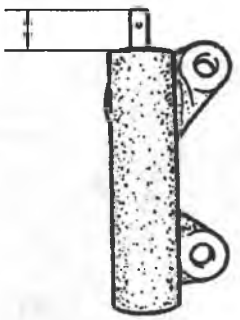
- Mark the timing belt rotation on the belt for proper reinstallation.



Timing Belt Auto Tensioner Installation Note

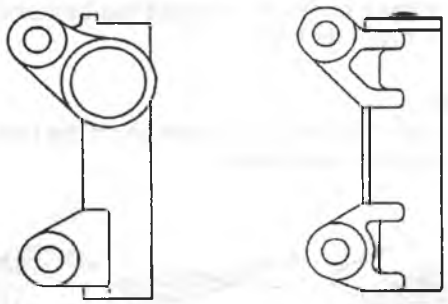
1. Measure the tensioner rod projection length. Replace the auto tensioner if necessary.

Projection (Free length)
Type A: 14.3—15.1 mm {0.563—0.594 in}
Type B: 12.0—13.0 mm {0.473—0.511 in}



W6U110WCC

Note
- There are two types of tensioners and they are interchangeable.

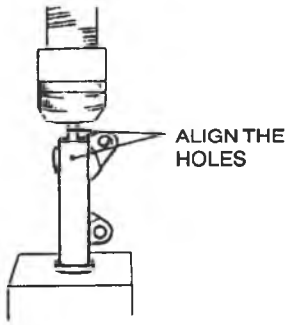


TYPE A TYPE B W6U110WCD

2. Inspect the auto tensioner for oil leakage. Replace the auto tensioner as necessary.

Caution
- **Applying pressure of more than 9.8 kN {1,000 kgf, 2,200 lbf} can damage the auto tensioner.**

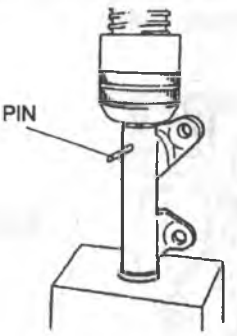
3. Slowly press in the tensioner rod using a press.



W6U110WCE

4. Insert a pin into the hole in the body as shown, to hold the tensioner rod.

Pin diameter
1.4 mm {0.055 in}

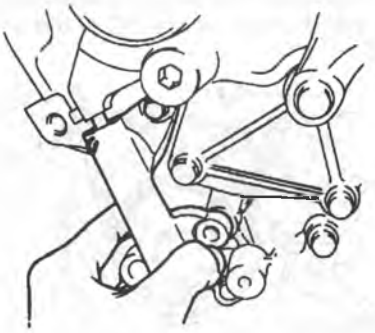


W6U110WCF

Timing Belt Installation Note

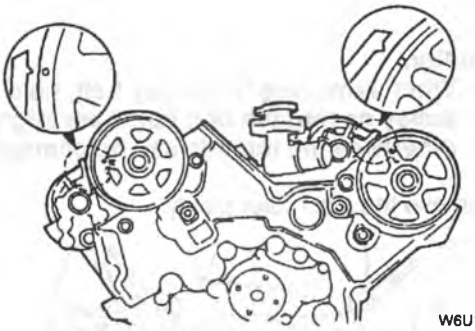
Note
- This must be done to reduce the timing belt resistance when the idler pulley is installed.

1. Set the tensioner in place and hand tighten the tensioner upper bolt.



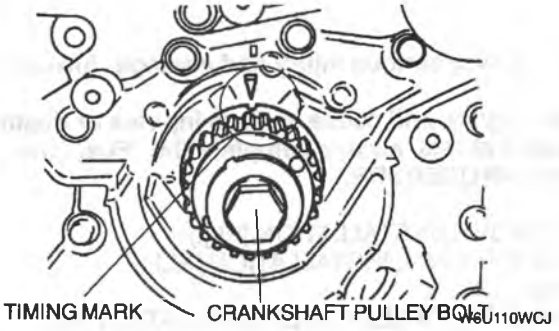
W6U110WCG

2. Turn the camshafts clockwise and align the timing marks.

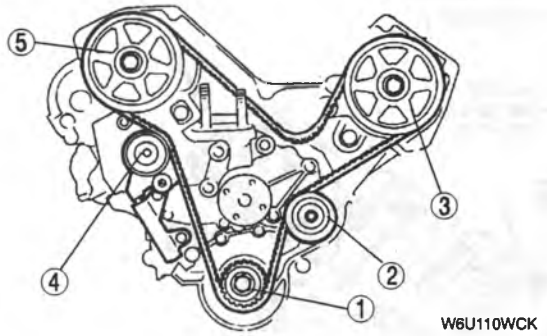


W6U110WCH

3. Using the crankshaft pulley bolt, turn the crankshaft clockwise and align the timing marks.

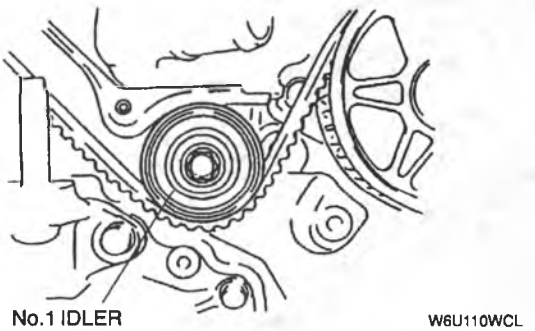


4. With the No.1 idler pulley removed, install the timing belt on the pulleys in the order shown below.
   a. Timing belt pulley
   b. No.2 idler pulley
   c. Camshaft pulley (LH)
   d. Tensioner pulley
   e. Camshaft pulley (RH)
5. Verify that there is tension between pulleys (3) and (1), and between pulleys (1) and (5).

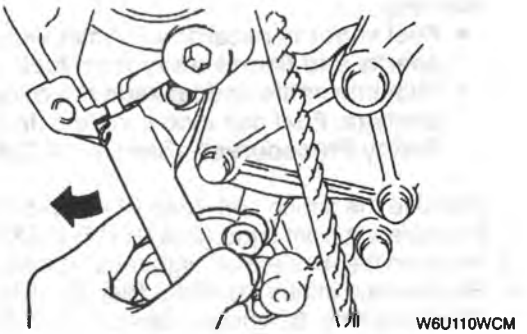


Caution
- **Verify that the belt has no looseness at the tension side.**
- **Do not damage the bolt threads when installing.**

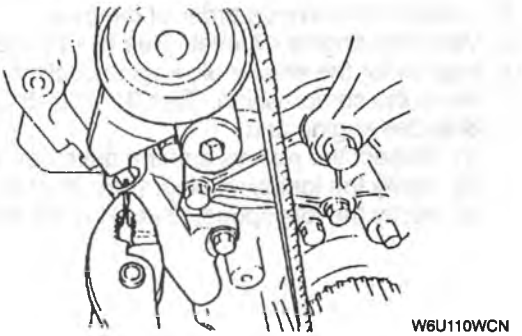
6. Install the No.1 idler while applying the pressure on the timing belt.



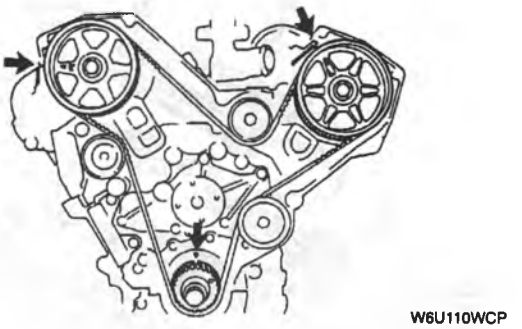
7. Push the auto tensioner in the direction of the arrow and hand tighten the lower bolt. Tighten the bolts.



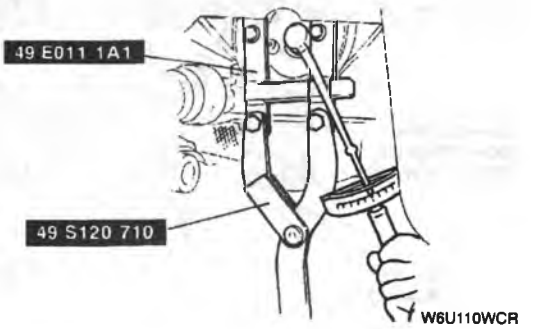
8. Remove the pin from the auto tensioner to apply tension to the belt.



9. Turn the crankshaft clockwise twice, and align the timing marks.
10. Verify that all timing marks are correctly aligned. If not, remove the timing belt and repeat from **Timing Belt Auto Tensioner Installation Note**.



Crankshaft Pulley Installation Note
- Hold the crankshaft using the **SSTs**.



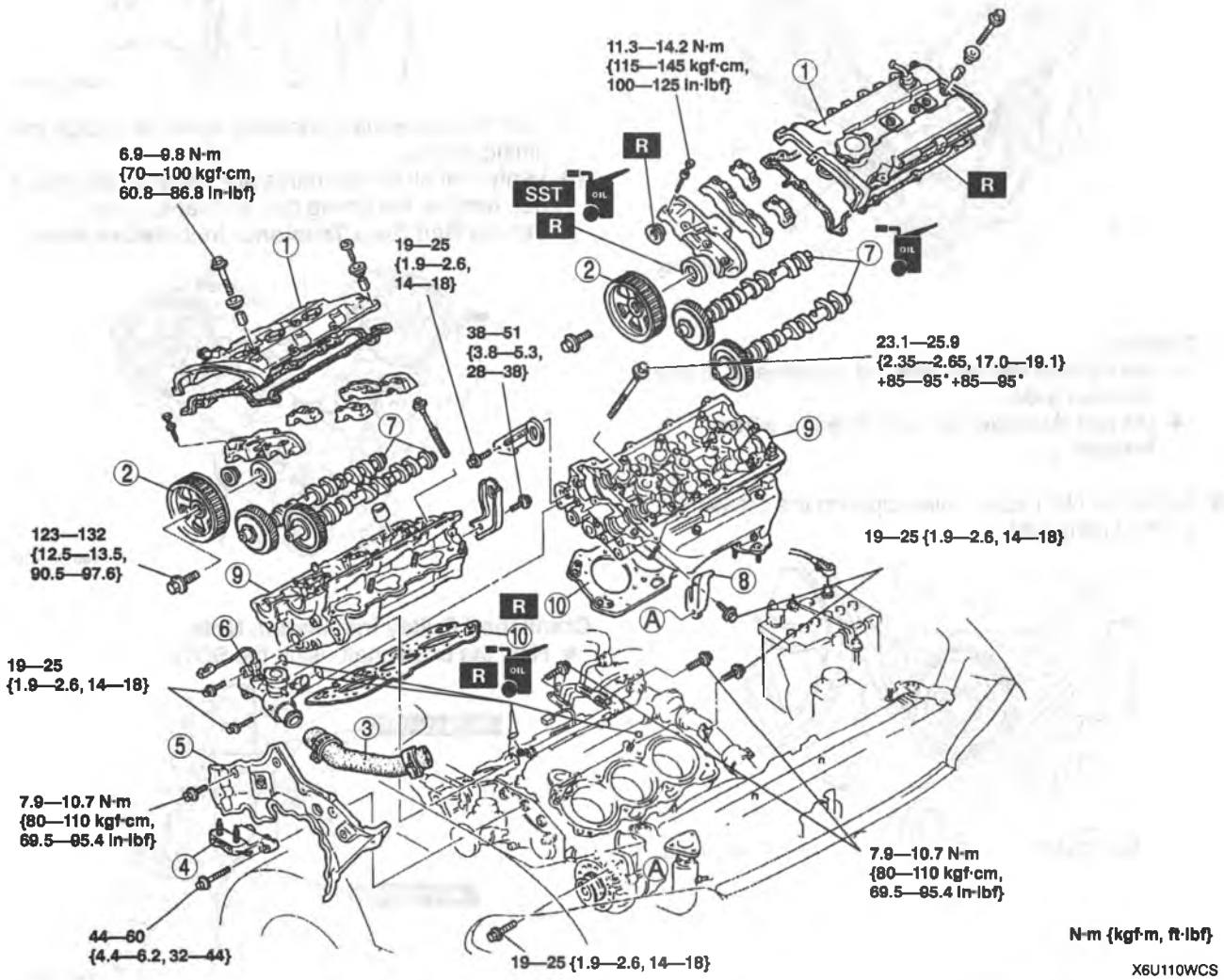
CYLINDER HEAD GASKET REPLACEMENT [KL]

Z6U011010271W02

Warning

- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures". (See 01-14-3 BEFORE REPAIR PROCEDURE.)**

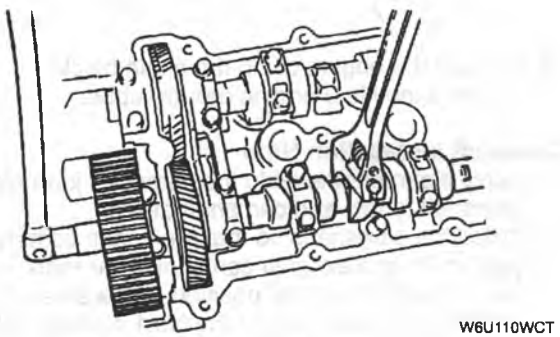
1. Remove the timing belt. (See 01-10B-6 TIMING BELT REMOVAL/INSTALLATION [KL].)
2. Remove the front pipe. (See 01-15-3 EXHAUST SYSTEM REMOVAL/INSTALLATION [KL].)
3. Remove the air cleaner, high-tension lead, and ignition coil.
4. Remove the intake manifold. (See 01-13B-4 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [KL].)
5. Disconnect the fuel hose. (See 01-14-3 BEFORE REPAIR PROCEDURE.) (See 01-14-4 AFTER REPAIR PROCEDURE.)
6. Drain the engine coolant. (See 01-12-2 ENGINE COOLANT REPLACEMENT.)
7. Remove in the order indicated in the table.
8. Install in the reverse order of removal.
9. Verify the engine oil level. (See 01-11-1 ENGINE OIL LEVEL INSPECTION.)
10. Inspect for the engine oil, engine coolant, and fuel leakage.
11. Verify the compression. (See 01-10B-5 COMPRESSION INSPECTION [KL].)
12. Start the engine and
    (1) Inspect the pulleys and the drive belt for runout and contact.
    (2) Verify the ignition timing. (See 01-10B-19 Ignition Timing Inspection.)
    (3) Verify the idle speed. (See 01-10B-20 Idle Speed Adjustment.)



1	Cylinder head cover (See 01-10B-14 Cylinder Head Cover Installation Note)
2	Camshaft pulley (See 01-10B-11 Camshaft Pulley Removal Note) (See 01-10B-14 Camshaft Pulley Installation Note)
3	Upper radiator hose
4	No.3 engine mount bracket
5	Seal plate
6	Water outlet
7	Camshaft (See 01-10B-11 Camshaft Removal Note) (See 01-10B-12 Camshaft Installation Note)
8	Generator stay
9	Cylinder head (See 01-10B-12 Cylinder Head Removal Note) (See 01-10B-12 Cylinder Head Installation Note)
10	Cylinder head gasket (See 01-10B-12 Cylinder Head Gasket Installation Note)

Camshaft Pulley Removal Note

- Hold the camshaft using a wrench on the cast hexagon as shown, and loosen the camshaft pulley lock bolt.



W6U110WCT

Camshaft Removal Note

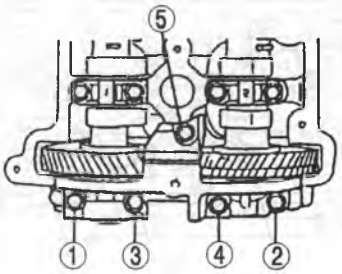
Caution

- **When the camshaft lobe is pressing on the tappet, removing the camshaft cap can damage the cylinder head thrust journal support.**

1. Loosen the front camshaft cap bolts in two or three steps in the order shown.

Note

- Bolt No.5 in the figure fits only the right cylinder head.



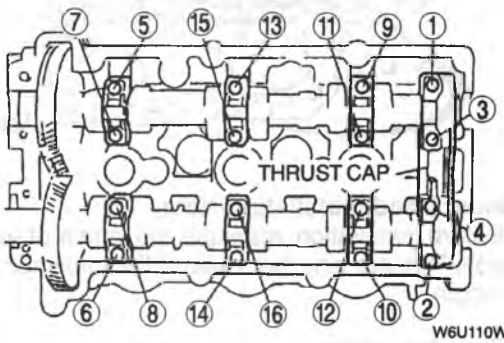
W6U110WCU

2. Remove the front camshaft cap bolts and the front camshaft caps.
3. Loosen the camshaft cap bolts gradually in two or three steps in the order shown.

Caution

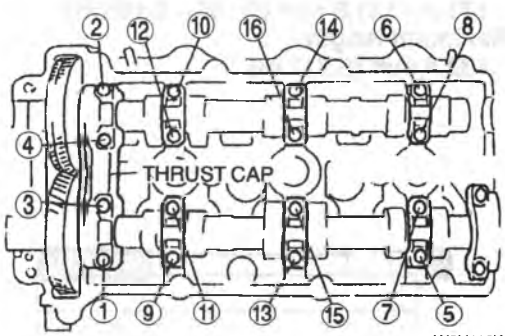
- **Remove the thrust caps only after removing all camshaft caps. Otherwise, the thrust caps can be damaged.**

RH



W6U110WCV

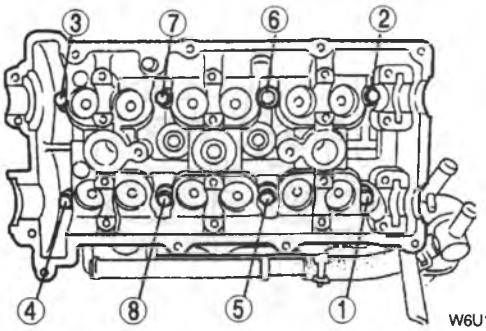
LH



W6U110WCW

Cylinder Head Removal Note

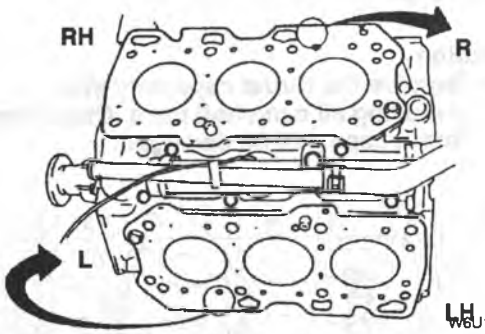
1. Temporarily install the No.3 engine mount bracket and No.3 engine mount rubber to support the engine.
2. Loosen the cylinder head bolts in two or three steps in the order shown.



W6U110WCX

Cylinder Head Gasket Installation Note

- Install new cylinder head gaskets on the cylinder block. (R mark for RH, L mark for LH)



W6U110WCY

Cylinder Head Installation Note

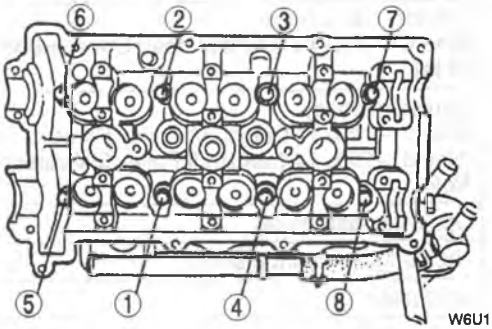
1. Before installation, measure the length of each bolt. Replace any that exceed the maximum length.

   Standard length
   131.2—131.8 mm {5.166—5.188 in}
   Maximum length
   132.5 mm {5.217 in}


W6U110WCZ

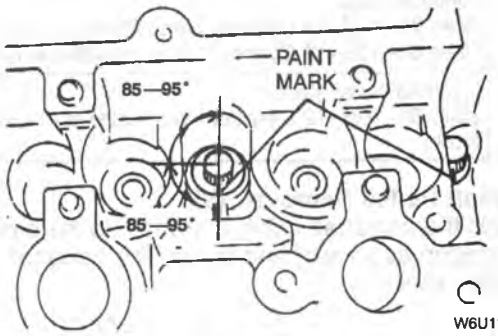
2. Tighten the bolts in two or three steps in the order shown.

   Tightening torque
   23.1—25.9 N·m
   {2.35—2.65 kgf·m, 17.0—19.1 ft·lbf}



W6U110WD0

3. Put a paint mark on each bolt head.
4. Using the marks as a reference, tighten the bolts by turning each **85—95°** in the sequence shown.
5. Further tighten each bolt by turning another **85—95°** in the sequence shown.

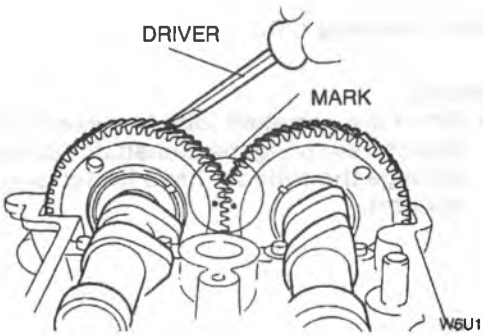


W6U110WD1

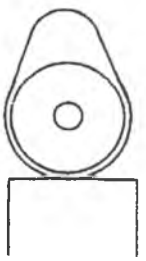
6. Support the engine using the chain block.
7. Remove the No.3 engine mount rubber.

Camshaft Installation Note

1. Apply clean engine oil to the camshaft journals, camshaft lobes, and camshaft gears.
2. Install the camshafts so that the intake camshaft gear mark and exhaust camshaft gear mark align. Adjust the friction gear position with a screwdriver. (Intake side cam lobes of the No.1 cylinder (RH) and No.2 cylinder (LH) face straight up.)



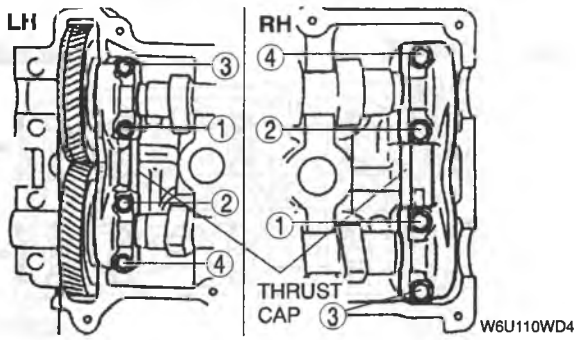
W6U110WD2


RH: No.1 CYLINDER (IN)
LH: No.2 CYLINDER (IN)

W6U110WD3

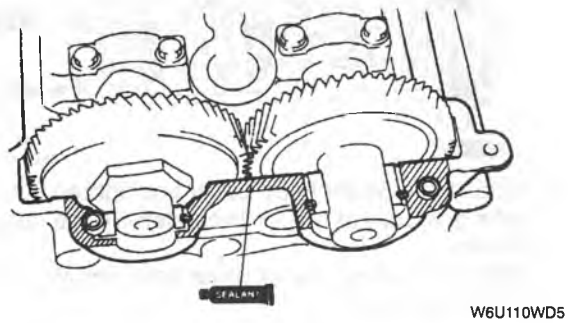
Caution
- **Install the thrust caps (RH: 4 mark, LH: B mark) first. Otherwise, camshaft can be broken or damaged.**

3. Install the thrust caps onto the cylinder head. Hand tighten the cap bolts gradually in two or three steps in the order shown, until the thrust caps are fully seated on the cylinder head.

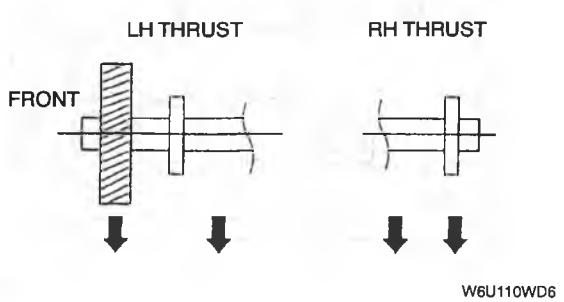


4. Apply silicone sealant to the shaded areas as shown.

Thickness
1.5—2.5 mm {0.060—0.098 in}



Caution
- **Because there is little camshaft thrust clearance, the camshaft must be held horizontally while it is installed. Otherwise, excessive force will be applied to the thrust area, causing burr on the thrust receiving area of the cylinder head journal. To avoid this, the following procedure must be observed.**



5. Install the camshaft caps according to their identification marks, and hand tighten the bolts.

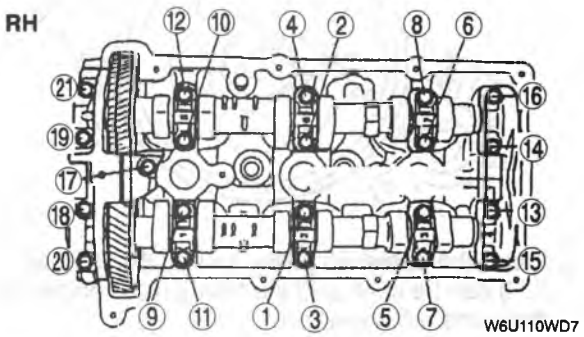
Note
- RH: numbers
- LH: letters

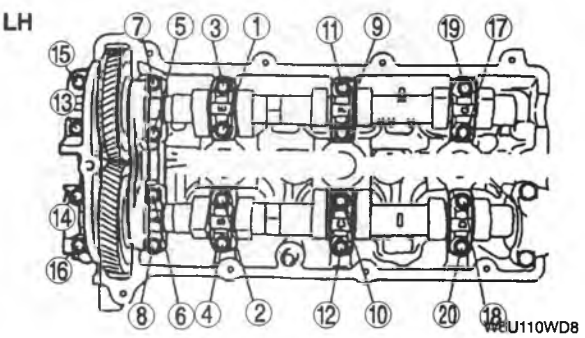
6. Tighten the bolts in the order shown. Verify that the camshaft remains horizontal as the camshaft cap bolts are tightened.

Tightening torque
11.3—14.2 N·m
{115—145 kgf·cm, 100—125 in·lbf}

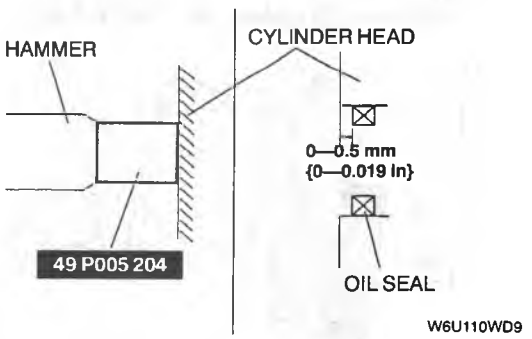
7. Retighten the bolts in the order shown.

Tightening torque
11.3—14.2 N·m
{115—145 kgf·cm, 100—125 in·lbf}

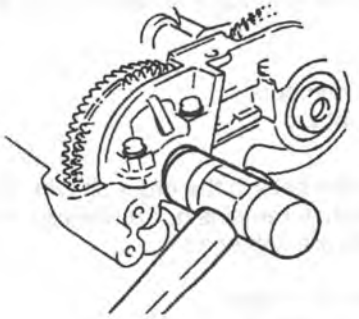




8. Apply clean engine oil to the lip of the new camshaft oil seal.
9. Push the oil seal slightly in by hand.
10. Tap the camshaft oil seal using the **SST**.



11. Tap in the new blind cap using a plastic hammer.

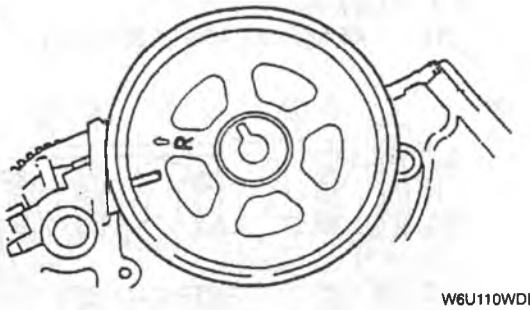


W6U110WDA

Camshaft Pulley Installation Note

1. Install the camshaft pulley so that the "R" mark (RH) can be seen and the timing mark aligns with the camshaft knock pin.

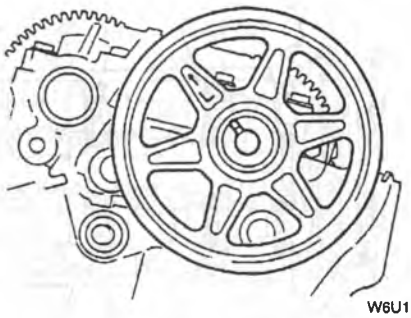
RH



W6U110WDB

2. Install the camshaft pulley so that the "L" mark (LH) can be seen and the timing mark aligns with the camshaft knock pin.

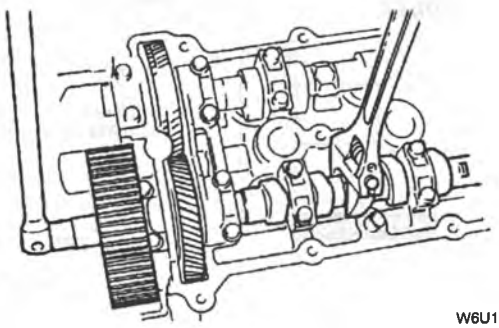
LH



W6U110WDC

3. Hold the camshaft by using a wrench on the cast hexagon as shown, and tighten each bolt.

Tightening torque
123—132 N·m
{12.5—13.5 kgf·m, 90.5—97.6 ft·lbf}



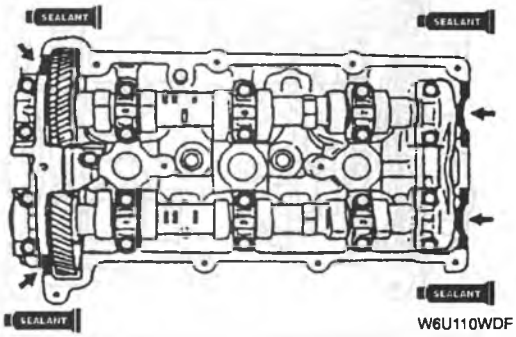
W6U110WDD

Cylinder Head Cover Installation Note

1. Verify that the grooves on the cylinder head cover are free of oil, water and other foreign material.
2. Install a new cylinder head cover gasket into the cylinder head cover.
3. Apply silicone sealant as shown.

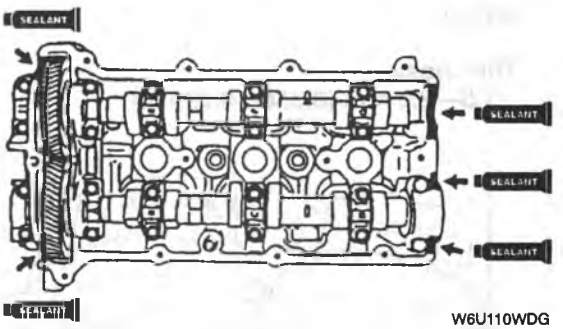
Thickness
1.5—2.5 mm {0.060—0.098 in}

RH



W6U110WDF

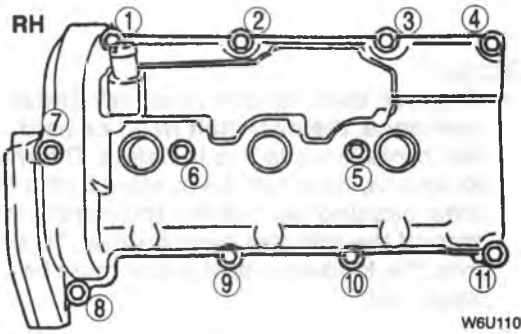
LH



W6U110WDG

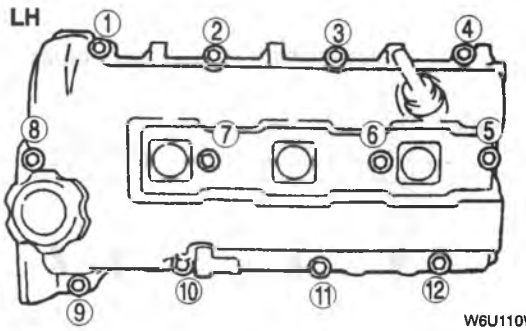
4. Install the cylinder head cover and tighten the bolts gradually in two or three steps in the order shown.
5. Retighten cylinder head cover bolts RH No.5 and 6, LH No.6 and 7.

RH



W6U110WDH

LH

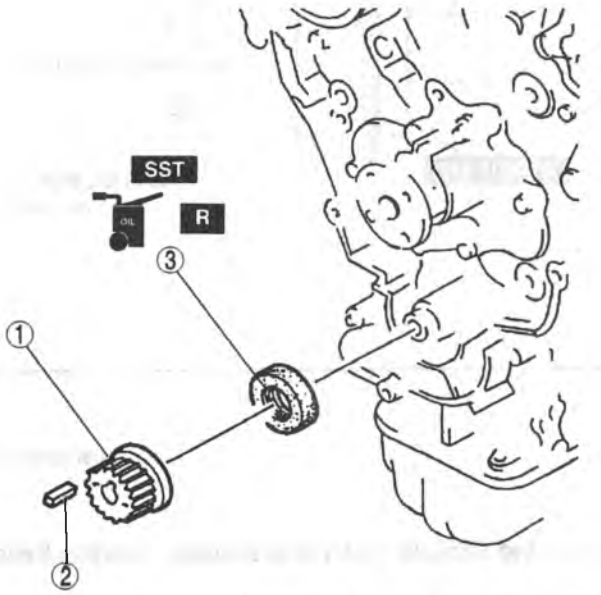


W6U110WDJ

FRONT OIL SEAL REPLACEMENT [KL]

Z6U011010602W02

1. Remove the timing belt. (See 01-10B-6 TIMING BELT REMOVAL/INSTALLATION [KL].)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

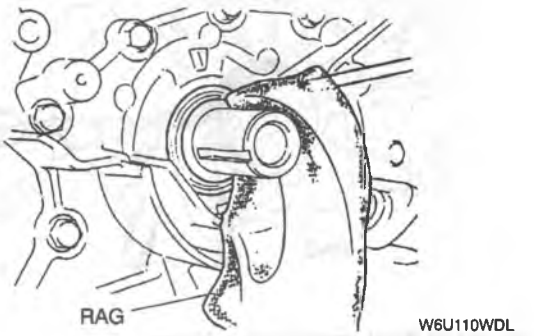


W6U110WDK

1	Timing belt pulley
2	Key
3	Front oil seal (See 01-10B-15 Front Oil Seal Removal Note) (See 01-10B-15 Front Oil Seal Installation Note)

Front Oil Seal Removal Note

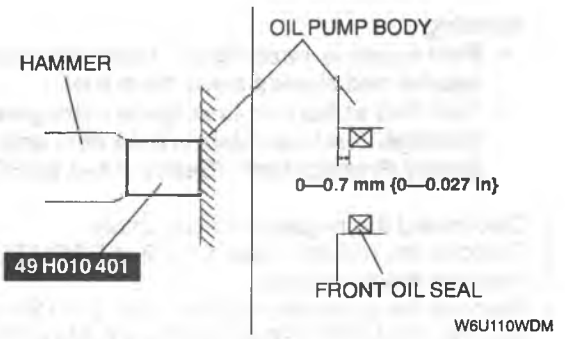
1. Cut the oil seal lip using a razor knife.
2. Remove the oil seal using a screwdriver protected with a rag.



W6U110WDL

Front Oil Seal Installation Note

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

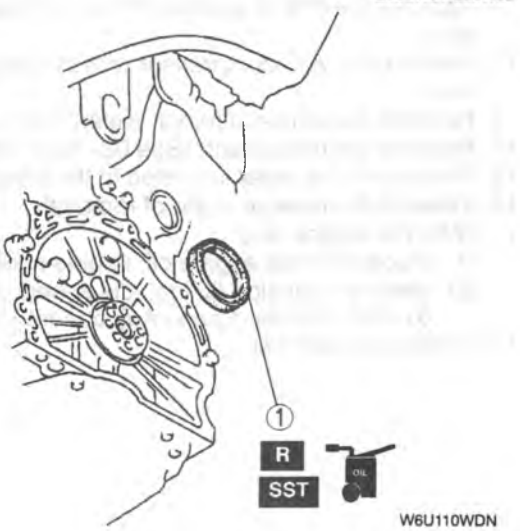


W6U110WDM

REAR OIL SEAL REPLACEMENT [KL]

Z6U011011399W02

1. Remove the flywheel. (MTX) (See 05-10-7 CLUTCH UNIT REMOVAL/INSTALLATION.)
2. Remove the drive plate. (ATX) (See 05-17B-44 DRIVE PLATE REMOVAL/INSTALLATION [GF4A-EL].)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

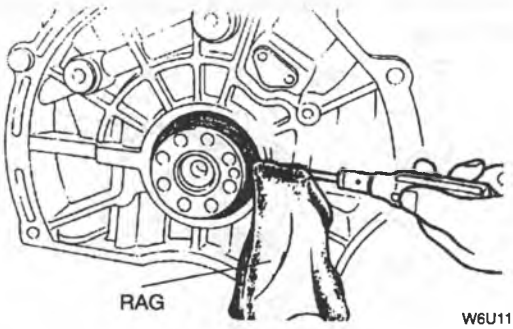


W6U110WDN

1	Rear oil seal (See 01-10B-16 Rear Oil Seal Removal Note) (See 01-10B-16 Rear Oil Seal Installation Note)

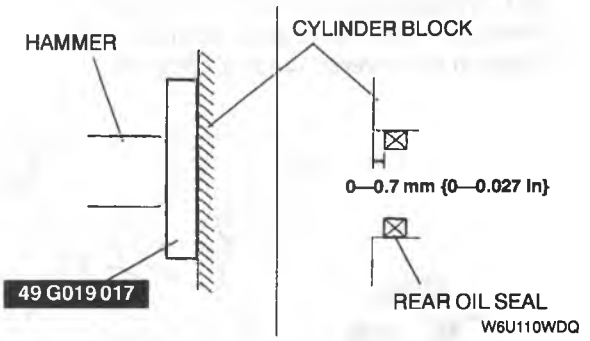
Rear Oil Seal Removal Note

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



W6U110WDP

2. Push the oil seal slightly in by hand.
3. Tap the oil seal in evenly using the **SST** and a hammer.



W6U110WDQ

Rear Oil Seal Installation Note

1. Apply clean engine oil to a new oil seal lip.

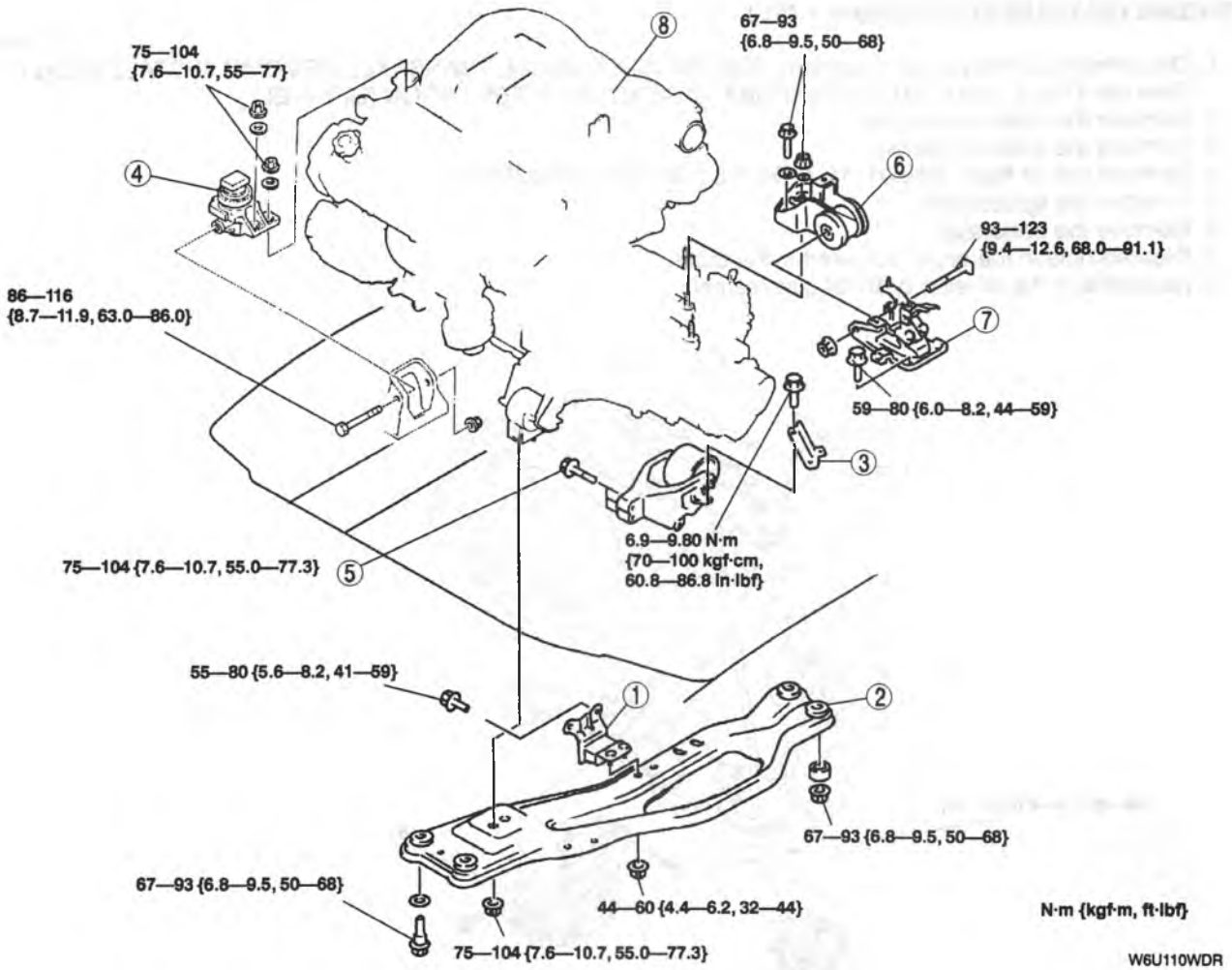
ENGINE REMOVAL/INSTALLATION [KL]

Z6U011002000W04

Warning

- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedures". (See01-14-3 BEFORE REPAIR PROCEDURE.)**

1. Disconnect the negative battery cable.
2. Remove the radiator. (See 01-12-4 RADIATOR REMOVAL/INSTALLATION.)
3. Remove the air cleaner.
4. Remove the accelerator cable. (See 01-13B-13 ACCELERATOR CABLE ADJUSTMENT [KL].) (See 01-13B-13 ACCELERATOR CABLE ADJUSTMENT [KL].)
5. Disconnect the fuel hose. (See 01-14-3 BEFORE REPAIR PROCEDURE.) (See 01-14-4 AFTER REPAIR PROCEDURE.)
6. Remove the front pipe. (See 01-15-3 EXHAUST SYSTEM REMOVAL/INSTALLATION [KL].)
7. Remove the rods, cables and pipes related to the transaxle.
8. Remove the battery.
9. Remove the P/S oil pump with the oil hose still connected. Position the P/S oil pump so that it is out of the way.
10. Remove the A/C compressor with the pipe still connected. Position the A/C compressor so that it is out of the way.
11. Remove the cruise actuator. (See 01-20-4 CRUISE ACTUATOR REMOVAL/INSTALLATION.)
12. Remove the drive shaft. (See 03-13-7 DRIVE SHAFT REMOVAL/INSTALLATION.)
13. Remove in the order indicated in the table.
14. Install in the reverse order of removal.
15. Start the engine and
    (1) Inspect for the engine oil, engine coolant, transaxle oil and fuel leakage.
    (2) Verify the ignition timing, idle speed, and idle mixture. (See 01-10B-19 Ignition Timing Inspection.) (See 01-10B-20 Idle Speed Adjustment.)(See 01-10B-21 Idle Mixture Inspection.)
16. Perform a road test.

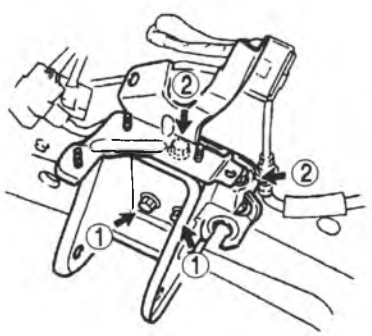


1	No.5 engine mount rubber
2	Engine mount member
3	No.1 engine mount stay bracket
4	No.3 engine mount rubber
5	No.1 engine mount bolt and nut

6	No.4 engine mount rubber
7	No.4 engine mount bracket (See 01-10B-17 No.4 Engine Mount Bracket Installation Note)
8	Engine, transaxle

No.4 Engine Mount Bracket Installation Note

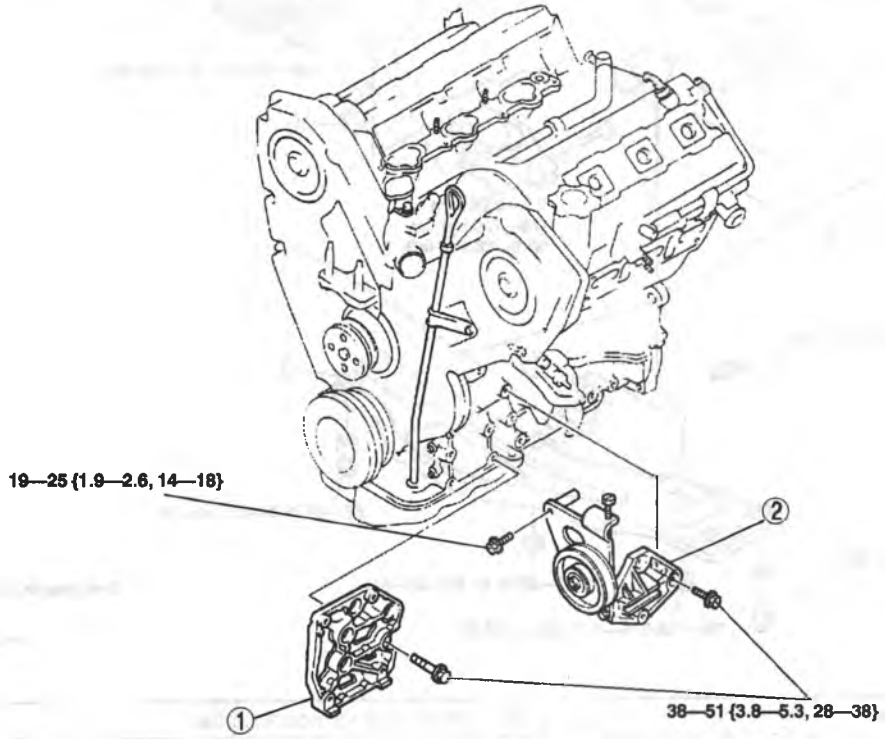
- Tighten the bolt in the order shown.



ENGINE DISASSEMBLY/ASSEMBLY [KL]

Z6U011002000W05

1. Disconnect the engine and transaxle. (See 05-15-4 MANUAL TRANSAXLE REMOVAL/INSTALLATION.) (See 05-17B-33 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [GF4A-EL].)
2. Remove the intake-air system.
3. Remove the exhaust system.
4. Remove the oil filter. (See 01-11-2 OIL FILTER REPLACEMENT.)
5. Remove the ignition coil.
6. Remove the generator.
7. Disassemble in the order indicated in the table.
8. Assemble in the reverse order of disassembly.



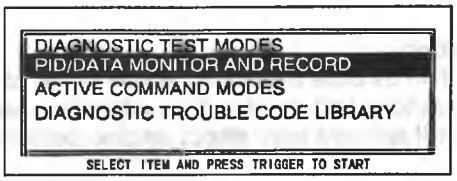
1	A/C compressor bracket	2	Generator bracket

ENGINE TUNE-UP [KL]

Z6U011002000W07

Engine Tune-up Preparation

1. Warm up the engine to the normal operating temperature.
2. Shift transaxle into Neutral (MTX) or P position (ATX).
3. Turn off all electrical loads.
   - Headlight
   - Blower motor
   - Rear window defroster
   - Power steering
4. Verify that the battery is fully charged. (See 01-17-1 BATTERY INSPECTION.)
5. Connect the **SSTs** (NGS tester) to the data link connector and select the "PID/DATA MONITOR AND RECORD" function and press TRIGGER.



W6U110WDU

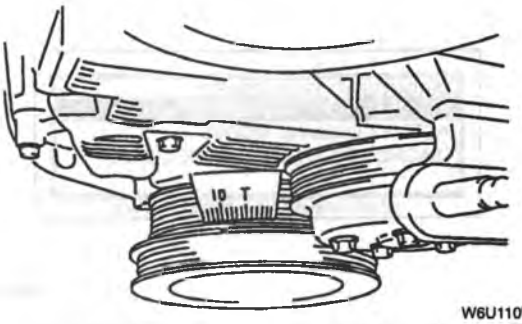
6. Select "RPM" and press TRIGGER.
7. Wait until the electrical fan stops.
8. Select "START" to begin.

Ignition Timing Inspection

1. Perform "Engine Tune-up Preparation".
2. Verify that the idle speed is within the specification.
   - If not as specified, adjust the idle speed. (See 01-10B-20 Idle Speed Adjustment.)

   Specification
   550—750 (650 ± 100) rpm

3. Connect a timing light to the high-tension lead of the No.1 cylinder.
4. Verify that the timing mark (yellow) is within the specification.
   - If not as specified, inspect the following.
     a. Camshaft position sensor
     b. Crankshaft position sensor
     c. Throttle position sensor
     d. Engine coolant temperature sensor
     e. Neutral switch (MTX)
     f. Clutch switch (MTX)
     g. Transaxle range switch (ATX)
   - If the devices are normal, replace the PCM.

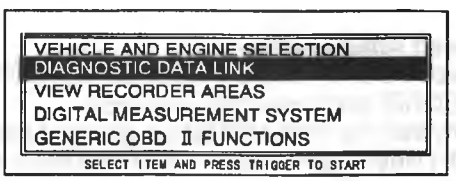


W6U110WDV

Specification
BTDC 4—16° (10 ± 6°)/550—750 rpm

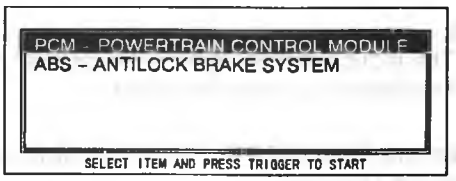
Idle Speed Inspection

1. Warm up the engine to normal operating temperature.
2. Shift the transaxle into Neutral (MTX) or P position (ATX).
3. Turn off all loads.
   - Blower motor
   - Power steering
   - Electrical loads. (e.g, headlight, rear window defroster)
4. Verify that the battery is fully charged. (See 01-17-1 BATTERY INSPECTION.)
5. Connect the **SSTs** (NGS tester) to data link connector.
6. Select the "DIAGNOSTIC DATA LINK" and press the TRIGGER.



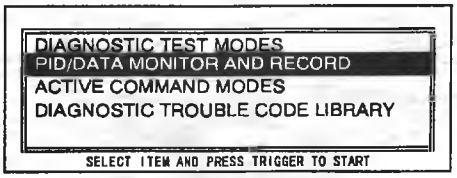
W6U110WY0

7. Select the "PCM-POWERTRAIN CONTROL MODULE" and press the TRIGGER.



W6U110WY1

8. Select "PID/DATA MONITOR AND RECORD" and press the TRIGGER.



W6U110WY3

9. Select the "RPM" and press the TRIGGER.
10. Wait until the electrical fans stop.
11. Verify that the idle speed is within specifications.
    - If not within specifications, adjust the idle speed as follows.

Specification
550—750 (650 ± 100) rpm

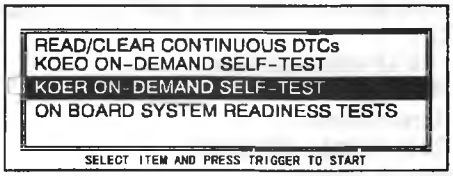
Caution
- **The air adjusting screw (AAS) must not be adjusted when the headlight HIGH system is malfunctioning. Any improper adjustment may affect engine performance.**

Note
- In order to activate the "KOER ON-DEMAND SELF-TEST" after completion of the following procedure, turn off the ignition switch at once, then operate the "KOER ON-DEMAND SELF-TEST".

Idle Speed Adjustment
1. Select "HDLMP" in the "PID/DATA MONITOR AND RECORD" and press the TRIGGER.
2. Verify that the "HDLMP" status changes from OFF to ON when the headlight switch is turned to the passing position.
    - If it does not change, inspect following harnesses, connectors and terminals of the headlight signal circuit.
        a. From battery to combination switch
        b. From combination switch to PCM
3. Connect the inductive pick-up type tachometer to the high tension lead.

Note
- The inductive pick-up type tachometer may indicate double engine speed.

4. Select the "DIAGNOSTIC TEST MODES" and press the TRIGGER.
5. Select the "KOER ON-DEMAND SELF-TEST" and press the TRIGGER.

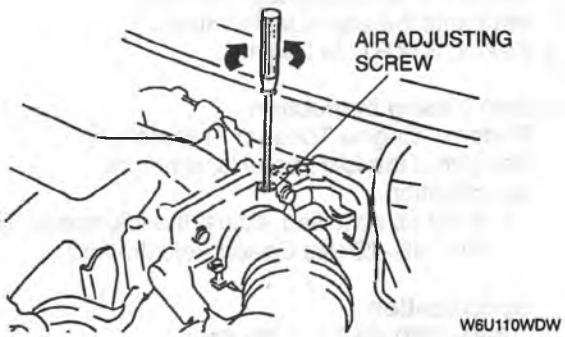


W6U110WY2

6. Turn the headlight switch to the passing position more than three times while each "passing" for 2 seconds after the "FOR EXAMPLE BOO, PSP AND TCS" is displayed.
7. Make sure the engine speed is fixed.

Caution
- **The throttle adjusting screw is set at the factory and must not be adjusted. Any adjustment may affect engine performance.**

8. Adjust the idle speed to the following specifications by turning the air adjusting screw within 2 minutes after the headlight switch is turned to passing position more than three times.



W6U110WDW

Specification
550—750 (650 ± 100) rpm

Idle-up Speed Inspection

1. Perform "Engine Tune-up Preparation".
2. Verify that the idle speed is normal.
3. Verify that the idle-up speed is within the specification.
   - If not as specified with all loads conditions, check the idle air control valve.
   - If not as specified with some load conditions, check related input switches, harnesses and connectors.

Load condition	Idle-up speed (rpm)*1		
	MTX	ATX	
		N, P position	D range
E/L ON*2	550—750	550—750	525—725
A/C ON*3	700—900	650—850	650—850
P/S ON*4	600—800	600—800	575—775

*1 : Excludes temporary idle speed drop just after the electrical loads (E/L) are turned on.

*2 : Headlight is on, Fan switch (3rd or higher), Cooling fan are operating.

*3 : A/C switch and fan switch are on.

*4 : Steering wheel is fully turned.

Idle Mixture Inspection

1. Perform "Engine Tune-up Preparation".
2. Verify that the idle speed and ignition timing are within the specification.
3. Insert an exhaust gas analyzer to the tailpipe.
4. Verify that the CO and HC concentrations are within the regulation.
   - If not, inspect the following.
     a. On-board diagnostic system
     b. Heated oxygen sensor (Front, Middle, Rear)
     c. Intake manifold vacuum
     d. Fuel line pressure
     e. Ignition timing control
5. If the systems are normal, replace the three way catalytic converter.

01-11 LUBRICATION

ENGINE OIL LEVEL INSPECTION 01-11-1
ENGINE OIL REPLACEMENT 01-11-1
OIL FILTER REPLACEMENT 01-11-2
OIL PRESSURE INSPECTION 01-11-2
OIL PAN
REMOVAL/INSTALLATION 01-11-3
Oil Pan Removal Note **01-11-4**
Oil Pan Installation Note **01-11-4**
OIL PUMP
REMOVAL/INSTALLATION 01-11-5
Oil Pan Upper Block
Removal Note **01-11-6**
Oil Pump Removal Note **01-11-7**
Oil Pump Installation Note **01-11-7**
Oil Baffle Installation Note **01-11-8**
Oil Pan Upper Block
Installation Note **01-11-8**
OIL PUMP DISASSEMBLY/
ASSEMBLY 01-11-9
Inner Rotor Installation Note **01-11-10**
Oil Pump Cover Installation Note **01-11-10**
OIL PUMP INSPECTION 01-11-10
Rotor Clearance Inspection **01-11-10**
Pressure Spring Inspection **01-11-11**

ENGINE OIL LEVEL INSPECTION

Z6U011114001W01

1. Position the vehicle on level ground.
2. Warm up the engine to normal operating temperature and stop it.
3. Wait for five minutes.
4. Remove the dipstick and inspect oil level and condition. Verify that the oil level is within the F and L marks on the dipstick.
5. Add or replace oil if necessary.

ENGINE OIL REPLACEMENT

Z6U011114001W02

Warning
- **Hot engines and engine oil can cause severe burns. Do not burn yourself with either.**
- **A vehicle that is lifted but not securely supported on safety stands is dangerous. It can slip or fall, causing death or serious injury. Never work around or under a lifted vehicle if it is not securely supported on safety stands.**
- **Continuous exposure to USED engine oil has caused skin cancer in laboratory mice. Protect your skin by washing with soap and water immediately after working with engine oil.**

1. Position the vehicle on level ground.
2. Remove the oil filler cap and the oil pan drain plug.
3. Drain the oil into a container.
4. Install the drain plug.

Tightening torque
30—41 N·m {3.0—4.2 kgf·m, 22—30 ft·lbf}

5. Refill the engine with the specified type and amount of engine oil.
6. Refit the oil filler cap.
7. Run the engine and inspect for oil leakage.
8. Inspect the oil level and add oil if necessary. (See 01-11-1 ENGINE OIL LEVEL INSPECTION.)

Note
- The actual oil level may vary from the specified capacity in some cases.

Oil capacity

L {US qt, Imp qt}

Item	Engine	
	FS	KL
Oil replacement	3.3 {3.5, 2.9}	3.7 {3.9, 3.3}
Oil and oil filter replacement	3.5 {3.7, 3.1}	4.0 {4.2, 3.5}
Total (dry engine)	3.7 {3.9, 3.3}	4.9 {5.2, 4.3}

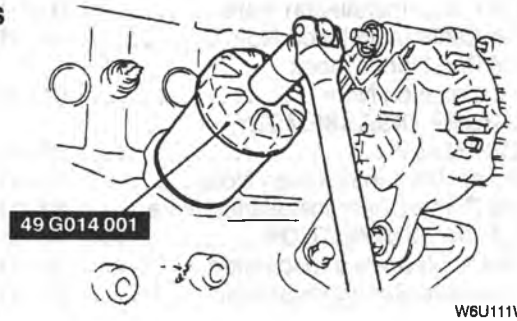
Engine oil grade
API Service SG (Energy Conserving II), SH (Energy Conserving II) or ILSAC (GF-I) SJ or ILSAC (GF-II)
Engine oil viscosity
Above -25°C {-13°F}: SAE 10W-30
-30 °C—37°C {-22°F—98°F}: SAE 5W-30

OIL FILTER REPLACEMENT

Z6U011114300W01

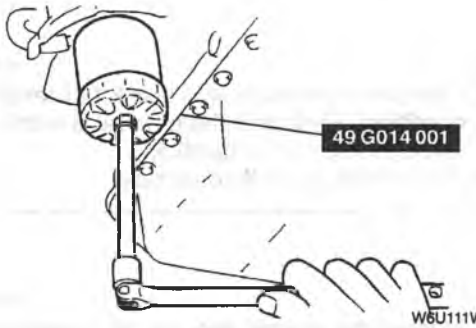
1. Remove the oil filter using the **SST**.

FS



W6U111WA0

KL



W6U111WA1

2. Use a clean rag to wipe off the mounting surface on the oil filter body.
3. Apply clean engine oil to the O-ring of the oil filter.
4. Using the **SST**, tighten the filter according to the installation direction on the side of it or packing box.
5. Start the engine and inspect for oil leakage.
6. Inspect the oil level and add oil if necessary. (See 01-11-1 ENGINE OIL LEVEL INSPECTION.)

OIL PRESSURE INSPECTION

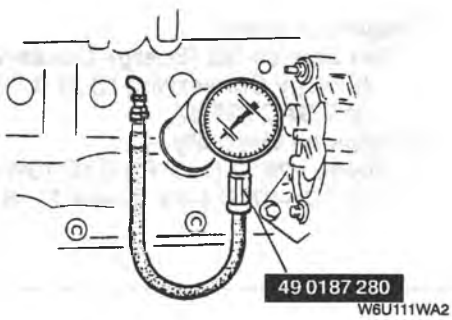
Z6U011102000W01

Warning

- **Continuous exposure to USED engine oil has caused skin cancer in laboratory mice. Protect your skin by washing with soap and water immediately after this working with engine oil.**
- **Hot engines and oil can cause severe burns. Turn off the engine and wait until it and the engine oil have cooled.**

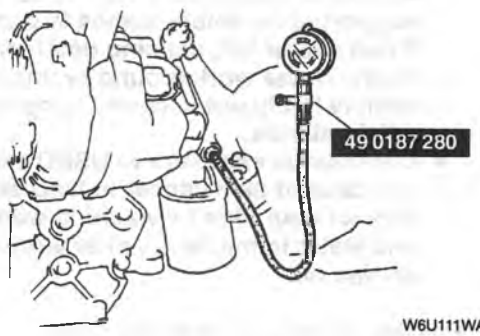
1. Remove the intake manifold bracket. (FS)
2. Remove the oil pressure switch.
3. Screw the **SST** into the oil pressure switch installation hole.

FS



W6U111WA2

KL



W6U111WA3

4. Warm up the engine to normal operating temperature.
5. Run the engine at the specified speed, and note the gauge readings.
   - If the pressure is not as specified, inspect for shortage of engine oil, oil leakage, or any worn parts inside of engine, etc. Repair or replace if necessary.

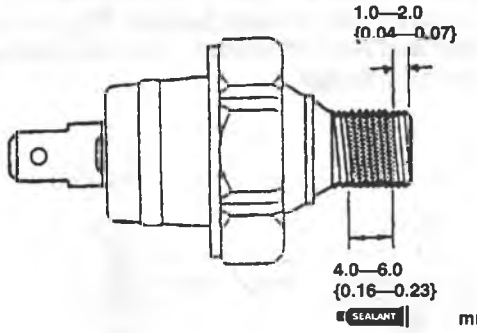
Note

- The oil pressure can vary with oil viscosity and temperature.

Oil pressure

FS: 393—490 kPa {4.0—5.0 kgf/cm^2, 57—71 psi} [3,000 rpm]
KL: 334—490 kPa {3.4—5.0 kgf/cm^2, 49—71 psi} [3,000 rpm]

6. Stop the engine and wait until it is cool.
7. Apply silicone sealant to the oil pressure switch threads as shown.
8. Remove the **SST**.



W6U111WA0

9. Install the oil pressure switch.

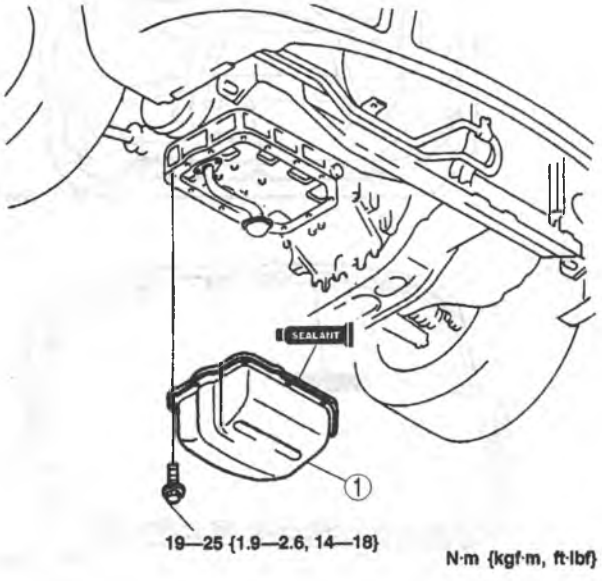
Tightening torque
12—17 N·m {1.2—1.8 kgf·m, 9—13 ft·lbf}

10. Start the engine and inspect for oil leakage.
11. Install the intake manifold bracket. (FS)

OIL PAN REMOVAL/INSTALLATION

1. Disconnect the negative battery cable.
2. Drain the engine oil. (See 01-11-1 ENGINE OIL REPLACEMENT.)
3. Remove the front pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [FS].) (See 01-15-3 EXHAUST SYSTEM REMOVAL/INSTALLATION [KL].)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.

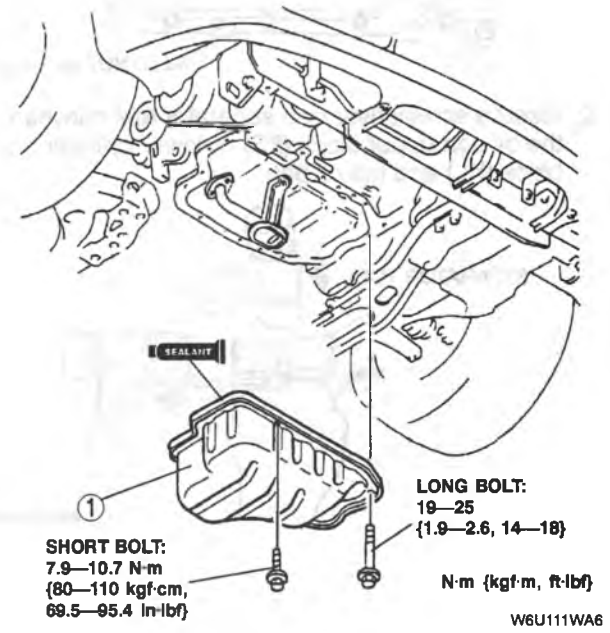
FS



W6U111WA5

Z6U011110040W01

KL



W6U111WA6

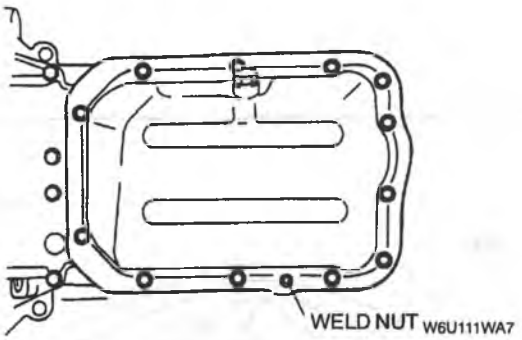
1	Oil pan (See 01-11-4 Oil Pan Removal Note) (See 01-11-4 Oil Pan Installation Note)

Oil Pan Removal Note

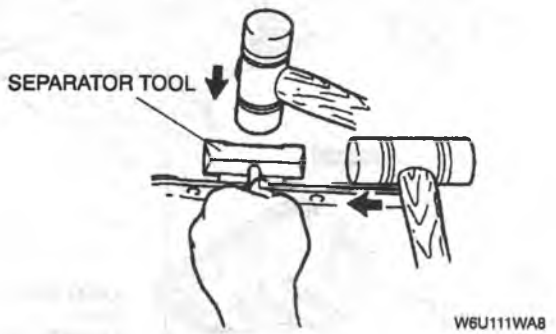
Caution

- **Pry tools can easily scratch the oil pan mounting surfaces. Prying off the oil pan can also easily bend the oil pan flange. See the following instructions before removing the oil pan.**

1. Screw an oil pan bolt in a weld nut hole to make a small gap between the oil pan upper block and the oil pan (FS).



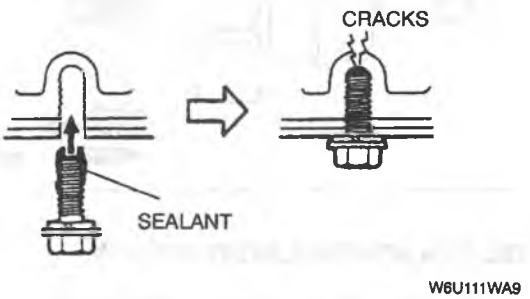
2. Insert a screwdriver or a separator tool between the oil pan upper block (FS) or lower cylinder block (KL) and the oil pan.



Oil Pan Installation Note

Caution

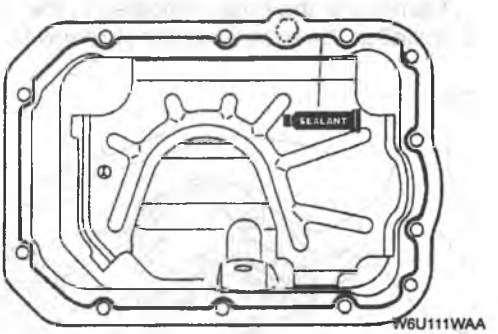
- **If the bolts are reused, remove the old sealant from the bolt threads. Tightening a bolt that has old sealant on it can cause thread damage.**



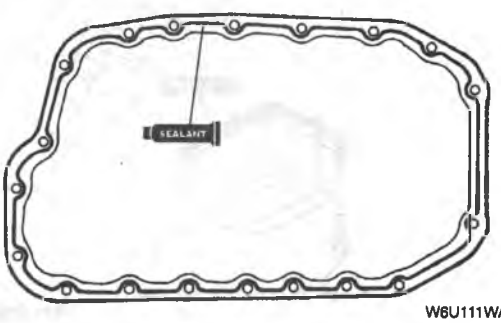
- Apply silicone sealant to the oil pan along the inside of the bolt holes and overlap the ends.

Thickness
2.0—3.0 mm {0.079—0.118 in}

FS



KL

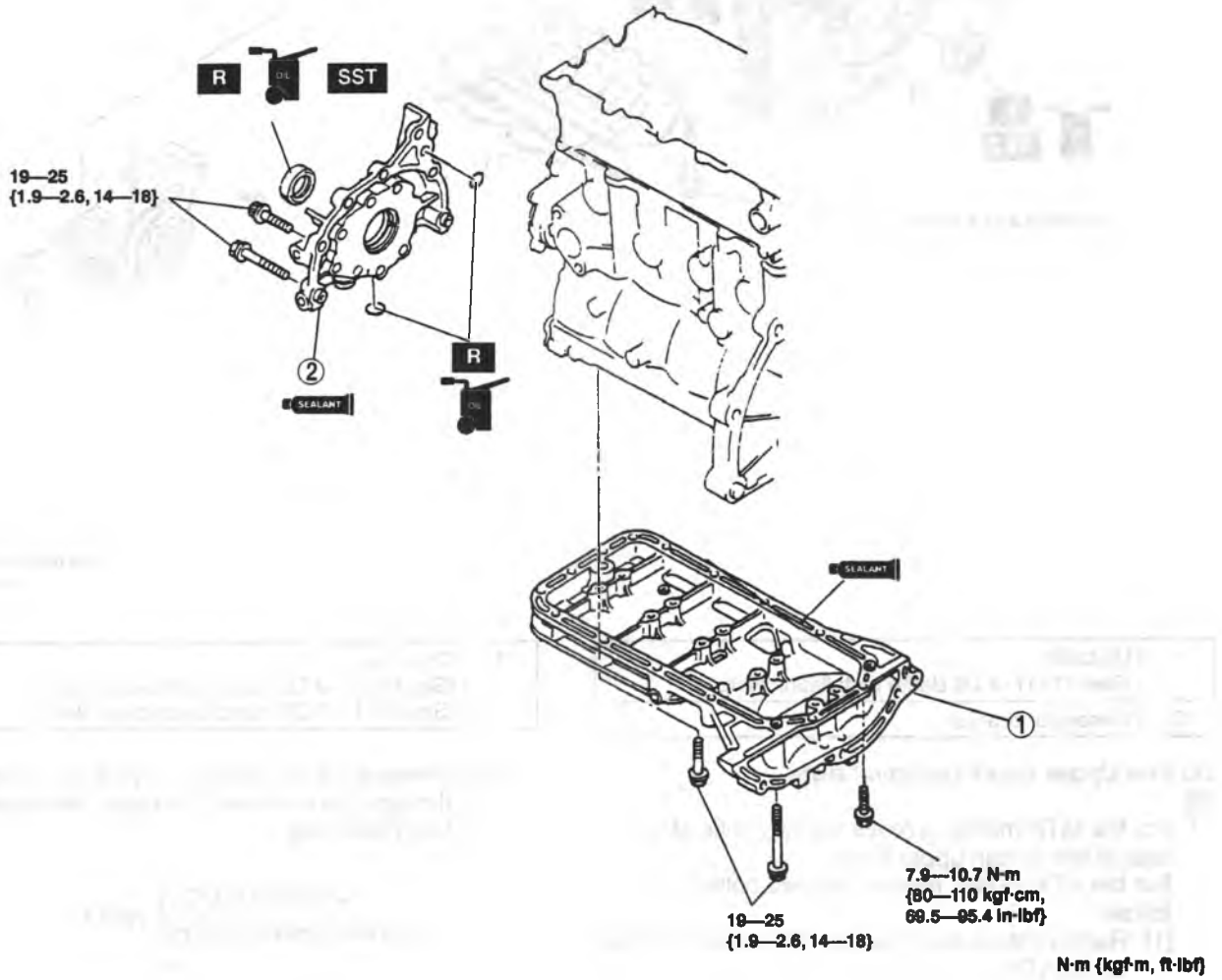


OIL PUMP REMOVAL/INSTALLATION

Z6U011119220W01

1. Remove the timing belt. (See 01-10A-6 TIMING BELT REMOVAL/INSTALLATION [FS].) (See 01-10B-6 TIMING BELT REMOVAL/INSTALLATION [KL].)
2. Remove the timing belt pulley.
3. Remove the oil pan. (See 01-11-3 OIL PAN REMOVAL/INSTALLATION.)
4. Remove the A/C compressor with the pipe still connected. (FS)
5. Remove the A/C compressor bracket.
6. Remove the generator.
7. Remove the transaxle. (FS MTX) (See 05-15-4 MANUAL TRANSAXLE REMOVAL/INSTALLATION.)
8. Remove in the order indicated in the table.
9. Install in the reverse order of removal.

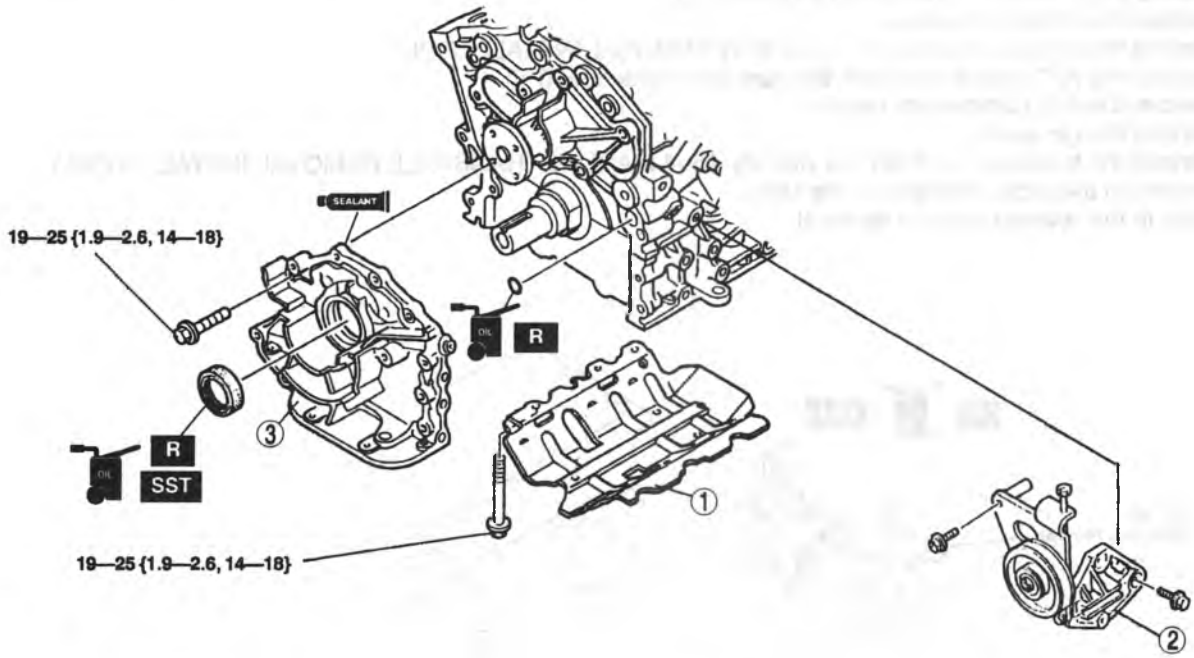
FS



1	Oil pan upper block (See 01-11-6 Oil Pan Upper Block Removal Note) (See 01-11-8 Oil Pan Upper Block Installation Note)

2	Oil pump (See 01-11-7 Oil Pump Removal Note) (See 01-11-7 Oil Pump Installation Note)

KL



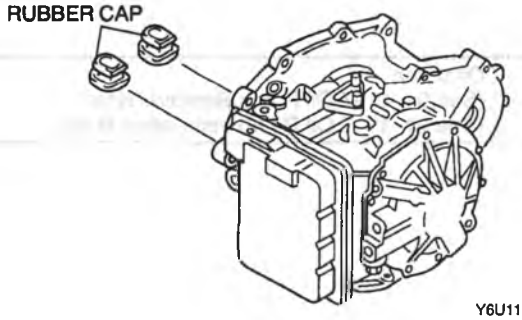
N·m {kgf·m, ft·lbf}
Y6U111WA2

1	Oil baffle (See 01-11-8 Oil Baffle Installation Note)
2	Generator bracket

3	Oil pump (See 01-11-7 Oil Pump Removal Note) (See 01-11-7 Oil Pump Installation Note)

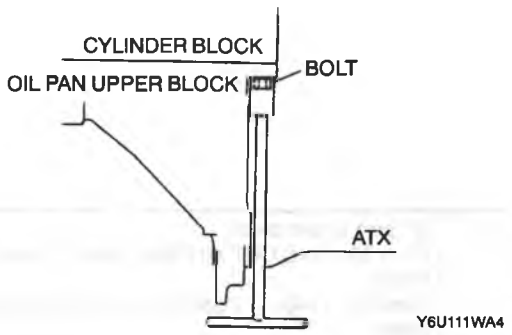
Oil Pan Upper Block Removal Note
FS

1. For the MTX model, remove the two bolts at the rear of the oil pan upper block.
   For the ATX model, remove the two bolts as follows.
   (1) Remove the rubber cap on the bottom surface of the ATX.



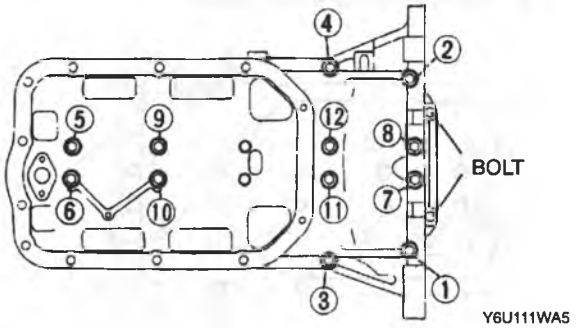
Y6U111WA3

(2) Remove the two bolts of oil pan upper block through the holes which rubber caps have been removed.



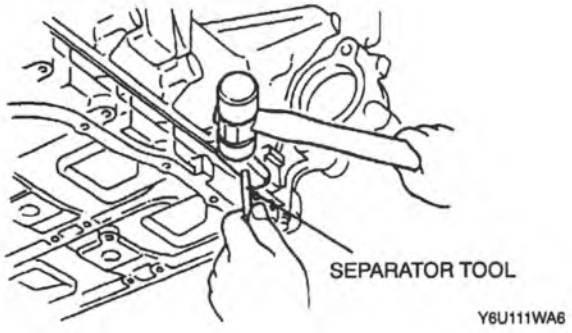
Y6U111WA4

2. Loosen the oil pan upper block bolts in two or three steps in the order shown.



Y6U111WA5

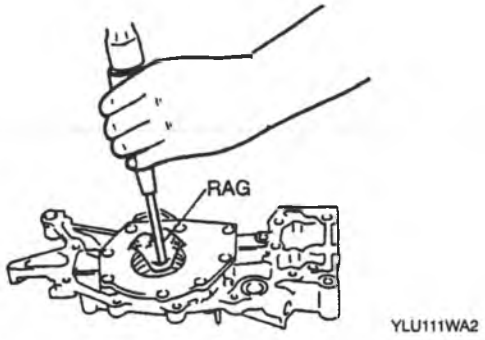
3. Remove the oil pan upper block using the separator tool.



Y6U111WA6

Oil Pump Removal Note

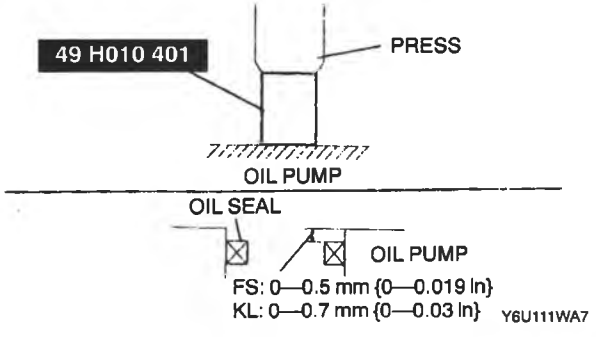
1. Remove the oil seal using a screwdriver protected with a rag.



YLU111WA2

Oil Pump Installation Note

1. Apply clean engine oil to a new oil seal.
2. Install the oil seal into the oil pump body by hand.
3. Press the oil seal into the oil pump body using the **SST**.

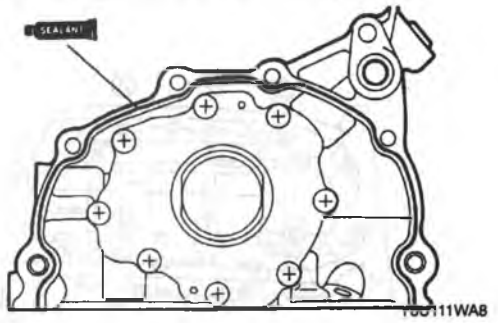


Y6U111WA7

4. Apply silicone sealant to the oil pump as shown.

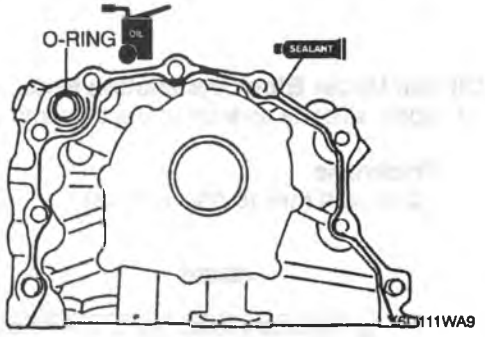
Thickness
1.0—2.0 mm {0.04—0.07 In}

FS



Y6U111WA8

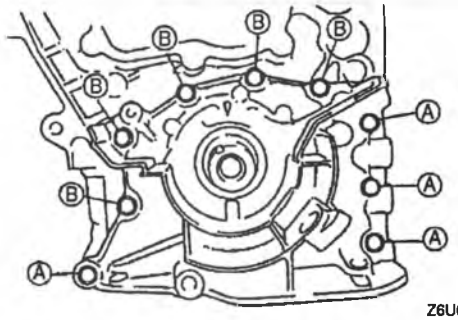
KL



Y6U111WA9

5. Apply clean engine oil to the new O-ring and install it into the oil pump body. (KL)
6. Install the oil pump bolt as shown. (KL)

Bolt length
A: 40 mm {1.6 in}
B: 25 mm {1.0 in}

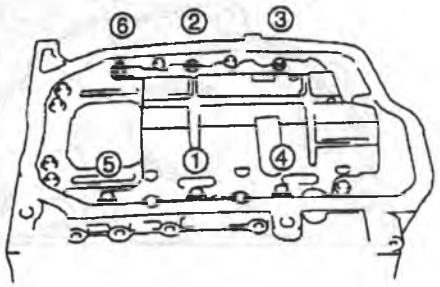


Z6U0111W001

Oil Baffle Installation Note

1. Install the oil baffle and tighten the bolts in 2 or 3 steps in the order shown.

Tightening torque
19—25 N·m {1.9—2.6 kgf·m, 14—18 ft·lbf}

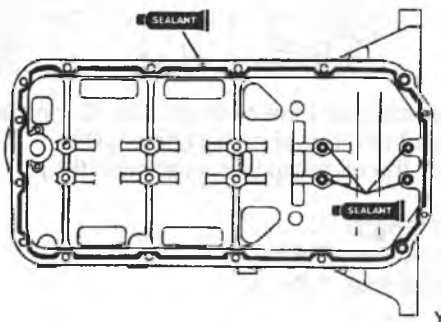


Z6U0111W002

Oil Pan Upper Block Installation Note

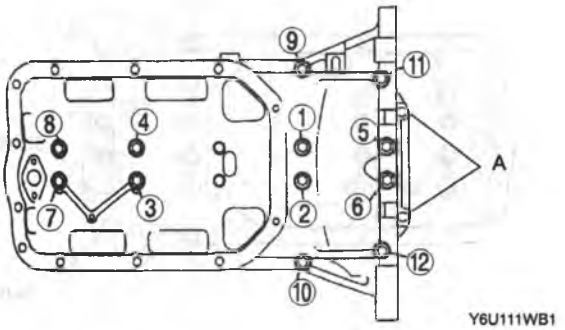
1. Apply silicone sealant to the oil pump as shown.

Thickness
2.0—3.0 mm {0.08—0.11 in}



Y6U111WB0

2. Tighten bolts A.
3. Tighten the oil pan upper block bolts in two or three steps in the order shown.



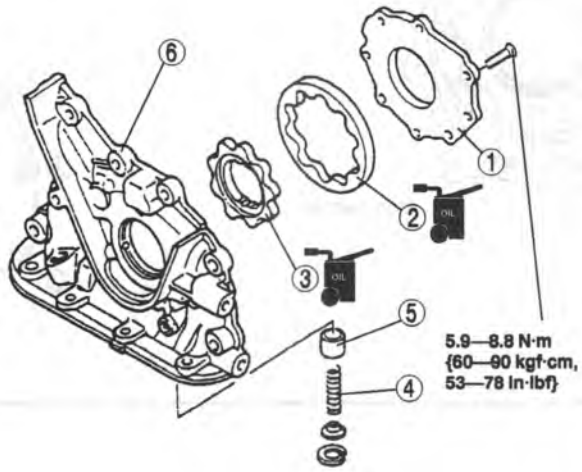
Y6U111WB1

OIL PUMP DISASSEMBLY/ASSEMBLY

Z6U011119220W02

1. Remove the oil pump. (See 01-11-5 OIL PUMP REMOVAL/INSTALLATION.)
2. Disassemble in the order indicated in the table.
3. Assemble in the reverse order of disassembly.

FS

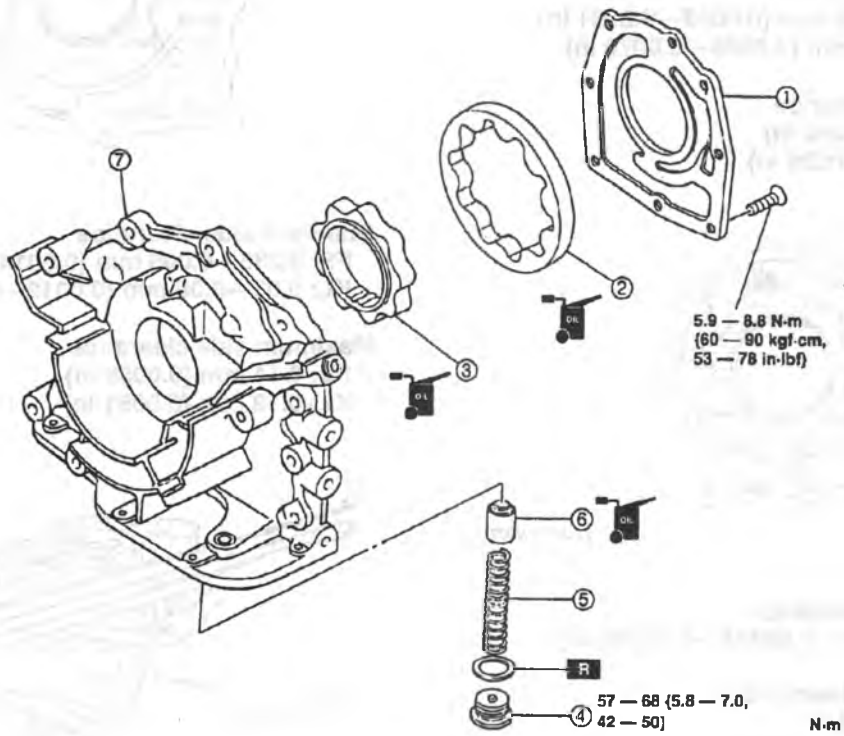


Z6U0111W003

1	Oil pump cover
2	Outer rotor
3	Inner rotor

4	Pressure spring
5	Control plunger
6	Oil pump body

KL



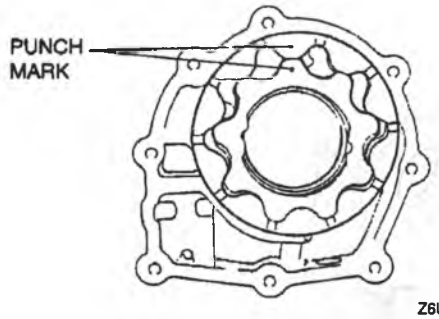
Z6U0111W004

1	Oil pump cover (See 01-11-10 Oil Pump Cover Installation Note)
2	Outer rotor
3	Inner rotor (See 01-11-10 Inner Rotor Installation Note)

4	Blind plug
5	Pressure spring
6	Control plunger
7	Oil pump body

Inner Rotor Installation Note

1. Install the inner rotor and outer rotor into the oil pump body with the marks aligned as shown.

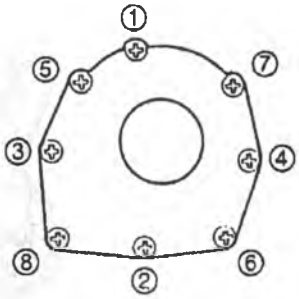


Z6U0111W005

Oil Pump Cover Installation Note

1. Install the oil pump cover and tighten the bolts in the order shown.

Tightening torque
5.9—8.8 N·m {60—90 kgf·cm, 53—78 in·lbf}



Z6U0111W006

OIL PUMP INSPECTION

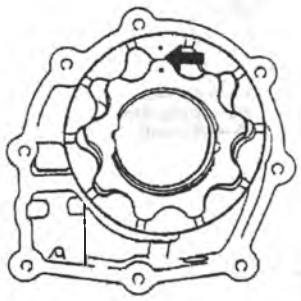
Z6U011119220W03

Rotor Clearance Inspection

1. Measure the following clearance.
   - Replace the rotor and/or pump body if necessary.

Standard tip clearance
FS: 0.130—0.206 mm {0.0052—0.0081 in}
KL: 0.02—0.18 mm {0.0008—0.0070 in}

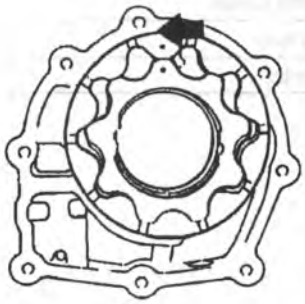
Maximum tip clearance
FS: 0.30 mm {0.012 in}
KL: 0.20 mm {0.0079 in}



Z6U0111W007

Standard body clearance
0.113—0.186 mm {0.00445—0.00732 in}

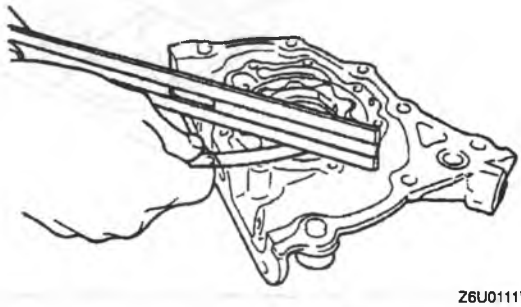
Maximum body clearance
0.22 mm {0.0086 in}



Z6U0111W008

Standard side clearance
FS: 0.035—0.095 mm {0.0014—0.0037 in}
KL: 0.03—0.08 mm {0.0012—0.0031 in}

Maximum side clearance
FS: 0.14 mm {0.0055 in}
KL: 0.13 mm {0.0051 in}



Z6U0111W009

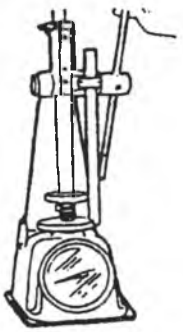
Pressure Spring Inspection

FS

1. Apply pressing force to the pressure spring and check the spring height. Replace the pressure spring if necessary.

Pressing force
97.7—107.4 N
{9.96—10.96kgf, 21.92—24.11 lbf}

Standard height
33.50 mm {1.319 in}

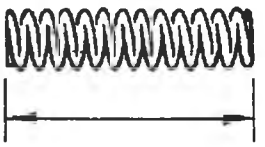


Y6U111WB3

KL

1. Measure the free length of the pressure spring.
   - Replace the pressure spring if necessary.

Free length
46.79 mm {1.842 in}



Z6U0111W010

01-12 COOLING SYSTEM

COOLING SYSTEM SERVICE WARNINGS 01-12-1
ENGINE COOLANT LEVEL INSPECTION 01-12-1
ENGINE COOLANT REPLACEMENT 01-12-2
ENGINE COOLANT LEAKAGE INSPECTION 01-12-3
RADIATOR CAP INSPECTION 01-12-3
RADIATOR REMOVAL/INSTALLATION 01-12-4
THERMOSTAT REMOVAL/INSTALLATION 01-12-4
Thermostat Installation Note 01-12-5
THERMOSTAT INSPECTION 01-12-5
WATER PUMP REMOVAL/INSTALLATION 01-12-6
COOLING FAN MOTOR INSPECTION 01-12-6
FAN MOTOR REMOVAL/INSTALLATION 01-12-7
Fan Component Removal Note 01-12-7
COOLING FAN RELAY INSPECTION 01-12-7

COOLING SYSTEM SERVICE WARNINGS

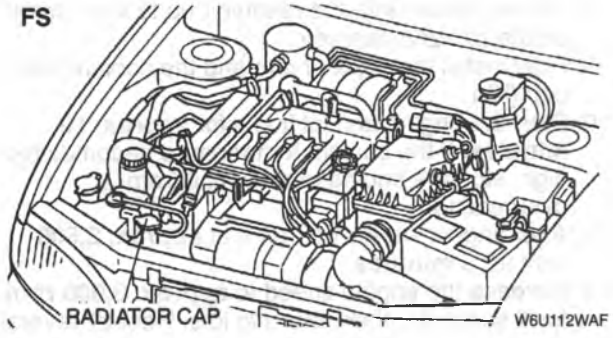
Z6U011201004W01

Warning

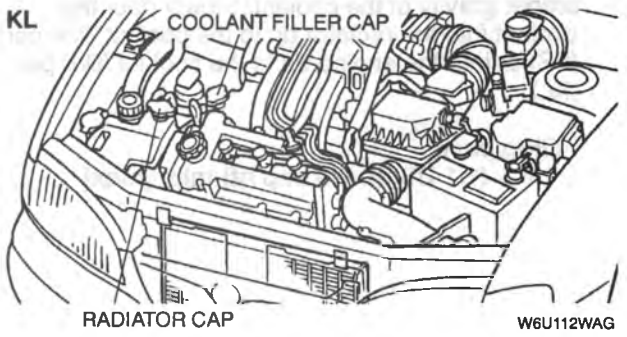
- **Removing the radiator cap or loosening the radiator drain plug while the engine is running, or when the engine and radiator are hot is dangerous. Scalding coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes. When you're sure all the pressure is gone, press down on the cap—still using a cloth—turn it, and remove it.**
- **Hot engines and engine coolant can cause severe burns. Turn off the engine and wait until it and the engine oil have cooled before draining the engine coolant.**

ENGINE COOLANT LEVEL INSPECTION

1. Remove the radiator cap (FS) or coolant filler cap (KL).



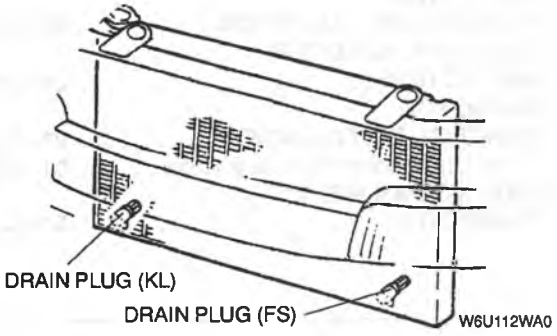
Z6U011215001W01



2. Verify that the coolant level is near the bottom line of the radiator filler neck (FS) or coolant filler neck (KL).
3. Verify that the coolant level on the coolant reservoir is between the F and L marks.
4. Add coolant if necessary.

ENGINE COOLANT REPLACEMENT

1. Drain the coolant in the coolant reservoir.
2. Remove the radiator cap and the coolant filler cap (KL) and loosen the radiator drain plug.



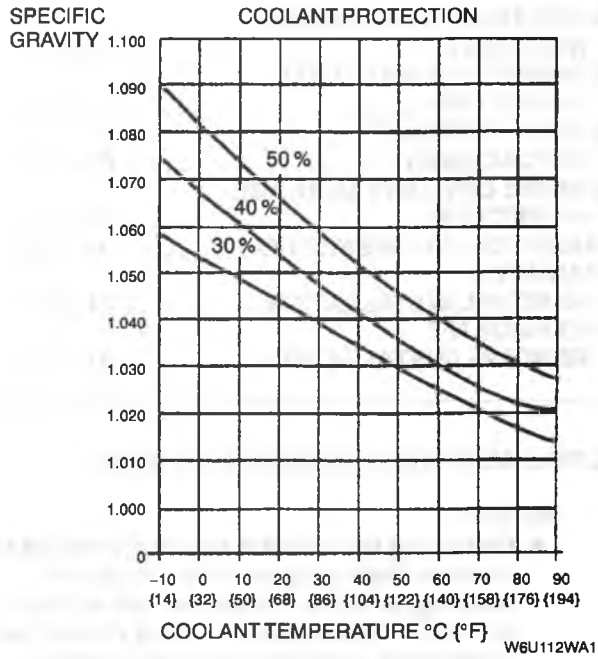
3. Drain the coolant into a container.
4. Flush the cooling system with water until all traces of color are gone.
5. Leave the system until it drains completely.
6. Tighten the radiator drain plug.

Caution
- **Do not use non-genuine Mazda orange colored or non-equivalent coolant. Do not mix green coolant with orange coolant. This could damage the cooling system.**
- **Use only soft (demineralized) water in the coolant mixture. Water that contains minerals will reduce the coolant effectiveness.**

7. Referring to the following graph and chart, select proper gravity of the coolant. Slowly pour the coolant into the radiator up to the coolant filler port (FS) or into the engine up to the coolant filler port (KL).

Filling pace
1.0 L {1.1 US qt, 0.9 Imp qt}/min. [max]

Z6U011215001W02



Antifreeze solution mixture percentage

Coolant protection	Volume percentage		Gravity at 20°C {68°F}
	Water	Coolant	
Above -16°C {3°F}	65	35	1.054
Above -2°C {-15°F}	55	45	1.066
Above -4°C {-40°F}	45	55	1.078

8. Fill the coolant into the reservoir up to the F mark on the coolant reservoir.
9. Fully install the radiator cap and the coolant filler cap (KL).
10. Start the engine and let it idle for **approx. 10 minutes**. If the coolant temperature becomes too high, stop the engine to prevent it from overheating.
11. After engine warms up, run it at **approx. 2,500 rpm** for **5 minutes**.
12. Increase the engine speed to **approx. 3,000 rpm** for **5 seconds**, then return to idle. Repeat several times.
13. Stop the engine and wait until it is cool.
14. Inspect the coolant level.
    - If it is low, repeat steps 8—13.
15. Inspect for the coolant leakage.

ENGINE COOLANT LEAKAGE INSPECTION

Z6U011215001W03

1. Inspect the coolant level. (See 01-12-1 ENGINE COOLANT LEVEL INSPECTION.)
2. Remove the radiator cap.
3. Connect a radiator cap tester and the **SSTs** to the radiator filler neck (FS) or reservoir filler neck (KL).



W6U112WA2

Caution
- **Applying more than 123 kPa {1.25 kgf/cm^2, 17.8 psi} can damage the hoses, fittings, and other components, and cause leaks.**

4. Apply pressure to the radiator.

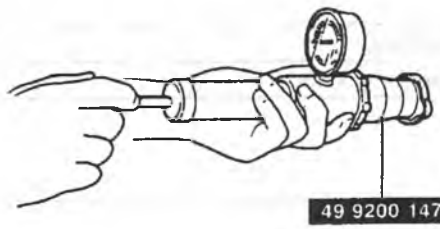
Pressure
123 kPa {1.25 kgf/cm^2, 17.8 psi}

5. Verify that the pressure is held.
   - If not, inspect the system for coolant leakage.

RADIATOR CAP INSPECTION

Z6U011215201W01

1. Attach the radiator cap to a radiator cap tester with the **SST**. Apply pressure gradually.



W6U112WA3

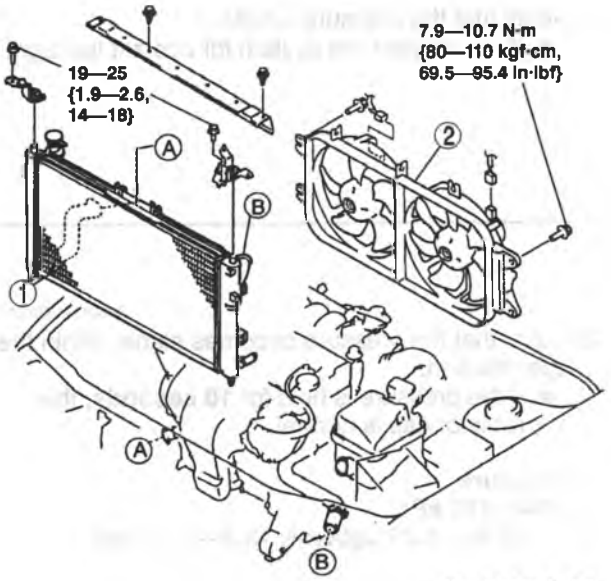
2. Verify that the pressure becomes stable within the specification.
   - If the pressure is held for **10 seconds**, the radiator cap is normal.

Pressure
94—122 kPa
{0.95—1.25 kgf/cm^2, 13.5—17.7 psi}

RADIATOR REMOVAL/INSTALLATION

1. Disconnect the negative battery cable.
2. Drain the engine coolant. (See 01-12-2 ENGINE COOLANT REPLACEMENT.)
3. Remove the fresh-air duct.
4. Remove the oil pipe. (FS: ATX)
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.

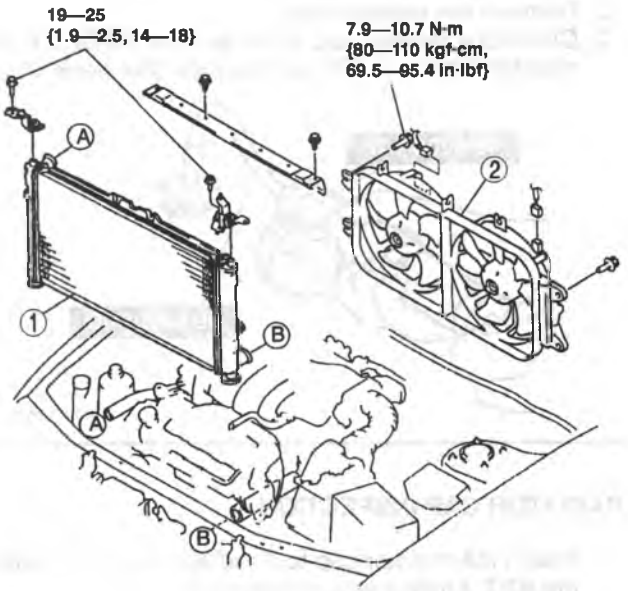
FS



N·m {kgf·m, ft·lbf}
Y6U112WA2

Z6U011215200W01

KL



N·m {kgf·m, ft·lbf}
Y6U112WA1

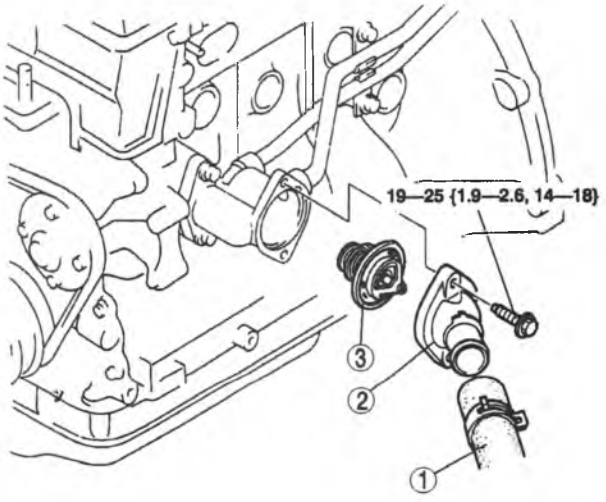
1	Radiator
2	Fan component

THERMOSTAT REMOVAL/INSTALLATION

1. Disconnect the negative battery cable.
2. Remove the ignition coil (KL).
3. Drain the engine coolant. (See 01-12-2 ENGINE COOLANT REPLACEMENT.)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.

Z6U011215171W01

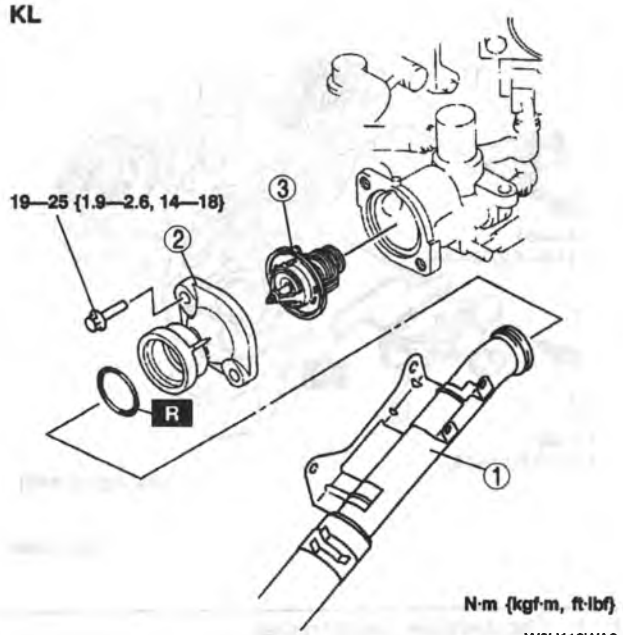
FS



N·m {kgf·m, ft·lbf}
W6U112WA7

1	Lower radiator hose
2	Thermostat cover
3	Thermostat (See 01-12-5 Thermostat Installation Note)

KL

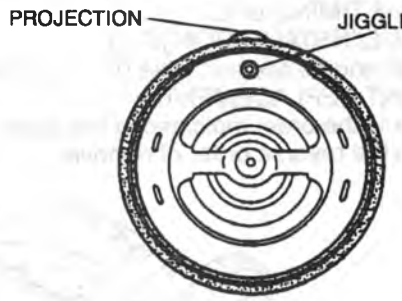


W6U112WA8

1	Water inlet pipe (MTX), Oil cooler (ATX)
2	Thermostat cover
3	Thermostat (See 01-12-5 Thermostat Installation Note)

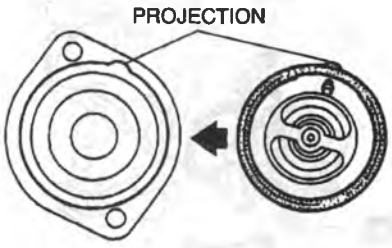
Thermostat Installation Note

1. Verify that the jiggle pin is aligned with the projection of the thermostat gasket as shown.



W6U112WAL

2. Install the thermostat into the thermostat case, aligning the projection on the gasket to the thermostat case as shown.



W6U112WA9

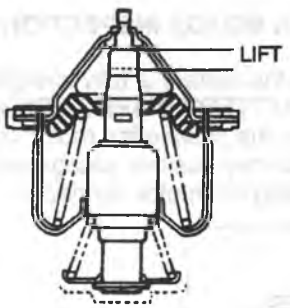
THERMOSTAT INSPECTION

Z6U011215171W02

Inspect the thermostat for the following. Replace if necessary.

- Open valve in room temperature
- Opening temperature and lift of the valve

Initial-opening temperature	°C {°F}	80—84 {176—183}
Full-open temperature	°C {°F}	95 {203}
Full-open lift	mm {in}	8.5 {0.33} min.

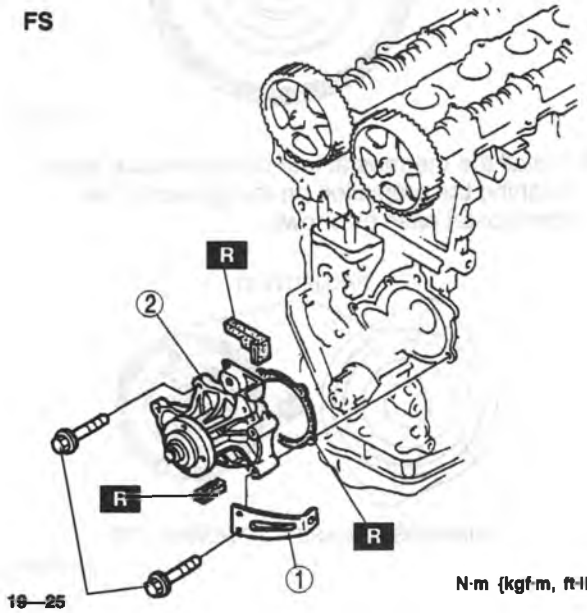


W6U112WAH

WATER PUMP REMOVAL/INSTALLATION

1. Remove the timing belt. (See 01-10A-6 TIMING BELT REMOVAL/INSTALLATION [FS].) (See 01-10B-6 TIMING BELT REMOVAL/INSTALLATION [KL].)
2. Drain the engine coolant. (See 01-12-2 ENGINE COOLANT REPLACEMENT.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

FS

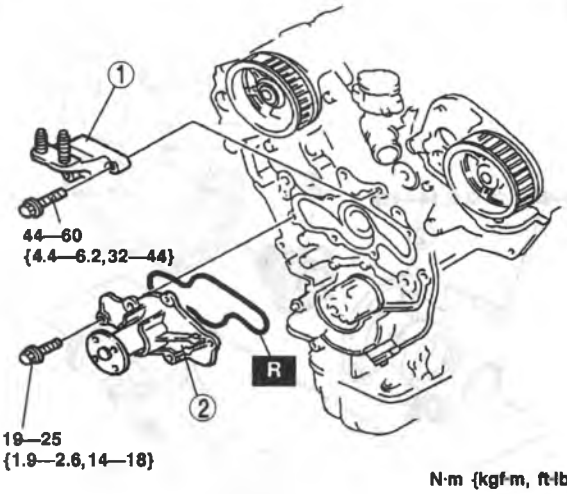


W6U112WAA

1	P/S oil pump adjuster
2	Water pump

Z6U011215010W01

KL



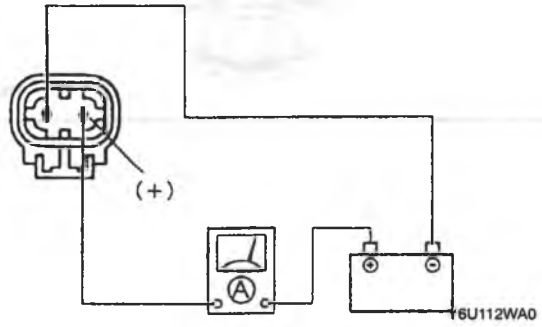
W6U112WAB

1	No.3 engine mount bracket
2	Water pump

COOLING FAN MOTOR INSPECTION

Z6U011215025W01

1. Verify that the battery is fully charged. (See 01-17-1 BATTERY INSPECTION.)
2. Disconnect the cooling fan motor connector.
3. Connect battery positive voltage and an ammeter to the cooling fan motor connector.



W6U112WA0

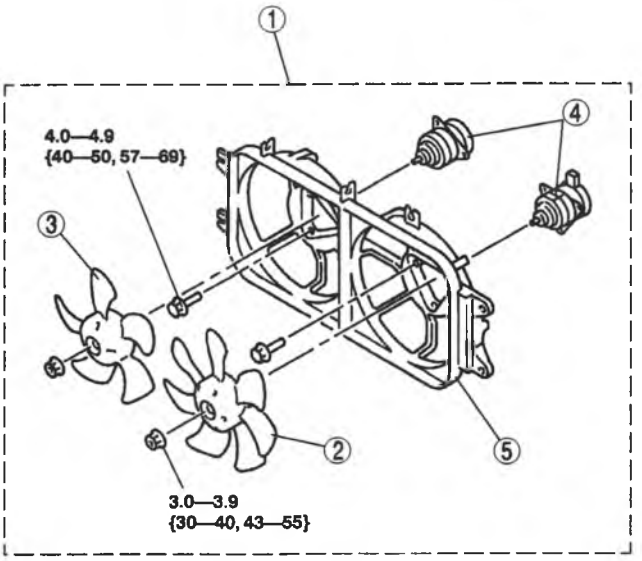
4. Verify that the cooling fan motor operates smoothly at the standard current draw.
   - If not as specified, replace the cooling fan motor.

Item	Engine	
	FS	KL
Current (A)	4.3—7.3	

FAN MOTOR REMOVAL/INSTALLATION

Z6U011215025W02

1. Disconnect the negative battery cable.
2. Remove the fresh-air duct.
3. Remove in the order indicated in the table.



N·m {kgf·m, ft·lbf}
Y6U112WA3

1	Fan Component (See 01-12-7 Fan Component Removal Note)
2	Cooling fan
3	Condenser fan
4	Fan motor
5	Radiator cowling

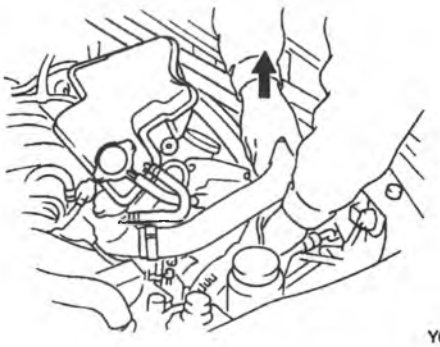
Fan Component Removal Note

1. Remove the radiator bracket.
2. Remove the radiator reservoir with the hoses still connected.

Note

- For KL engine, move the upper radiator hose to lift the radiator.

3. While lifting the radiator, remove the lower bolt of the radiator cowling.

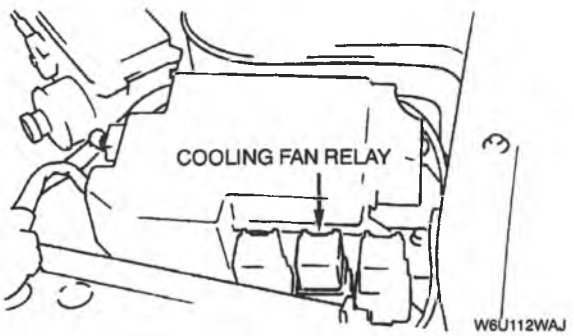


Y6U112WA4

COOLING FAN RELAY INSPECTION

Z6U011267730W01

1. Disconnect the negative battery cable.
2. Remove the cooling fan relay.
   - If not as specified, replace the cooling fan relay.



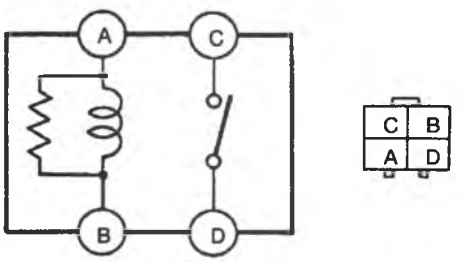
W6U112WAJ

3. Apply battery positive voltage and inspect for continuity between terminals of the cooling fan relay using an ohmmeter.

○—○ : Continuity

Step	Terminal			
	A	B	C	D
1	○	○		
2	B+	GND	○	○

W6U112WAK



W6U112WAE

01-13A INTAKE-AIR SYSTEM [FS]

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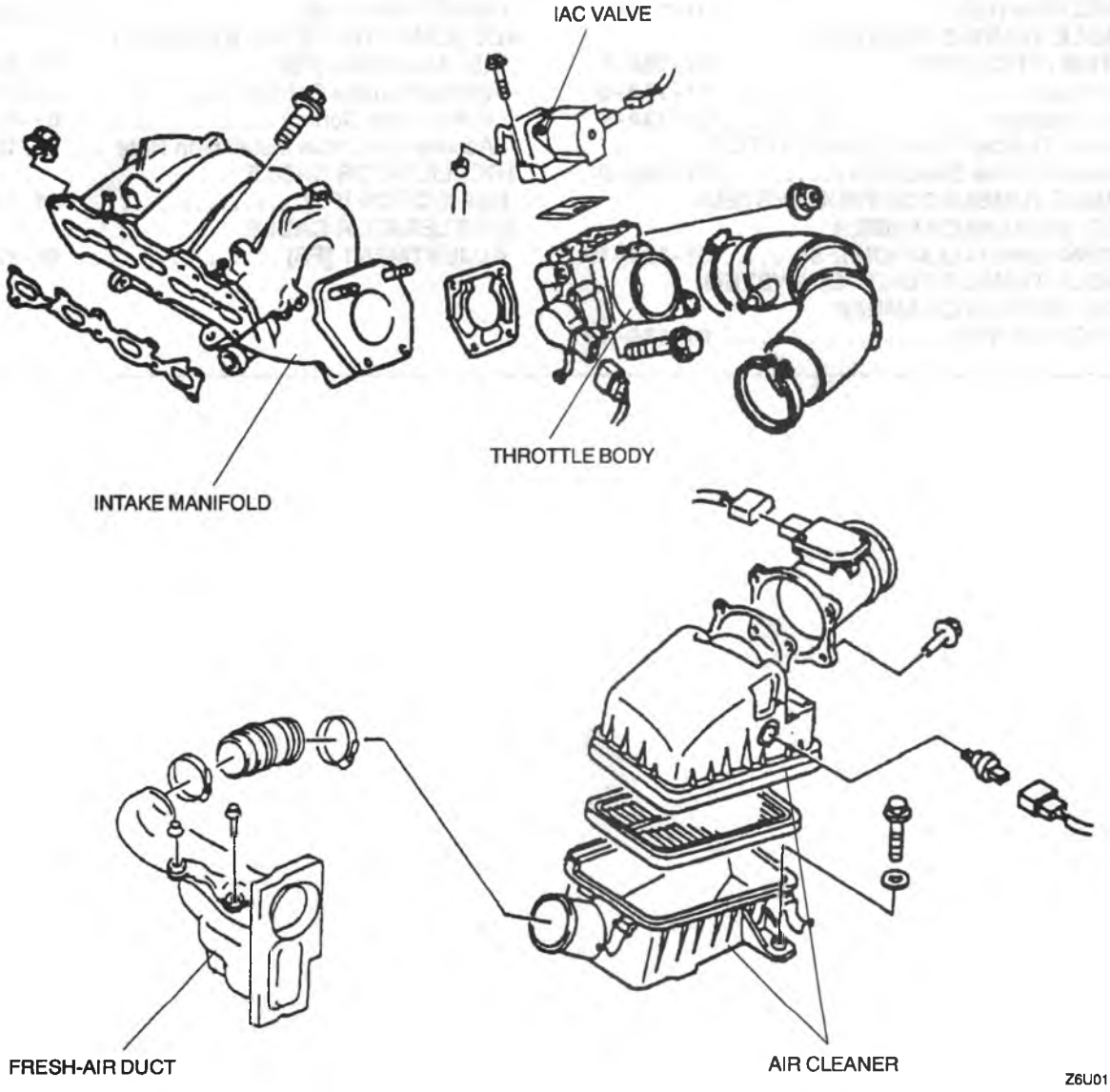
INTAKE-AIR SYSTEM [FS]

Z6U011301005W01

The intake-air system is composed of the following parts:

- The fresh-air duct channels fresh air to the air cleaner and is equipped with a resonance chamber to reduce induction noise.
- The air cleaner removes dust and particles to prevent engine contamination.
- The mass airflow (MAF) sensor measures the intake air volume.
- The air hose directs fresh air to the throttle body.
- The throttle body controls the overall quantity of air provided to the engine and is equipped with an air adjusting screw (AAS) for the idle speed adjustment.
- The idle air control (IAC) valve directs by-pass air to the throttle body to maintain the proper engine idle speed under various conditions. It is controlled by the powertrain control module (PCM).
- The intake manifold distributes the fresh air into the each cylinder. It is equipped with the variable tumble control system (VTCS) shutter valve for emission performance and fuel economy improvements.

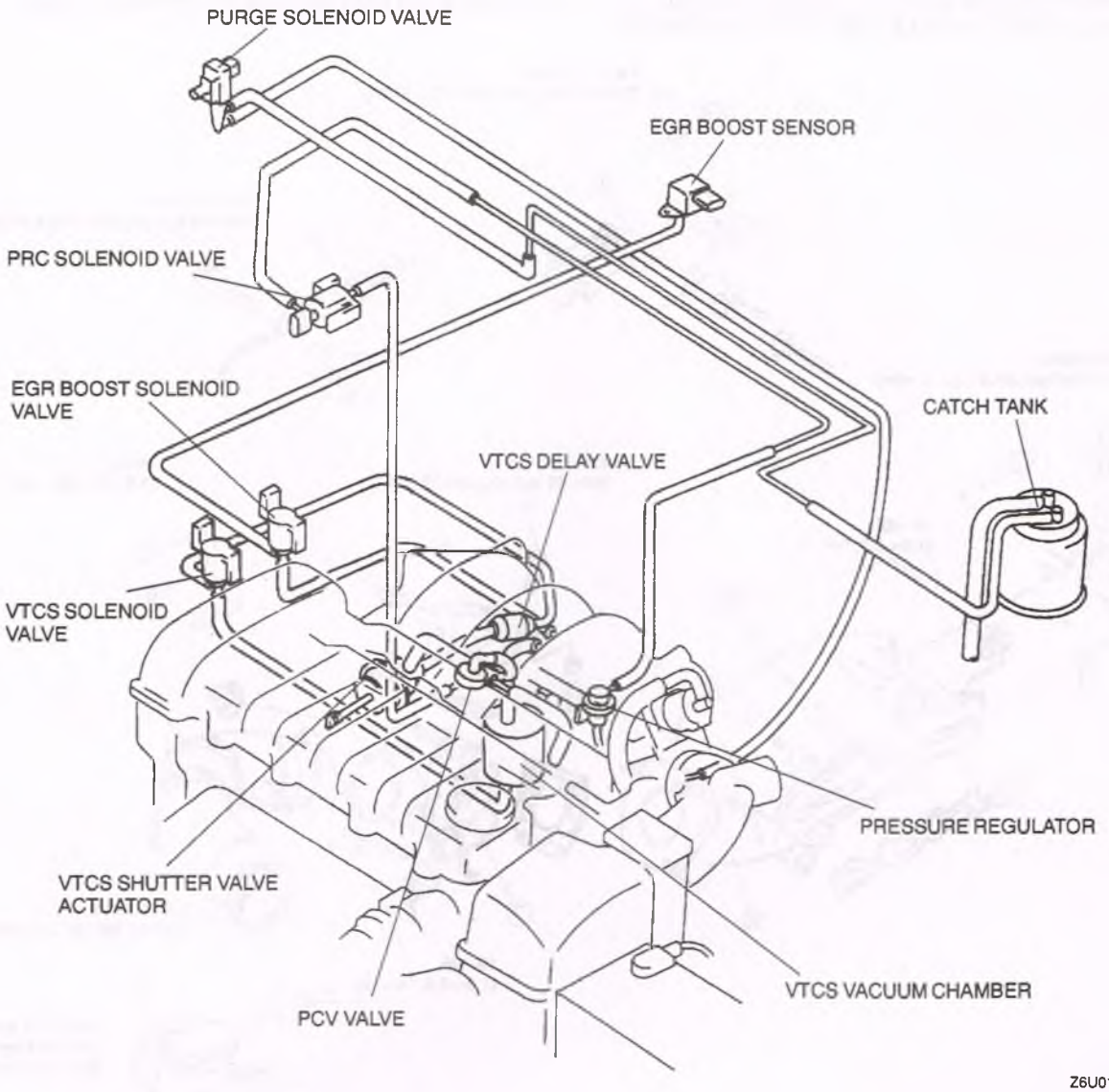
Structural View



Z6U0102W001

VACUUM HOSE ROUTING DIAGRAM [FS]

Z6U011320030W01



Z6U0102W002

INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS]

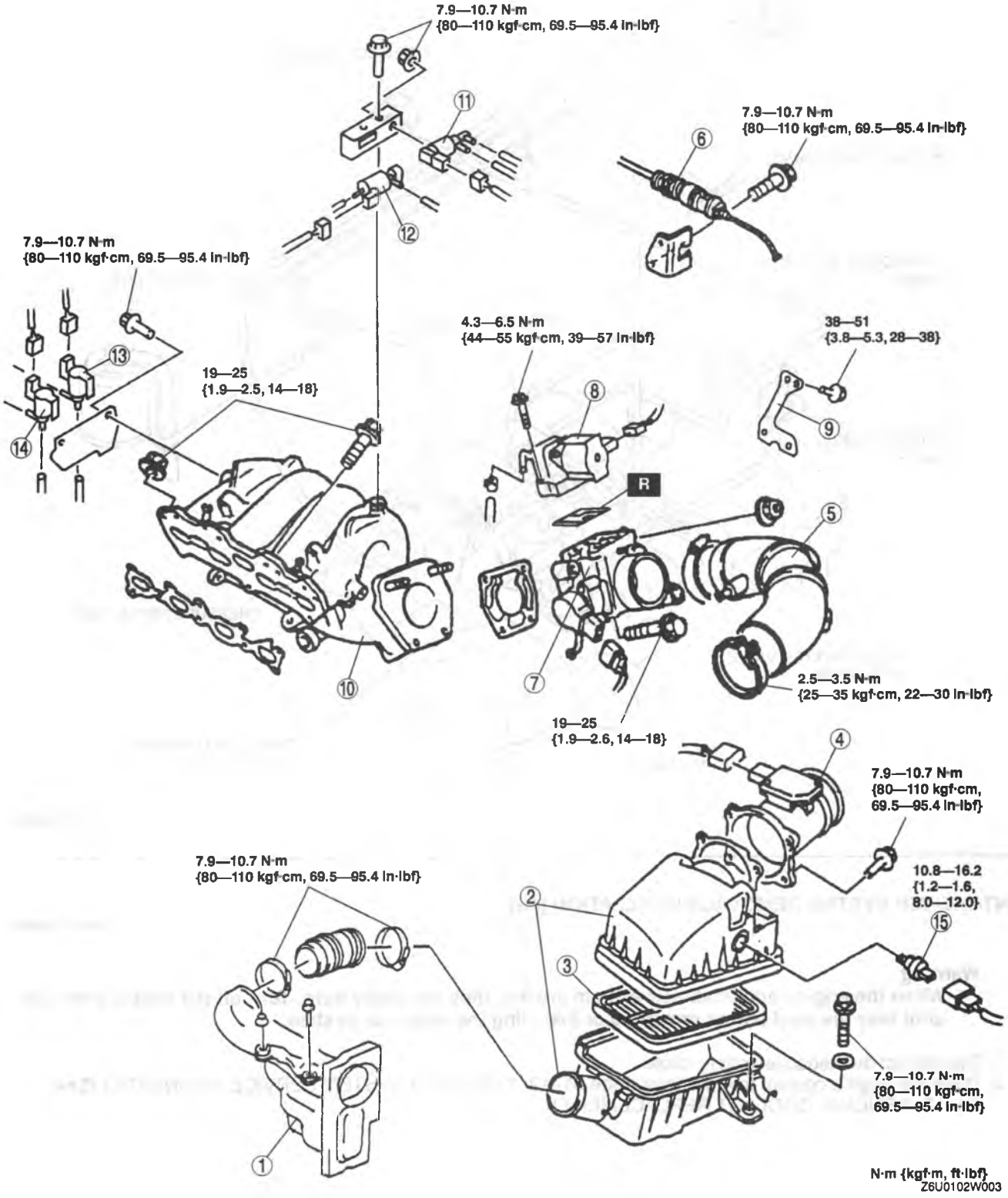
Z6U011313000W01

Warning

- **When the engine and intake-air system are hot, they can badly burn. Turn off the engine and wait until they are cool before removing or installing the intake-air system.**

1. Disconnect the negative battery cable.
2. Drain the engine coolant from radiator. (See 01-12-1 COOLING SYSTEM SERVICE WARNINGS.) (See 01-12-2 ENGINE COOLANT REPLACEMENT.)

3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.
5. Refill the engine coolant to radiator. (See 01-12-1 COOLING SYSTEM SERVICE WARNINGS.) (See 01-12-2 ENGINE COOLANT REPLACEMENT.)



1	Fresh-air duct
2	Air cleaner
3	Air cleaner element

4	Mass air flow sensor
5	Air hose
6	Accelerator cable

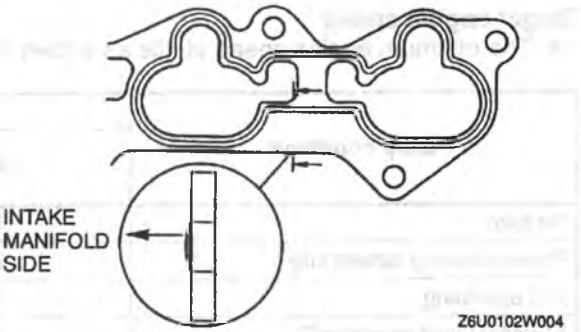
7	Throttle body
8	IAC valve
9	Intake manifold stay
10	Intake manifold (See 01-13A-5 Intake Manifold Removal Note) (See 01-13A-5 Intake Manifold Installation Note)
11	Purge solenoid valve
12	PRC solenoid valve
13	EGR boost solenoid valve
14	VTCS solenoid valve
15	Intake air temperature sensor

Intake Manifold Removal Note

Warning
- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and 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 the "BEFORE REPAIR PROCEDURE". (See 01-14-3 BEFORE REPAIR PROCEDURE.)**

- To remove the intake manifold, remove the fuel distributor, EGR pipe, and EGR valve.

Intake Manifold Installation Note
- To install the intake manifold gasket, make sure that the convex side of gasket is faced to the intake manifold side.



Z6U0102W004

IDLE AIR CONTROL SYSTEM [FS]

Z6U011320661W01

Description
Operation
- The PCM carries out idle air control through the following modes.
  i. Deceleration mode
  ii. Closed loop control mode

Deceleration mode (i.e. closed or partially closed throttle)
- During deceleration the PCM enables the IAC to adjust air flow to the throttle body to prevent engine stalling.

Closed loop control mode
- The following conditions must be met for idle air control in closed loop control mode.
  i. The vehicle speed is below 4 km/h {2.5 mph}.
  ii. The PCM determines the neutral condition based on the input by the neutral/clutch switch. (MTX only)
- The purpose of closed loop control mode is to maintain engine stability when idle through feedback control.

Adoptive air compensation
- The PCM memorizes the idle air trim level required to maintain the target engine speed.
  When the following conditions exist, the PCM prohibits adaptive air compensation.
  i. During closed loop control mode.
  ii. During no load condition (Neutral [MTX], N position [ATX]) instead of the closed loop control.(When changes of engine speed are above specification)
  iii. When it does not meet condition (1) or (2) above, and the charging efficiency is below the specified value.
- When the idle air trim correction is above the specified value, the PCM judges the malfunction in the idle air control system, and stores a DTC.
- If the Keep Alive RAM has been reset, the idle air trim learning correction is also cleared, the engine must idle for 15 minutes at each of the following four separated modes to learn the new idle air trim.

Transaxle position	A/C operation
Neutral position (MTX)P or N position (ATX)	ON
	OFF
Other than P or N position (ATX)	ON
	OFF

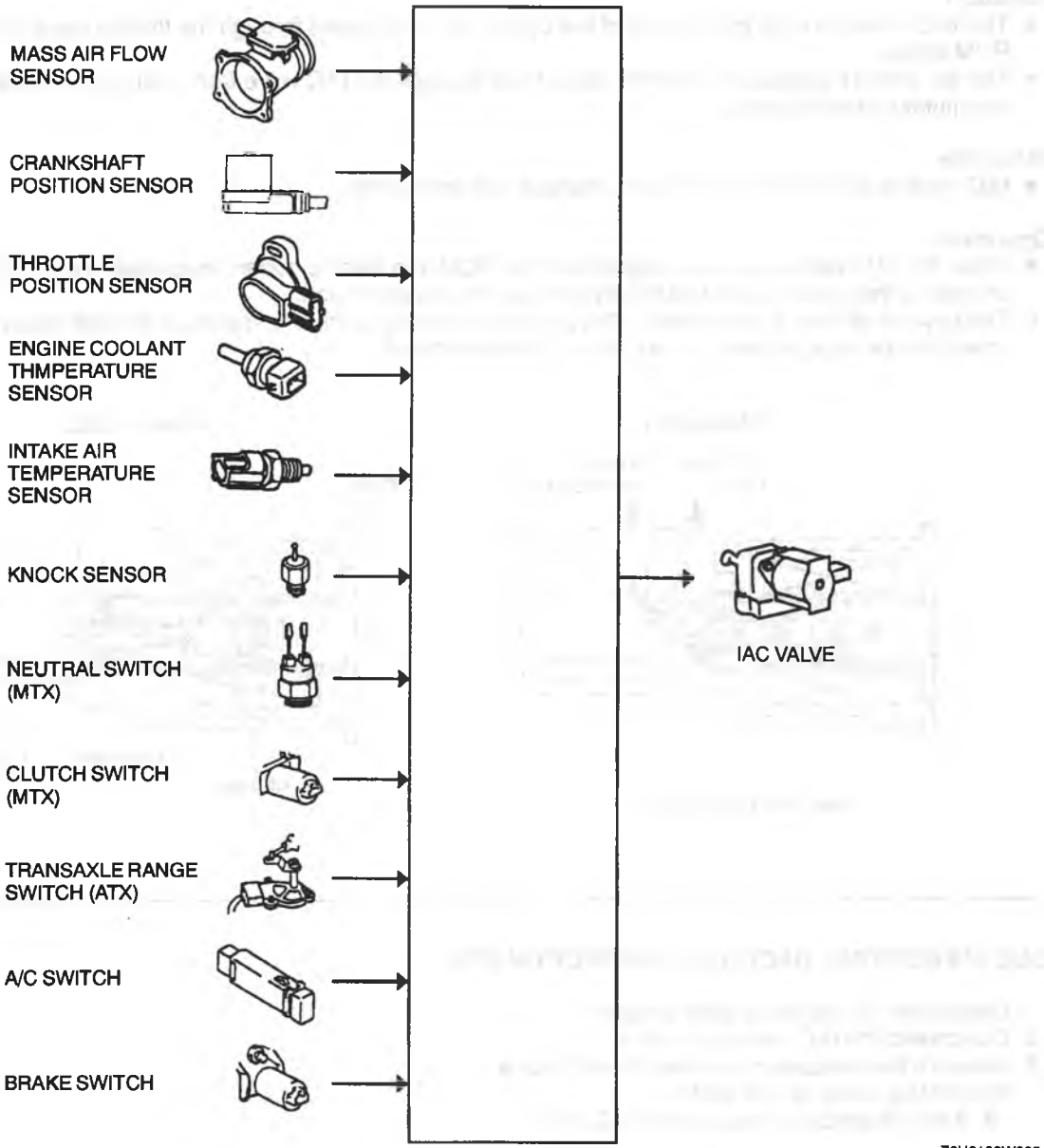
Target engine speed

- The optimum engine speed at idle as shown in the following table.

Load condition	Idle speed (rpm)		
	MTX	ATX	
		N, P position	D range
No load	700	650	650
Power steering turned fully	700	650	650
A/C operating	775	650	650
Electrical load operating*1	775	675	675

*1 : Head, cooling fan, fan switch above second position, and rear window defroster

Block Diagram



Idle Air Control (IAC) Valve Description

Function

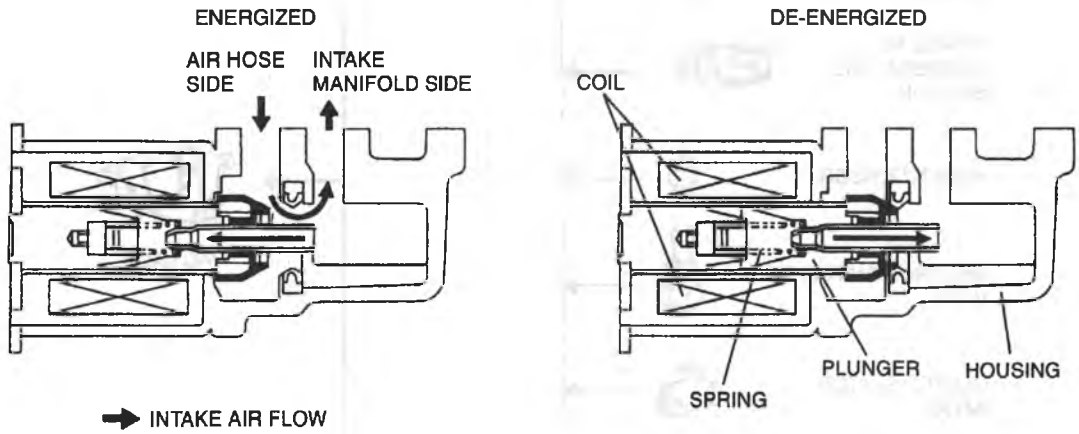
- The IAC valve controls the amount of the bypass air that passes through the throttle valve ,IAC controlled by a PCM signal.
- The air, which bypasses the throttle valve, flows through the IAC valve from inlet port (air hose side) to outlet port (intake manifold side).

Structure

- IAC valve is composed of a housing, plunger, coil and spring.

Operation

- When the IAC valve receives a signal from the PCM, the electric current is applied to the coil circuit. The plunger is then pulled back to allow bypass air into the outlet port.
- The bypass air flow is controlled by the period of time that current is applied to the coil circuit. This current opens the plunger, allowing bypass air into the outlet port.



Z6U0102W006

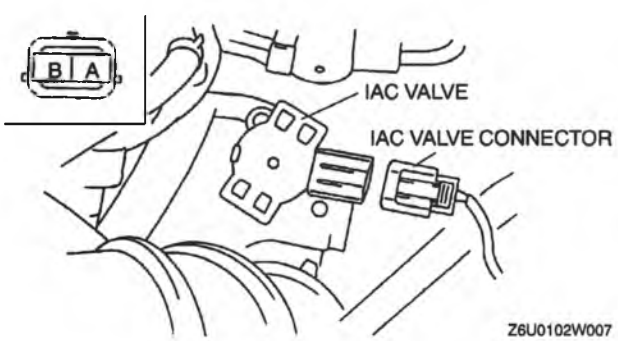
IDLE AIR CONTROL (IAC) VALVE INSPECTION [FS]

Z6U011320661W02

1. Disconnect the negative battery cable.
2. Disconnect the IAC valve connector.
3. Measure the resistance between the IAC valve terminal by using an ohmmeter.
   - If not as specified, replace the IAC valve.

Resistance

7.7—9.3 Ω [23 °C {73.4 °F}]



Z6U0102W007

VARIABLE TUMBLE CONTROL SYSTEM (VTCS) [FS]

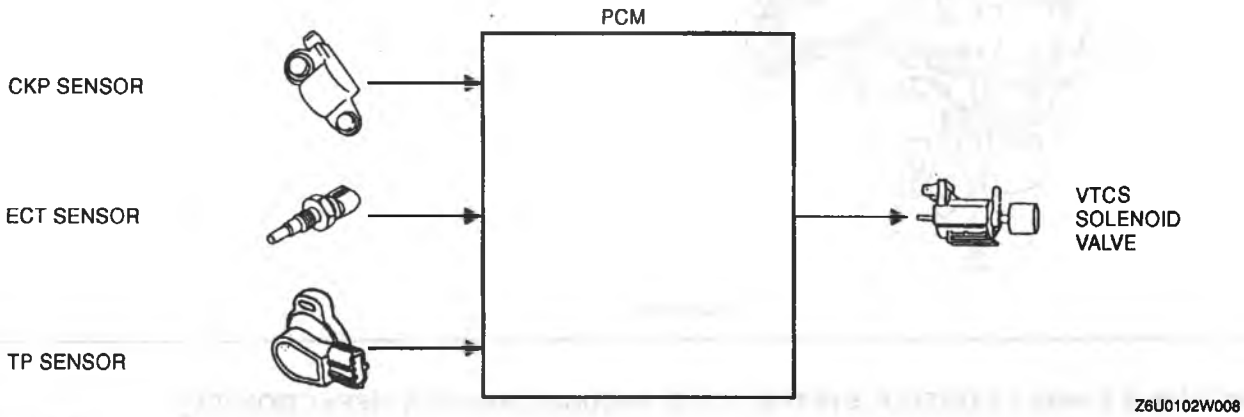
Z6U011313012W01

Description

Operation

- The PCM turns the variable tumble control solenoid valve ON to close the crescent shaped shutter valve in the intake manifold when all of the following conditions have been met:
  i. ECT is below 65 °C {149 °F}.
  ii. Engine speed is below 3,000 rpm.
  iii. Throttle opening angle is below preset value.
  iv. ECT sensor and TP sensor are not malfunctioning.
- The PCM turns the VTCS solenoid valve OFF to maintain startability and stability during engine cranking and for 0.15 second after engine is started.

Block Diagram



Z6U0102W008

Variable Tumble Control System (VTCS) Solenoid Valve Description

Function

- VTCS solenoid valve supplies intake manifold vacuum or atmosphere to the VTCS for shutter valve actuation.

Structure

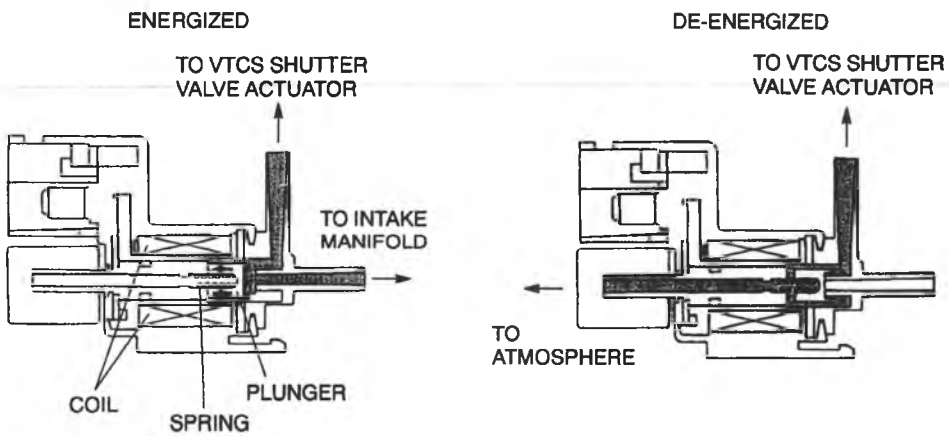
- VTCS solenoid valve is mainly composed of a coil, spring, plunger and filter.

Operation (energized)

- The plunger is pulled back to open the air passage between the VTCS delay valve and VTCS vacuum chamber, which applies the intake manifold vacuum to the VTCS shutter valve actuator.

Operation (de-energized)

- The plunger is returned forward to open the air passage between the VTCS delay valve and the VTCS solenoid valve air filter applies the vacuum is then vented to atmosphere and the VTCS shutter valve actuator.



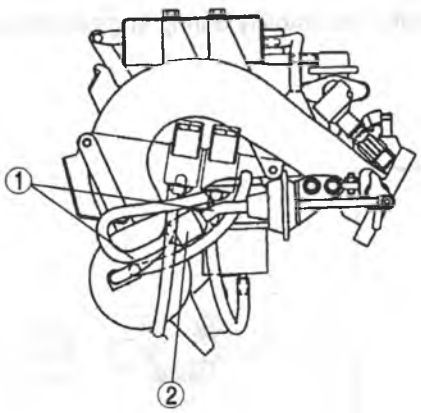
Z6U0102W009

VARIABLE TUMBLE CONTROL SYSTEM (VTCS) VACUUM CHAMBER REMOVAL/INSTALLATION [FS]

Z6U011320331W01

1. Disconnect the negative battery cable.
2. Remove the intake manifold.(See 01-13A-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Vacuum hose
2	VTCS vacuum chamber

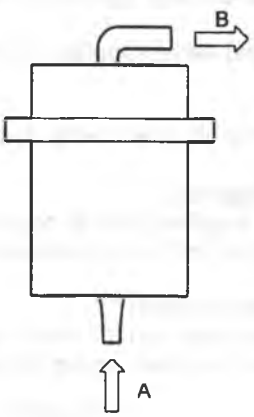


Z6U0102W010

VARIABLE TUMBLE CONTROL SYSTEM (VTCS) VACUUM CHAMBER INSPECTION [FS]

Z6U011320331W02

1. Remove the VTCS vacuum chamber.(See 01-13A-10 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) VACUUM CHAMBER REMOVAL/INSTALLATION [FS].)
2. Blow through port A and verify that the air flows from port B.
   - If not as specified, replace the VTCS vacuum chamber.
3. Blow through port B and verify that the air does not flows from port A.
   - If not as specified, replace the VTCS vacuum chamber.



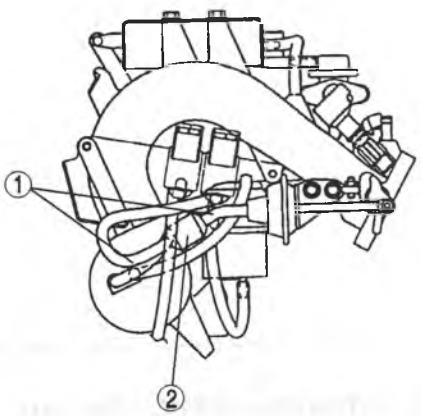
Z6U0102W011

VARIABLE TUMBLE CONTROL SYSTEM (VTCS) DELAY VALVE REMOVAL/INSTALLATION [FS]

Z6U011318800W01

1. Disconnect the negative battery cable.
2. Remove the intake manifold.(See 01-13A-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Vacuum hose
2	VTCS delay valve

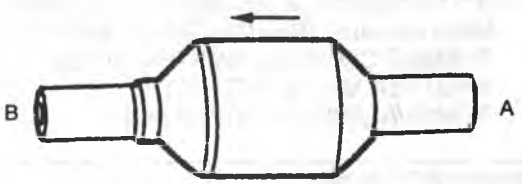


Z6U0102W010

VARIABLE TUMBLE CONTROL SYSTEM (VTCS) DELAY VALVE INSPECTION [FS]

Z6U011318800W02

1. Remove the VTCS delay valve.(See 01-13A-11 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) DELAY VALVE REMOVAL/INSTALLATION [FS].)
2. Blow through port A and verify that the air flows from port B.
   - If not as specified, replace the VTCS delay valve.
3. Blow through port B and verify that the air does not flow from port A.
   - If not as specified, replace the VTCS delay valve.



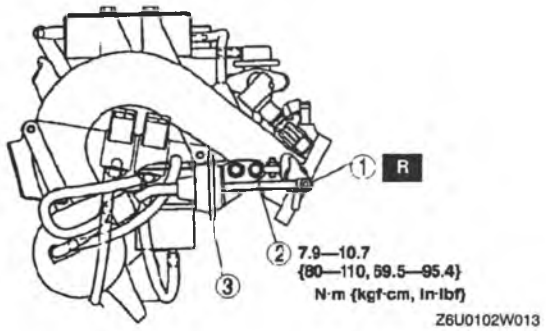
Z6U0102W012

VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [FS]

Z6U011320153W01

1. Disconnect the negative battery cable.
2. Remove the intake manifold.(See 01-13A-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	E ring
2	Bolt
3	VTCS shutter valve actuator



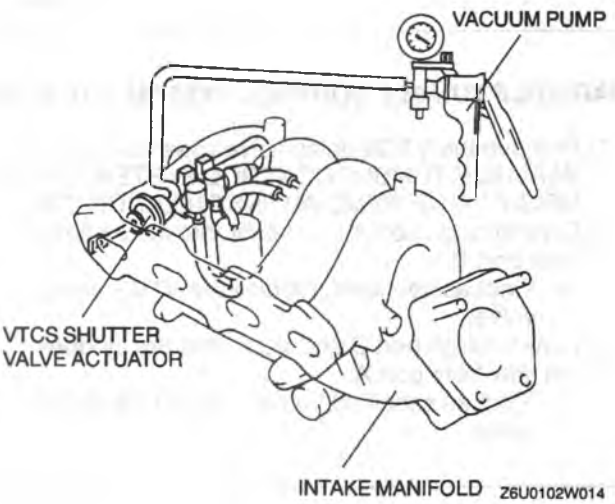
Z6U0102W013

VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR INSPECTION [FS]

Z6U011320153W02

1. Disconnect the vacuum hose from the VTCS shutter valve actuator.
2. Connect a vacuum pump to the VTCS shutter valve actuator.
3. Apply pressure slowly and inspect the rod movement of the VTCS shutter valve actuator under the following condition.
   - If not as specified, replace the VTCS shutter valve actuator. (See 01-13A-12 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [FS].)

Pressure (kPa {mmHg, inHg})	Rod movement
Above -1.3 {-10, -0.39}	Not pulled
-1.3— -4 {-10— -30, -0.40— -1.18}	Start to move
Below -25.3 {-190, -7.48}	Fully pulled



Z6U0102W014

   - If as specified, but "VTCS Operation Inspection" failed, inspect the vacuum hoses for improper routing, kinks or leakage, and go to Step 4.g
4. Disconnect the vacuum pump to the VTCS shutter valve actuator.
5. Reconnect the vacuum hose from the VTCS shutter valve actuator.

VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SOLENOID VALVE INSPECTION [FS]

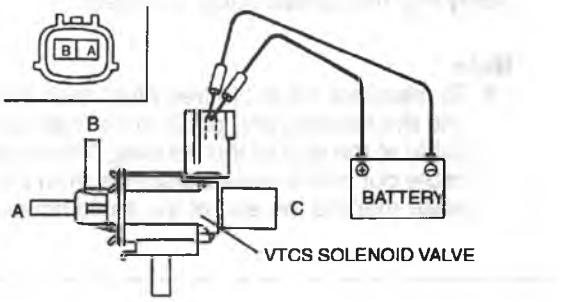
Z6U011318745W01

1. Remove the VTCS solenoid valve.
2. Inspect for the air flow inspection each port under the following condition.
   - If as specified, replace the VTCS solenoid valve.

O—O : Continuity O=O : Airflow

Step	Terminal		Port		
	A	B	A	B	C
1	O—O			O=O	
2	B+	GND	O=O		

Z6U0102W015



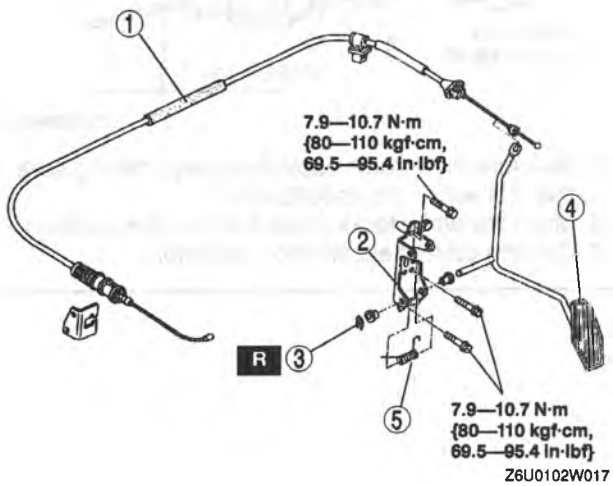
Z6U0102W016

ACCELERATOR PEDAL REMOVAL/INSTALLATION [FS]

Z6U011341600W01

Without Cruise Control

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.

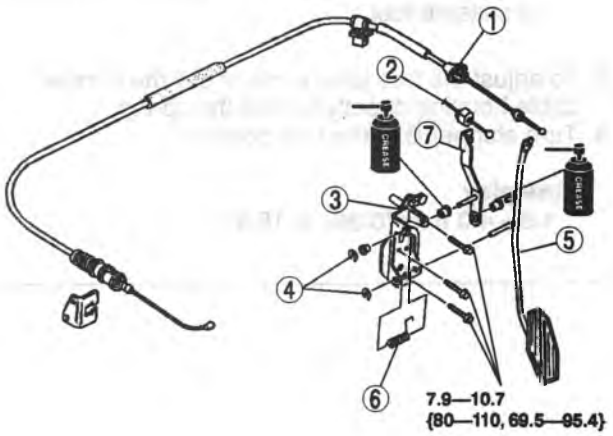


Z6U0102W017

1	Accelerator cable (See01-13A-13 Accelerator Cable Installation Note)
2	Retainer
3	E clip
4	Accelerator pedal
5	Return spring

With Cruise Control

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



N·m {kgf·cm, in·lbf}

Z6U0113W001

1	Accelerator cable (See01-13A-13 Accelerator Cable Installation Note)
2	Cruise actuator cable
3	Retainer
4	E clip
5	Acclerator pedal
6	Return spring
7	Bracket

Accelerator Cable Installation Note

- Carry out the "ACCELERATOR CABLE ADJUSTMENT" procedure after installing the accelerator cable. (See 01-13A-14 ACCELERATOR CABLE ADJUSTMENT [FS].)

ACCELERATOR CABLE INSPECTION [FS]

Z6U011341660W01

1. Verify that the throttle valve is closed.

Note
- To measure the cable free play, push the cable into the housing and put a white mark on the cable at the end of the housing. Then pull the cable out and measure distance from the white mark to the end of the cable housing.

2. Measure the free play of throttle cable.
   - If not within the specification, adjust the accelerator cable. (See 01-13A-14 ACCELERATOR CABLE ADJUSTMENT [FS].)

Free play
1.5—4.0 mm {0.06—0.15 in}

ACCELERATOR CABLE ADJUSTMENT [FS]

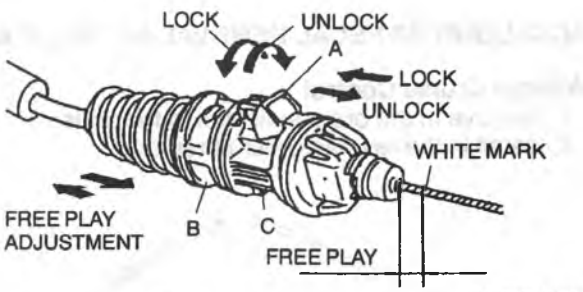
Z6U011341660W02

1. Move the white locking tab A to the unlock position.
2. Turn stopper B to the unlock position.

Note
- If stopper B will not unlock, it may be necessary to carefully bend tab C out by using a suitable tool.

3. To adjust the free play, push or pull the throttle cable housing directly behind the spring.
4. Turn stopper B to the lock position.

Free play
1.5—4.0 mm {0.06—0.15 in}



Z6U0102W018

5. Measure the throttle cable free play, making sure that it is within the specification.
6. Move the white locking tab A to the lock position.
7. Confirm correct accelerator operation.

01-13B INTAKE-AIR SYSTEM [KL]

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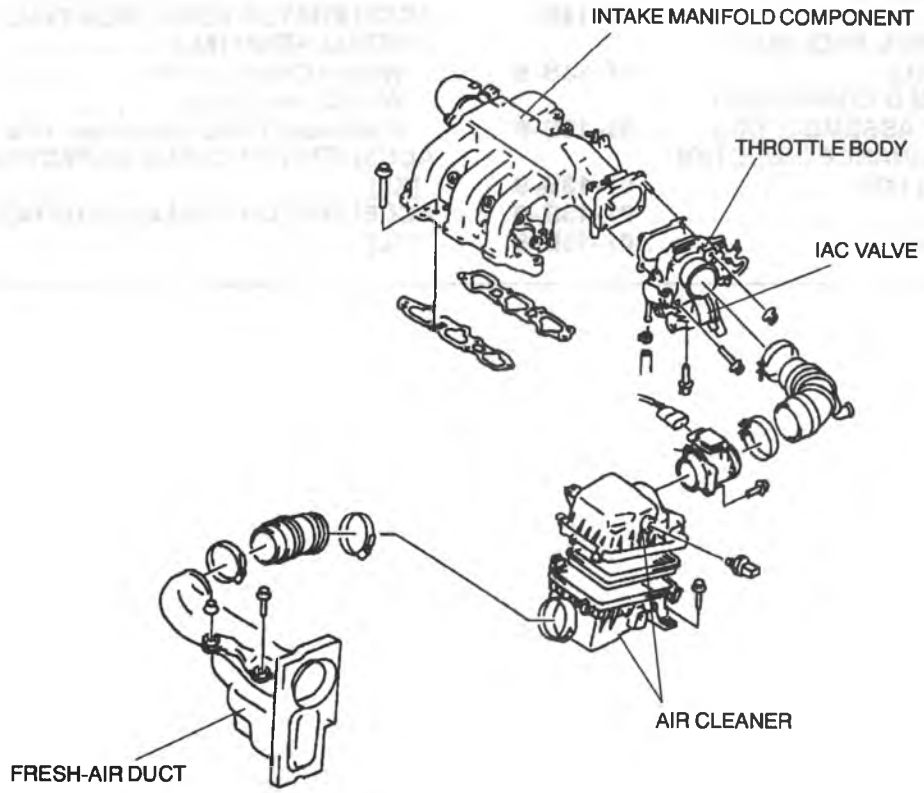
INTAKE-AIR SYSTEM [KL]

Z6U011301005W02

The intake-air system is composed of the following parts:

- The fresh-air duct channels fresh air to the air cleaner and is equipped with a resonance chamber to reduce induction noise.
- The air cleaner removes dust and particles to prevent engine contamination.
- The mass air flow (MAF) sensor measures the intake air volume.
- The air hose directs fresh air to the throttle body.
- The throttle body controls the overall quantity of air provided to the engine and is equipped with an air adjusting screw (AAS) for the idle speed adjustment.
- The idle air control (IAC) valve directs by-pass air to the throttle body to maintain the proper engine idle speed under various conditions. It is controlled by the powertrain control module (PCM).
- The intake manifold distributes the fresh air into the each cylinder. It is equipped with the variable resonance induction system (VRIS) shutter valve for improved engine performance.

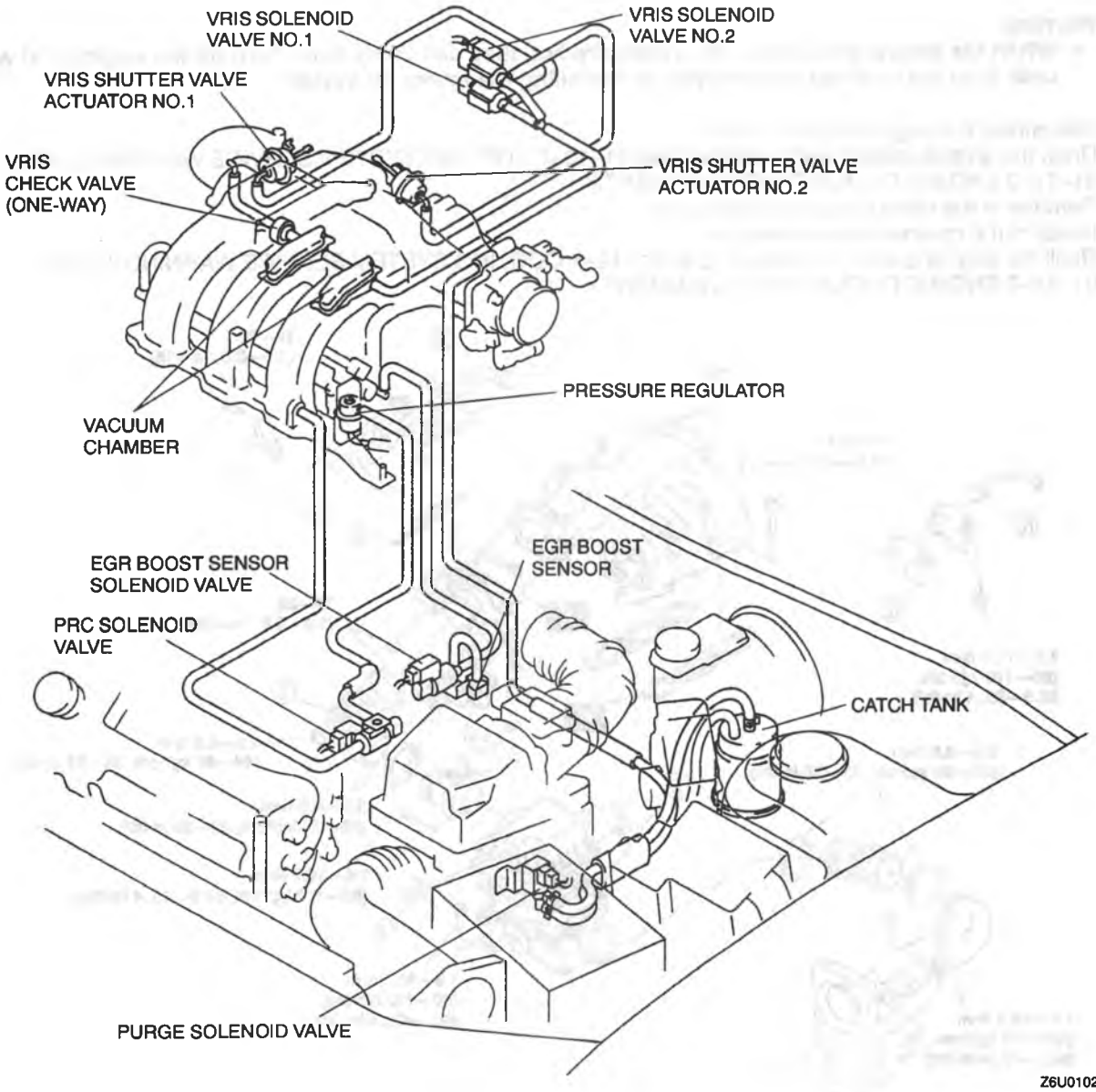
Structural View



Z6U0102W019

VACUUM HOSE ROUTING DIAGRAM [KL]

Z6U011320030W02



Z6U0102W020

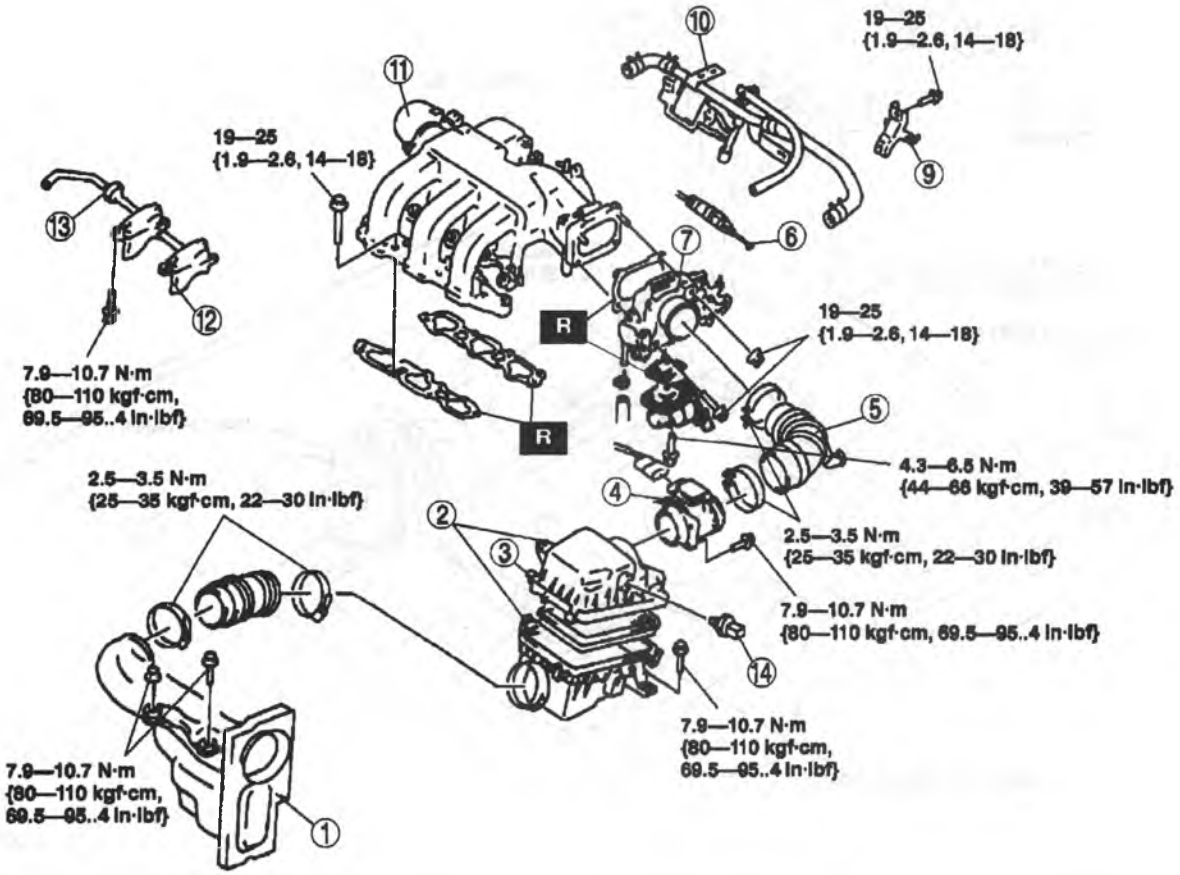
INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [KL]

Z6U011313000W02

Warning

- **When the engine and intake-air system are hot, they can badly burn. Turn off the engine and wait until they are cool before removing or installing the intake-air system.**

1. Disconnect the negative battery cable.
2. Drain the engine coolant from radiator. (See 01-12-1 COOLING SYSTEM SERVICE WARNINGS.) (See 01-12-2 ENGINE COOLANT REPLACEMENT.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.
5. Refill the engine coolant to radiator. (See 01-12-1 COOLING SYSTEM SERVICE WARNINGS.) (See 01-12-2 ENGINE COOLANT REPLACEMENT.)



N·m {kgf·m, ft·lbf}

Z6U0113W002

1	Fresh-air duct
2	Air cleaner
3	Air cleaner element
4	Mass air flow sensor
5	Air hose
6	Accelerator cable
7	Throttle body
8	IAC valve
9	Intake manifold stay
10	Ventilation pipe

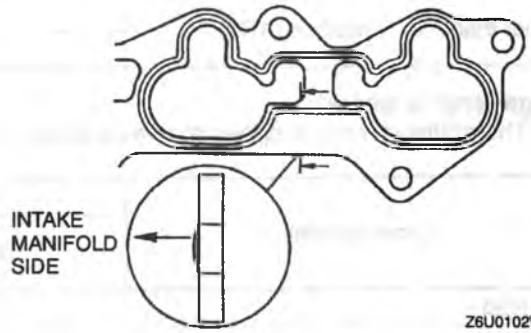
11	Intake manifold component (See 01-13B-5 Intake Manifold Component Removal Note) (See 01-13B-5 Intake Manifold Component Installation Note)
12	Vacuum chamber
13	VRIS check valve (one-way) (See 01-13B-11 VARIABLE RESONANCE INDUCTION SYSTEM (VRIS) CHECK VALVE (ONE-WAY) INSPECTION [KL])
14	Intake air temperature sensor

Intake Manifold Component Removal Note

Warning
- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and 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 the "BEFORE REPAIR PROCEDURE" (See 01-14-3 BEFORE REPAIR PROCEDURE.).**

- To remove the intake manifold component, remove the fuel distributor.

Intake Manifold Component Installation Note
- To install the intake manifold gasket, make sure that the convex side of gasket is faced to the intake manifold side.



Z6U0102W022

IDLE AIR CONTROL SYSTEM [KL]

Z6U011320661W03

Description
Operation
- The PCM carries out idle air control through the following modes.
  i. Deceleration mode
  ii. Closed loop control mode

Deceleration mode (i.e. closed or partially closed throttle)
- During deceleration the PCM enables the IAC to adjust air flow to the3 throttle body to prevent engine stalling.

Closed loop control mode
- The following conditions must be met for idle air control in closed loop control mode.
  i. The vehicle speed is below 4 km/h {2.5 mph}.
  ii. The PCM determines the neutral condition based on the input by the neutral/clutch switch. (MTX only)
- The purpose of closed loop control mode is to maintain engine stability when idle through feedback control.

Adoptive air compensation
- The PCM memorizes the idle air trim level required to maintain the target engine speed.
  When the following conditions exist, the PCM prohibits adaptive air compensation.
  i. During closed loop control mode.
  ii. During no load condition (Neutral [MTX], N position [ATX]) instead of the closed loop control. (When changes of engine speed are above specification)
  iii. When it does not meet condition (1) or (2) above, and the charging efficiency is below the specified value.
- When the idle air trim correction is above the specified value, the PCM judges the malfunction in the idle air control system, and stores a DTC.
- If the Keep Alive RAM has been reset, the idle air trim learning correction is also cleared, the engine must idle for 15 minutes at each of the following four separated modes to learn the new idle air trim.

Transaxle position	A/C operation
Neutral position (MTX)P or N position (ATX)	ON
	OFF
Other than P or N position (ATX)	ON
	OFF

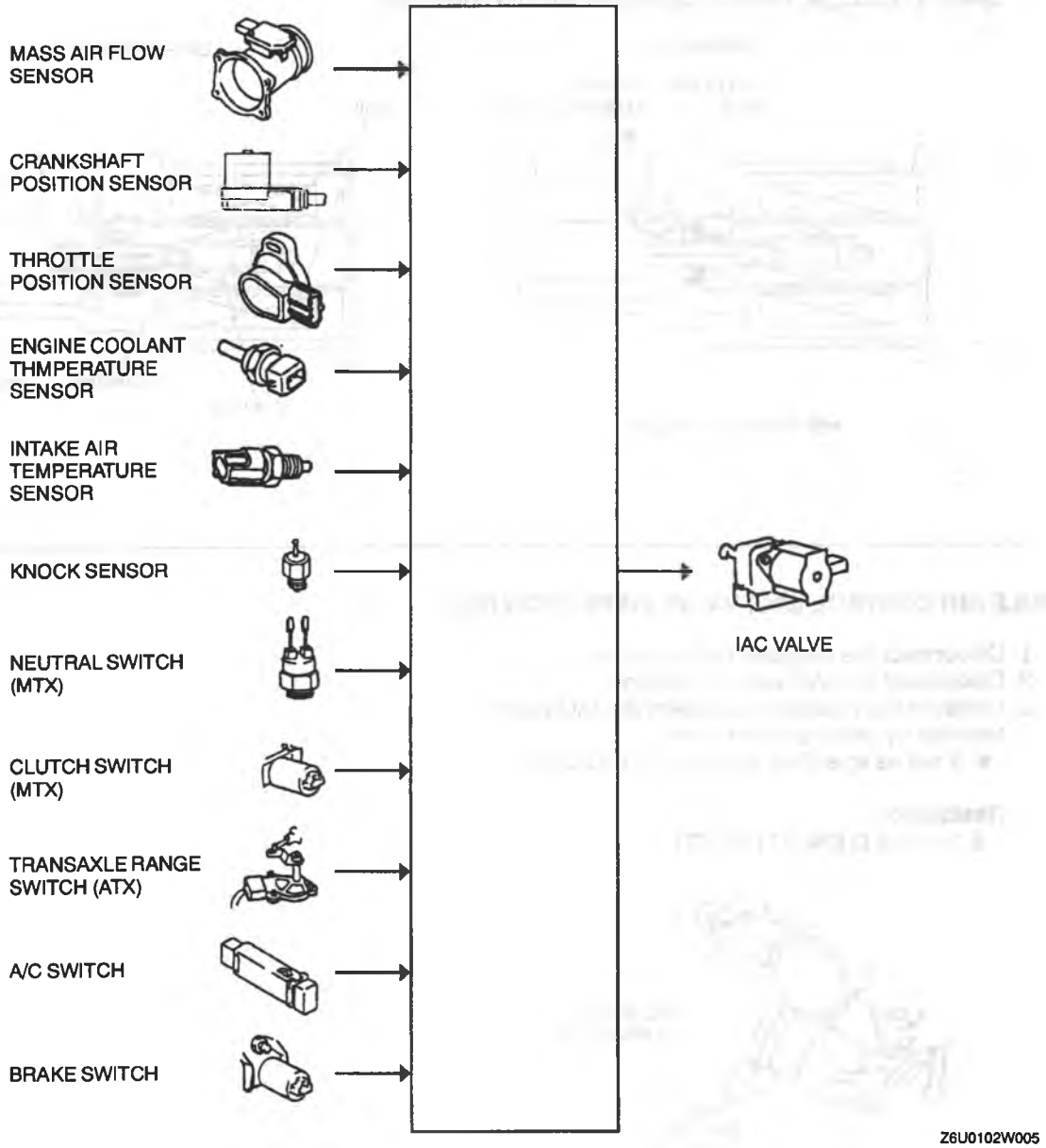
Target engine speed

- The optimum engine speed at idle as shown in the following table.

Load condition	Idle speed (rpm)		
	MTX	ATX	
		N, P position	D range
No load	650	650	625
Power steering turned fully	650	650	625
A/C operating	825	825	800
Electrical load operating*1	650	650	625

*1 : Headlight, cooling fan ON, fan switch above second position, and rear window defroster.

Block Diagram



Idle Air Control (IAC) Valve Description

Function

- The IAC valve controls the amount of the bypass air that passes through the throttle valve, IAC is controlled by a PCM signal.
- The air, which bypasses the throttle valve, flows through the IAC valve from inlet port (air hose side) to outlet port (intake manifold side).

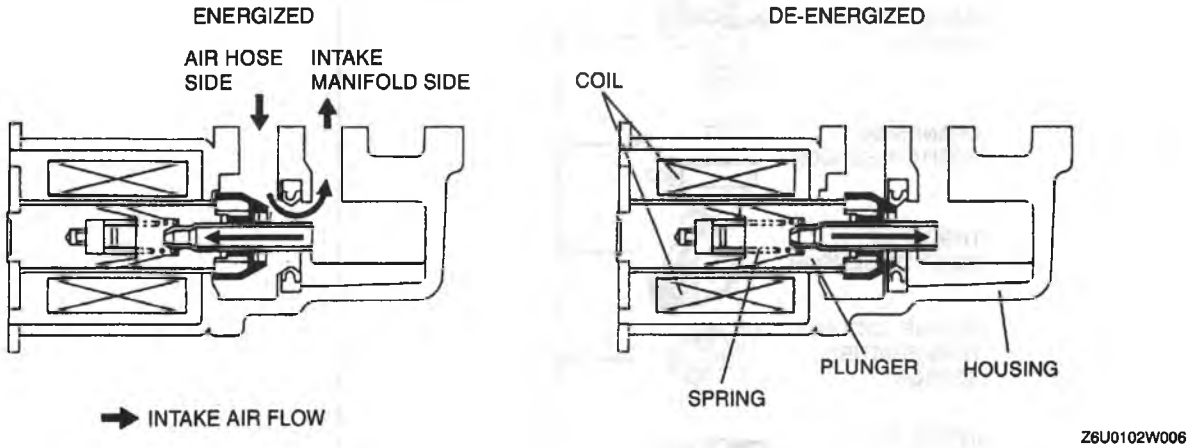
Structure

- IAC valve is composed of a housing, plunger, coil and spring.

Operation

- When the IAC valve receives a signal from the PCM, the electric current is applied to the coil circuit. The plunger is then pulled back to allow bypass air into the outlet port.

- The bypass air flow is controlled by the period of time that current is applied to the coil circuit. This current opens the plunger, allowing bypass air into the outlet port.



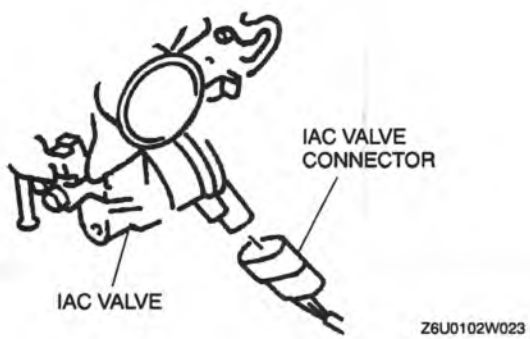
Z6U0102W006

IDLE AIR CONTROL (IAC) VALVE INSPECTION [KL]

Z6U011320661W04

1. Disconnect the negative battery cable.
2. Disconnect the IAC valve connector.
3. Measure the resistance between the IAC valve terminal by using an ohmmeter.
   - If not as specified, replace the IAC valve.

Resistance
8.7—10.5 Ω [24 °C {75 °F}]



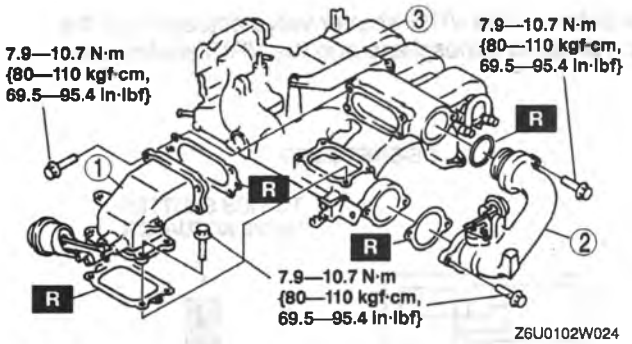
Z6U0102W023

INTAKE MANIFOLD COMPONENT DISASSEMBLY/ASSEMBLY [KL]

Z6U011313100W01

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

1	VRIS shutter valve body component
2	Air intake pipe component
3	Intake manifold



Z6U0102W024

VARIABLE RESONANCE INDUCTION SYSTEM (VRIS) [KL]

Z6U011313013W01

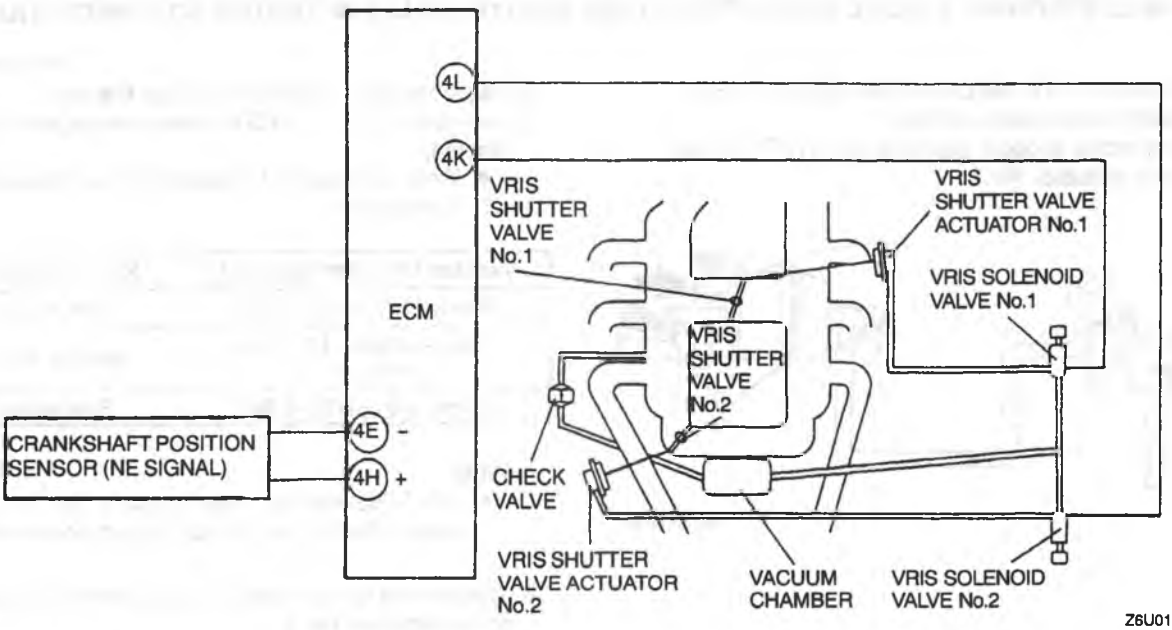
Description

Operation

- The solenoid valves are actuated at the engine speeds shown below (under no engine load).

Engine speed (rpm)	0—3750	3750—4250	4250—6250	6250—7500
VRIS solenoid valve No.1	Not actuated	Actuated	Actuated	Not actuated
VRIS solenoid valve No.2	Not actuated	Not actuated	Actuated	Not actuated

System Diagram



Z6U0102W025

Variable Resonance Induction System (VRIS) Solenoid Valve Description

Function

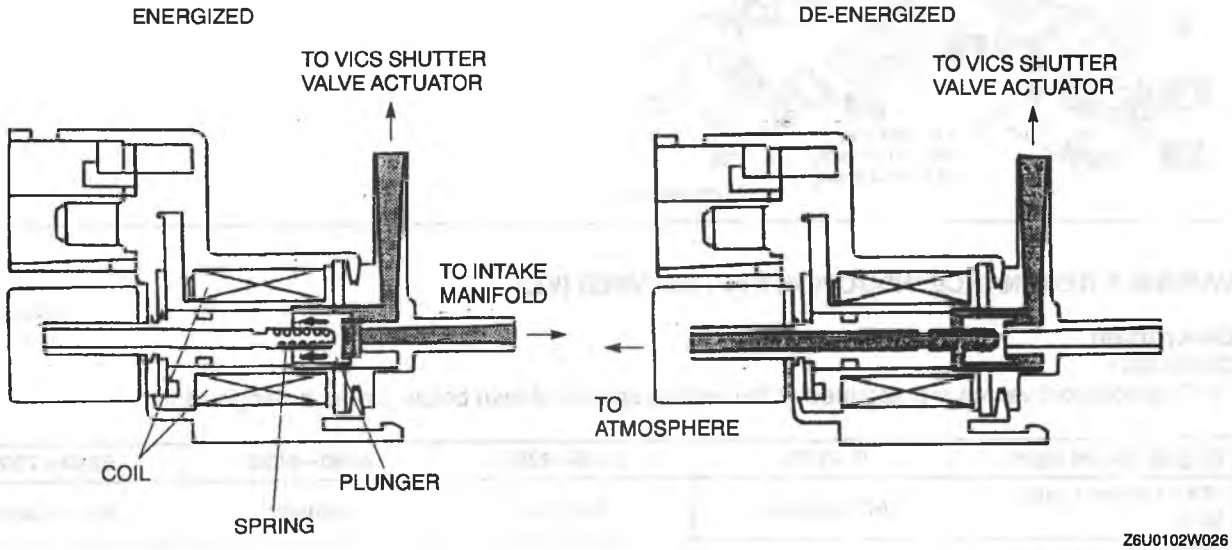
- VRIS solenoid valve changes the air passage from the intake manifold or atmosphere to the VRIS for shutter valve actuation.

Structure

- VRIS solenoid valve is composed of a coil, spring, plunger and filter.

Operation (energized)
- The plunger is pulled back to open the air passage between the VRIS shutter valve actuator and VRIS vacuum chamber, which applies the intake manifold vacuum to the VRIS shutter valve actuator.

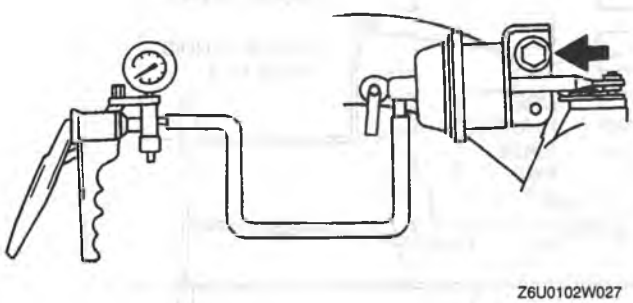
Operation (de-energized)
- The plunger is returned forward to open the air passage between the VRIS shutter valve actuator and the VRIS solenoid valve air filter applies the vacuum is then vented to atmosphere and the VRIS shutter valve actuator.



VARIABLE RESONANCE INDUCTION SYSTEM (VRIS) SHUTTER VALVE ACTUATOR NO.1 INSPECTION [KL]

Z6U011320154W01

1. Disconnect the vacuum hose from the VRIS shutter valve actuator No.1.
2. Connect a vacuum pump to the VRIS shutter valve actuator No.1.



3. Apply vacuum slowly and check the rod movement of the VRIS shutter valve actuator as shown.
   - If not as specified, replace the air intake pipe component.

Vacuum kPa {mmHg, InHg}	Rod movement
Above −1.33 {−10, −0.39}	Not pulled
−1.34— −4.00 {−10— −30, −0.40— −1.18}	Start to move
Below −23 {−170, −6.69}	Fully pulled

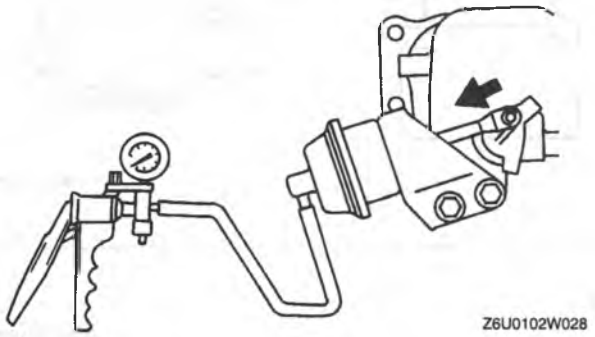
Note
- The VRIS shutter valve actuator No.1 is assembled to the air intake pipe component.

4. Disconnect the vacuum pump to the VRIS shutter valve actuator No.1.
5. Reconnect the vacuum hose from the VRIS shutter valve actuator No.1.

VARIABLE RESONANCE INDUCTION SYSTEM (VRIS) SHUTTER VALVE ACTUATOR NO.2 INSPECTION [KL]

Z6U011320154W02

1. Disconnect the vacuum hose from the VRIS shutter valve actuator No.2.
2. Connect the vacuum pump to the VRIS shutter valve actuator No.2.



Z6U0102W028

3. Apply vacuum slowly and check the rod movement of the VRIS shutter valve actuator as shown.
   - If not as specified, replace the VRIS shutter valve body component.

Vacuum kPa {mmHg, inHg}	Rod movement
Above -1.33 {-10, -0.39}	Not pulled
-1.34— -4.00 {-10— -30, -0.40— -1.18}	Start to move
Below -23 {-170, -6.69}	Fully pulled

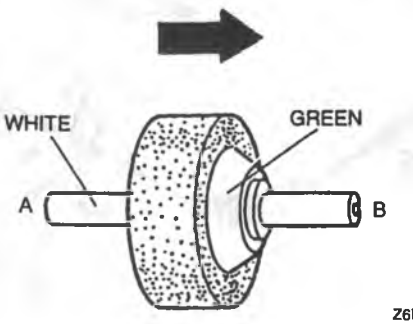
Note
- The VRIS shutter valve actuator No.2 is assembled to the VRIS shutter valve body component.

4. Disconnect the vacuum pump to the VRIS shutter valve actuator No.2.
5. Reconnect the vacuum hose from the VRIS shutter valve actuator No.2.

VARIABLE RESONANCE INDUCTION SYSTEM (VRIS) CHECK VALVE (ONE-WAY) INSPECTION [KL]

Z6U011342911W01

1. Remove the check valve.
2. Blow through port A and verify that air flows from port B.
   - If not as specified, replace the VRIS check valve (one-way).
3. Blow through port B and verify that air does not flow from port A.
   - If not as specified, replace the VRIS check valve (one-way).



Z6U0102W029

VARIABLE RESONANCE INDUCTION SYSTEM (VRIS) SOLENOID VALVE NO.1 NO.2 INSPECTION [KL]

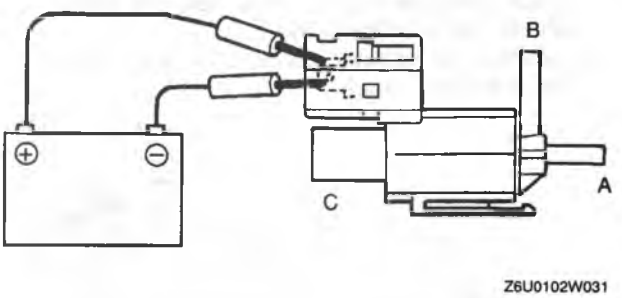
Z6U011318741W01

1. Remove the VRIS solenoid valves No.1 and No.2.
2. Inspect for air flow between each port under the following conditions.
   - If not as specified, replace the VRIS solenoid valves No.1 and No.2.

○—○ : Continuity ○═○ : Airflow

Step	Terminal		Port		
	A	B	A	B	C
1	○—○			○═○	
2	B+	GND	○═○		

Z6U0102W030



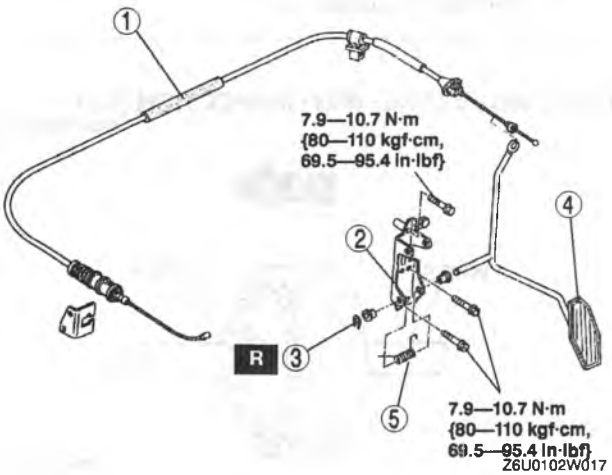
Z6U0102W031

ACCELERATOR PEDAL REMOVAL/INSTALLATION [KL]

Z6U011341600W02

Without Cruise Control

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.

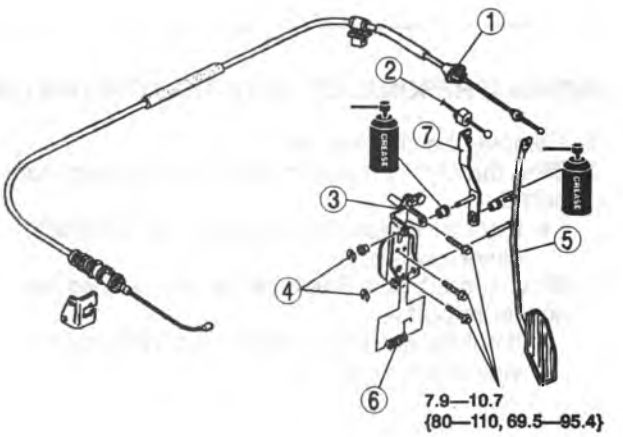


Z6U0102W017

1	Accelerator cable (See 01-13B-12 Accelerator Cable Installation Note)
2	Retainer
3	E clip
4	Accelerator pedal
5	Return spring

With Cruise Control

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



N·m {kgf·cm, in·lbf}

Z6U0113W001

1	Accelerator cable (See 01-13B-12 Accelerator Cable Installation Note)
2	Cruise actuator cable
3	Retainer
4	E clip
5	Accelerator pedal
6	Return spring
7	Bracket

Accelerator Cable Installation Note

- Carry out the "ACCELERATOR CABLE ADJUSTMENT" procedure after installing the accelerator cable. (See 01-13B-13 ACCELERATOR CABLE ADJUSTMENT [KL].)

ACCELERATOR CABLE INSPECTION [KL]

Z6U011341660W03

1. Verify that the throttle valve is closed.

Note
- To measure the cable free play, push the cable into the housing and put a white mark on the cable at the end of the housing. Then pull the cable out and measure distance from the white mark to the end of the cable housing.

2. Measure the free play of throttle cable.
   - If not within the specification, adjust the accelerator cable. (See 01-13B-13 ACCELERATOR CABLE ADJUSTMENT [KL].)

Free play
1.5—4.0 mm {0.06—0.15 in}

ACCELERATOR CABLE ADJUSTMENT [KL]

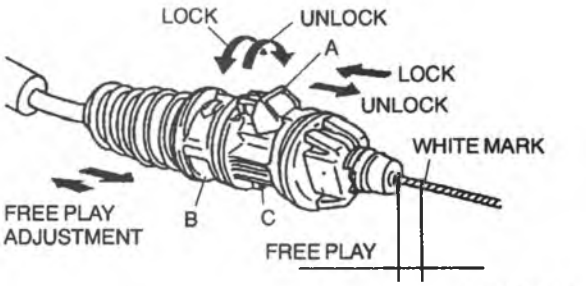
Z6U011341660W04

1. Move the white locking tab A to the unlock position.
2. Turn stopper B to the unlock position.

Note
- If stopper B will not unlock, it may be necessary to carefully bend tab C out by using a suitable tool.

3. To adjust the free play, push or pull the throttle cable housing directly behind the spring.
4. Turn stopper B to the lock position.

Free play
1.5—4.0 mm {0.06—0.15 in}



Z6U0102W032

5. Measure the throttle cable free play, making sure that it is within the specification.
6. Move the white locking tab A to the lock position.
7. Confirm correct accelerator operation.

01-14 FUEL SYSTEM

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FUEL SYSTEM

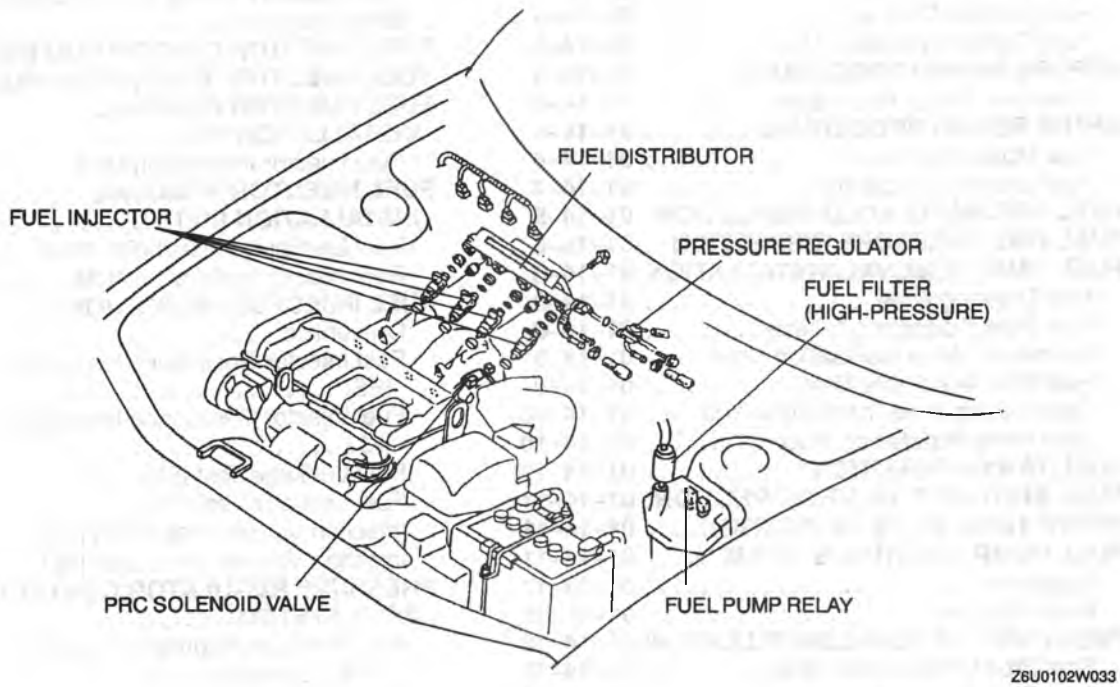
Z6U011401006W01

Fuel System Outline

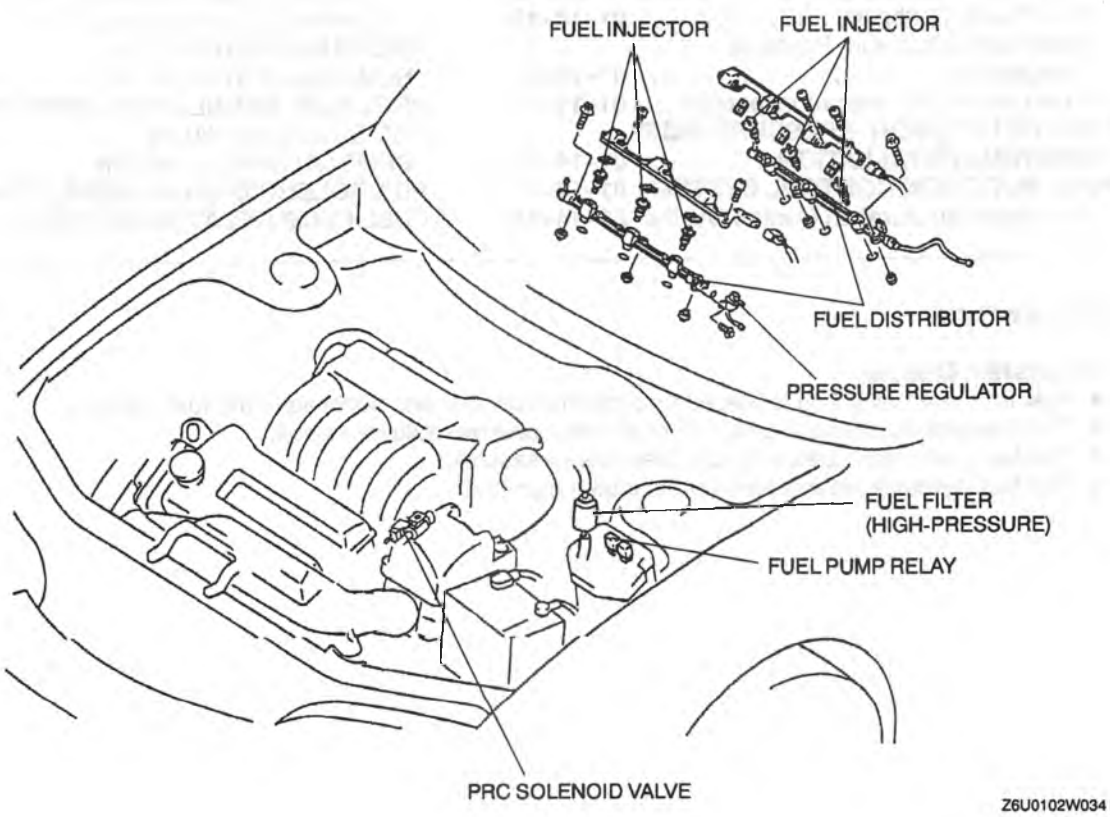
- Fuel from the fuel pump is filtered through the fuel filter and supplied to the fuel injectors.
- The fuel tank incorporate a fuel shut-off valve and two rollover valves.
- The fuel pump equipped with fuel filter (low-pressure).
- The fuel injectors are installed on the intake manifold.

Fuel System Structural View
Engine room side

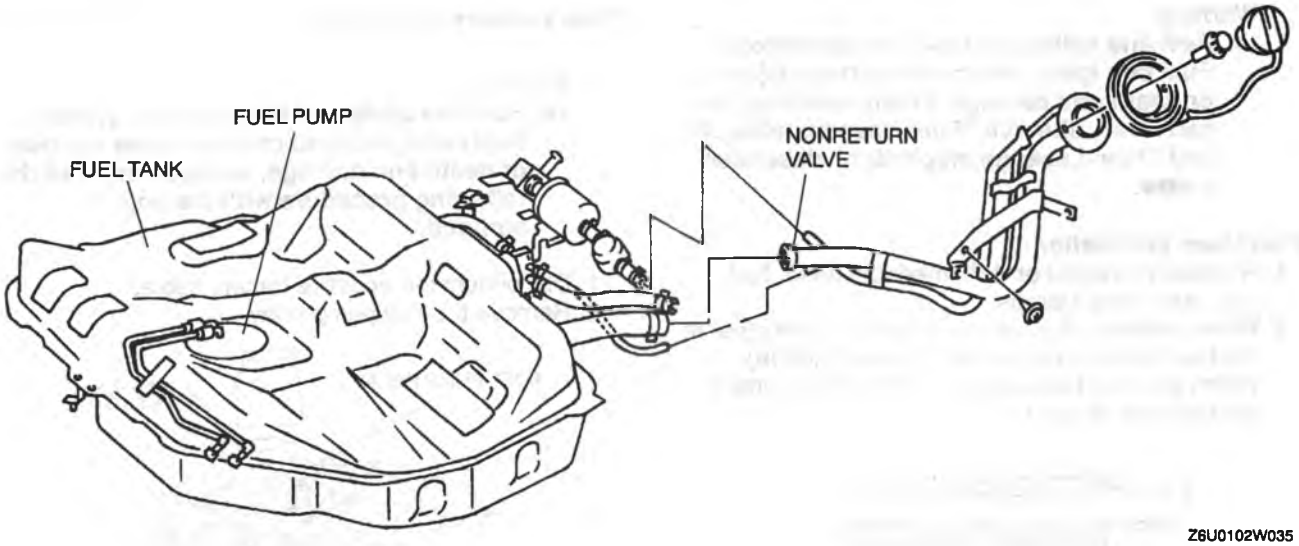
FS



KL



Fuel tank side



Z6U0102W035

BEFORE REPAIR PROCEDURE

Z6U011401006W02

Warning

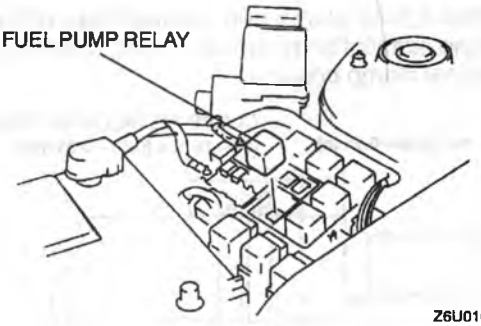
- **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always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

Fuel Line Safety Procedure

Note

- Fuel in the fuel system is under high-pressure when the engine is not running.

1. Remove the fuel pump relay.



Z6U0102W036

2. Start the engine.
3. After the engine stalls, crank the engine several times.
4. Turn off the ignition switch.
5. Install the fuel pump relay.
6. Remove the fuel-filler cap and release the pressure in the fuel tank.

AFTER REPAIR PROCEDURE

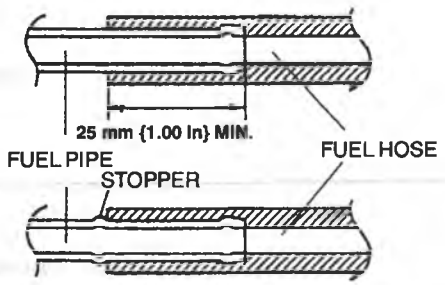
Z6U011401006W03

Warning

- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. When installing the fuel hose, observe "Fuel Hose Installation" and "Fuel Leakage Inspection" described below.**

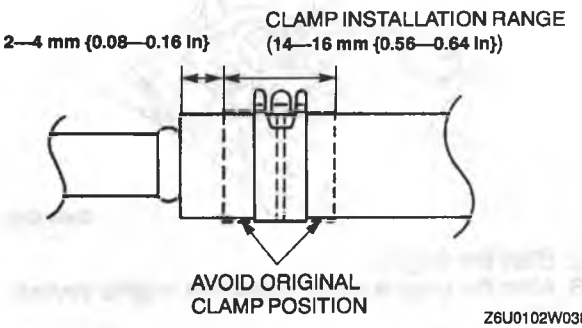
Fuel Hose Installation

1. Replace damaged or deformed fuel hose, fuel pipe, and hose clamps.
2. When installing the fuel hose onto the fuel pipe, fit the hose onto the pipe over **25 mm {1.00 in}**. When the pipe has a stopper, fit the hose until it contacts the stopper.



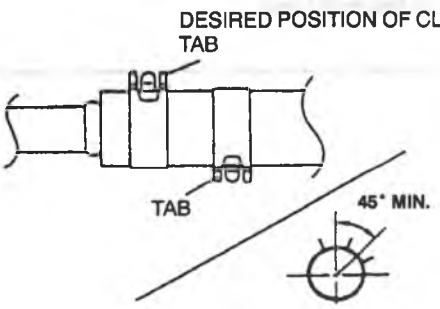
Z6U0102W037

3. Install a hose clamp over the fuel hose within the clamp installation range as shown, avoiding the original clamp position.



Z6U0102W038

4. When installing two clamps, their tabs must be positioned **more than 45° (desired 180°)** apart.



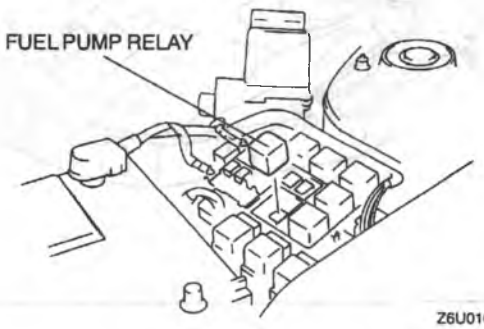
Z6U0102W039

Fuel Leakage Inspection

Warning

- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Always carry out the following procedure with the engine stopped.**

1. Disconnect the negative battery cable.
2. Remove the fuel pump relay.

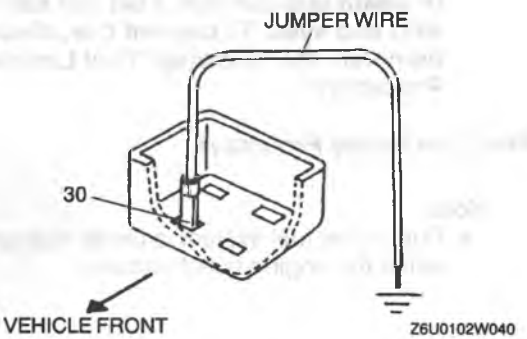


Z6U0102W036

Caution

- **Connecting the wrong fuel pump relay socket terminals may possibly cause a malfunction. Carefully connect the specified terminal only.**

3. Short the fuel pump relay socket terminal 30 to the body GND using a jumper wire.



Z6U0102W040

Caution

- **Before connecting the negative battery cable be sure all fuel connections, clamps and fittings are secure. Fuel pump will operate at full pressure anytime the cable is connected to the battery. When the cable makes contact, it is sure to arc and create a danger of ignition or explosion.**

4. Connect the negative battery cable to operate the fuel pump.
5. Pressurize the system this way for **at least 5 minutes** to be sure of no leaks.
   - If there is fuel leakage, inspect for damaged fuel hoses, hose clamps, and fuel pipe sealing surface and replace as necessary.

6. Disconnect the negative battery cable and remove the jumper wire.
7. After repair, assemble the system and repeat steps 1 to 6.

FUEL PRESSURE HOLD INSPECTION

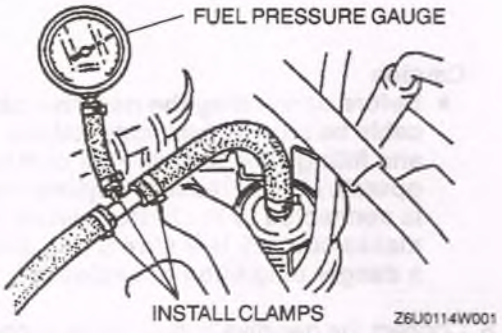
Z6U011401006W04

Warning

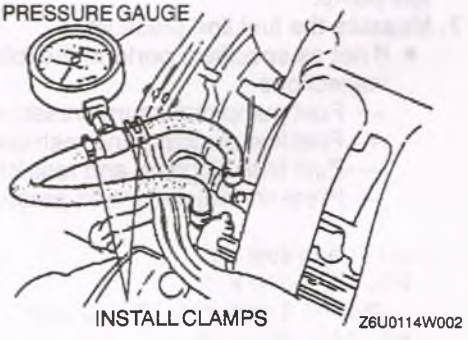
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" (See 01-14-3 BEFORE REPAIR PROCEDURE.) (See 01-14-4 AFTER REPAIR PROCEDURE).**

1. Disconnect the negative battery cable.
2. Install a fuel pressure gauge between the fuel filter and the main fuel hose. (Install clamps as shown.)

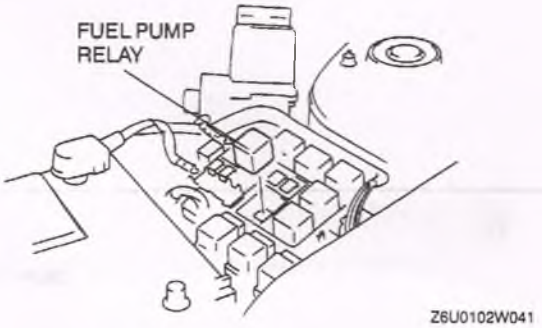
FS



KL



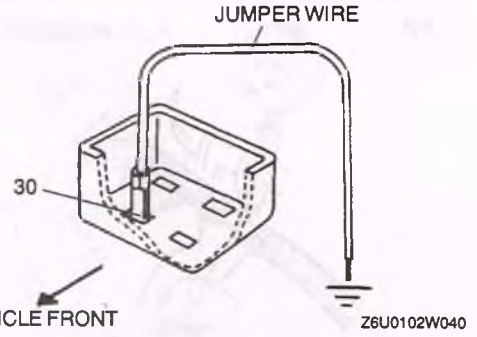
3. Disconnect the negative battery cable.
4. Remove the fuel pump relay.



Caution

- **Connecting the wrong fuel pump relay socket terminals may possibly cause a malfunction. Carefully connect the specified terminal only.**

5. Short the fuel pump relay socket terminal 30 to the body GND using a jumper wire.



Caution

- **Before connecting the negative battery cable be sure all fuel connections, clamps and fittings are secure. Fuel pump will operate at full pressure anytime the cable is connected to the battery. When the cable makes contact, it is sure to arc and create a danger of ignition or explosion.**

6. Connect the negative battery cable for **10 seconds** to operate the fuel pump.
7. Disconnect the negative battery cable and remove the jumper wire.
8. Observe the fuel pressure after **5 minutes**.
   - If not as specified, perform the following inspections.
     - — Fuel pump hold pressure.
     - — Pressure regulator hold pressure.
     - — Injector fuel leakage.

Fuel pressure
More than 147 kPa {1.50 kgf/cm^2, 21.3 psi}

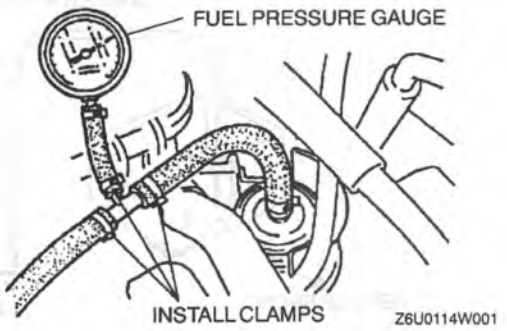
FUEL LINE PRESSURE INSPECTION

Z6U011401006W05

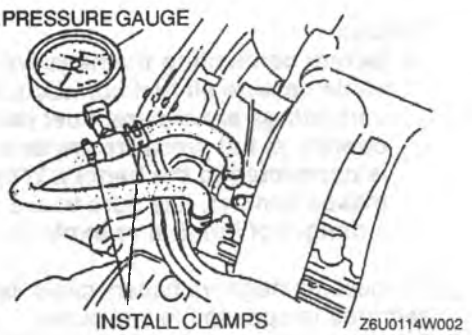
Warning
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" (See 01-14-3 BEFORE REPAIR PROCEDURE.) (See 01-14-4 AFTER REPAIR PROCEDURE).**

1. Disconnect the negative battery cable.
2. Install a fuel pressure gauge between the fuel filter and the main fuel hose. (Install clamps as shown.)

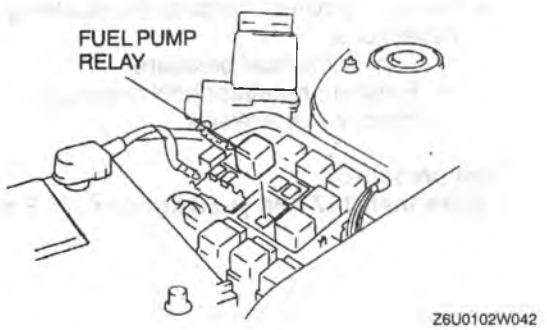
FS



KL

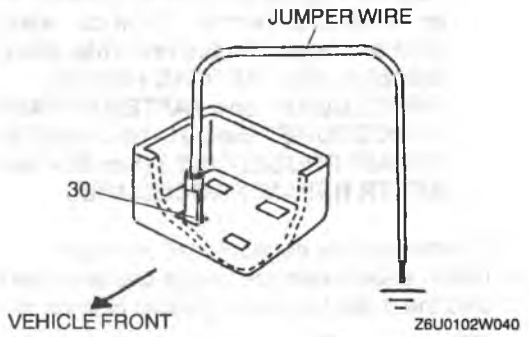


3. Disconnect the negative battery cable.
4. Remove the fuel pump relay.



Caution
- **Connecting the wrong fuel pump relay socket terminals may possibly cause a malfunction. Carefully connect the specified terminal only.**

5. Short the fuel pump relay socket terminal 30 to the body GND using a jumper wire.



Caution
- **Before connecting the negative battery cable be sure all fuel connections, clamps and fittings are secure. Fuel pump will operate at full pressure anytime the cable is connected to the battery. When the cable makes contact, it is sure to arc and create a danger of ignition or explosion.**

6. Connect the negative battery cable to operate the fuel pump.
7. Measure the fuel line pressure.
   - If not as specified, perform the following inspections.
     - — Fuel pump maximum pressure.
     - — Fuel line clogging and restriction.
     - — Fuel filter clogging and restriction.
     - — Pressure regulator hold pressure.

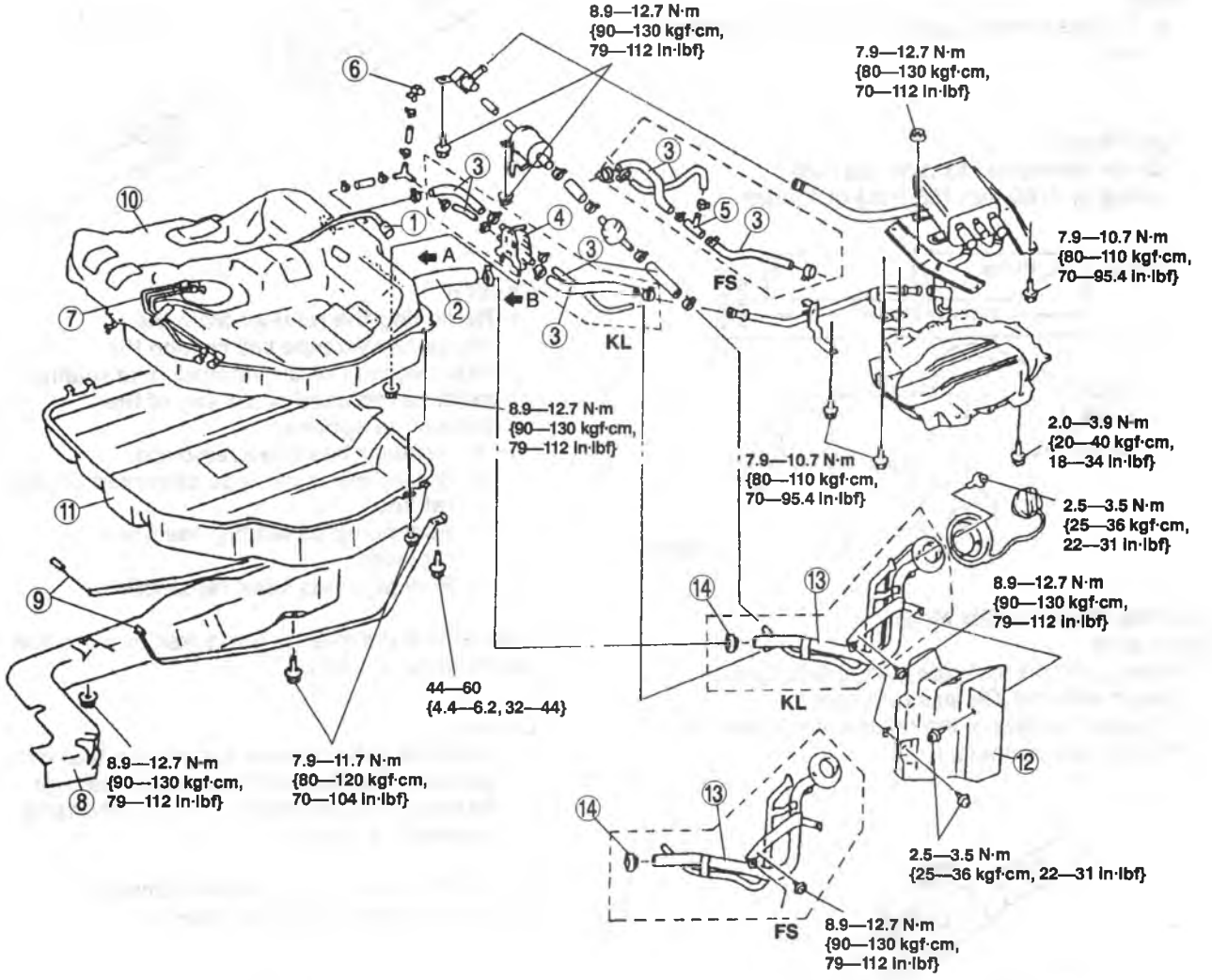
Fuel line pressure
FS: 260—320 kPa
{2.6—3.3 kgf/cm^2, 37—46 psi}
KL: 270—310 kPa
{2.7—3.2 kgf/cm^2, 39—45 psi}

FUEL TANK REMOVAL/INSTALLATION

Z6U011442110W01

Warning
- **Repairing a fuel tank that has not been properly steam cleaned can be dangerous. Explosion or fire may cause death or serious injury. Always properly steam clean a fuel tank before repairing it.**

1. Complete the "BEFORE REPAIR PROCEDURE". (See 01-14-3 BEFORE REPAIR PROCEDURE.)
2. Disconnect the negative battery cable.
3. Siphon the fuel from the fuel tank. (See 01-14-8 Fuel Drawing Note.)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. Complete the "AFTER REPAIR PROCEDURE". (See 01-14-4 AFTER REPAIR PROCEDURE.)



N·m {kgf·m, ft·lbf}
Z6U0102W043

1	Fuel pump connector
2	Joint hose (See 01-14-10 Joint Hose Installation Note)
3	Evaporative hose (See 01-14-10 Evaporative Hose Installation Note)
4	Pressure control valve
5	Hose joint
6	Fuel tank pressure sensor
7	Fuel pipe (See 01-14-8 Fuel Pipe Disassembly Note) (See 01-14-9 Fuel Pipe Assembly Note)

8	Presilencer insulator
9	Fuel tank strap
10	Fuel tank
11	Fuel tank protector
12	Fuel-filler pipe insulator
13	Fuel-filler pipe
14	Nonreturn valve (See 01-14-9 Nonreturn Valve Installation Note)

Fuel Drawing Note

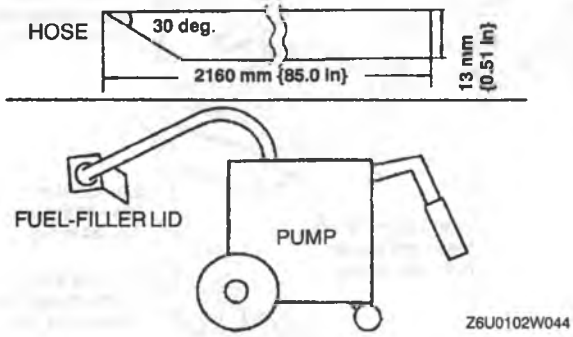
1. Remove the fuel-filler cap and insert a hose into the fuel tank through the fuel-filler pipe.
2. Siphon the fuel into a container by using a fuel drawing pump.

Note

- For easier work, prepare a hose of following size.

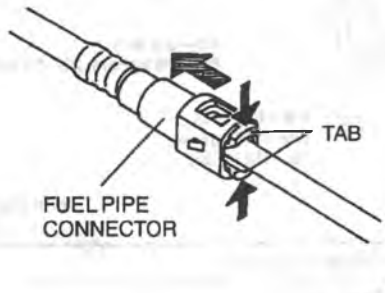
Specification

Outer diameter: 13 mm {0.51 in}
Length: 2160 mm {85.0 in} or longer

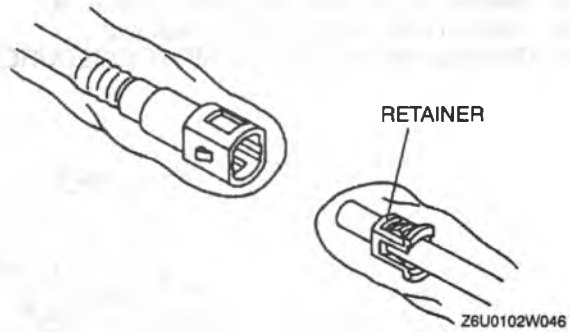


Fuel Pipe Disassembly Note
Piping side

1. Inspect that the fuel pipe joint area is free of foreign material. Clean if necessary.
2. Squeeze the tabs of the retainer and disconnect the fuel pipe connector.



3. Cover the disconnected connector and pipe to prevent them from scratched or contaminated with foreign material.



Caution

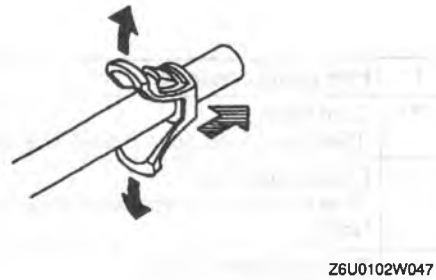
- **Removing the retainer from the disconnected pipe will reduce the effectiveness of the retainer. The retainer must be replaced when any of the followings applies.**
  1. **Retainer has been removed.**
  2. **Scratches or damage observed on the retainer.**
  3. **Fuel pump assembly has been replaced.**
  4. **Fuel pipe has been replaced.**

4. If removal of the retainer is required, remove it in the following procedure.

Caution

- **Removing the retainer by using a tool can damage the pipe and cause fuel leakage. Remove the retainer by opening the tabs outward by hand.**

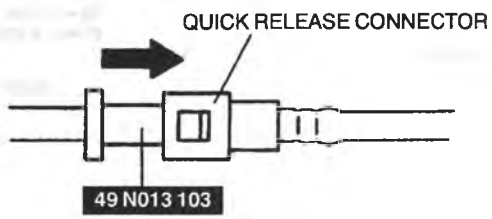
(1) Open the tabs of the retainer outward.
(2) Remove and discard the retainer.



Fuel pump side

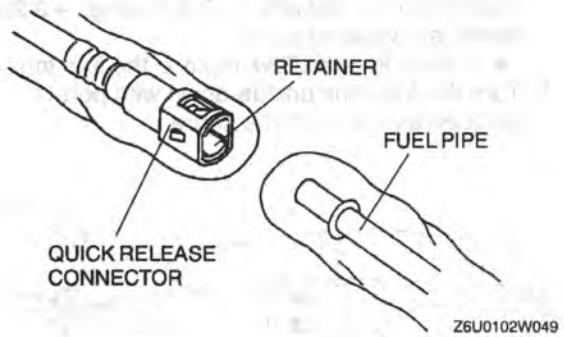
Caution
- **The retainer must be replaced if removed from the fuel pipe without using the SST. Otherwise, effectiveness of the retainer will be reduced.**

1. Inspect that the quick release connector joint area is free of foreign materials. Clean as necessary.
2. Set the **SST** as shown and push into the quick release connector to disconnect the plastic fuel hose.



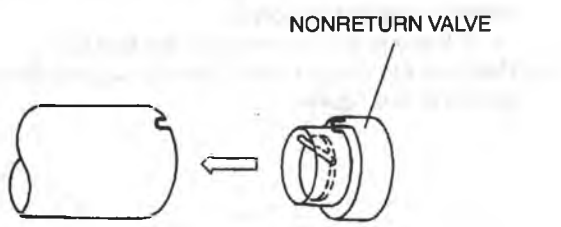
Z6U0102W048

3. Cover the disconnected quick release connector and fuel pipe to prevent them from being scratched or contaminated with foreign materials.



Z6U0102W049

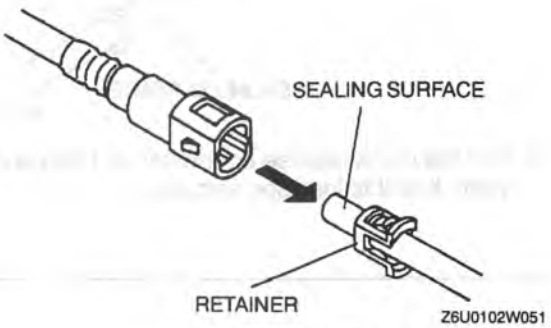
Nonreturn Valve Installation Note
- Align the nonreturn valve with the notch in the fuel filler pipe as shown, then install.



Z6U0102W050

Fuel Pipe Assembly Note
Piping side

1. When retainer is not removed, observe the following procedure.
   (1) Inspect the fuel pipe for kinks. Replace the fuel pipe if necessary.
   (2) Inspect that the inside of the pipe and the connector is free of foreign material and damage. Clean if necessary, taking care not to damage the sealing surfaces.
   (3) Align the pipe and connector so that the tabs of the retainer are correctly fitted into the connector. Push the connector into the retainer until two clicks are heard.

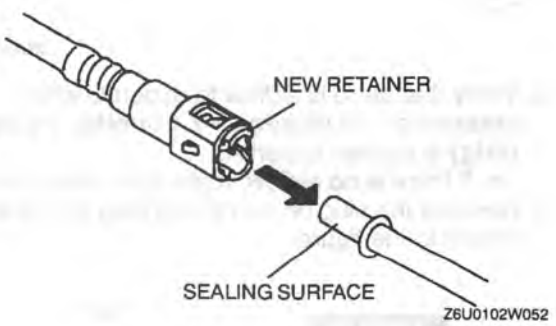


Z6U0102W051

   (4) Pull the connector by hand and verify that it is installed securely. Visually check that the tabs of the retainer are securely fitted into the connector.
2. When retainer is removed, observe the following procedure.

Note
- Use the designated genuine retainer only.

   (1) Install a new retainer onto the connector.
   (2) Inspect that the inside of the pipe and the connector is free of foreign material and damage. Clean if necessary, taking care not to damage the sealing surfaces.
   (3) Push the connector into the retainer until a click is heard.

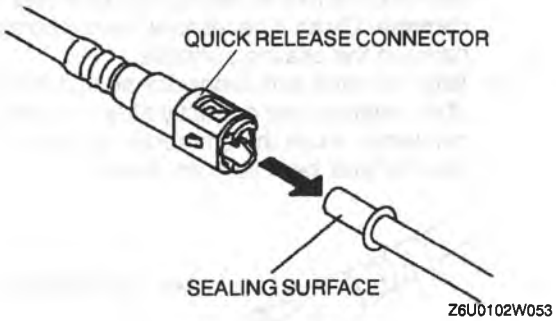


Z6U0102W052

   (4) Pull the connector by hand and verify that it is installed securely. Visually check that the tabs of the retainer are securely fitted into the connector.

Fuel pump side

1. Inspect that the inside of the fuel pipe and the quick release connector is free of foreign materials and damage. Clean as necessary, taking care not to damage the sealing surfaces.
2. Push the quick release connector into the fuel pipe until a click is head.



Z6U0102W053

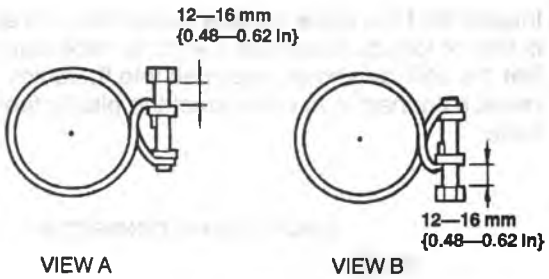
3. Pull the quick release connector by hand and verify that it is installed securely.

Evaporative Hose Installation Note

- Fit each hose onto the pipe **over 25 mm {0.98 in}**.

Joint Hose Installation Note

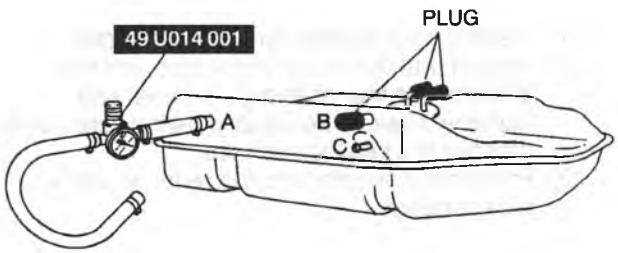
- Fit the joint hose onto the pipe **over 35 mm {1.38 in}**.
- Install clamps as shown.



Z6U0102W054

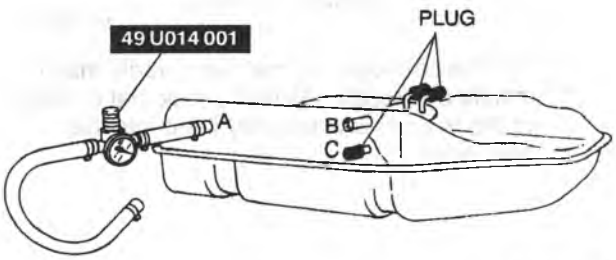
FUEL TANK INSPECTION

1. Remove the fuel tank. (See 01-14-6 FUEL TANK REMOVAL/INSTALLATION.)
2. Attach an air hose to the **SST**.
3. Plug the main and return fuel pipe on the fuel pump.
4. Set the **SST** to port A and plug port B as shown in the figure.



Z6U0102W055

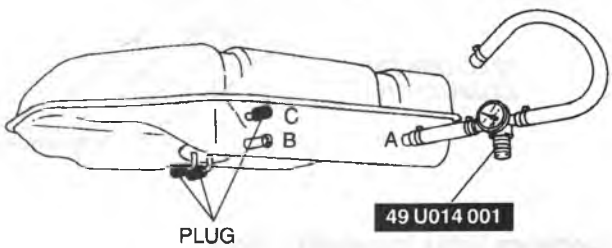
5. Verify that there is airflow from port C when pressure of **+0.98 kPa {+7.4 mmHg, +0.29 inHg}** is applied to port A.
   - If there is no airflow, replace the fuel tank.
6. Remove the plug on port B and plug port C as shown in the figure.



Z6U0102W056

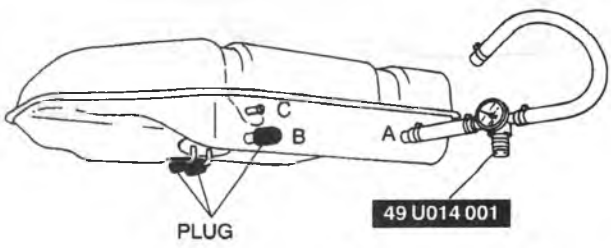
Z6U011442110W02

7. Verify that there is airflow from port B when pressure of **+0.98 kPa {+7.4 mmHg, +0.29 inHg}** is applied to port A.
   - If there is no airflow, replace the fuel tank.
8. Turn the fuel tank upside-down with port C plugged as shown in the figure.



Z6U0102W057

9. Verify that there is no airflow from port B when pressure of **+0.98 kPa {+7.4 mmHg, +0.29 inHg}** is applied to port A.
   - If there is airflow, replace the fuel tank.
10. Remove the plug on port C and plug port B as shown in the figure.



Z6U0102W058

11. Verify that there is no airflow from port C when pressure of **+0.98 kPa {+7.4 mmHg, +0.29 inHg}** is applied to port A.
    - If there is airflow, replace the fuel tank.

FUEL SHUT-OFF VALVE INSPECTION

Z6U011442990W01

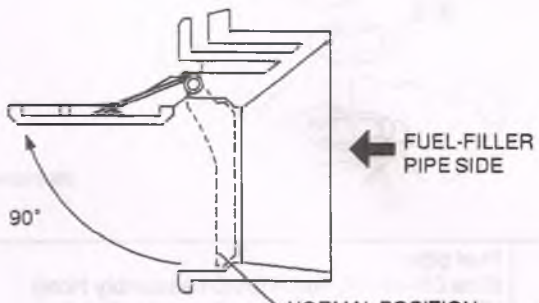
Note
- The fuel shut-off valve is located in the fuel tank.

- Carry out the "FUEL TANK INSPECTION". (See 01-14-10 FUEL TANK INSPECTION.)

NONRETURN VALVE INSPECTION

Z6U011442270W01

1. Remove the nonreturn valve. (See 01-14-6 FUEL TANK REMOVAL/INSTALLATION.)
2. Verify that the nonreturn valve opens up to **90°** when it is pushed from the fuel-filler pipe side, and it returns to the normal position by the spring force.
   - If the nonreturn valve does not open up to **90°** or does not return to the normal position, replace the nonreturn valve.



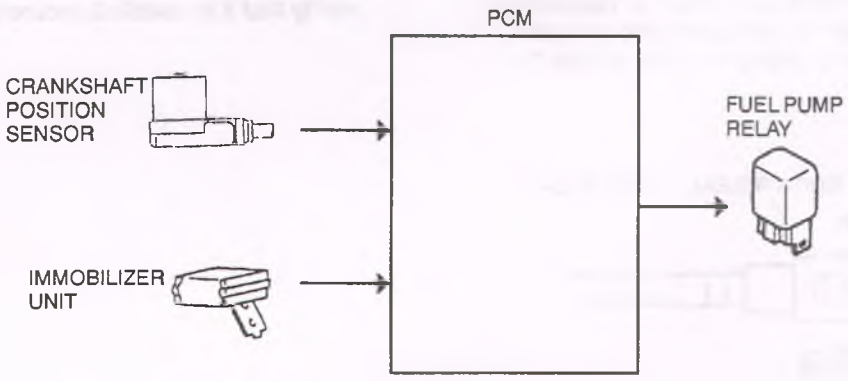
Z6U0102W059

FUEL PUMP CONTROL SYSTEM

Z6U011413350W01

Operation
- When the engine is running (including cranking), terminal 70 (with immobilizer) or 80 (without immobilizer) of the PCM is ON (0 V) actuating the fuel pump through the fuel pump relay.
- When the engine is stopped, terminal 70 (with immobilizer) or 80 (without immobilizer) of the PCM is OFF (battery positive voltage) and the fuel pump is not actuated.

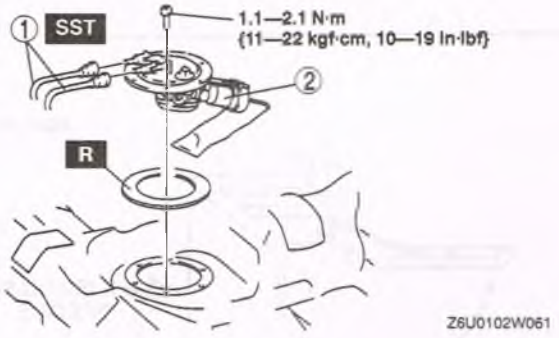
Block Diagram



Z6U0102W060

FUEL PUMP REMOVAL/INSTALLATION

1. Complete the "BEFORE REPAIR PROCEDURE". (See 01-14-3 BEFORE REPAIR PROCEDURE.)
2. Disconnect the negative battery cable.
3. Remove the fuel tank. (See 01-14-6 FUEL TANK REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. Complete the "AFTER REPAIR PROCEDURE". (See 01-14-4 AFTER REPAIR PROCEDURE.)



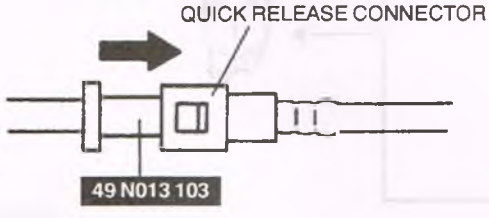
Z6U0102W061

1	Fuel pipe (See 01-14-12 Fuel Pipe Disassembly Note) (See 01-14-12 Fuel Pipe Assembly Note)
2	Fuel pump

Fuel Pipe Disassembly Note

Caution
- **The retainer must be replaced if removed from the fuel pipe without using the SST. Otherwise, effectiveness of the retainer will be reduced.**

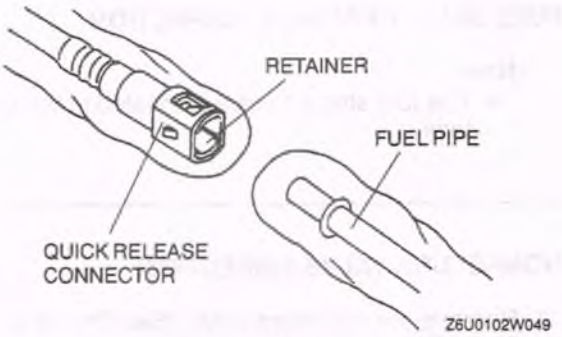
1. Inspect that the quick release connector joint area is free of foreign materials. Clean as necessary.
2. Set the **SST** as shown and push into the quick release connector to disconnect the plastic fuel hose.



Z6U0102W048

Z6U011413350W02

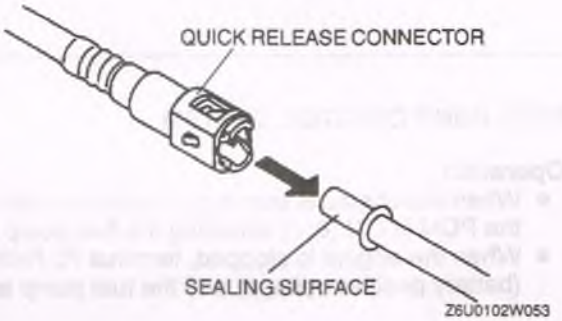
3. Cover the disconnected quick release connector and fuel pipe to prevent them from being scratched or contaminated with foreign materials.



Z6U0102W049

Fuel Pipe Assembly Note

1. Inspect that the inside of the fuel pipe and the quick release connector is free of foreign materials and damage. Clean as necessary, taking care not to damage the sealing surfaces.
2. Push the quick release connector into the fuel pipe until a click is head.



Z6U0102W053

3. Pull the quick release connector by hand and verify that it is installed securely.

FUEL PUMP INSPECTION

Z6U011413350W03

Fuel Pump Continuity

1. Disconnect the fuel pump connector.
2. Inspect continuity between fuel pump connector terminals A and D.
   - If there is no continuity, carry out the "Fuel Pump Maximum Pressure Inspection".



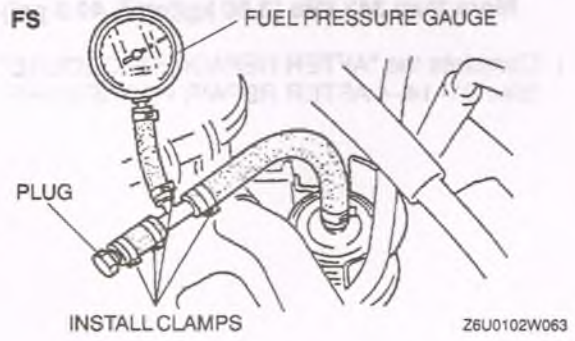
Z6U0102W062

Fuel Pump Maximum Pressure Inspection

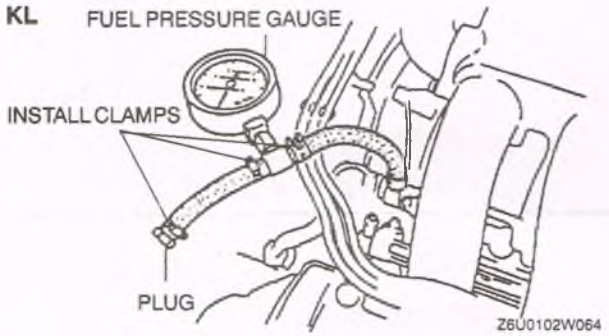
Warning

- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Always carry out the following procedure with the engine stopped.**

1. Complete the "BEFORE REPAIR PROCEDURE". (See 01-14-3 BEFORE REPAIR PROCEDURE.)
2. Disconnect the negative battery cable.
3. Remove the cruise actuator with the harness and cable connected. [FS]
4. Connect a fuel pressure gauge to the fuel filter [FS] or the main fuel pipe [KL] and plug the outlet of the gauge as shown. (Install clamps as shown.)

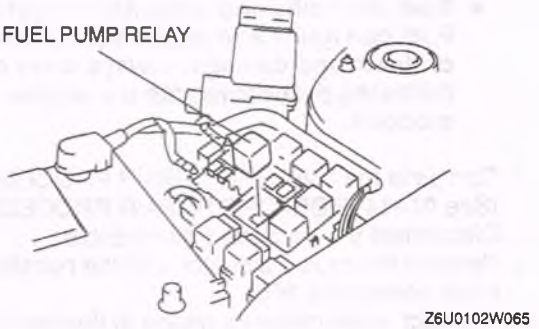


Z6U0102W063



Z6U0102W064

5. Remove the fuel pump relay.

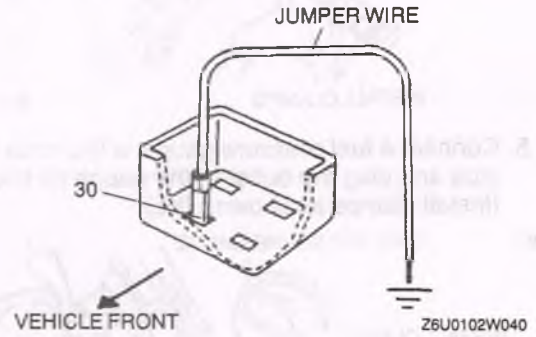


Z6U0102W065

Caution

- **Connecting the wrong fuel pump relay socket terminals may possibly cause a malfunction. Carefully connect the specified terminal only.**

6. Short the fuel pump relay socket terminal 30 to the body GND using a jumper wire.



Z6U0102W040

Caution

- **Before connecting the negative battery cable be sure all fuel connections, clamps and fittings are secure. Fuel pump will operate at full pressure anytime the cable is connected to the battery. When the cable makes contact, it is sure to arc and create a danger of ignition or explosion.**

7. Connect the negative battery cable to operate the fuel pump. Measure the fuel pump maximum pressure.

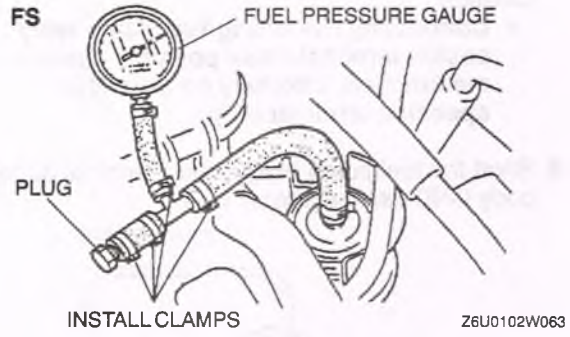
   Fuel pump maximum pressure
   480—630 kPa {4.8—6.5 kgf/cm^2, 69—92 psi}

8. Disconnect the negative battery cable and remove the jumper wire.
   - If not as specified, carry out the "Fuel Line Hold Pressure Inspection".
9. Complete the "AFTER REPAIR PROCEDURE". (See 01-14-4 AFTER REPAIR PROCEDURE.)

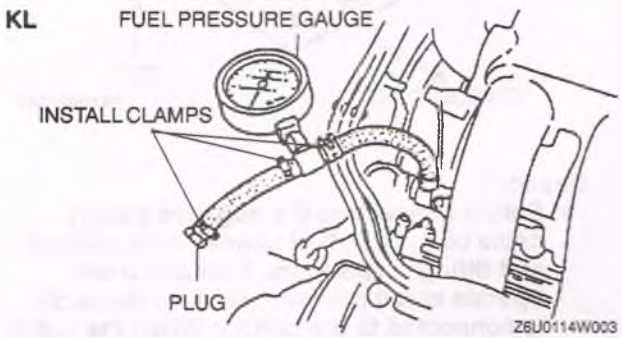
Fuel Line Hold Pressure Inspection

Warning
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Always carry out the following procedure with the engine stopped.**

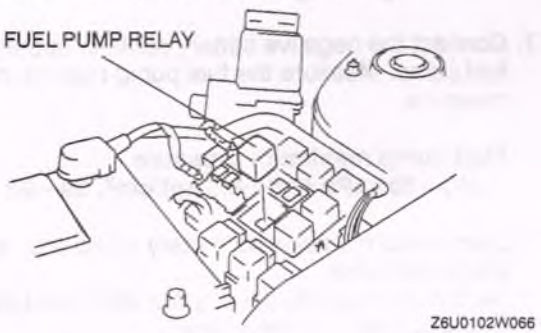
1. Complete the "BEFORE REPAIR PROCEDURE". (See 01-14-3 BEFORE REPAIR PROCEDURE.)
2. Disconnect the negative battery cable.
3. Remove the cruise actuator with the harness and cable connected. [FS]
4. Connect a fuel pressure gauge to the fuel filter and plug the outlet of the gauge as shown. (Install clamps as shown.) [FS]



5. Connect a fuel pressure gauge to the main fuel pipe and plug the outlet of the gauge as shown. (Install clamps as shown.) [KL]

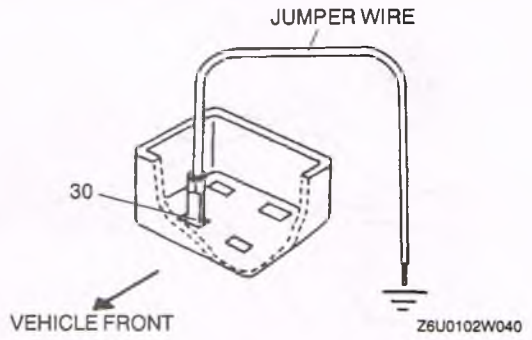


6. Remove the fuel pump relay.



Caution
- **Connecting the wrong fuel pump relay socket terminals may possibly cause a malfunction. Carefully connect the specified terminal only.**

7. Short the fuel pump relay socket terminal 30 to the body GND using a jumper wire.



Caution
- **Before connecting the negative battery cable be sure all fuel connections, clamps and fittings are secure. Fuel pump will operate at full pressure anytime the cable is connected to the battery. When the cable makes contact, it is sure to arc and create a danger of ignition or explosion.**

8. Connect the negative battery cable for **10 seconds** to operate the fuel pump.
9. Disconnect the negative battery cable and remove the jumper wire.
10. Observe the fuel pressure **after 5 minutes**.
    - If not as specified, replace the fuel pump.

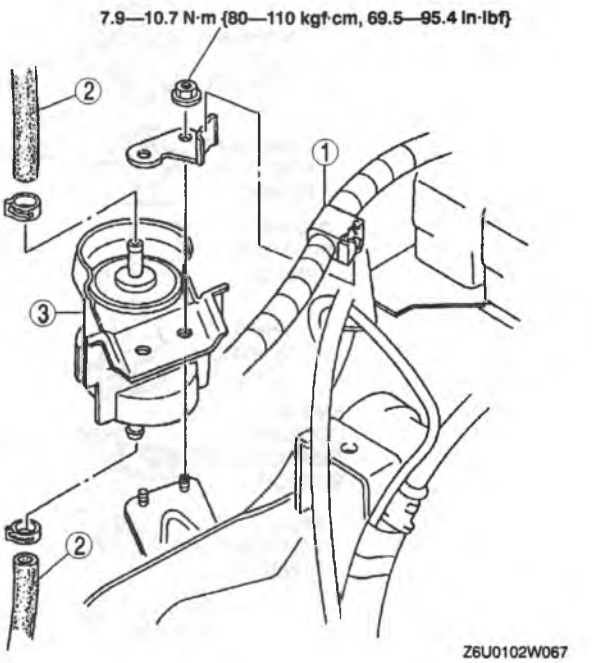
Fuel pressure
More than 343 kPa {3.50 kgf/cm^2, 49.8 psi}

11. Complete the "AFTER REPAIR PROCEDURE". (See 01-14-4 AFTER REPAIR PROCEDURE.)

FUEL FILTER (HIGH-PRESSURE SIDE) REMOVAL/INSTALLATION

Z6U011434801W01

1. Complete the "BEFORE REPAIR PROCEDURE". (See 01-14-3 BEFORE REPAIR PROCEDURE.)
2. Disconnect the negative battery cable.
3. Remove the cruise actuator with the harness and cable connected. [FS]
4. Remove the air cleaner and air hose. [KL]
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.
7. Complete the "AFTER REPAIR PROCEDURE". (See 01-14-4 AFTER REPAIR PROCEDURE.)



Z6U0102W067

1	Harness
2	Fuel hose
3	Fuel filter (high-pressure side)

FUEL INJECTION CONTROL SYSTEM

Z6U011413250W01

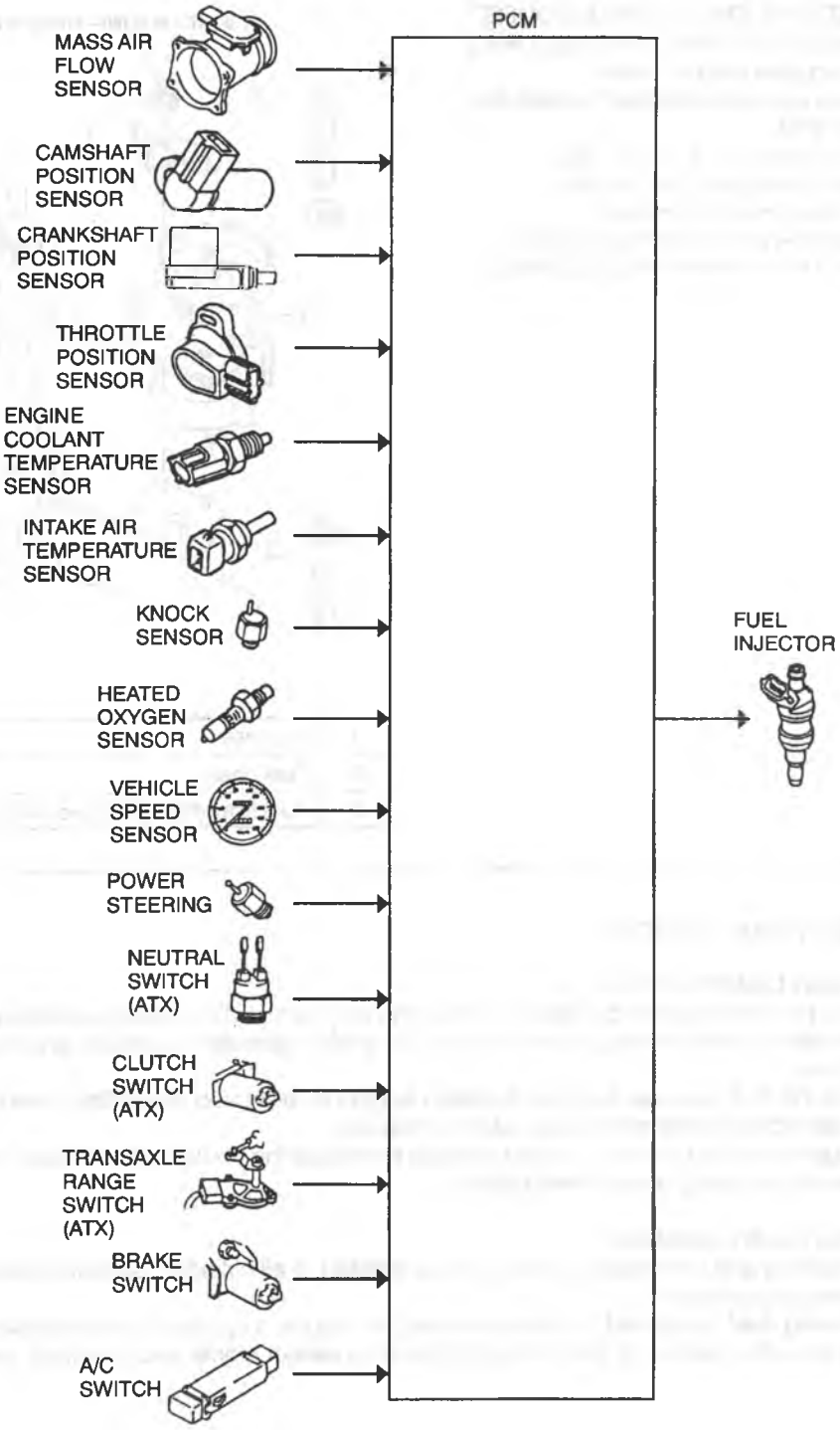
Fuel Injection Duration Control Outline

- The PCM controls the fuel injection duration to obtain the optimum air/fuel ratio parameter (stoichiometric) at the closed loop engine operation range, according to the engine operation condition and heated oxygen sensor output signal.
- The PCM controls the fuel injection duration to obtain engine stability and drivability at the open loop engine operation range according to the engine operation conditions.
- The PCM stops fuel injection for one or more cylinders to protect the powertrain and over rev conditions and to reduce engine torque during drive wheel slipping.

Fuel Injection Timing Control Outline

- During engine cranking and underspeed mode, fuel is injected to all cylinders synchronously based on the crankshaft position sensor signal.
- During normal driving, fuel is injected in optimum timing during each cylinder's intake stroke according to the engine operating condition based on the crankshaft position sensor signal and camshaft position sensor signal.

Block Diagram

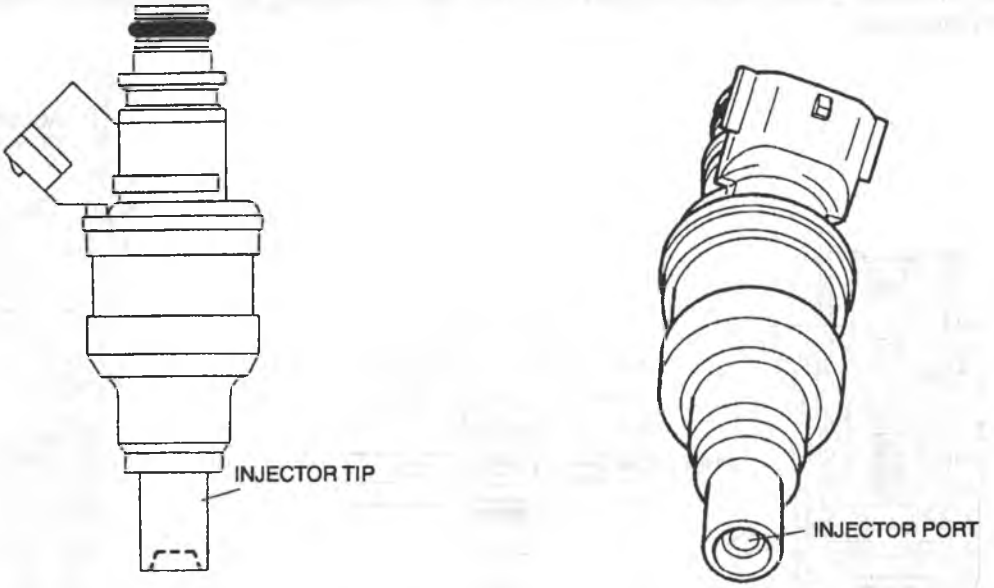


Z6U0102W068

FUEL INJECTOR DESCRIPTION [FS]

Z6U011413250W02

- The fuel injectors inject fuel to the intake port area of each cylinder and are actuated by the fuel injection signal from the PCM.
- The fuel injectors are top-feed type.
- To prevent the injection port from being clogged by blowback combustion gas, the fuel injector features the multi-plate injection port and cylindrical injector tip.

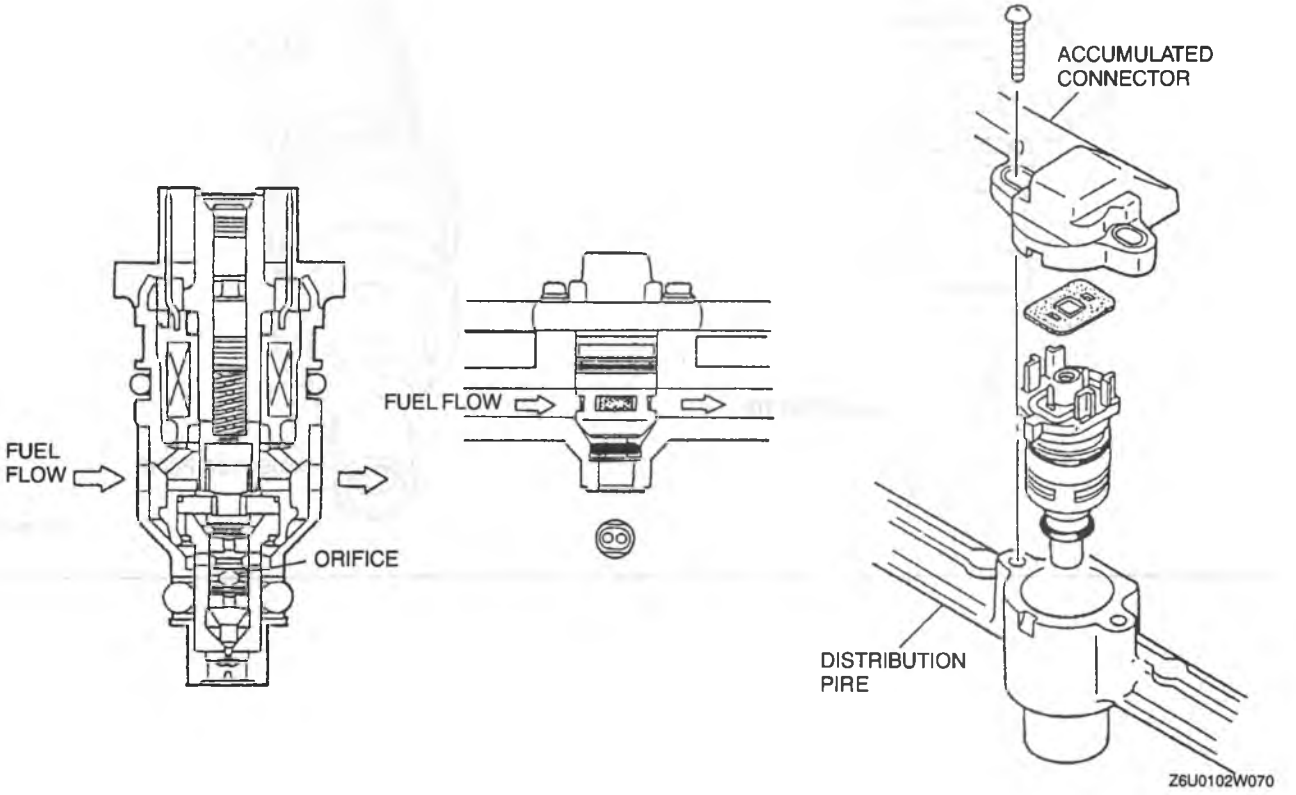


Z6U0102W069

FUEL INJECTOR DESCRIPTION [KL]

Z6U011413250W03

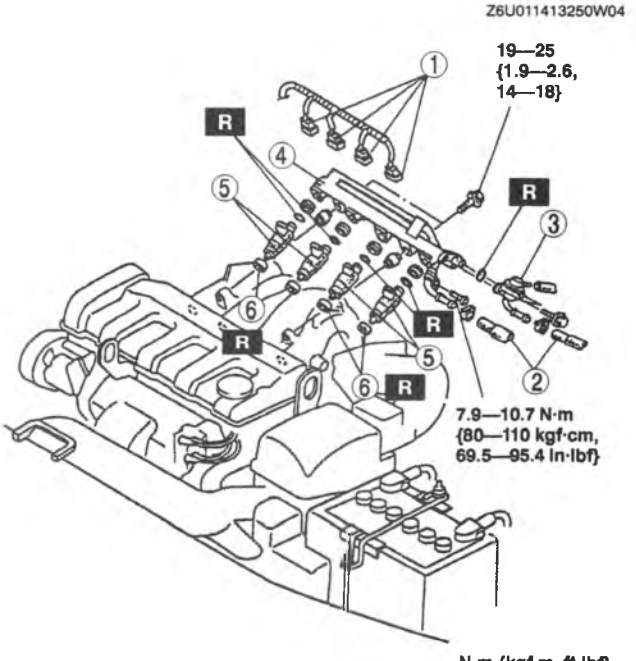
- Internal flow adjusting, side-feed type fuel injectors with two spray ports are used.
- Each fuel injector injects fuel to two intake valve heads, synchronized with the air intake timing of respective cylinder.
- A side-feed type fuel injector has holes on its side for smooth fuel supply/return. The fuel is supplied through these holes, and surplus fuel returns through them. Also, the fuel vapor in the injector generated by the engine heat is purged easily, prevents injector vapor lock. As a result, restarting after high-speed or heavy load driving has improved.



FUEL INJECTOR REMOVAL/INSTALLATION [FS]

1. Complete the "BEFORE REPAIR PROCEDURE". (See 01-14-3 BEFORE REPAIR PROCEDURE.)
2. Disconnect the negative battery cable.
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.
5. Complete the "AFTER REPAIR PROCEDURE". (See 01-14-4 AFTER REPAIR PROCEDURE.)

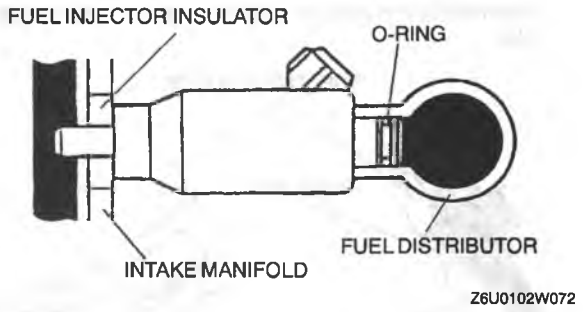
Z6U011413250W04



1	Fuel injector connector
2	Fuel hose
3	Pressure regulator
4	Fuel distributor
5	Fuel injector (See 01-14-19 Fuel Injector Installation Note)
6	Fuel injector insulator

Fuel Injector Installation Note

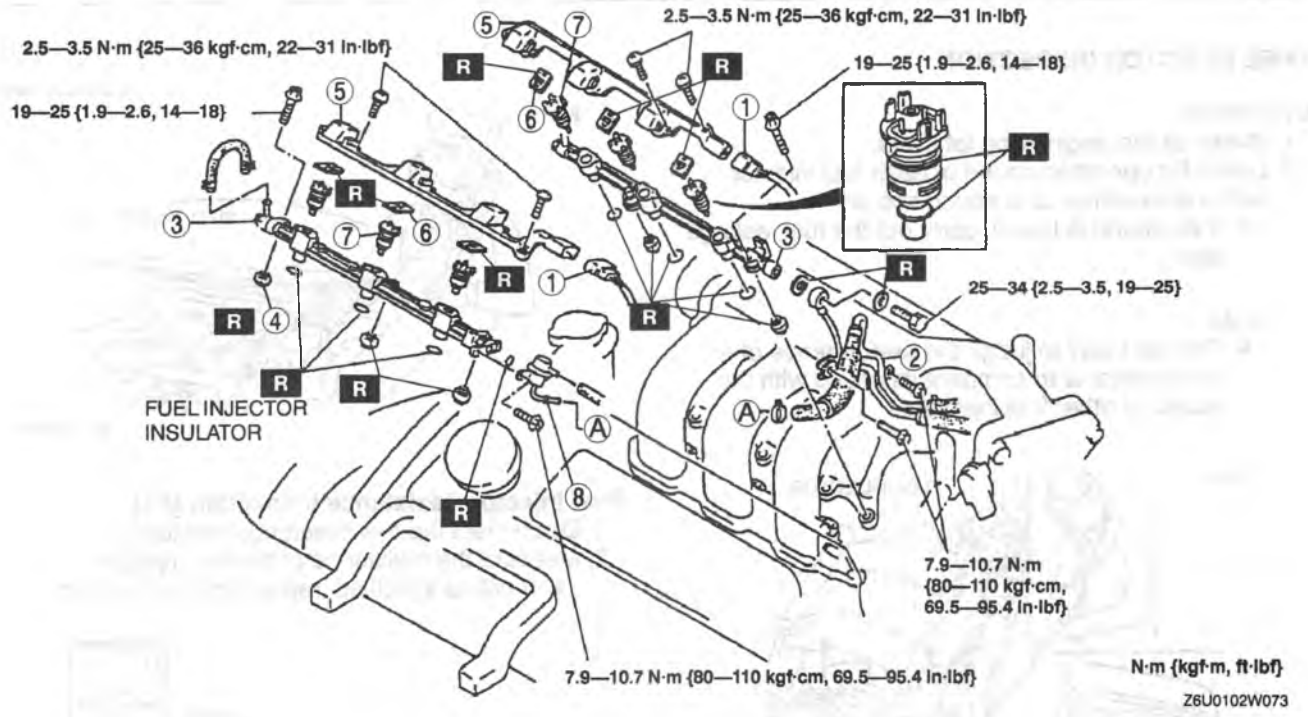
1. Use new fuel injector O-rings.
2. Apply a small amount of engine oil to the O-rings and install them into the fuel distributor.
3. Verify that the O-rings and the fuel injector sealing surfaces are free of foreign materials. Clean with gasoline if necessary.
4. Install the fuel injectors in the fuel distributor with light twisting motion so that the O-rings will not be folded.



FUEL INJECTOR REMOVAL/INSTALLATION [KL]

Z6U011413250W05

1. Complete the "BEFORE REPAIR PROCEDURE". (See 01-14-3 BEFORE REPAIR PROCEDURE.)
2. Disconnect the negative battery cable.
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.
5. Complete the "AFTER REPAIR PROCEDURE". (See 01-14-4 AFTER REPAIR PROCEDURE.)

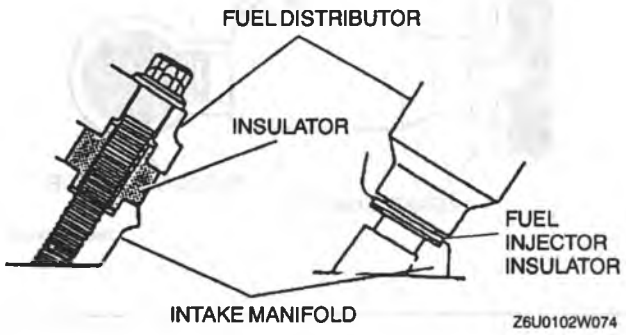


1	Connector
2	Fuel hose and fuel pipe
3	Fuel distributor (See 01-14-20 Fuel Distributor Installation Note)
4	Insulator

5	Accumulated connector
6	Spacer
7	Fuel injector (See 01-14-20 Fuel Injector Installation Note)
8	Pressure regulator

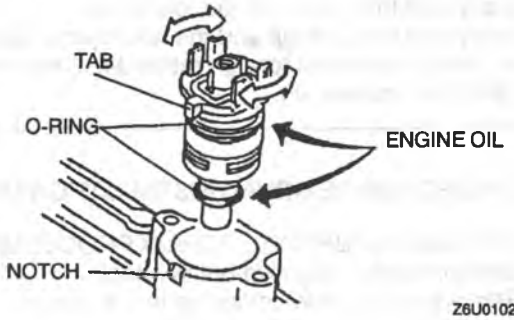
Fuel Distributor Installation Note

1. Install new fuel injector insulators.
2. Install the insulators, making sure that each is pressed in fully, and that it is not twisted or bent. Incorrectly installed insulators can cause rough idle.



Fuel Injector Installation Note

1. Install new O-rings.
2. Apply a small amount of clean engine oil to the O-rings before installing them.
3. Verify that the fuel distributor is clean.
4. Clean the fuel distributor with gasoline, if necessary.
5. Install the fuel injector squarely into the fuel distributor while turning it back and forth.
6. Fit the fuel injector tab into the notch in the fuel distributor.
7. Install the harness.



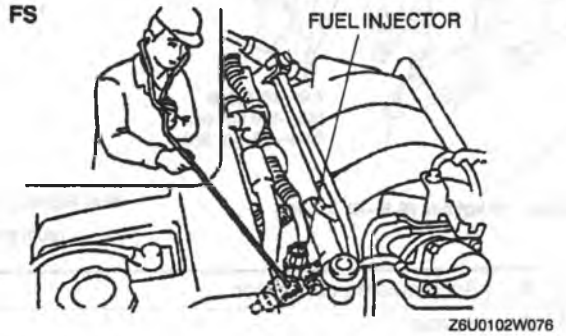
FUEL INJECTOR INSPECTION

On-vehicle

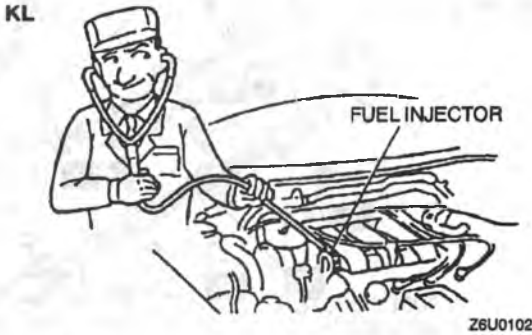
1. Warm up the engine and let it idle.
2. Listen for operation sound of each fuel injector with a screwdriver or a sound scope.
   - If no sound is heard, carry out the fuel leakage test.

Note

- The best way to judge the performance of a fuel injector is to compare its sound with the sound of other fuel injectors.

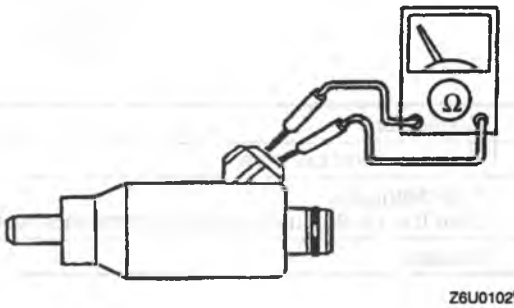


Z6U011413250W06



Fuel Injector Resistance Inspection [FS]

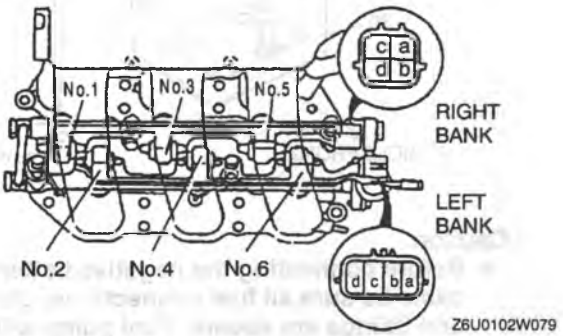
1. Disconnect the fuel injector connectors.
2. Measure the resistance of the fuel injector.
   - If not as specified, replace the fuel injector.



Resistance
12—16 Ω (at 20 °C {68 °F})

Fuel Injector Resistance Inspection [KL]

1. Turn off the ignition switch and disconnect the fuel injector connectors.
2. Measure resistance of the fuel injector with an ohmmeter at the following conditions.
   - If not as specified, inspect continuity of the harness and inspect for poor connection.
   - If the harness is okay, replace the fuel injector.



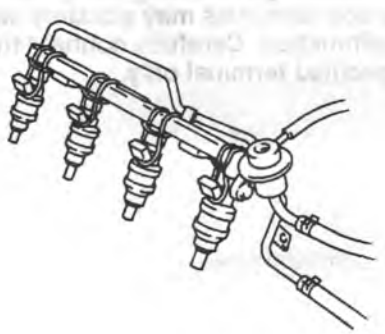
Harness	Terminal	Injector No.
Right Bank	a—b	1
	a—c	5
	a—d	3
Left Bank	d—c	2
	d—b	4
	d—a	6

Resistance
12—16 Ω [20 °C {68 °F}]

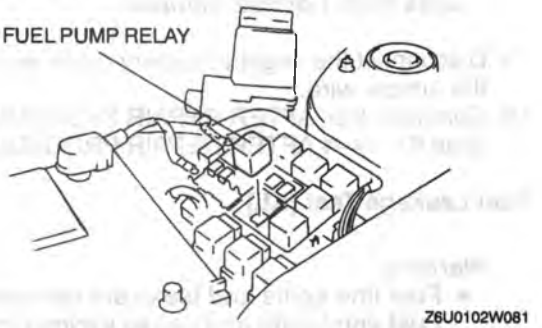
Fuel Leakage Test [FS]

Warning
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Always carry out the following procedure with the engine stopped.**

1. Complete the "BEFORE REPAIR PROCEDURE". (See 01-14-3 BEFORE REPAIR PROCEDURE.)
2. Disconnect the negative battery cable.
3. Remove the fuel injectors together with the fuel distributor. (See 01-14-18 FUEL INJECTOR REMOVAL/INSTALLATION [FS].)
4. Fasten the fuel injectors firmly to the fuel distributor with wire.

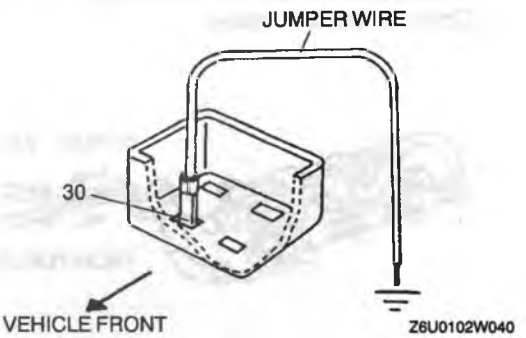


5. Remove the fuel pump relay.



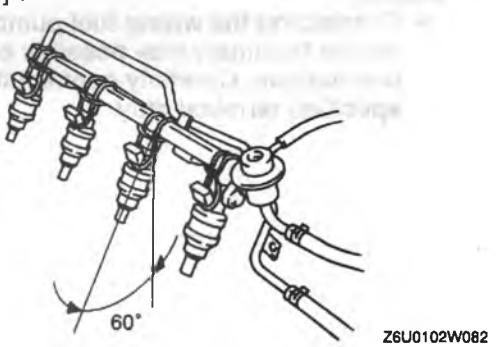
Caution
- **Connecting the wrong fuel pump relay socket terminals may possibly cause a malfunction. Carefully connect the specified terminal only.**

6. Short the fuel pump relay socket terminals 30 to the body GND using a jumper wire.



Caution
- **Before connecting the negative battery cable be sure all fuel connections, clamps and fittings are secure. Fuel pump will operate at full pressure anytime the cable is connected to the battery. When the cable makes contact, it is sure to arc and create a danger of ignition or explosion.**

7. Connect the negative battery cable to operate the fuel pump.
8. Tilt the fuel injectors **approx. 60 degrees** and verify that no fuel leaks from the fuel injector nozzles.
   - If not as specified, carry out the "Volume Test [FS]".



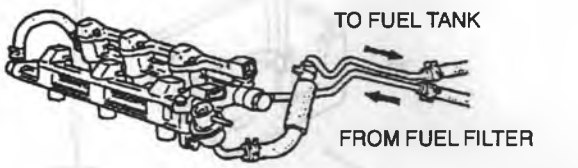
Fuel leakage
Less than 1 drop/2 minutes

9. Disconnect the negative battery cable and remove the jumper wire.
10. Complete the "AFTER REPAIR PROCEDURE". (See 01-14-4 AFTER REPAIR PROCEDURE.)

Fuel Leakage Test [KL]

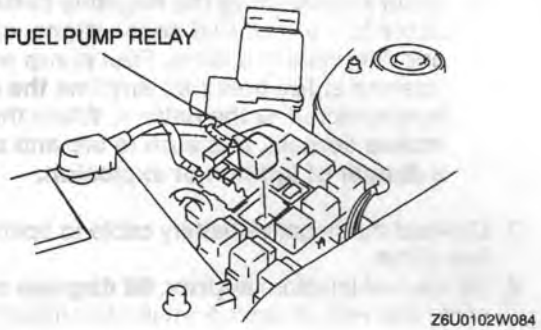
Warning
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Always carry out the following procedure with the engine stopped.**

1. Complete the "BEFORE REPAIR PROCEDURE". (See 01-14-3 BEFORE REPAIR PROCEDURE.)
2. Disconnect the negative battery cable.
3. Remove the fuel distributor component from the intake manifold. (See 01-14-19 FUEL INJECTOR REMOVAL/INSTALLATION [KL].)
4. Connect the fuel hoses.



Z6U0102W083

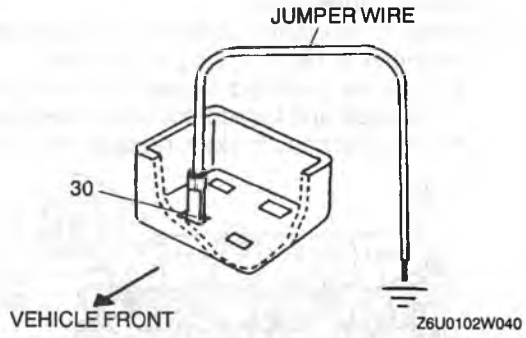
5. Remove the fuel pump relay.



Z6U0102W084

Caution
- **Connecting the wrong fuel pump relay socket terminals may possibly cause a malfunction. Carefully connect the specified terminal only.**

6. Short the fuel pump relay socket terminals 30 to the body GND using a jumper wire.



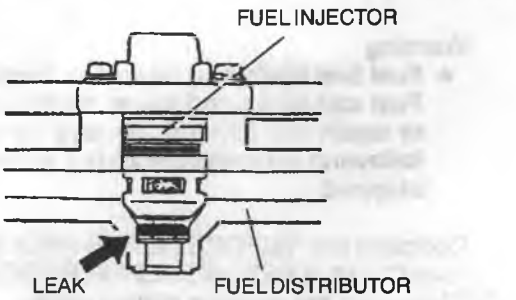
Z6U0102W040

Caution
- **Before connecting the negative battery cable be sure all fuel connections, clamps and fittings are secure. Fuel pump will operate at full pressure anytime the cable is connected to the battery. When the cable makes contact, it is sure to arc and create a danger of ignition or explosion.**

7. Connect the negative battery cable to operate the fuel pump and inspect for fuel leaks from the fuel injectors.

Fuel leakage
Less than 1 drop/2 min.

8. Disconnect the negative battery cable and remove the jumper wire.
   - If not as specified, remove the leaking fuel injector and inspect the O-rings and fuel distributor for damage. Replace as necessary.

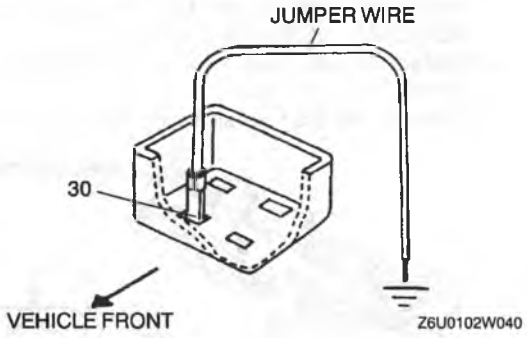


Z6U0102W085

9. Install the fuel injector.

Caution
- **Connecting the wrong fuel pump relay socket terminals may possibly cause a malfunction. Carefully connect the specified terminal only.**

10. Short the fuel pump relay socket terminals 30 to the body GND using a jumper wire.



Caution
- **Before connecting the negative battery cable be sure all fuel connections, clamps and fittings are secure. Fuel pump will operate at full pressure anytime the cable is connected to the battery. When the cable makes contact, it is sure to arc and create a danger of ignition or explosion.**

11. Connect the negative battery cable to operate the fuel pump and inspect for fuel leaks from fuel injector.
12. Disconnect the negative battery cable and remove the jumper wire.
    - If not as specified, carry out the "Volume Test [KL]".
13. Complete the "AFTER REPAIR PROCEDURE". (See 01-14-4 AFTER REPAIR PROCEDURE.)

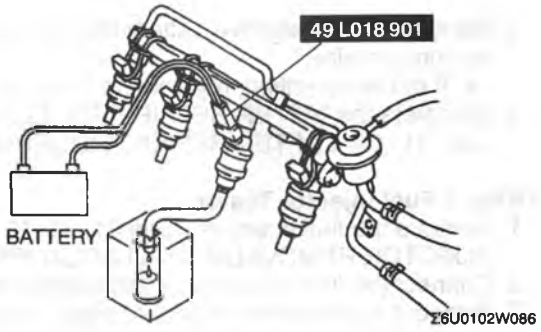
Injection Volume Inspection [FS]

Warning
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Always carry out the following procedure with the engine stopped.**

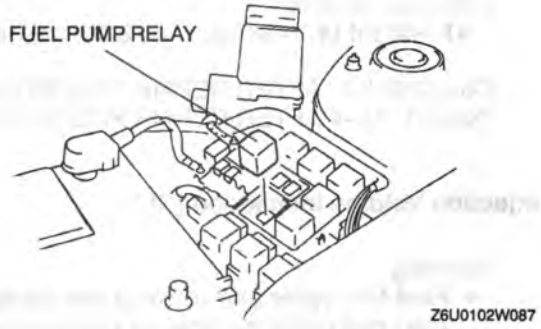
Note
- Perform the following inspection only when directed.
- If there is an after market fuel injector tester or the **SST** (49 L018 901), perform this inspection.
- If there is no after market fuel injector tester or the **SST**, perform "Simulation Test", "Resistance Inspection" and "Fuel Leakage Inspection" to verify whether the fuel injector is okay or not.

1. Complete the "BEFORE REPAIR PROCEDURE". (See 01-14-3 BEFORE REPAIR PROCEDURE.)
2. Disconnect the negative battery cable.

Using the SST
1. Remove the fuel injector together with the fuel distributor. (See 01-14-18 FUEL INJECTOR REMOVAL/INSTALLATION [FS].)
2. Fasten the fuel injectors firmly to the fuel distributor with wire.
3. Connect the **SST** as shown in the figure.

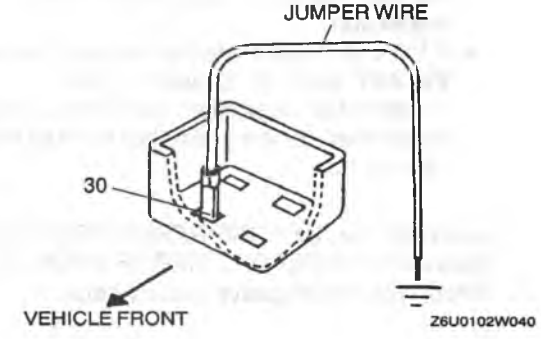


4. Remove the fuel pump relay.



Caution
- **Connecting the wrong fuel pump relay socket terminals may possibly cause a malfunction. Carefully connect the specified terminal only.**

5. Short the pump relay socket terminal 30 to the body GND using a jumper wire.



Caution
- **Before connecting the negative battery cable be sure all fuel connections, clamps and fittings are secure. Fuel pump will operate at full pressure anytime the cable is connected to the battery. When the cable makes contact, it is sure to arc and create a danger of ignition or explosion.**

6. Connect the negative battery cable to operate the fuel pump.
7. Measure the injection volume of each fuel injector by using a graduated container.

Injection volume
47—68 ml {47—68 cc, 1.4—2.0 fl oz}/15 sec.

8. Disconnect the negative battery cable and remove the jumper wire.
   - If not as specified, replace the fuel injector.
9. Complete the "AFTER REPAIR PROCEDURE". (See 01-14-4 AFTER REPAIR PROCEDURE.)

Using a Fuel Injector Tester

1. Remove the fuel injectors. (See 01-14-18 FUEL INJECTOR REMOVAL/INSTALLATION [FS].)
2. Connect the fuel injector to a fuel injector tester.
3. Measure the injection volume of each fuel injector.
   - If not as specified, replace the fuel injector.

Injection volume
47—68 ml {47—68 cc, 1.4—2.0 fl oz}/15 sec.

4. Complete the "AFTER REPAIR PROCEDURE". (See 01-14-4 AFTER REPAIR PROCEDURE.)

Injection Volume Inspection [KL]

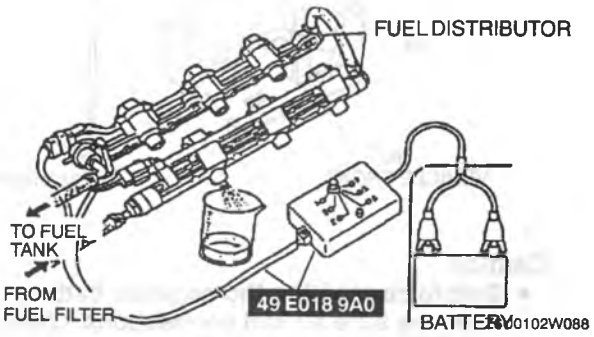
Warning
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Always carry out the following procedure with the engine stopped.**

Note
- Perform the following inspection only when directed.
- If there is an after market fuel injector tester or the **SST** (49 E018 9A0), perform this inspection.
- If there is no after market fuel injector tester or the **SST**, perform "Simulation Test", "Resistance Inspection" and "Fuel Leakage Inspection" to verify whether the fuel injector is okay or not.

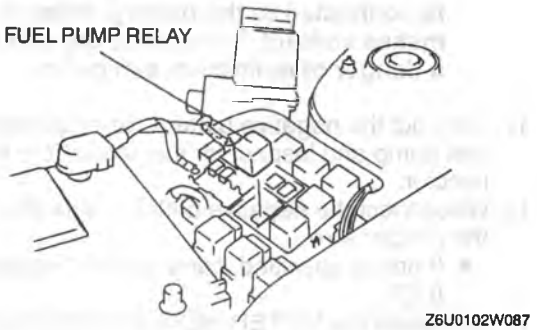
1. Complete the "BEFORE REPAIR PROCEDURE". (See 01-14-3 BEFORE REPAIR PROCEDURE.)
2. Disconnect the negative battery cable.

Using the SST

1. Remove the fuel injector together with the fuel distributor. (See 01-14-19 FUEL INJECTOR REMOVAL/INSTALLATION [KL].)
2. Fasten the fuel injectors firmly to the fuel distributor with wire.
3. Connect the **SST** as shown in the figure.

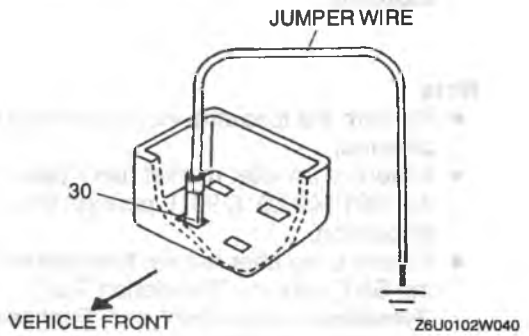


4. Remove the fuel pump relay.



Caution
- **Connecting the wrong fuel pump relay socket terminals may possibly cause a malfunction. Carefully connect the specified terminal only.**

5. Short the pump relay socket terminal 30 to the body GND using a jumper wire.



Caution
- **Before connecting the negative battery cable be sure all fuel connections, clamps and fittings are secure. Fuel pump will operate at full pressure anytime the cable is connected to the battery. When the cable makes contact, it is sure to arc and create a danger of ignition or explosion.**

6. Connect the negative battery cable to operate the fuel pump.
7. Measure the injection volume of each fuel injector by using a graduated container.

   Injection volume
   48—56 ml {48—56 cc, 1.7—1.8 fl oz}/15 sec.

8. Disconnect the negative battery cable and remove the jumper wire.
   - If not as specified, replace the fuel injector.
9. Complete the "AFTER REPAIR PROCEDURE". (See 01-14-4 AFTER REPAIR PROCEDURE.)

Using a Fuel Injector Tester

1. Remove the fuel injectors. (See 01-14-19 FUEL INJECTOR REMOVAL/INSTALLATION [KL].)
2. Connect the fuel injector to a fuel injector tester.
3. Measure the injection volume of each fuel injector.
   - If not as specified, replace the fuel injector.

   Injection volume
   48—56 ml {48—56 cc, 1.7—1.8 fl oz}/15 sec.

4. Complete the "AFTER REPAIR PROCEDURE". (See 01-14-4 AFTER REPAIR PROCEDURE.)

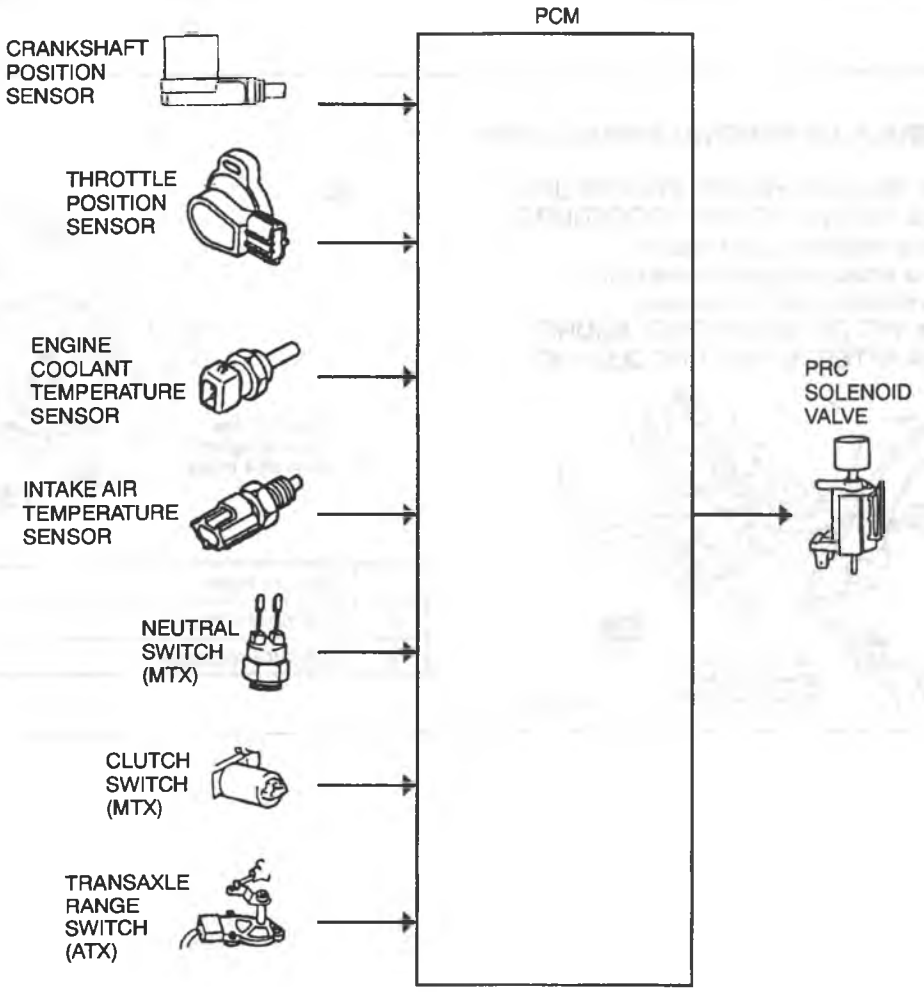
PRESSURE REGULATOR CONTROL (PRC) SYSTEM

Z6U011413280W01

Fuel Pressure Regulator Control (PRC) Operation

- When ail of the conditions below are met, the PCM actuates the PRC solenoid valve to cut the vacuum applied and to apply the atmospheric pressure to the pressure regulator. Consequently fuel pressure is increased to 280 kPa {2.9 kgf/cm^2, 41 psi}.
  i. Engine speed is below 1,000 rpm with the throttle valve position below the specified value or transaxle is in neutral. (P or N position (ATX), Neutral or clutch pedal depressed. (MTX))
  ii. Engine coolant temperature is above 90 °C {194 °F}.
  iii. Intake air temperature is above 90 °C {194 °F}.
  iv. For approx. 60 seconds after the engine is put in to run mode.

Block Diagram



Z6U0102W089

Pressure Regulator Control (PRC) Solenoid Valve Description

Function

- The PRC solenoid valve cuts the vacuum applied to the pressure regulator from the intake manifold, which increases the fuel line pressure so as to prevent vapor lock in the pressure regulator during starting when the engine is hot and for a specified period after start.

Structure

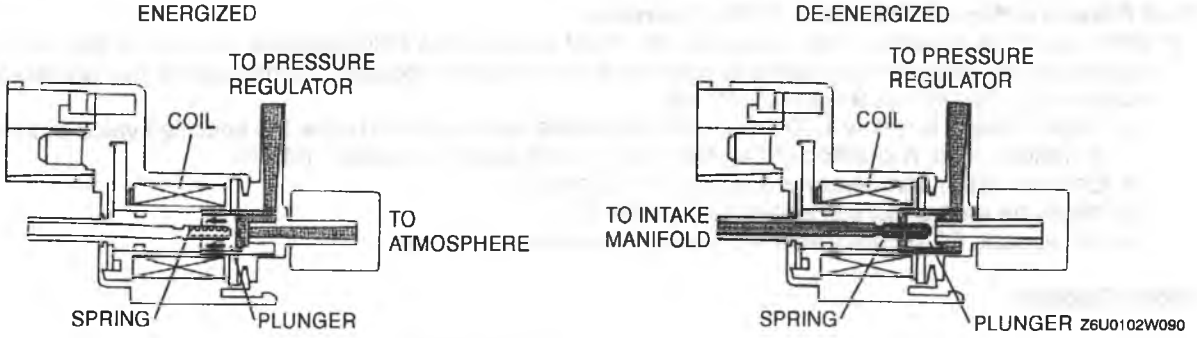
- The PRC solenoid valve is located between the pressure regulator and intake manifold.
- The PRC solenoid valve Is composed of a coil, plunger, spring and air filter.

Operation (energized)

- The PRC solenoid valve opens the air passage between the pressure regulator and air filter of the PRC solenoid valve, which applies the barometric pressure to the pressure regulator diaphragm chamber.

Operation (de-energized)

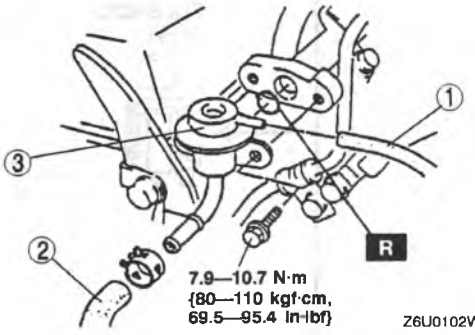
- The PRC solenoid valve opens the air passage between the pressure regulator and intake manifold, which applies the intake manifold vacuum to the pressure regulator diaphragm chamber.



PRESSURE REGULATOR REMOVAL/INSTALLATION

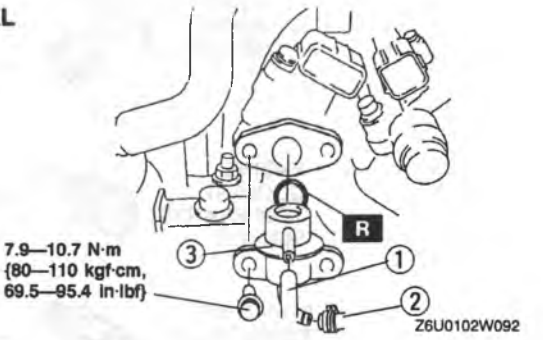
1. Complete the "BEFORE REPAIR PROCEDURE." (See 01-14-3 BEFORE REPAIR PROCEDURE.)
2. Disconnect the negative battery cable.
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.
5. Complete the "AFTER REPAIR PROCEDURE". (See 01-14-4 AFTER REPAIR PROCEDURE.)

FS



Z6U011413280W02

KL

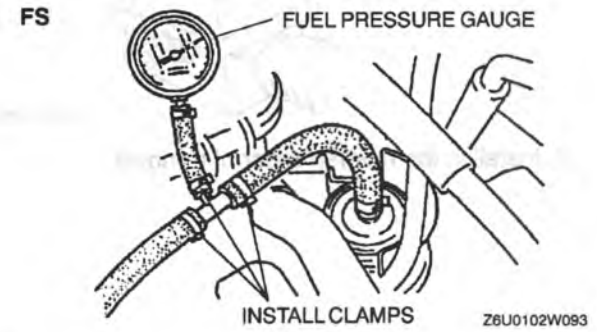


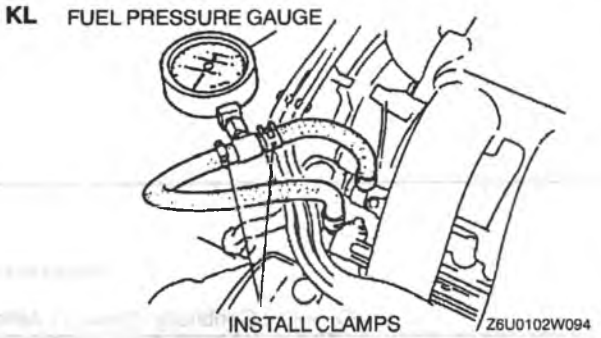
1	Vacuum hose
2	Fuel return hose
3	Pressure regulator

PRESSURE REGULATOR INSPECTION

Z6U011413280W03

1. Complete the "BEFORE REPAIR PROCEDURE". (See 01-14-3 BEFORE REPAIR PROCEDURE.)
2. Disconnect the negative battery cable.
3. Connect a fuel pressure gauge between the fuel filter and the fuel distributor [FS] or between the fuel distributors RH and LH [KL]. (Install clamps as shown.)

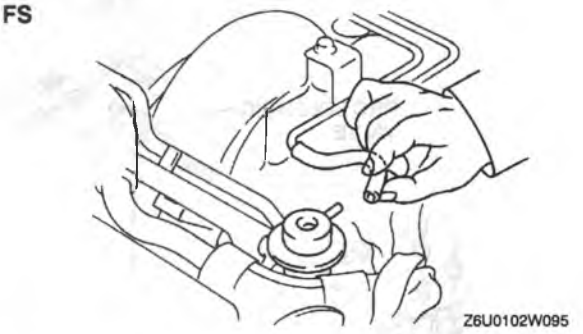


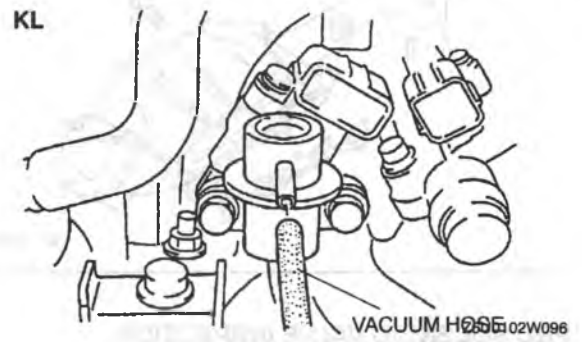


4. Connect the negative battery cable.
5. Start the engine and let it idle.
6. Measure the fuel line pressure **after approx. 2 minutes**.

Fuel line pressure
FS: 210—260 kPa {2.1—2.7 kgf/cm^2, 30—38 psi}
KL: 210—250 kPa {2.1—2.6 kgf/cm^2, 30—36 psi}

7. Disconnect the vacuum hose from the pressure regulator and measure the fuel line pressure.
   - If not as specified, replace the pressure regulator.





Fuel line pressure
FS: 260—320 kPa {2.6—3.3 kgf/cm^2, 37—46 psi}
KL: 270—310 kPa {2.7—3.2 kgf/cm^2, 39—45 psi}

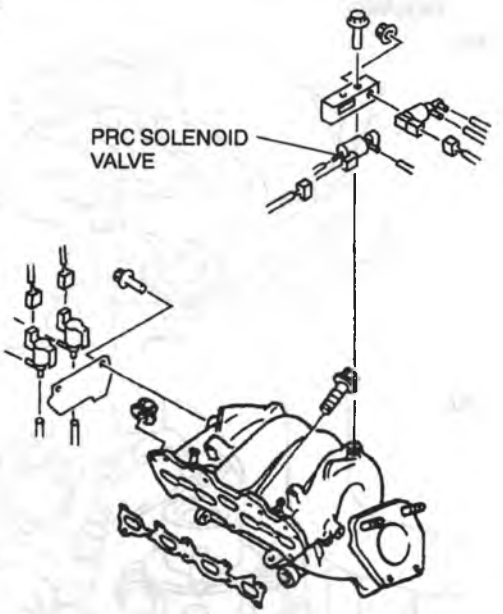
8. Complete the "AFTER REPAIR PROCEDURE". (See 01-14-4 AFTER REPAIR PROCEDURE.)

PRC SOLENOID VALVE REMOVAL/INSTALLATION

Z6U011418740W01

1. Remove the PRC solenoid valve from the intake manifold [FS] or from the air cleaner [KL].

FS



Z6U0102W097

KL



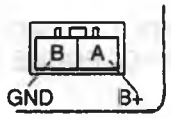
Z6U0102W098

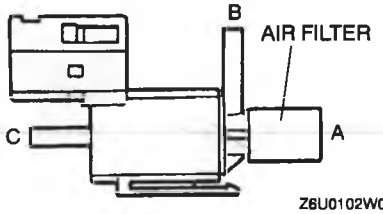
2. Install in the reverse order of removal.

PRC SOLENOID VALVE INSPECTION

Z6U011418740W02

1. Remove the PRC solenoid valve.
2. Inspect airflow between each port under the following conditions.
   - If not as specified, replace the PRC solenoid valve.





Z6U0102W099

○—○ : Continuity ○═○ : Airflow

Step	Terminal		Port		
	A	B	A	B	C
1	○—○			○═○	
2	B+	GND	○═○		

Z6U0102W100

FUEL PUMP RELAY INSPECTION

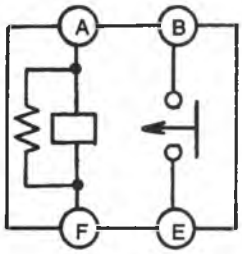
1. Remove the fuel pump relay.
2. Inspect continuity between the fuel pump relay terminals using an ohmmeter.
   - If not as specified, replace the fuel pump relay.

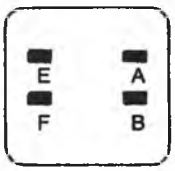
○—○ : Continuity

Step	Terminal			
	A	F	B	E
1	○	○		
2	B+	GND	○	○

Z6U0102W101

Z6U011418621W01





Z6U0102W102

01-15 EXHAUST SYSTEM

EXHAUST SYSTEM INSPECTION **01-15-1**
EXHAUST SYSTEM REMOVAL/ INSTALLATION [FS] **01-15-2**
EXHAUST SYSTEM REMOVAL/ INSTALLATION [KL] **01-15-3**
Heated Oxygen Sensor (Front RH), Heated Oxygen Sensor (Front LH) Removal Note **01-15-4**
Warm Up Three Way Catalytic Converter (RH), Warm Up Three Way Catalytic Converter (LH) Installation Note **01-15-4**
Heated Oxygen Sensor (Front RH), Heated Oxygen Sensor (Front LH) Installation Note **01-15-4**

EXHAUST SYSTEM INSPECTION

Z6U011540000W01

1. Start the engine and check each exhaust system component for exhaust gas leakage.
2. If leakage is found, repair or replace as necessary.

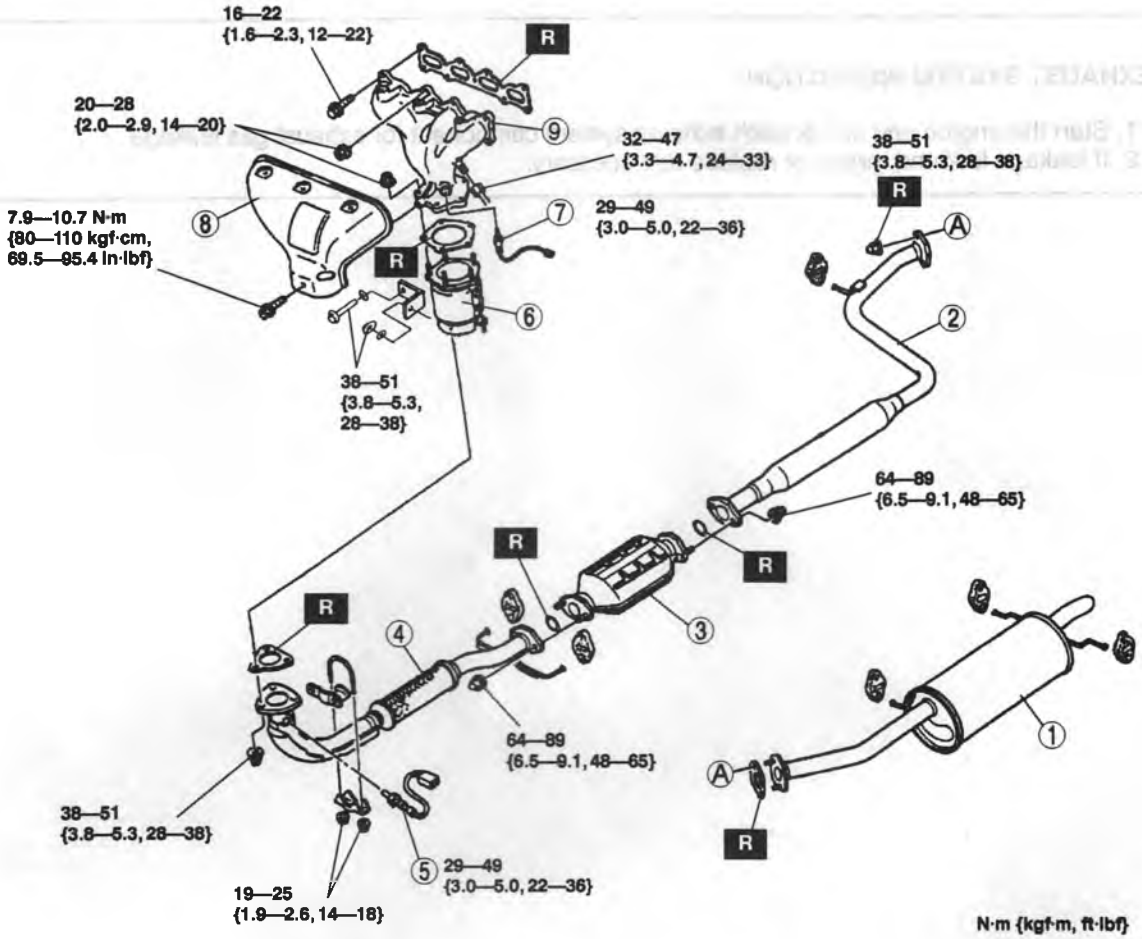
EXHAUST SYSTEM REMOVAL/INSTALLATION [FS]

Z6U011540000W02

Warning

- **When the engine and exhaust system are hot, they can badly burn. Turn off the engine and wait until they are cool before removing or installing the exhaust system.**

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



Z6U0102W103

1	Main silencer
2	Presilencer
3	Three way catalytic converter
4	Front pipe
5	Heated oxygen sensor (Rear)

6	Warm up three way catalytic converter
7	Heated oxygen sensor (Front)
8	Exhaust manifold insulator
9	Exhaust manifold

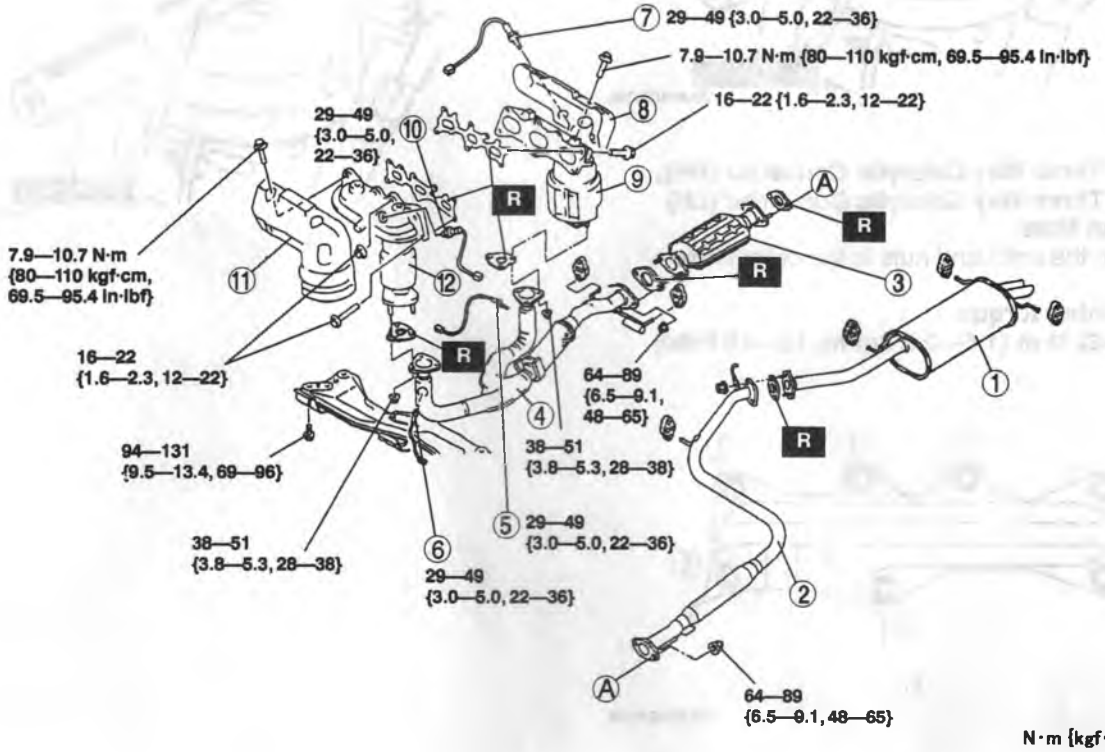
EXHAUST SYSTEM REMOVAL/INSTALLATION [KL]

Z6U011540000W03

Warning

- **When the engine and exhaust system are hot, they can badly burn. Turn off the engine and wait until they are cool before removing or installing the exhaust system.**

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



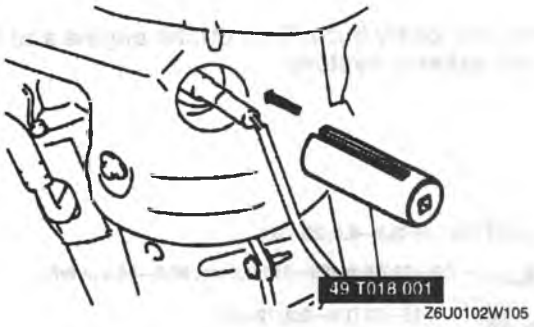
Z6U0115W001

1	Main silencer
2	Presilencer
3	Three way catalytic converter
4	Front pipe
5	Heated oxygen sensor (Rear RH)
6	Heated oxygen sensor (Rear LH)
7	Heated oxygen sensor (Front RH) (See01-15-4 Heated Oxygen Sensor (Front RH), Heated Oxygen Sensor (Front LH) Removal Note) (See01-15-4 Heated Oxygen Sensor (Front RH), Heated Oxygen Sensor (Front LH) Installation Note)
8	Exhaust manifold insulator (RH)

9	Warm up three way catalytic converter (RH) (See01-15-4 Warm Up Three Way Catalytic Converter (RH), Warm Up Three Way Catalytic Converter (LH) Installation Note)
10	Heated oxygen sensor (Front LH) (See01-15-4 Heated Oxygen Sensor (Front RH), Heated Oxygen Sensor (Front LH) Removal Note) (See01-15-4 Heated Oxygen Sensor (Front RH), Heated Oxygen Sensor (Front LH) Installation Note)
11	Exhaust manifold insulator (LH)
12	Warm up three way catalytic converter (LH) (See01-15-4 Warm Up Three Way Catalytic Converter (RH), Warm Up Three Way Catalytic Converter (LH) Installation Note)
13	Exhaust manifold (RH)
14	Exhaust manifold (LH)

Heated Oxygen Sensor (Front RH), Heated Oxygen Sensor (Front LH) Removal Note

1. Use the **SST** to remove the HO2S.

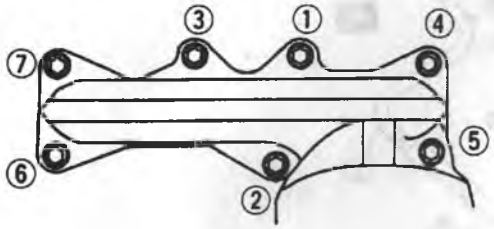


Z6U0102W105

Warm Up Three Way Catalytic Converter (RH), Warm Up Three Way Catalytic Converter (LH) Installation Note

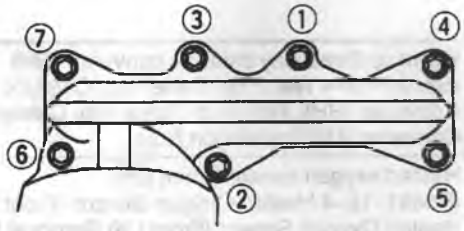
1. Tighten the bolts and nuts in the order shown.

Tightening torque
16—22 N·m {1.6—2.3 kgf·m, 12—16 ft·lbf}



LH

Z6U0102W106



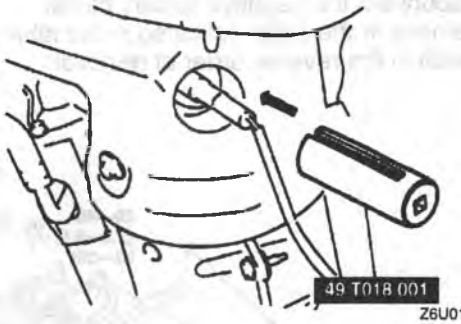
RH

Z6U0102W107

Heated Oxygen Sensor (Front RH), Heated Oxygen Sensor (Front LH) Installation Note

1. Use the **SST** to install the HO2S.

Tightening torque
29—49 N·m {3.0—5.0 kgf·m, 22—36 ft·lbf}



Z6U0102W105

01-16 EMISSION SYSTEM

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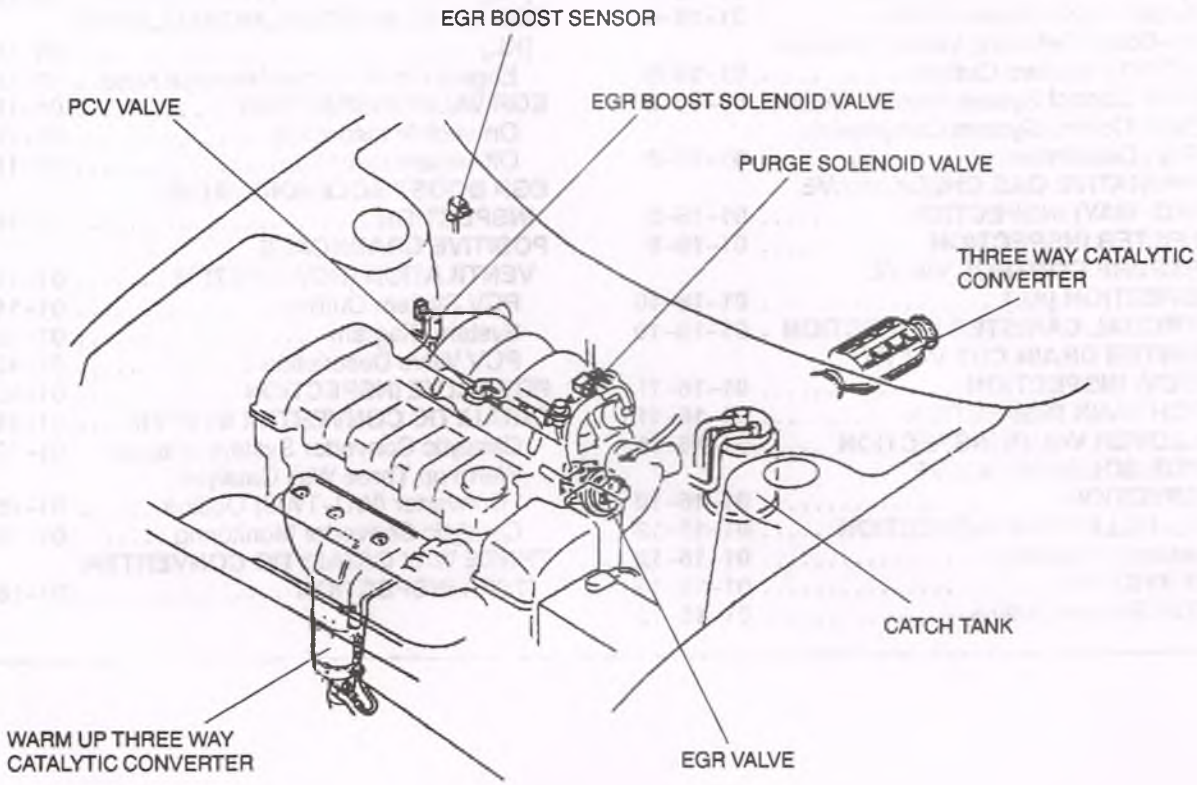
EMISSION SYSTEM OUTLINE

Z6U011601007W01

The emission system consists of the following:
- Catalytic converter and exhaust system.
- Evaporative emission (EVAP) control system.
- Exhaust gas recirculation (EGR) system.
- Positive Crankcase Ventilation (PCV) system.

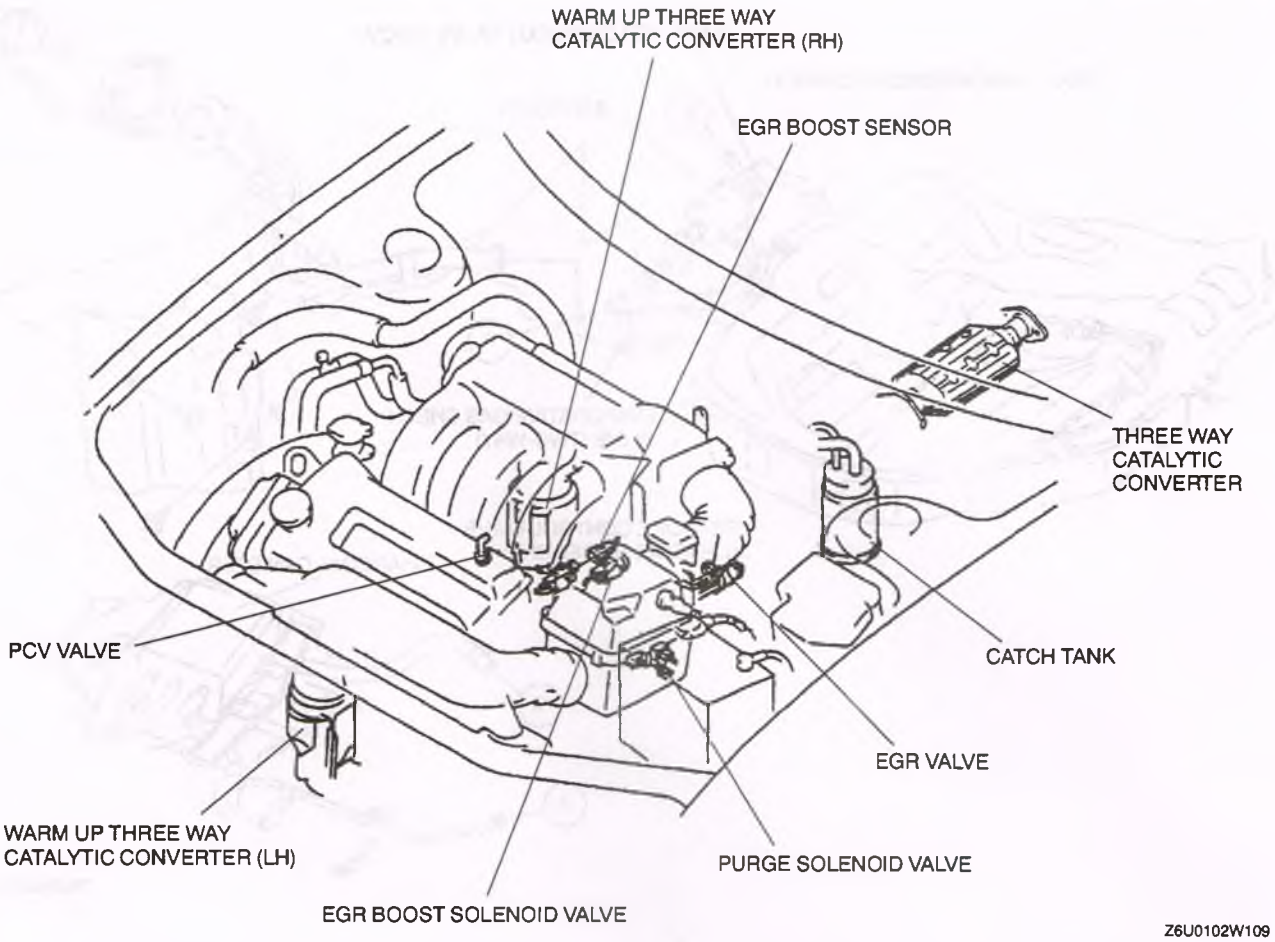
Structural View
Engine room side

FS

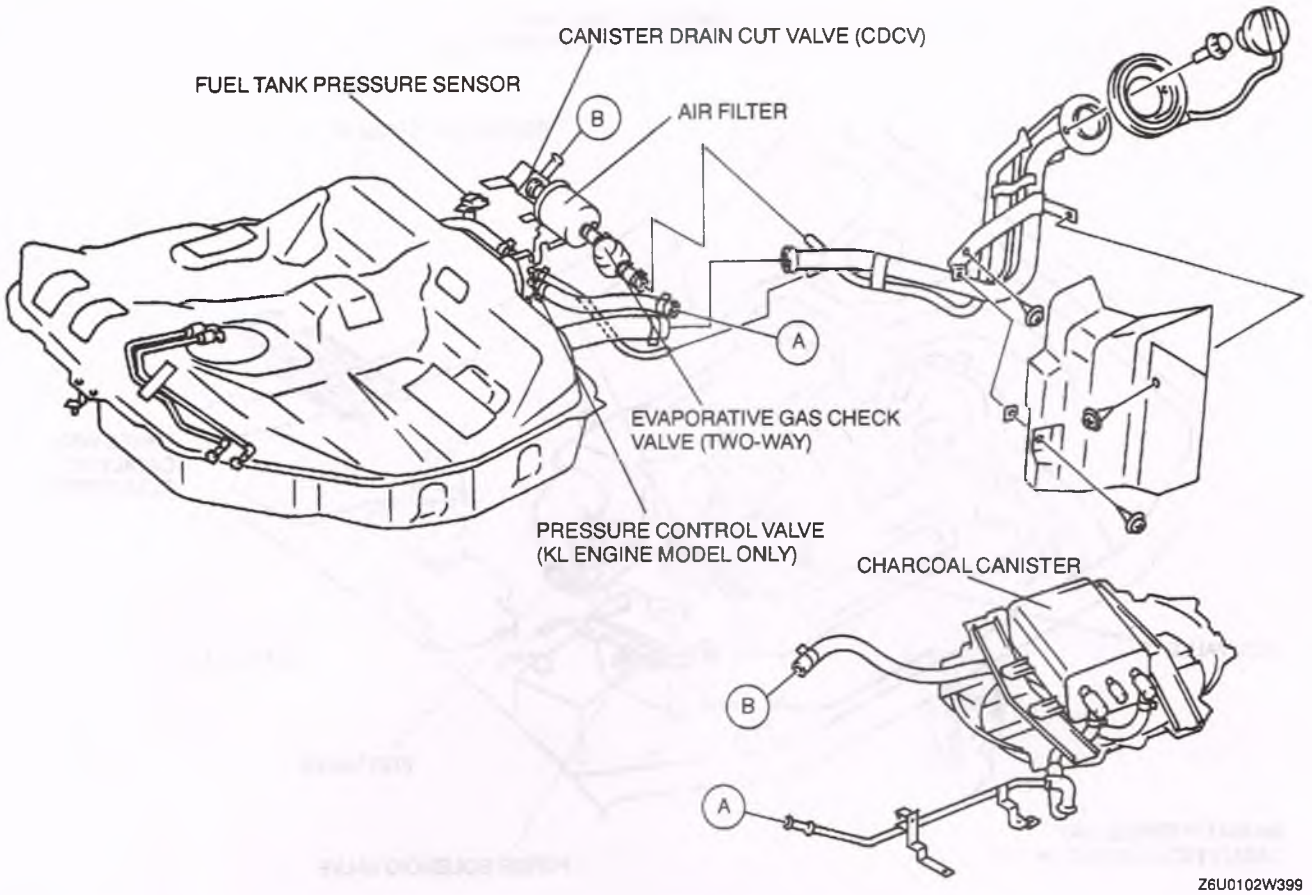


Z6U0102W108

KL


WARM UP THREE WAY
CATALYTIC CONVERTER (RH)
EGR BOOST SENSOR
THREE WAY
CATALYTIC
CONVERTER
PCV VALVE
CATCH TANK
EGR VALVE
WARM UP THREE WAY
CATALYTIC CONVERTER (LH)
PURGE SOLENOID VALVE
EGR BOOST SOLENOID VALVE
Z6U0102W109

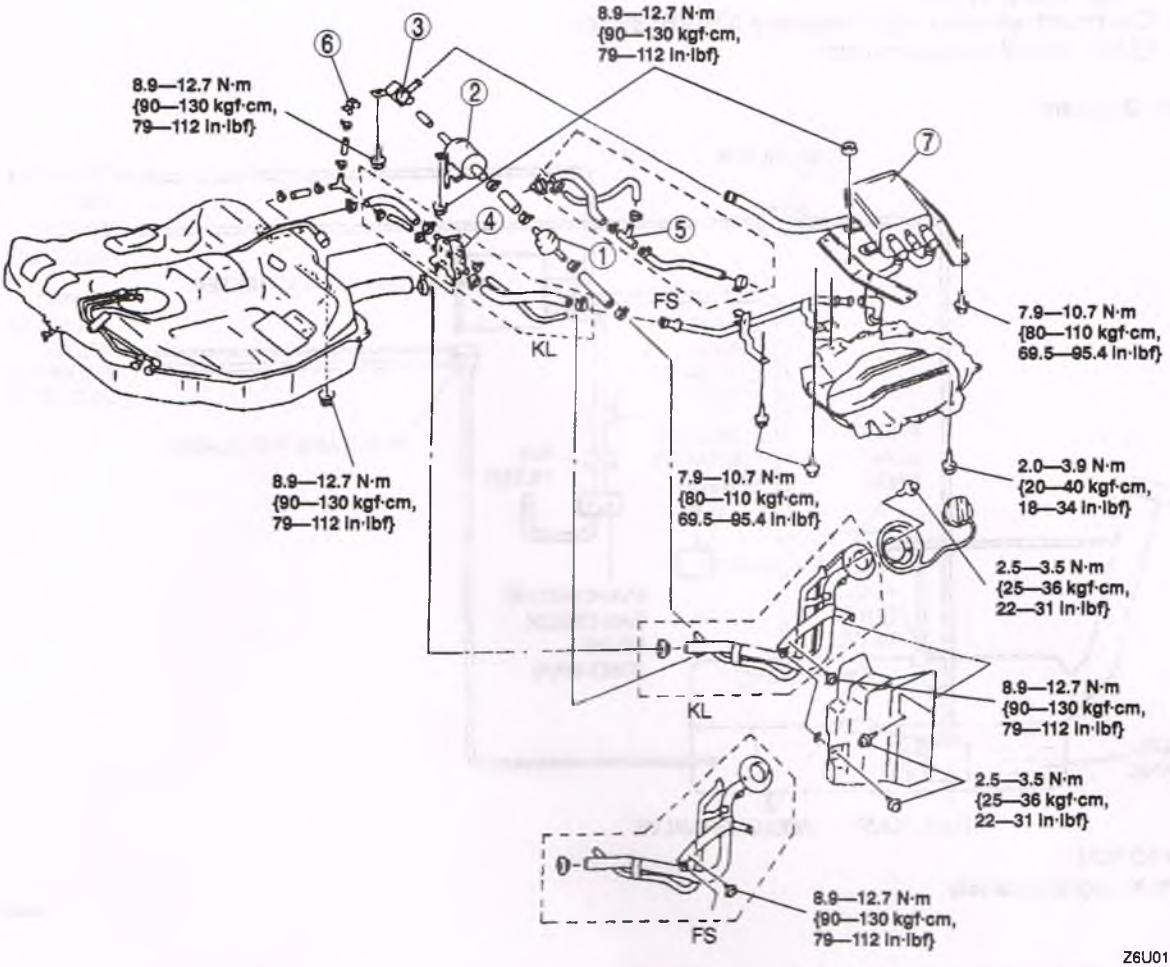
Fuel tank side



EMISSION SYSTEM (FUEL TANK SIDE) COMPONENT REMOVAL/INSTALLATION

Z6U011601007W02

1. Remove the fuel tank. (See 01-14-6 FUEL TANK REMOVAL/INSTALLATION.)
2. Remove the components indicated in the table.
3. Install in the reverse order of removal.



Z6U0102W400

1	Evaporative gas check valve (two-way)
2	Air filter
3	Canister drain cut valve (CDCV)
4	Pressure control valve (KL engine model)

5	Hose joint (FS engine model)
6	Fuel tank pressure sensor
7	Charcoal canister

EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM

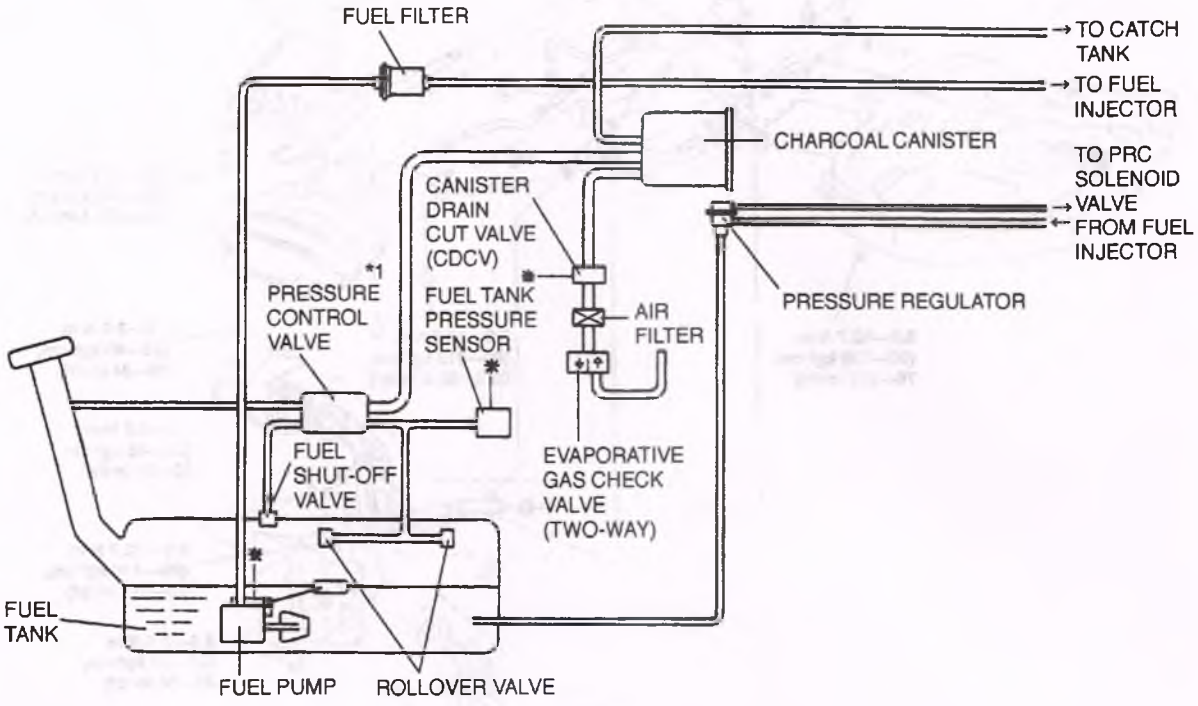
Z6U011601007W03

EVAP Control System Outline

The EVAP control system prevents fuel vapor from releasing to the atmosphere and consists of the following:

- Purge control system
- On-board refueling vapor recovery (ORVR) system
- EVAP control system monitor

System Diagram



✱ TO PCM

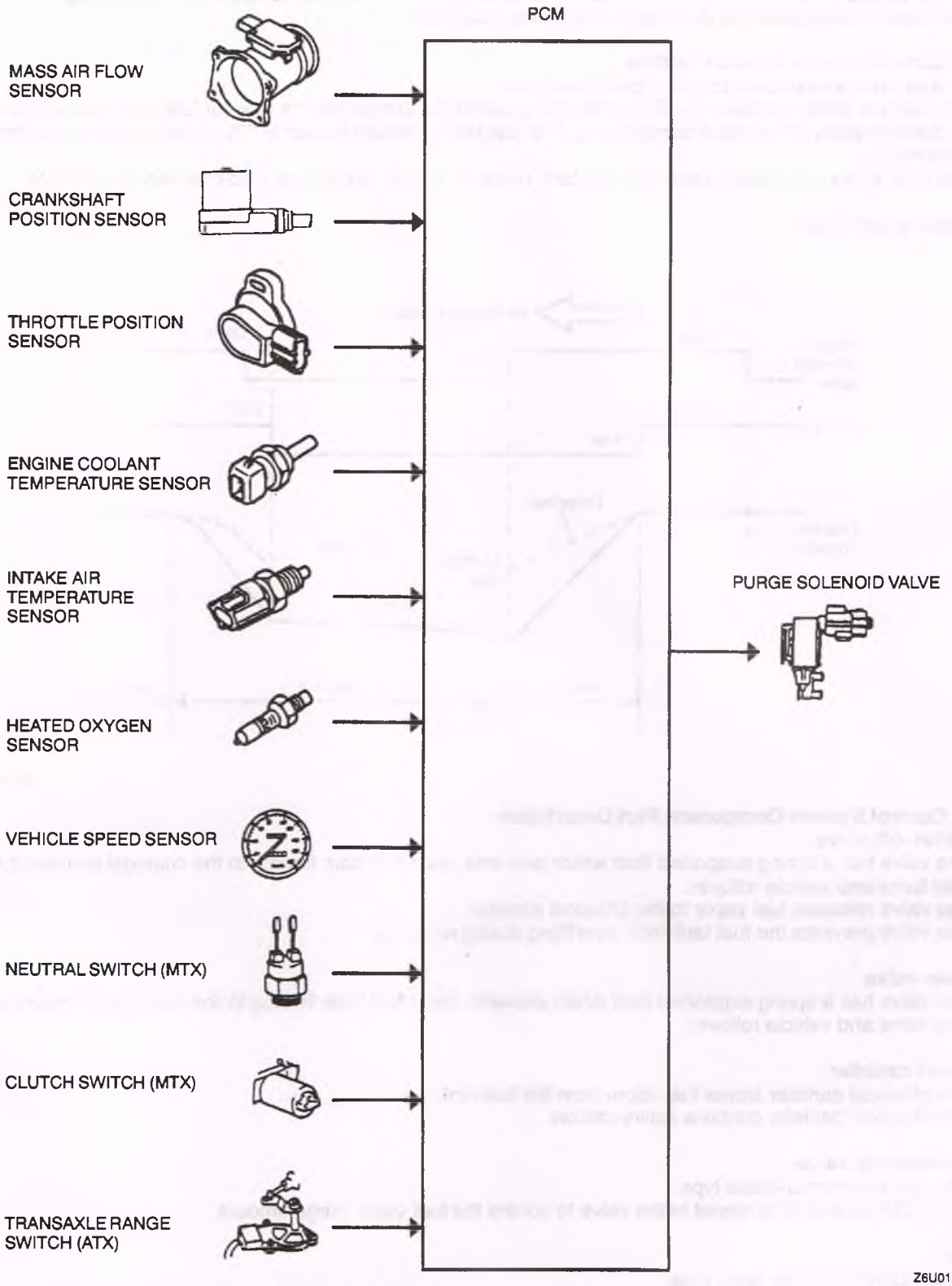
*1: KL engine model only

Z6U0102W110

Purge Control System Outline

- Fuel vapor is stored in the charcoal canister until it is purged to the engine for burning.
- The PCM sends a duty signal to the purge solenoid valve to control the purge amount.
- The purge amount is determined based on the signal from the following sensors:
- Purging take place during a preset period after starting the engine. Purging can take place during idle.

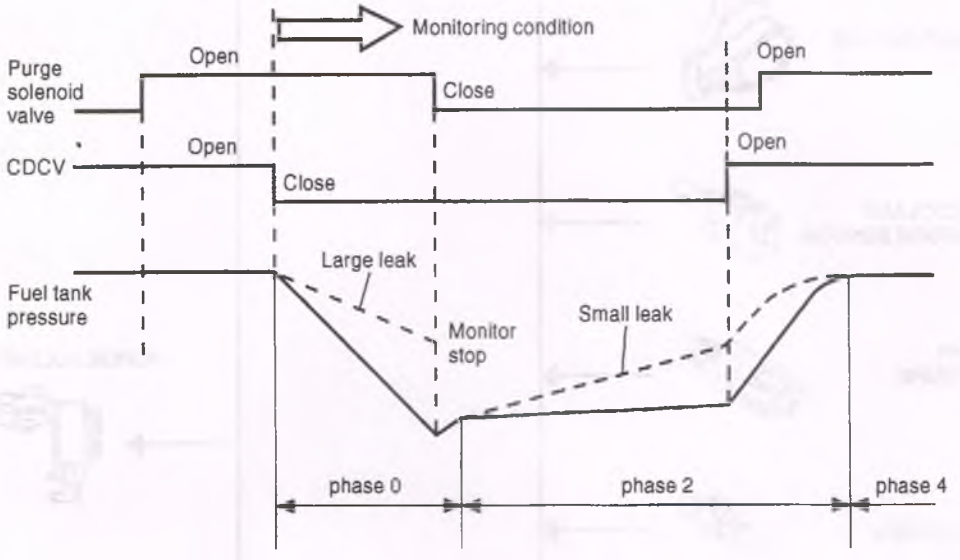
Block diagram



On-Board Refueling Vapor Recovery (ORVR) System Outline
- The pressure control valve maintains fuel vapor passage to the charcoal canister during refueling.
- Fuel vapor during refueling is stored in the charcoal canister.

EVAP Control System Monitor Outline
- The system is monitored one time per drive cycle.
- The canister drain cut valve (CDCV) seals the system from atmosphere to monitor leakage, blockage and proper operation of individual components. The fuel tank pressure sensor (FTP) signal is used to determine a malfunction.
- The CDCV, purge solenoid valve and fuel tank pressure sensor circuits are also checked by the PCM.

Monitoring condition



Z6U0102W112

EVAP Control System Component Part Description
Fuel shut-off valve
- The valve has a spring supported float which prevents liquid fuel from flowing to the charcoal canister during tight turns and vehicle rollover.
- The valve releases fuel vapor to the charcoal canister.
- The valve prevents the fuel tank from overfilling during refueling.

Rollover valve
- The valve has a spring supported float which prevents liquid fuel from flowing to the charcoal canister during tight turns and vehicle rollover.

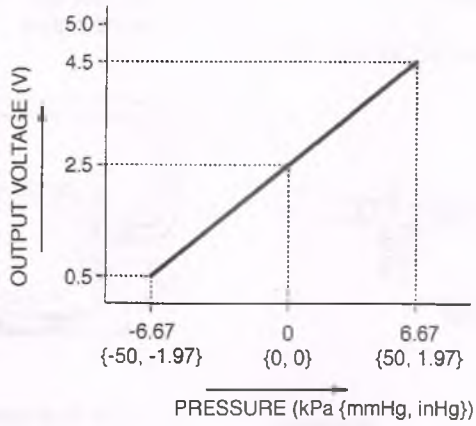
Charcoal canister
- The charcoal canister stores fuel vapor from the fuel tank.
- The charcoal canister contains active carbon.

Purge solenoid valve
- The valve is normal-close type.
- The PCM sends a duty signal to the valve to control the fuel vapor purge amount.

CDCV
- The CDCV is normal open type.
- The CDCV is used during EVAP control system monitoring and seals the EVAP control system from atmosphere.

Fuel tank pressure (FTP) sensor

- The FTP sensor converts the fuel tank pressure into a voltage value and sends the voltage signal to the PCM.

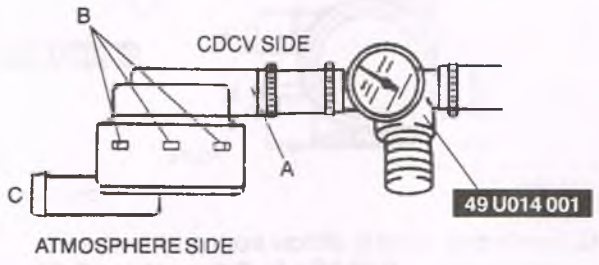


Z6U0102W113

EVAPORATIVE GAS CHECK VALVE (TWO-WAY) INSPECTION

Z6U011642914W01

1. Remove the check valve (two-way).
2. Attach an air hose to the **SST**.
3. Set the **SST** to port A as shown in the figure.



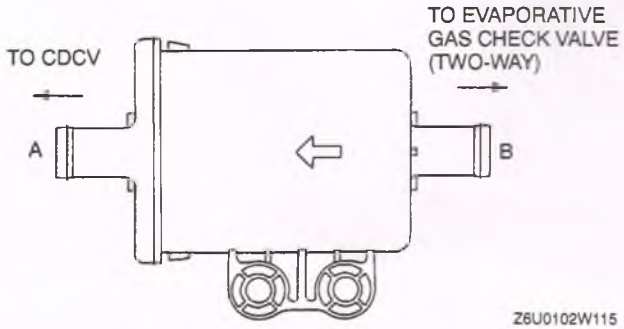
Z6U0102W114

4. Verify that there is airflow from port B when pressure of **+0.98 kPa {+7.4 mmHg, +0.29 inHg}** is applied to port A.
   - If there is no airflow, replace the evaporative gas check valve (two-way).
5. Verify that there is airflow from port A when pressure of **+0.98 kPa {+7.4 mmHg, +0.29 inHg}** is applied to port C.
   - If there is no airflow, replace the evaporative gas check valve (two-way).

AIR FILTER INSPECTION

Z6U011613988W01

1. Remove the air filter.
2. Blow air into port A and verify that air smoothly flows from port B.
   - If not as specified, replace the air filter.
3. Blow air into port B and verify that air smoothly flows from port A.
   - If not as specified, replace the air filter.

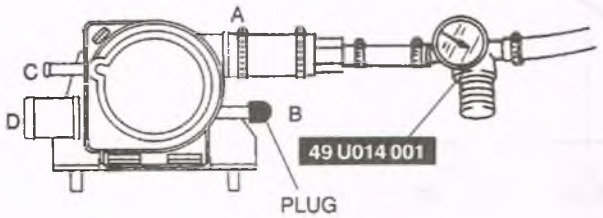


Z6U0102W115

PRESSURE CONTROL VALVE INSPECTION [KL]

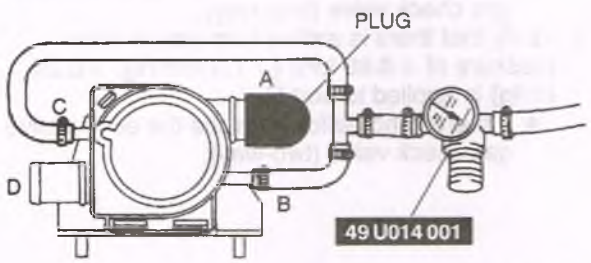
Z6U011642950W01

1. Remove the pressure control valve.
2. Attach an air hose to the **SST**.
3. Set the **SST** to port A and plug port B as shown in the figure.



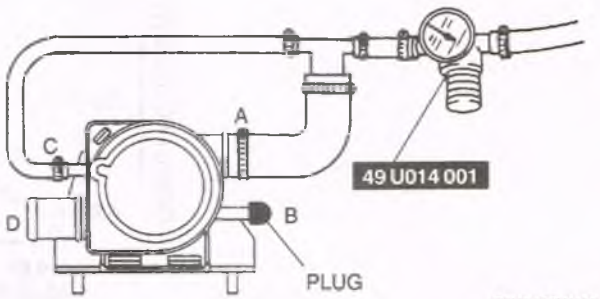
Z6U0102W116

4. Verify that there is airflow from port D when pressure of **+0.98 kPa {+7.4 mmHg, +0.29 inHg}** is applied to port A.
   - If there is no airflow, replace the pressure control valve.
5. Set the **SST** to port B, C and plug port A as shown in the figure.



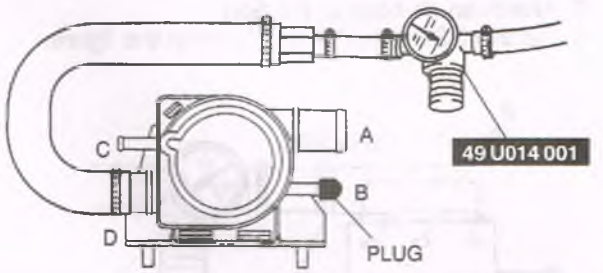
Z6U0102W117

6. Verify that there is airflow from port D when pressure of **+0.98 kPa {+7.4 mmHg, +0.29 inHg}** is applied to port B, C.
   - If there is no airflow, replace the pressure control valve.
7. Set the **SST** to port A, C and plug port B as shown in the figure.



Z6U0102W118

8. Verify that there is no airflow from port D when pressure of **+0.98 kPa {+7.4 mmHg, +0.29 inHg}** is applied to port A, C.
   - If there is airflow, replace the pressure control valve.
9. Set the **SST** to port D and plug port B.



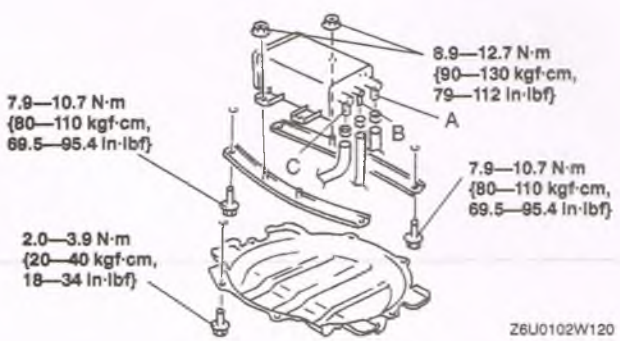
Z6U0102W119

10. Verify that there is airflow from port A when pressure of **+0.98 kPa {+7.4 mmHg, +0.29 inHg}** is applied to port D.
    - If there is no airflow, replace the pressure control valve.

CHARCOAL CANISTER INSPECTION

Z6U011613970W01

1. Remove the charcoal canister.
2. Plug ports A and B, then blow air into port C.
3. Verify that there is no air leakage.
   - If not as specified, replace the charcoal canister.



Z6U0102W120

CANISTER DRAIN CUT VALVE (CDCV) INSPECTION

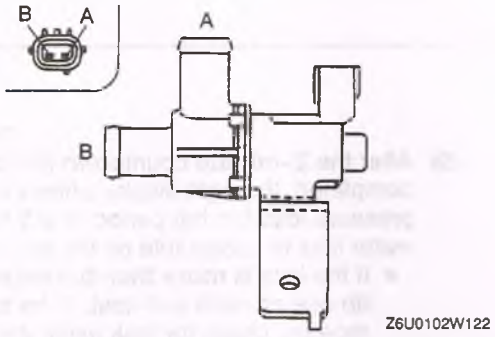
Z6U011618743W01

1. Remove the CDCV.
2. Inspect airflow between the ports of the CDCV.
   - If not as specified, replace the CDCV.

○—○ : Continuity ○═○ : Airflow

Step	Terminal		Port	
	A	B	A	B
1	○—○		○═○	
2	B+	GND		

Z6U0102W121

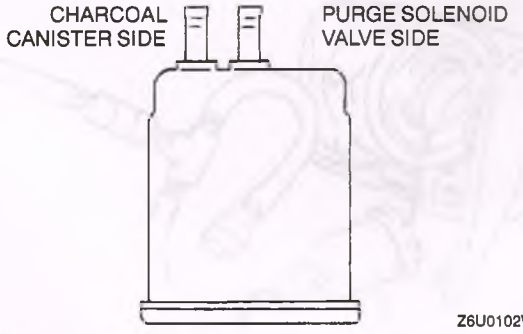


Z6U0102W122

CATCH TANK INSPECTION

Z6U011613978W01

1. Remove the catch tank.
2. Plug the charcoal canister side port of the catch tank.
3. Blow air into the catch tank from the purge solenoid valve side port and verify that there is no air leakage.
   - If there is air leakage, replace the catch tank.



Z6U0102W123

ROLLOVER VALVE INSPECTION

Z6U011642720W01

Note

- Two rollover valves are located in the fuel tank.
- Carry out the "FUEL TANK INSPECTION". (See 01-14-10 FUEL TANK INSPECTION.)

PURGE SOLENOID VALVE INSPECTION

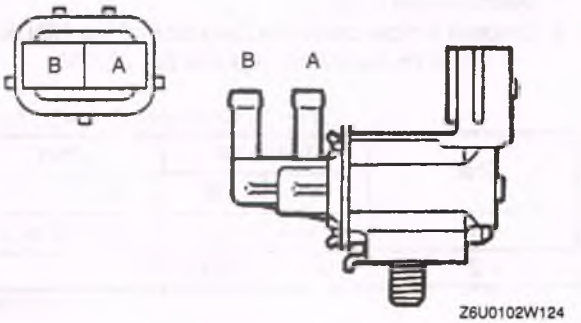
1. Remove the purge solenoid valve.
2. Inspect airflow of the valve under the following conditions.
   - If not as specified, replace the purge solenoid valve.

○—○ : Continuity ○═○ : Airflow

Step	Terminal		Port	
	A	B	A	B
1	○	○		
2	B+	GND	○	○

Z6U0102W125

Z6U011618740W01



Z6U0102W124

FUEL-FILLER CAP INSPECTION

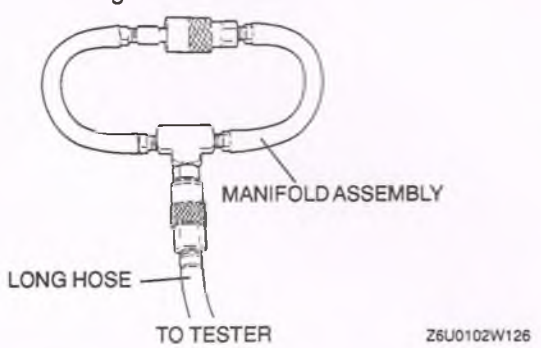
Z6U011642250W01

Leakage Inspection

1. Perform the following **SST** (Evaporative Emission System Tester MZ254AT3641) self-test:

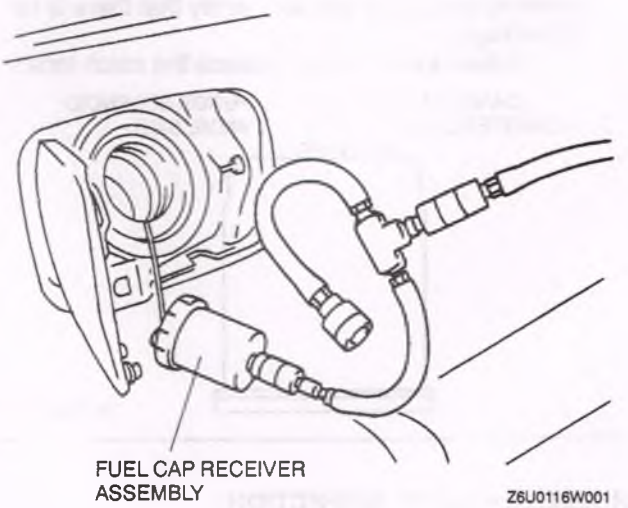
Note
- If the tester does not work correctly during self-test, refer to the tester operators manual for more detailed procedures.

(1) Verify the gas cylinder valve is closed and the control valve located on the tester is in the TEST position. All tester display should be off at this time.
(2) Connect the long hose (part of **SST**) to the tester.
(3) Connect the manifold assembly (part of **SST**) to the long hose as shown.



Z6U0102W126

(4) Open the gas cylinder valve and verify the gas cylinder regulator left gauge reads **10 to 20 psi** (preset at factory).
   - If not, refer to the tester operators manual to contact tester manufacturer.
(5) Press the ON/OFF switch to turn on the **SST** and make sure the left display reads 0.0.
(6) Turn the control valve on the tester to the FILL position.
(7) Verify the left display reading is **within 13.9 to 14.0 inches** of water.
   - If not, adjust the pressure using the regulator knob located on the right side of the tester.
(8) Turn the control valve to TEST position and press the START switch.
(9) After the **2-minute** countdown (left display) is completed, the right display shows the total pressure loss for that period. A **0.5 inch** of water loss is acceptable on the self-test.
   - If the loss is **more than 0.5 inch** of water, do one or more self-test. If the failed test repeats, check for leak using the ultrasonic leak detector (part of **SST**).
2. Press the RESET switch to set the left display reading to 0.0.
3. Connect the fuel cap receiver assembly (part of **SST**) to the manifold assembly and fuel-filler cap from the vehicle.
   - If the fuel-filler cap is not a genuine part, replace it.



Z6U0116W001

4. Turn the control valve to the FILL position.
5. Wait (**maximum 20 seconds**) until the left display reads **13.9 to 14 inches** of water.
   - If the reading is slightly below, adjust it using the regulator knob.
   - If the reading is far below, the fuel-filler cap has leak. Replace it.
6. Turn the control valve to the TEST position and press the START switch.
7. After the **2-minute** countdown (left display) is completed, check the test result (the failed/passed light on the tester).
   - If the green light turns on, the fuel-filler cap is OK.
   - If the red light turns on, the fuel-filler cap has leakage. Replace it.
8. Close the gas cylinder valve.
9. Turn the control valve to the FILL position.
10. Press the ON/OFF switch to turn off the tester

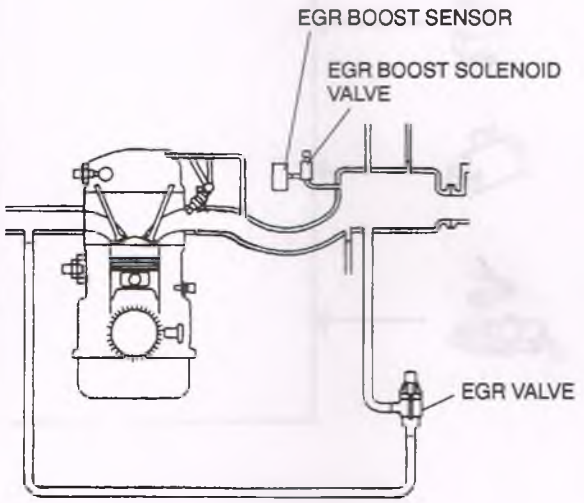
EGR SYSTEM

Z6U011620000W01

EGR System Outline

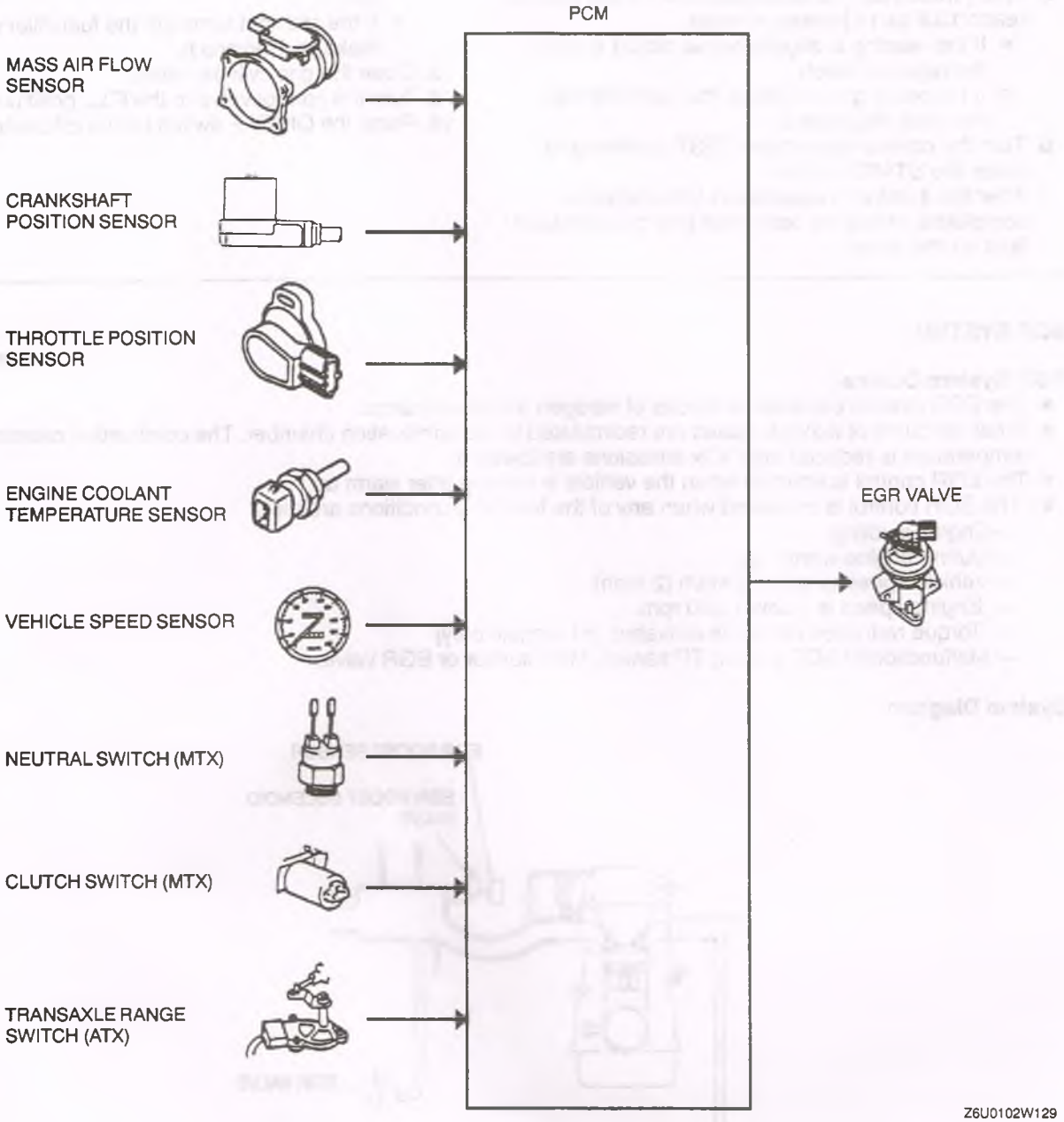
- The EGR system controls the oxides of nitrogen (NOx) emissions.
- Small amounts of exhaust gases are recirculated to the combustion chamber. The combustion chamber temperature is reduced and NOx emissions are lowered.
- The EGR control is enabled when the vehicle is running after warm up.
- The EGR control is cancelled when any of the following conditions are met.
  - —Engine is idling.
  - —During engine warm-up.
  - —Vehicle speed is below 3 km/h {2 mph}.
  - — Engine speed is below 1,000 rpm.
  - — Torque reduction control is activated. [KL engine only]
  - —Malfunction of ECT sensor, TP sensor, MAF sensor or EGR valve.

System Diagram



Z6U0102W128

Block Diagram



EGR System Monitor Outline

- The circuits of the EGR system devices are continuously monitored by the PCM.
- The EGR flow is monitored using the EGR boost sensor signal.

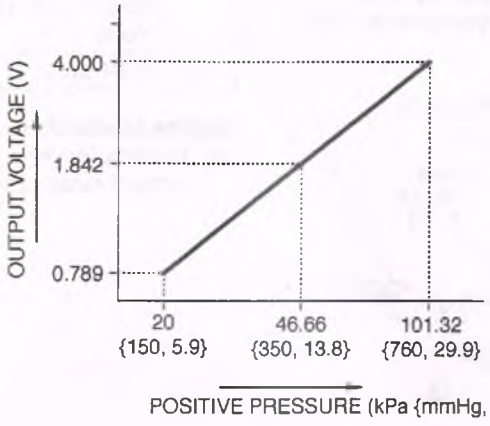
EGR System Component Part Description

EGR valve

- The EGR valve is a stepping motor type.
- The PCM controls the EGR valve to increases or decreases the EGR amount.
- Engine coolant flows through the EGR valve to cool it and improve reliability. [KL engine only]

EGR Boost Sensor

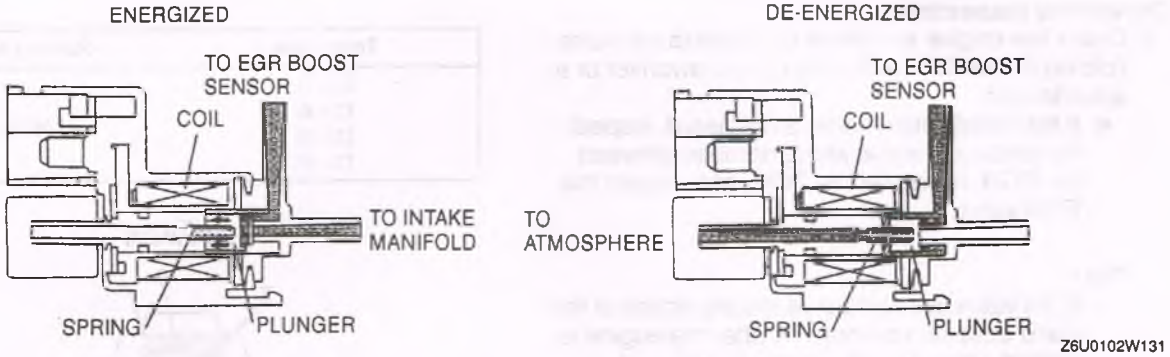
- The EGR boost sensor converts the intake manifold pressure and barometric pressure into a voltage value, and sends the voltage signal to the PCM.
- The pressure application is changed by the EGR boost sensor solenoid valve.
- The voltage value is used only for the EGR and EVAP system monitoring.



Z6U0102W130

EGR Boost Solenoid Valve

- The EGR boost solenoid valve switches the application of barometric pressure or intake manifold vacuum to the EGR boost sensor.
- Intake manifold vacuum is applied to the EGR boost sensor when the solenoid is energized.



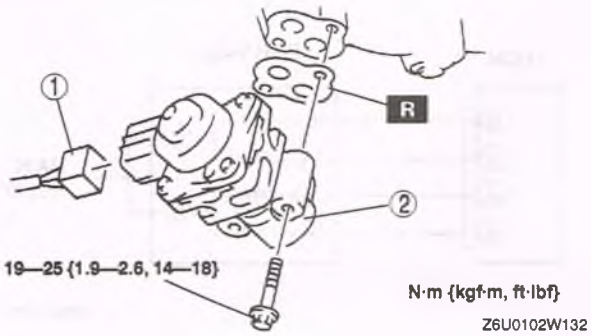
Z6U0102W131

EGR VALVE REMOVAL/INSTALLATION [FS]

Z6U011620300W01

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.

1	EGR valve connector
2	EGR valve



Z6U0102W132

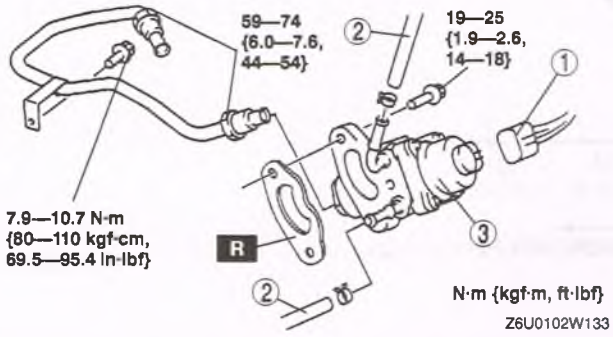
EGR VALVE REMOVAL/INSTALLATION [KL]

Z6U011620300W02

Warning

- **Do not remove the EGR valve with the engine hot. Engine coolant in the EGR valve may badly burn or injure. Always remove and install the EGR valve when the engine is cold.**

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



Z6U0102W133

1	EGR valve connector
2	Engine coolant hose (See 01-16-16 Engine Coolant Hose Removal Note)
3	EGR valve

Engine Coolant Hose Removal Note

- To avoid engine coolant leakage, plug the engine coolant hose after disconnecting.

EGR VALVE INSPECTION

Z6U011620300W03

On-vehicle Inspection

1. Crank the engine and listen for initialization noise (clicks) of the EGR valve using a screwdriver or a soundscope.
   - If the initialization noise is not heard, inspect for continuity of the wiring harness between the EGR valve and the PCM, and inspect the EGR valve.

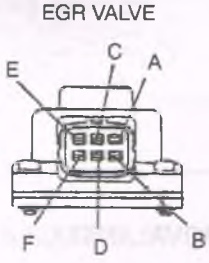
Note

- EGR valve initialization is closing action of the valve observed before and after the engine is started, and when the engine is stopped.

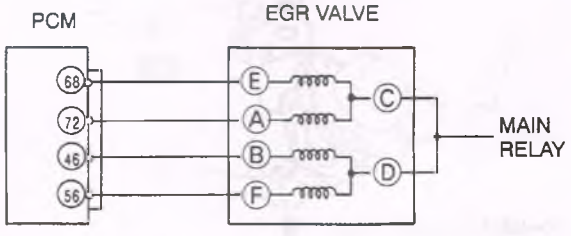
Off-vehicle Inspection

1. Inspect resistance of the EGR valve coils.
   - If not as specified, replace the EGR valve.

Terminals	Resistance (Ω)
C—E C—A D—B D—F	Approx. 22



Z6U0102W134



Z6U0102W135

EGR BOOST SOLENOID VALVE INSPECTION

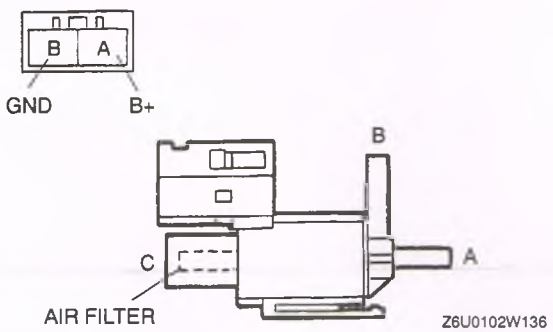
Z6U011618742W01

1. Remove the EGR boost solenoid valve.
2. Inspect airflow between each port under the following conditions.
   - If not as specified, replace the EGR boost solenoid valve.

○—○ : Continuity ○═○ : Airflow

Step	Terminal		Port		
	A	B	A	B	C
1	○	○		○	○
2	B+	GND	○	○	

Z6U0102W137



Z6U0102W136

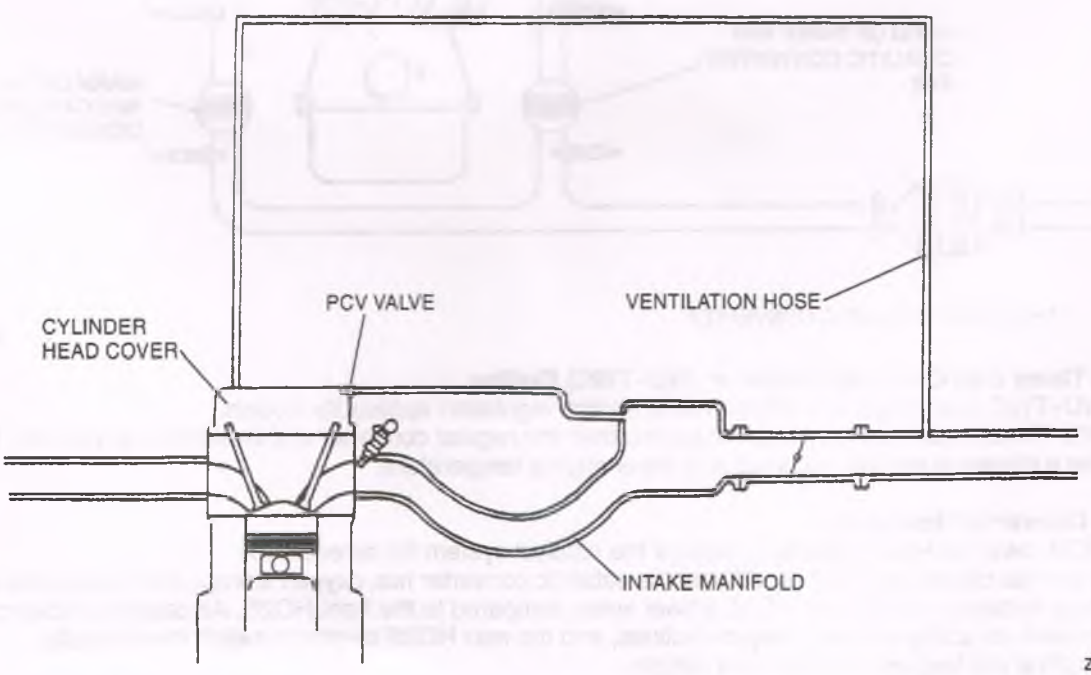
POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM

Z6U011613890W01

PCV System Outline

- The PCV system discharges blow-by gas from the crankcase to the intake manifold.

System Diagram



Z6U0102W138

PCV Valve Description

- The PCV valve regulates the amount of ventilating air and blow-by gas to the intake manifold and prevents backfire from traveling into the crankcase.

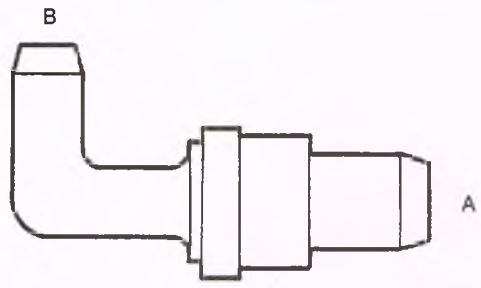
PCV VALVE INSPECTION

Z6U011613890W02

1. Remove the PCV valve.
2. Blow through the valve and verify that air flows as specified.
   - If not as specified, replace the PCV valve.

Specification

Condition	Airflow
Air applied to port A	Yes
Air applied to port B	No

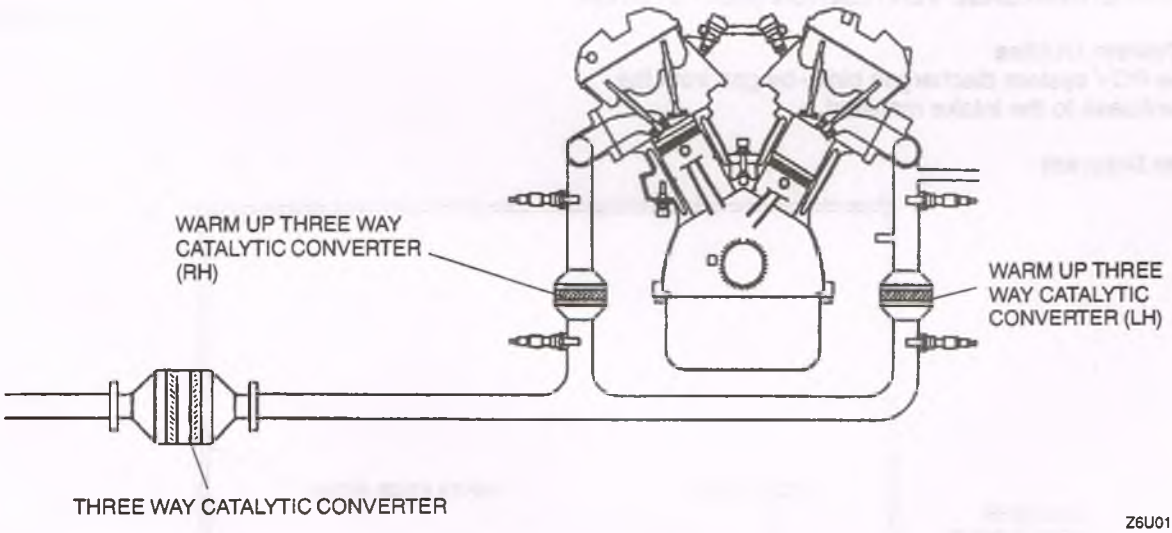


Z6U0102W139

CATALYTIC CONVERTER SYSTEM

Z6U011620500W01

Catalytic Converter System Diagram



Z6U0102W140

Warm up Three Way Catalytic Converter (WU-TWC) Outline

- The WU-TWC is installed to the California emission regulation applicable models.
- The WU-TWC is installed closer to the engine than the regular converter and is warmed up quicker. This enables a chemical reaction to occur at a lower engine temperature.

Catalytic Converter Monitoring

- The PCM uses the HO2S signals to monitor the catalyst system for deterioration.
- Under normal closed loop fuel conditions, the catalytic converter has oxygen storage that makes the rich/lean switching frequency of the rear HO2S slower when compared to the front HO2S. As catalyst efficiency deteriorates, its ability to store oxygen declines, and the rear HO2S begins to switch more rapidly, approaching the frequency of the front sensor.
- WU-TWC is monitored for the California emission regulation applicable model. The regular converter (under body) is monitored for the Federal models.
- Front and rear HO2S switches are counted for a predetermined period. A rear-to front HO2S switch ratio is calculated. If the switch ratio is grater than the threshold, the PCM determines the catalyst has failed.

THREE WAY CATALYTIC CONVERTER (TWC) INSPECTION

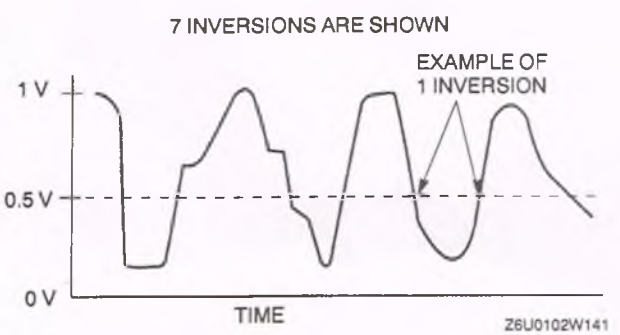
Z6U011620500W02

Note
- Make sure that no HO2S DTC has been detected. If detected, this inspection cannot be used for TWC inspection.

1. Connect the NGS tester and monitor PIDs as following.
   FS
   - Monitor TWC using O2S11 PID for upstream HO2S and O2S12 PID for downstream HO2S.

   KL
   - California emission regulation applicable models.
     - — Monitor the left WU-TWC using O2S21 PID up stream HO2S and O2S22 PID for downstream HO2S.
     - — Monitor the right WU-TWC using O2S11 PID for upstream HO2S and O2S12 PID for downstream HO2S.
   - Federal emission regulation applicable models.
     - — Monitor TWC using O2S12 PID for upstream HO2S and O2S13 PID for downstream HO2S.
2. Press START to begin monitoring the appropriate PIDs.
3. Drive the vehicle for **10 minutes** at **65—96 km/h {40—60 mph}** to ensure the front catalytic converter reaches operating temperature.
4. Stop the vehicle and leave in a safe place.
5. Let the engine idle.
6. Press TRIGGER to begin recording PIDs.
7. Wait for minute then press TRIGGER again to finish recording.
8. Select the appropriate PIDs and read the graph of "VIEW RECORDING".
9. Count the number of times (inversions) that the upstream HO2S graph line actually crosses the **0.5 V** line.
10. Count the number of times (inversion) that the downstream HO2S graph line actually crosses the **0.5 V** line.

Note
- Do not count the number of peaks. Refer to the illustration.



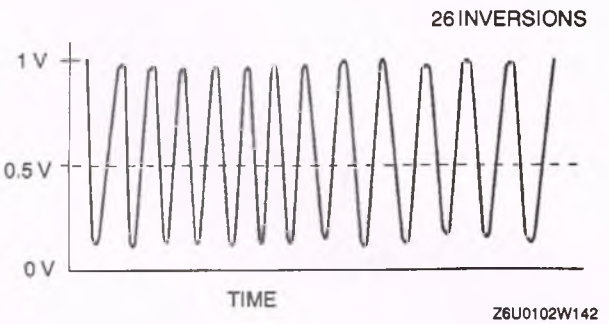
Z6U0102W141

11. Using the following equation, calculate the value of ratio.

Equation
RATIO = Upstream HO2S inversion ÷ downstream HO2S inversion

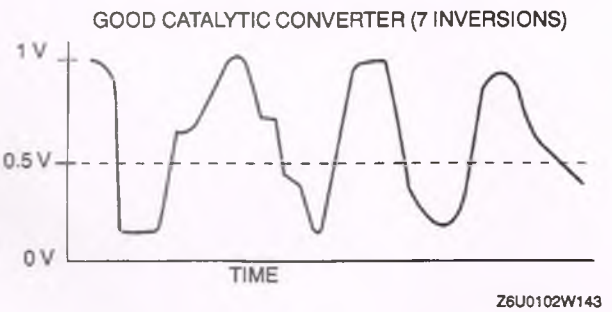
- If the ratio is 2 or more or no downstream HO2S inversion, the WU-TWC is functioning properly.
- If the ratio is less than 2, the WU-TWC is not functioning properly. Replace the WU-TWC.

Upstream HO2S graph line example



Z6U0102W142

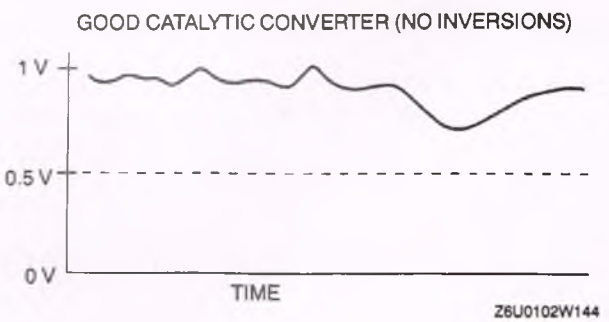
Downstream HO2S graph line example 1



Z6U0102W143

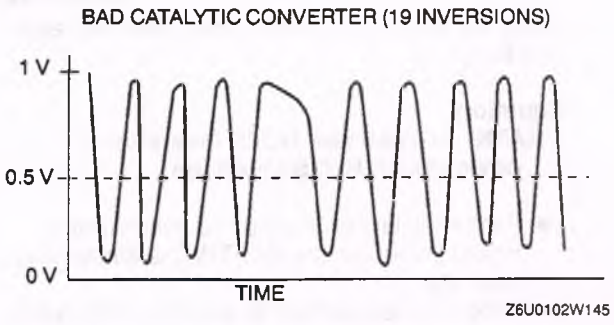
Equation
RATIO = 26 inversions (upstream HO2S inversions) ÷ 7 inversions (downstream HO2S inversions)

Downstream HO2S graph line example 2



Z6U0102W144

Downstream HO2S graph line example 3



Equation

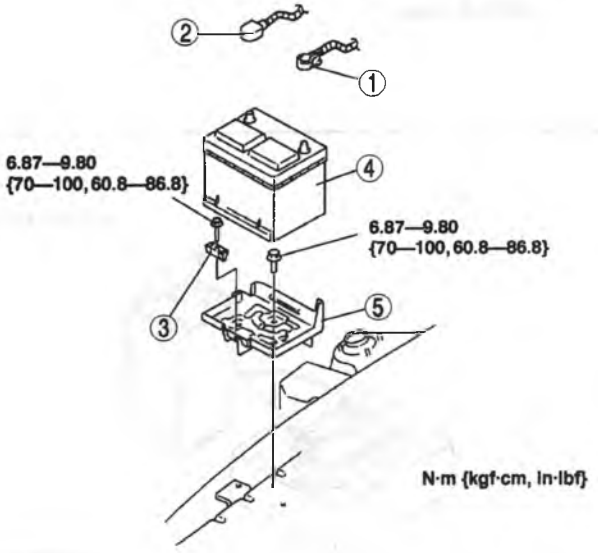
RATIO = 26 inversions (upstream HO2S inversions) ÷ 19 inversions (downstream HO2S inversions) = 1.4 (bad converter)

01-17 CHARGING SYSTEM

BATTERY REMOVAL/INSTALLATION . 01-17-1
BATTERY INSPECTION 01-17-1
Battery 01-17-1
Back-up Current 01-17-2
BATTERY RECHARGING 01-17-2
GENERATOR REMOVAL/INSTALLATION 01-17-3
A/C Compressor [KL] Removal Note .. 01-17-3
GENERATOR INSPECTION 01-17-3
Generator Warning Light 01-17-3
Generator 01-17-4

BATTERY REMOVAL/INSTALLATION

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



Z6U0102W146

Z6U011718520W01

1	Negative battery cable
2	Positive battery cable
3	Battery clamp
4	Battery
5	Battery tray

BATTERY INSPECTION

Battery

- Inspect the battery in the following procedure.

Z6U011718520W02

Step	Inspection		Action
1	Measure open circuit voltage of battery.	Above 12.4 V	Go to step 3.
		Below 12.4 V	Go to next step.
2	Quick charge for 30 minutes and check voltage again.	Above 12.4 V	Go to next step.
		Below 12.4 V	Replace battery.
3	Apply test load (see test load chart) to battery using a battery load tester and record battery voltage after 15 seconds. Is voltage more than specification?	Yes	Go to next step.
		No	Replace battery.
4	Inspect the charge eye condition. Does condition indicate battery is okay.	Yes	Battery is okay.
		No	Replace battery.

Test load chart

Battery	Load (A)
GROUP 36R	240

Battery positive voltage with load

Approximate battery temp.	Minimum voltage (V)
21 °C {70 °F}	9.6
15 °C {60 °F}	9.5
10 °C {50 °F}	9.4
4 °C {40 °F}	9.3
-1 °C {30 °F}	9.1
-7 °C {20 °F}	8.9
-12 °C {10 °F}	8.7
-18 °C {0 °F}	8.5

Back-up Current

1. Verify that the ignition switch is at LOCK position and that the ignition key has been removed.
2. Disconnect the negative battery cable.

Caution

- **Operating electrical loads while measuring the back-up current can damage the circuit tester.**

3. Measure the back-up current between the negative battery terminal and the negative battery cable.
   (1) If the current exceeds the maximum, remove the fuse in the main fuse block and the fuse block one by one while measuring the back-up current.
   (2) Inspect and repair harnesses and connectors of the fuse at which the current reduces.

Back-up current
20 mA max.

BATTERY RECHARGING

Warning

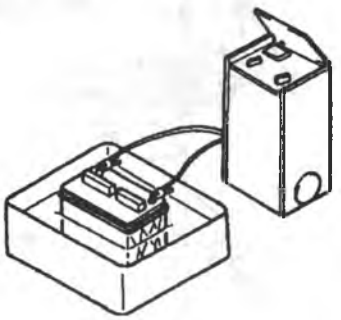
- **Hydrogen gas is produced during normal battery operation. A battery-related explosion can cause serious injury. Keep all flames (including cigarettes), heat, and sparks away from the top and surrounding area of open battery cells.**

Caution

- **When disconnecting the battery, remove the negative cable first and install it last to prevent damage to electrical components or the battery.**
- **To prevent damage to electrical components or the battery, turn all accessories off and stop the engine before performing maintenance or recharging the battery.**
- **Do not quick charge for over 30 minutes. It will damage the battery.**

1. Place a battery in a pan of water to prevent it from overheating. The water level should come up about halfway on the battery. Keep water off the top of the battery.

Z6U011718520W03



Z6U0102W147

2. Connect a battery charger to the battery.
3. Adjust the charging current as follows.

Battery type (5-hour rate)	Slow charge (A)	Quick charge(A)/ (30 min.)
GROUP 36R (48)	4.5—5.5	30

4. After the battery has been charged again, measure the battery positive voltage and verify that the battery keeps specified voltage for more than 1 hour.
   - If not as specified, replace the battery.

Specification
Above 12.4 V

GENERATOR REMOVAL/INSTALLATION

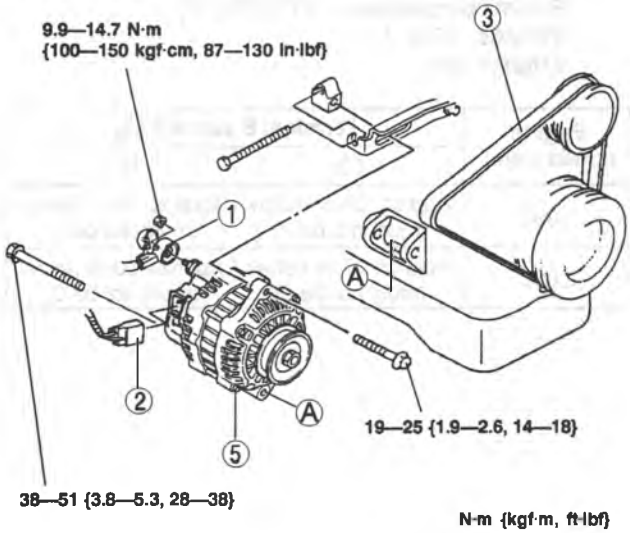
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Warning

- **When the battery cables are connected, touching the vehicle body with generator terminal B will generate sparks. This can cause personal injury, fire, and damage to the electrical components. Always disconnect the battery before performing the following operation.**

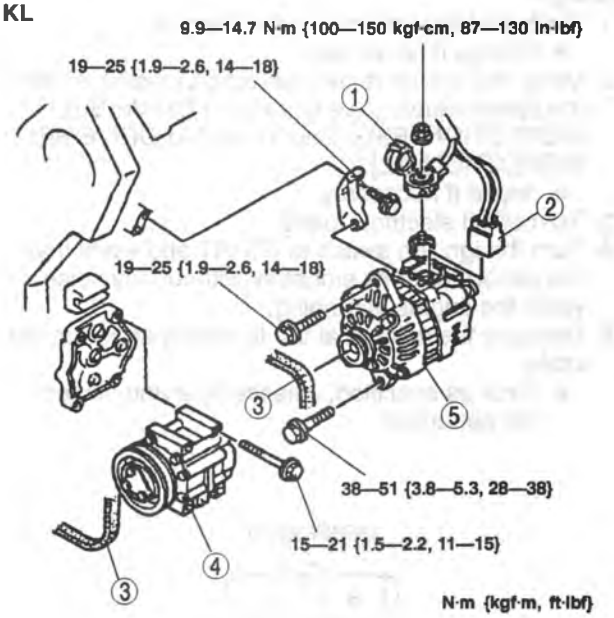
1. Disconnect the negative battery cable.
2. Remove the transverse member. (FS)
3. Remove the front pipe. (FS) (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [FS].)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. Verify the drive belt deflection/tension. (See 01-10A-1 DRIVE BELT INSPECTION [FS].) (See 01-10B-1 DRIVE BELT INSPECTION [KL].)

FS



Z6U0102W148

KL



Z6U0102W149

1	Terminal B wire
2	Connector
3	Drive belt
4	A/C compressor [KL] (See 01-17-3 A/C Compressor [KL] Removal Note)
5	Generator

A/C Compressor [KL] Removal Note

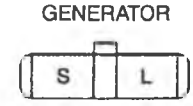
- Remove the A/C compressor with the pipe still connected. Position the A/C compressor so that it is out of the way.

GENERATOR INSPECTION

Z6U011718300W02

Generator Warning Light

1. Verify that the battery is fully charged.
   - Charge if necessary.
2. Verify that the drive belt deflection/tension is within the specification. (See 01-10A-1 DRIVE BELT INSPECTION [FS].) (See 01-10B-1 DRIVE BELT INSPECTION [KL].)
   - Adjust if necessary.
3. Turn the ignition switch to ON and verify that the generator warning light comes on.
   - If not, inspect the generator warning light and wiring harnesses between the battery and generator warning light and between the battery and generator terminal L.



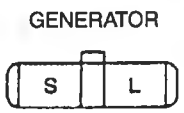
Z6U0102W150

4. Turn the ignition switch to START and verify that the generator warning light goes out after engine starts.
   - If not, inspect the generator.

Generator

Voltage

1. Verify that the battery is fully charged.
   - Charge if necessary.
2. Verify that the drive belt deflection/tension is within the specification. (See 01-10A-1 DRIVE BELT INSPECTION [FS].) (See 01-10B-1 DRIVE BELT INSPECTION [KL].)
   - Adjust if necessary.
3. Turn off all electrical loads.
4. Turn the ignition switch to START and verify that the generator turns smoothly without any noise while the engine is running.
5. Measure the voltage at the terminals shown in the table.
   - If not as specified, disassemble and inspect the generator.



Z6U0102W151

Standard voltage

Terminal	Ignition switch ON (V)		Idle (V) [20 °C {68 °F}]	
	FS	KL	FS	KL
B	B+		14.1—14.7	
L	Approx. 1		13.2—13.8	
S	B+		14.1—14.7	

Current

1. Verify that the battery is fully charged.
   - Charge if necessary.
2. Verify that the drive belt deflection/tension is within the specification. (See 01-10A-1 DRIVE BELT INSPECTION [FS].) (See 01-10B-1 DRIVE BELT INSPECTION [KL].)
   - Adjust if necessary.
3. Disconnect the negative battery cable.
4. Connect a circuit tester, capable of reading 120 A or over, between generator terminal B and the wiring harness.
5. Connect the negative battery cable.
6. Turn all electrical loads off.
7. Start the engine and increase the engine speed to **2,000—2,500 rpm**.
8. Turn the following electrical loads on and verify that the current reading increases.
   (1) Headlights
   (2) Blower motor
   (3) Rear window defroster
- If generator terminal B current will not increase, disassemble and inspect the generator.

Note

- Current required for generating power varies with electrical loads applied.

Standard current (Reference)

Measuring conditions
Room temperature: 20°C {68°F}
Voltage: 13.5 V
Engine hot

Engine speed (rpm)	Terminal B current (A)	
	FS	KL
1,000	Approx. 58 or below (must not be 0)	Approx. 70 or below (must not be 0)
2,000	Approx. 77 or below (must not be 0)	Approx. 90 or below (must not be 0)

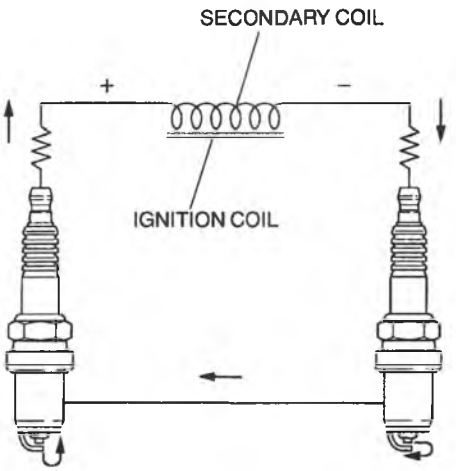
01-18 IGNITION SYSTEM

IGNITION SYSTEM OUTLINE **01-18-2**
IGNITION COIL
REMOVAL/INSTALLATION **01-18-3**
IGNITION COIL INSPECTION **01-18-4**
Primary Coil Winding **01-18-4**
Secondary Coil Winding **01-18-4**
Insulation Resistance of Case **01-18-5**
HIGH-TENSION LEAD REMOVAL **01-18-5**
HIGH-TENSION LEAD INSTALLATION **01-18-6**
HIGH-TENSION LEAD INSPECTION .. **01-18-6**
SPARK PLUG INSPECTION [KL] **01-18-6**

IGNITION SYSTEM OUTLINE

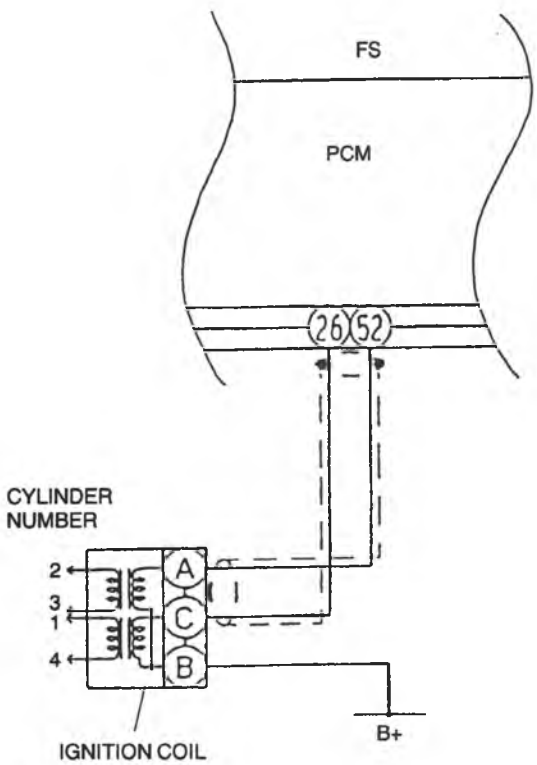
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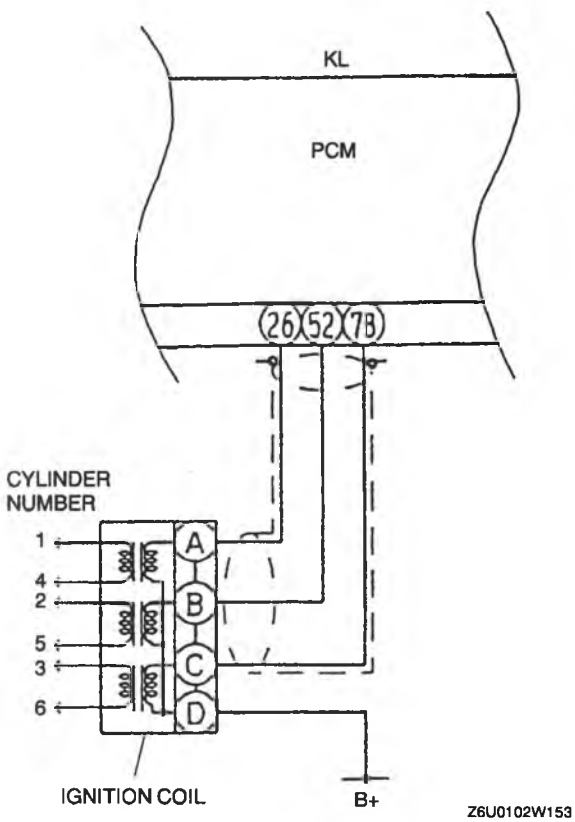
- The DLI (Distributorless ignition) system has been adopted.
- In the DLI system, a distributor is not used, ignition coil is placed inside at the side of the cylinder head, and the spark plugs are ignited directly by the coil.
- The PCM uses the CKP sensor to indicate crankshaft position and speed by sensing a missing tooth on a pulse wheel mounted to the crankshaft.
- The PCM uses the CMP sensor to identify top dead center of compression of cylinder 1 to synchronize the firing of the individual coils.
- Each coil ignites two spark plugs at the same time.
- The paired plugs are ignited during the compression and exhaust strokes.
- The PCM controls the ignition and ignition timing by controlling coil primary circuit.
- Ignition timing is not adjustable.



COIL PACK SPARK DIAGRAM

Z6U0102W152



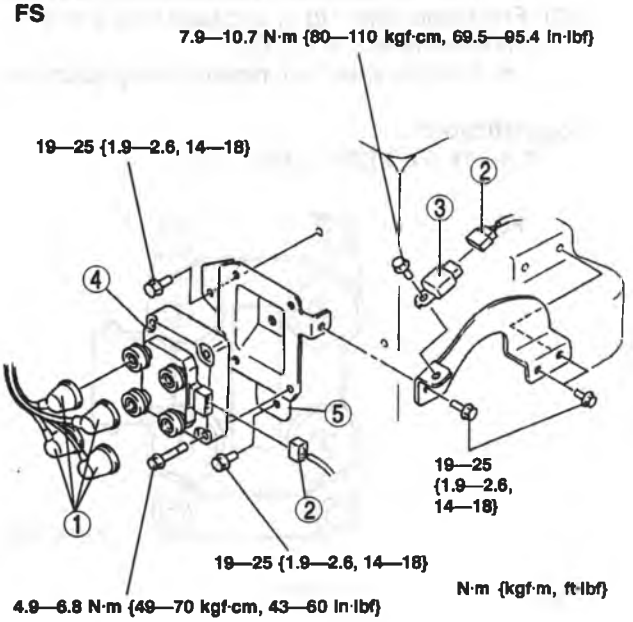


Z6U0102W153

IGNITION COIL REMOVAL/INSTALLATION

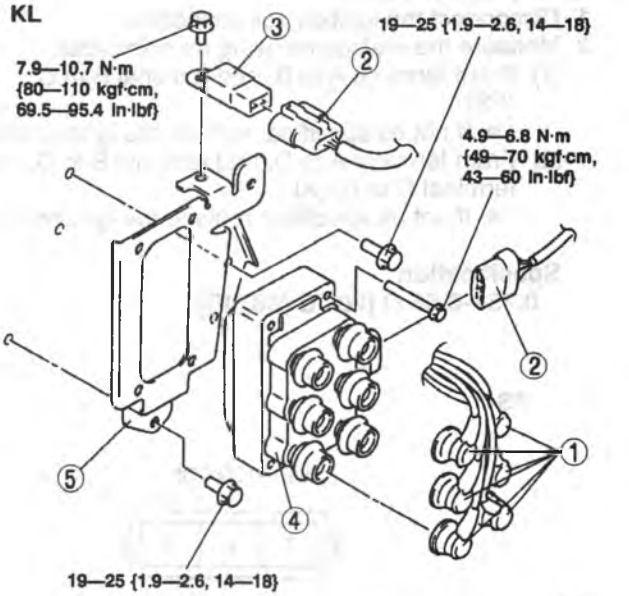
1. Disconnect the negative battery cable.
2. Remove the fresh-air duct. (FS) (See 01-13A-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

FS



Z6U0102W154

KL



Z6U0102W155

1	High-tension lead (See 01-18-5 HIGH-TENSION LEAD REMOVAL) (See01-18-6 HIGH-TENSION LEAD INSTALLATION)
2	Connector
3	Condenser
4	Ignition coil
5	Ignition coil bracket

IGNITION COIL INSPECTION

Z6U011818100W02

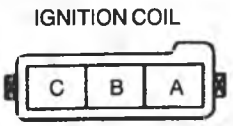
Primary Coil Winding

1. Disconnect the ignition coil connector.
2. Measure the resistance using an ohmmeter.
   (1) From terminal A to B, and terminal B to C. (FS)
   - If not as specified, replace the ignition coil.

   (2) From terminal A to D, and terminal B to D, and terminal C to D. (KL)
   - If not as specified, replace the ignition coil.

Specification
0.45—0.55 Ω [20 °C {68 °F}]

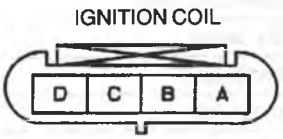
FS



IGNITION COIL SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

Z6U0102W156

KL



IGNITION COIL SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

Z6U0102W157

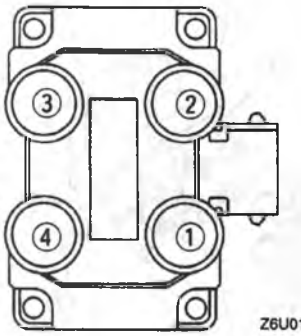
Secondary Coil Winding

1. Disconnect the high-tension leads. (See 01-18-5 HIGH-TENSION LEAD REMOVAL.)
2. Measure the resistance using an ohmmeter.
   (1) From lead hole 1 to 4, and lead hole 2 to 3. (FS)
   - If not as specified, replace the Ignition coil.

   (2) From lead hole 1 to 4, and lead hole 2 to 5, and lead hole 3 to 6. (KL)
   - If not as specified, replace the ignition coil.

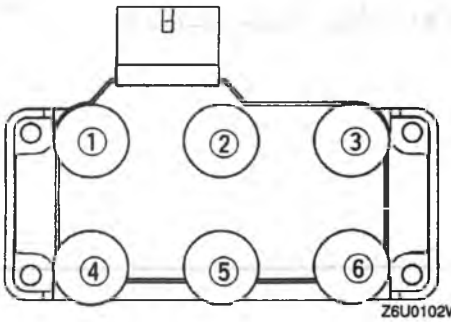
Specification
11.5—15.5 kΩ [20 °C {68 °F}]

FS



Z6U0102W158

KL



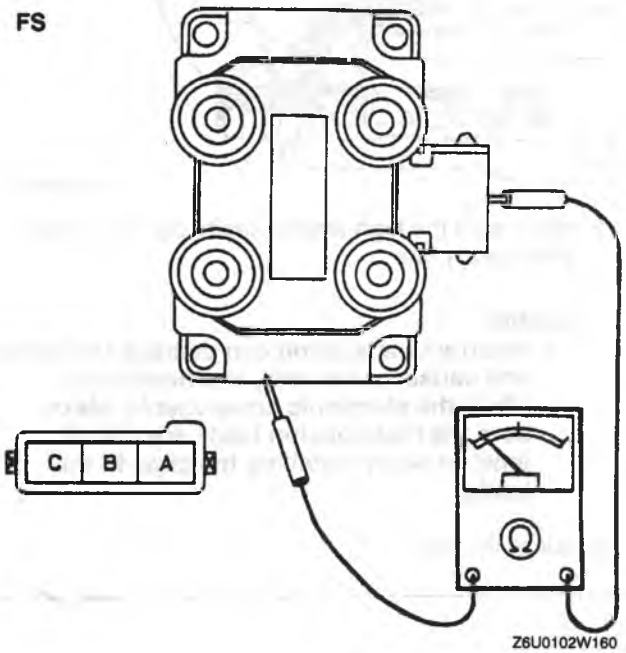
Z6U0102W159

Insulation Resistance of Case

1. Disconnect the high-tension leads and ignition coil connector. (See 01-18-5 HIGH-TENSION LEAD REMOVAL.)
2. Measure the insulation resistance between terminal B (FS) or D (KL), and ignition coil case using an ohmmeter.
   - If not as specified, replace the ignition coil.

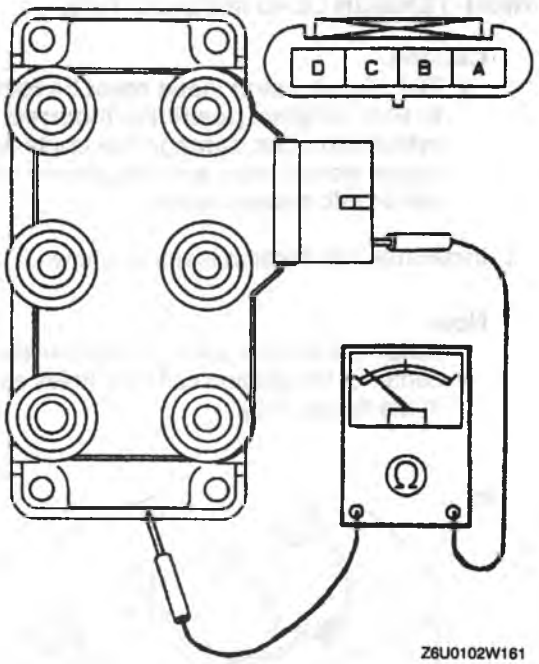
Specification
Above 10 MΩ

FS



Z6U0102W160

KL



Z6U0102W161

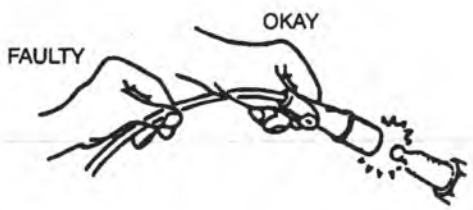
HIGH-TENSION LEAD REMOVAL

Z6U011818140W01

Caution

- **Pulling on the wire part of the high-tension lead may break it. To remove the leads, pull only on the plug cap.**
- **Do not use tools when removing or installing the high-tension leads. Doing so may scratch or damage the insulation of the leads, which may cause a short circuit.**
- **Incorrect installation can damage the leads and cause power loss, and negatively affect the electronic components. Make a note of the installation position and spacing of the high-tension leads before removing them.**

1. Disconnect the negative battery cable.
2. Remove the high-tension leads.



Z6U0102W162

HIGH-TENSION LEAD INSTALLATION

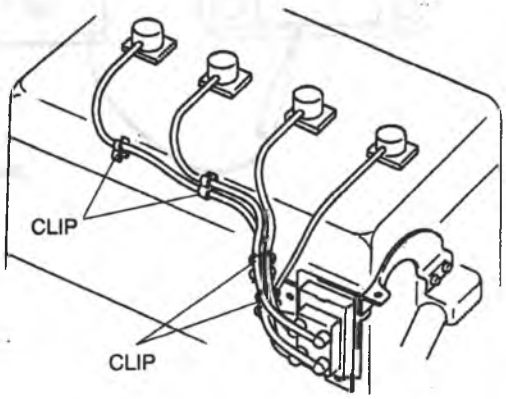
Z6U011818140W02

Caution
- **The high-tension leads must be reinstalled to their original positions. Incorrect installation can damage the leads and cause power loss, and negatively effect the electronic components.**

1. Install the high-tension leads as shown.

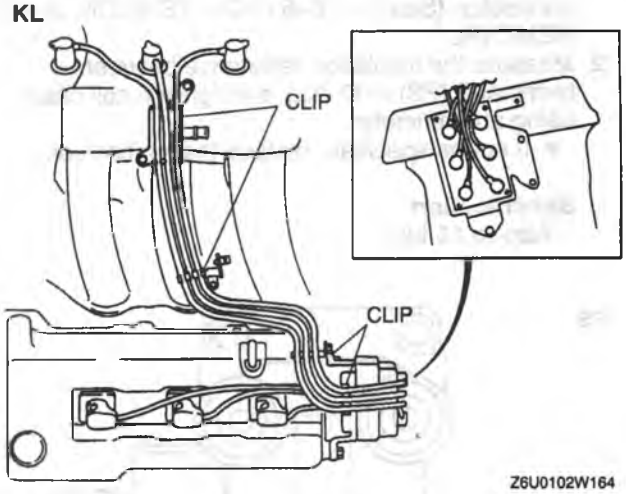
Note
- Install the ignition coil high-tension leads in the center of the ignition coil lead holes as shown in the figure. (KL)

FS



Z6U0102W163

KL



Z6U0102W164

2. Make sure the high-tension leads do not interfere with metal parts.

Caution
- **Incorrect installation can damage the leads and cause power loss, and negatively affect the electronic components. Make sure the high-tension leads are free of tension when installing the clips to the leads.**

3. Install the clip.

HIGH-TENSION LEAD INSPECTION

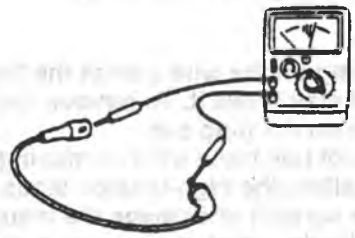
Z6U011818140W03

1. Measure the resistance of the high-tension leads using an ohmmeter.
   - If not as specified, replace the high-tension lead.

Specification

(kΩ)

High-tension lead	Engine type	
	FS	KL
No.1 lead	5.9—13.6	10.3—22.4
No.2 lead	4.9—11.5	5.3—11.5
No.3 lead	3.8—8.9	10.3—22.5
No.4 lead	3.6—8.5	4.1—8.9
No.5 lead	—	10.1—22.1
No.6 lead	—	4.1—8.8



Z6U0102W165

SPARK PLUG INSPECTION [KL]

Z6U011818110W01

Caution
- **To protect the platinum electrode:**
  1. **Do not use a wire brush to clean the electrode.**
  2. **Use a plug cleaner for a maximum of 20 seconds and air pressure below 589 kPa {6.00 kgf/cm^2, 85.0 psi}.**
  3. **Do not adjust the plug gap.**

01–19 STARTING SYSTEM

STARTER REMOVAL/INSTALLATION . 01–19–2
Starter Installation Note (FS) **01–19–3**
STARTER INSPECTION 01–19–3
On-vehicle Inspection **01–19–3**
No Load Test **01–19–3**
STARTER INTERLOCK SWITCH INSPECTION (MTX) 01–19–4

STARTER REMOVAL/INSTALLATION

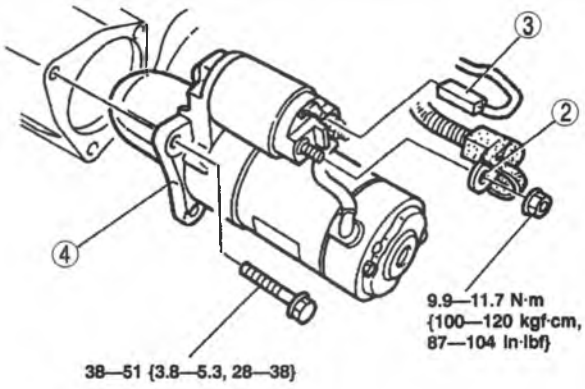
Z6U011918400W01

Warning

- **When the battery cables are connected, touching the vehicle body with starter terminal B will generate sparks. This can cause personal injury, fire, and damage to the electrical components. Always disconnect the battery before performing the following operation.**

1. Remove the battery.
2. Remove the air cleaner component. (See 01-13A-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].) (See 01-13B-4 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [KL].)
3. Remove the transverse member.
4. Remove the intake manifold bracket. (FS)
5. Remove the fuel filter with the fuel hose still connected. Position the fuel filter so that it is out of the way. (KL ATX)
6. Remove the oil pipe. (KL ATX) (See 05-17B-43 Oil Pipe Installation Note.)
7. Remove in the order indicated in the table.
8. Install in the reverse order of removal.

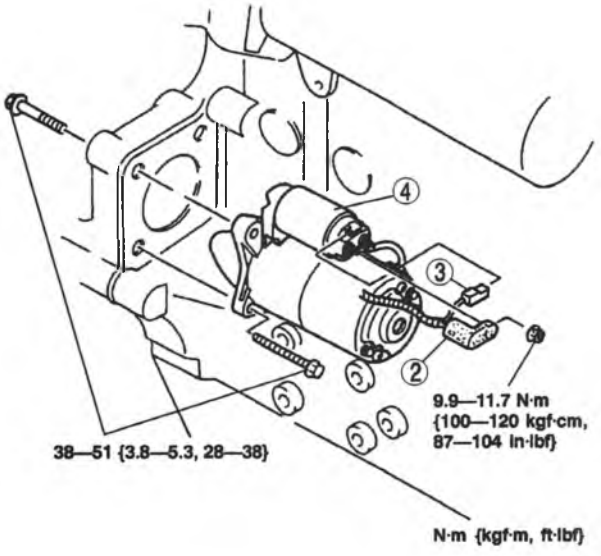
KL (MTX)



N·m {kgf·m, ft·lbf}

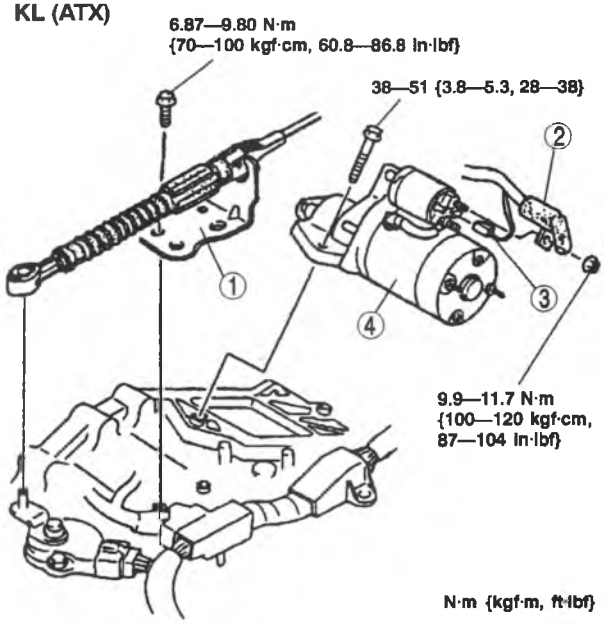
Z6U0102W167

FS



Z6U0102W166

KL (ATX)

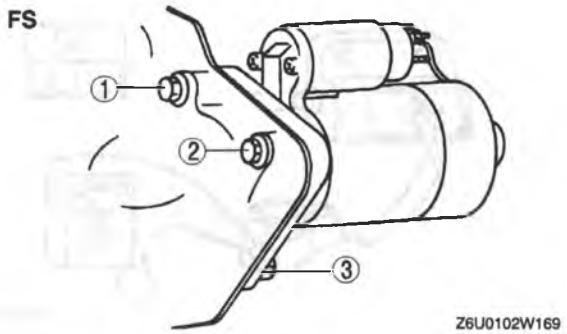


Z6U0102W168

1	Selector cable (KL ATX)
2	Terminal B wire
3	Terminal S wire
4	Starter (See 01-19-3 Starter Installation Note (FS))

Starter Installation Note (FS)

- Tighten the starter fitting bolts in the order shown.



Z6U0102W169

STARTER INSPECTION

Z6U011918400W02

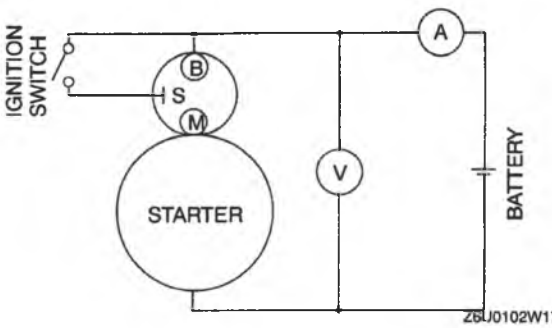
On-vehicle Inspection

1. Verify that the battery is fully charged.
2. Crank the engine and verify that the starter turns smoothly without any noise.
3. Measure the voltage at terminals S and B when the ignition switch is in START position.
   - If the voltage is within the specification, remove the starter and inspect the magnetic switch and the starter.
   - If the voltage is not as specified, inspect the wiring harness, ignition switch, starter interlock switch (MTX), and transaxle range switch (ATX).

Specification
Above 8 V

No Load Test

1. Verify that the battery is fully charged.
2. Connect the starter, battery, voltmeter, and ammeter as shown.



Z6U0102W170

3. Operate the starter and verify that it turns smoothly.
4. Measure the voltage and current while the starter is operating.
   - If not as specified, repair or replace the inner parts as necessary.

Specification

Item	Engine	
	FS	KL
Voltage (V)	11	
Current (A)	Below 90	

STARTER INTERLOCK SWITCH INSPECTION (MTX)

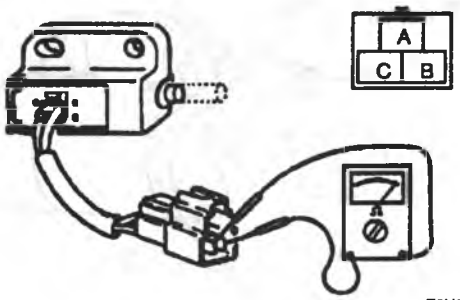
1. Disconnect the starter interlock switch connector.
2. Inspect for continuity between terminals of the starter interlock switch using an ohmmeter.
   - If not as specified, replace the starter interlock switch.

O—O : Continuity

Condition	Terminal	
	B	C
Clutch pedal not depressed		
Clutch pedal depressed	O—	—O

Z6U0102W356

Z6U011943440W01



Z6U0102W171

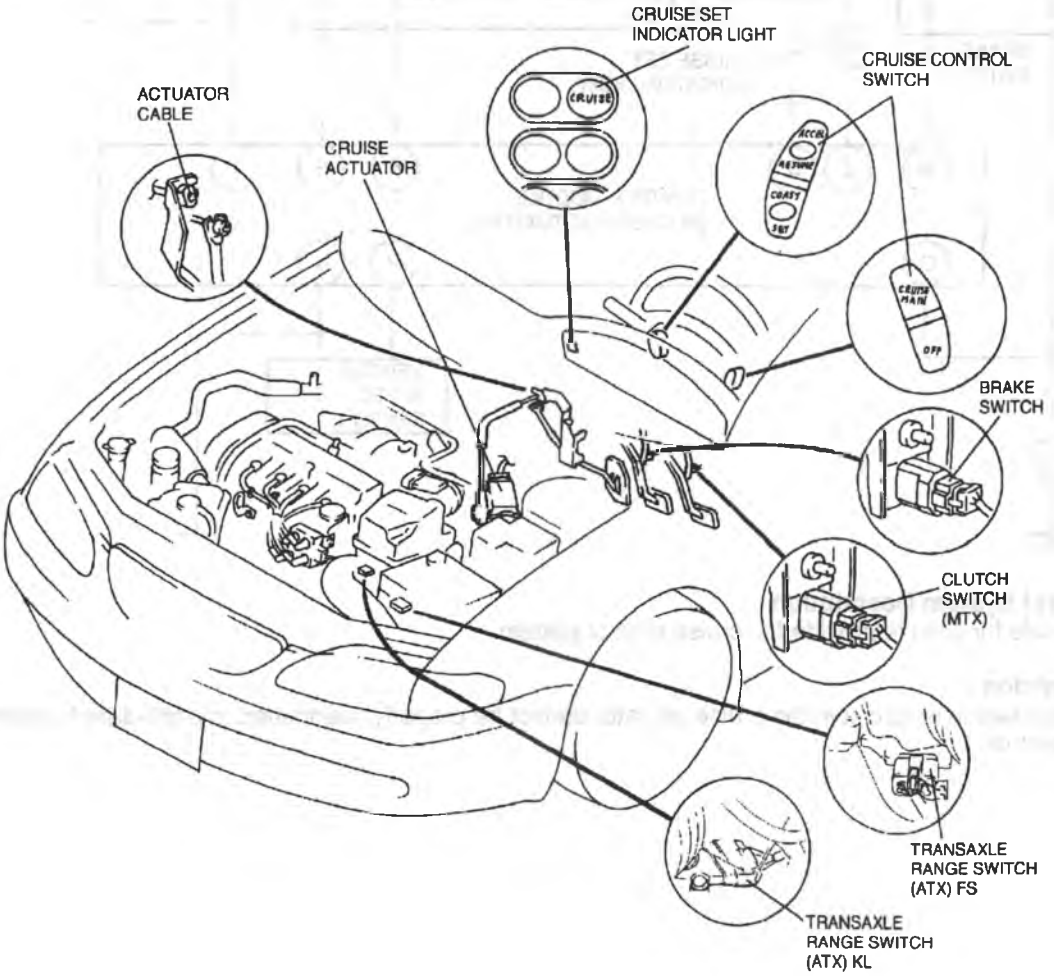
01-20 CRUISE CONTROL SYSTEM

CRUISE CONTROL SYSTEM COMPONENTS 01-20-1
Cruise Control System Structural View 01-20-1
Cruise Control System Wiring Diagram 01-20-2
Cruise Control System Description ... 01-20-2
Fail-safe function 01-20-2
CRUISE ACTUATOR REMOVAL/INSTALLATION 01-20-4
Actuator Cable Removal Note 01-20-4
CRUISE ACTUATOR INSPECTION 01-20-5
Terminal Voltage List (Reference) 01-20-5
ACTUATOR CABLE ADJUSTMENT ... 01-20-6
ACTUATOR CABLE REMOVAL/INSTALLATION 01-20-7
CRUISE CONTROL SWITCH REMOVAL/INSTALLATION 01-20-8
CRUISE CONTROL SWITCH INSPECTION 01-20-8

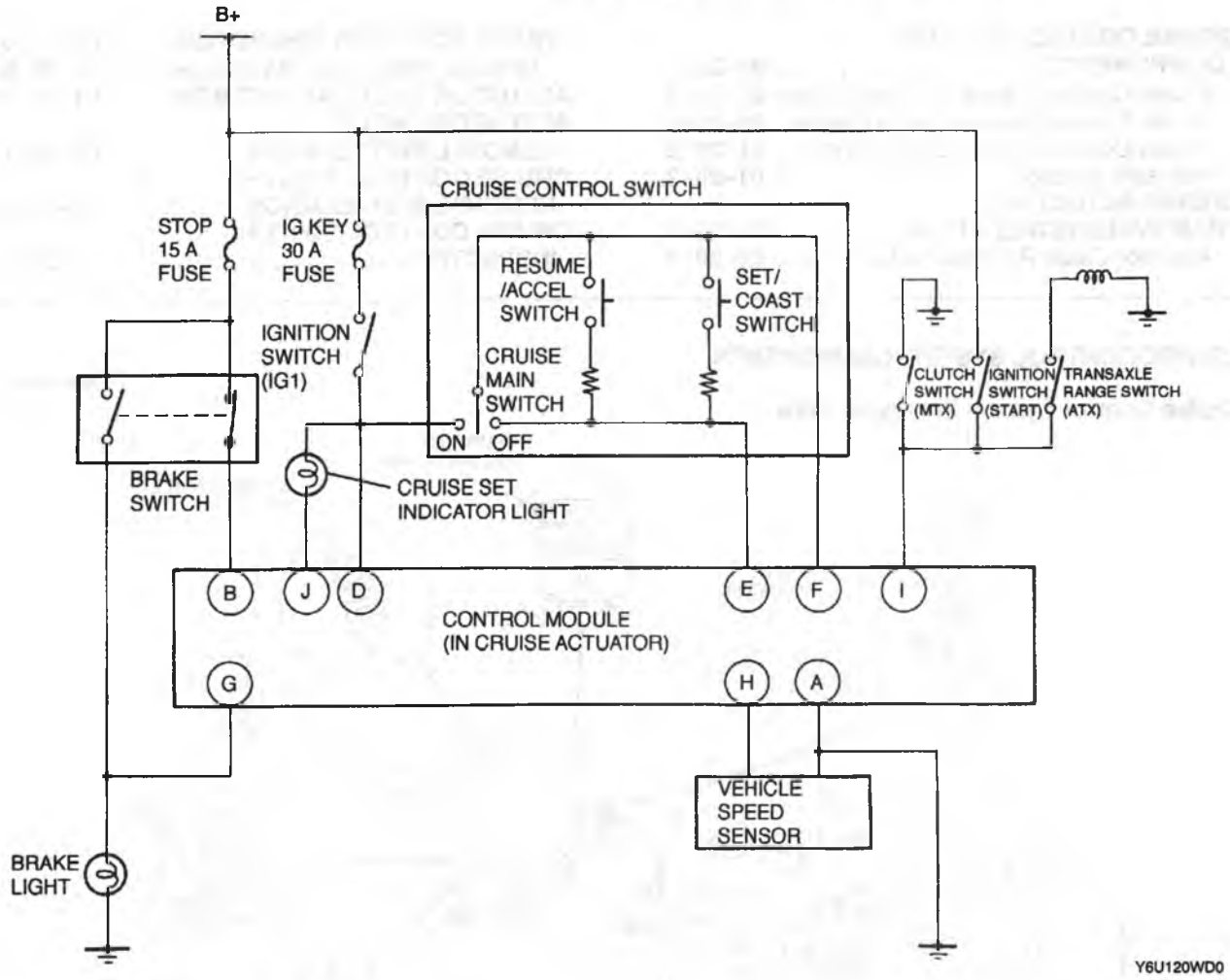
CRUISE CONTROL SYSTEM COMPONENTS

Z6U012066310W01

Cruise Control System Structural View



Cruise Control System Wiring Diagram



Cruise Control System Description

- The fail-safe function is provided in cruise control system.

Fail-safe function

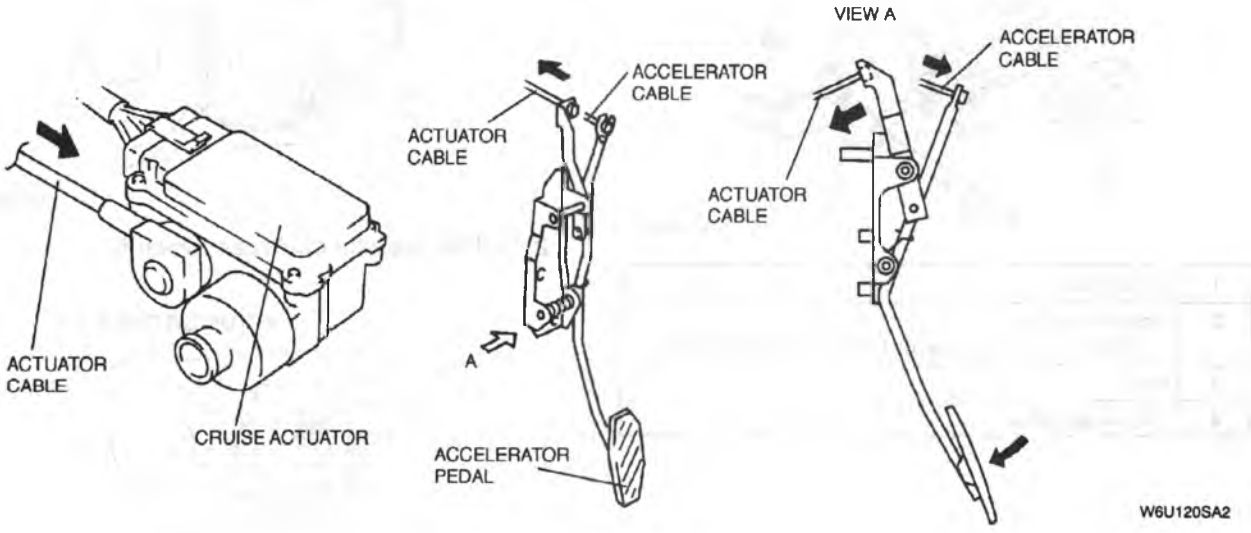
- If the brake switch or circuit in the cruise actuator cannot be properly maintained, the fail-safe function stops system control.

Components and function

Component	Function		Remarks
Vehicle speed sensor	Speed signals are sent to control module built in the cruise actuator from vehicle speedometer sensor		—
Cruise actuator	Microcomputer controls all functions (vehicle speed set, resume, accel, coast), and operates accelerator linkage and adjusts vehicle speed based on signals from the control module in the cruise actuator.		• Stepper motor type • Control module built in type
Cruise control switch	CRUISE MAIN	Controls ON/OFF of cruise control system main power.	Cruise control switches in steering wheel
	SET	Sets cruise control speed.	
	COAST	• Pressing and holding switch decreases set speed. • Pressing switch repeatedly decreases set speed in steps of 1.6 km/h {1.0 mph}.	
	RESUME	Returns vehicle to set speed if vehicle speed is 40 km/h {25 mph} or more when cruise control is temporarily canceled.	
	ACCEL	• Pressing and holding switch increases set speed. • Pressing switch repeatedly increases set speed in steps of 1.6 km/h {1.0 mph}.	
Brake switch	A normally open and normally closed switch are built into in the brake switch, and when cruise control system operates or releases, condition converts into a signal and is sent to cruise actuator.		—
Cruise set indicator light	Indicates cruise control system operation.		In instrument cluster
Actuator cable	Cruise actuator is connected with the accelerator pedal. When cruise control system operates, the accelerator pedal is moved.		—

Operation

1. The cruise control module sends signals to the stepping motor housed in the cruise actuator. The stepping motor moves the accelerator pedal by means of the internal geartrain, electromagnetic coupling and actuator cable. The vehicle speed sensor sends the reference signal that the control module and compares it to the set speed. If a discrepancy exists, the control module actuates the stepping motor to adjust the accelerator pedal and maintain a constant vehicle speed. When accelerating, the accelerator pedal is moved as shown in the figure.



2. When any of switches operated by the brake, clutch or selector lever, the control module cancels the cruise control.

Operating condition

- When the following conditions are satisfied, the cruise control system operates:
  1. The ignition switch is turned and left at ON position (IG 1 ON).
  2. The cruise control switch is turned on (CRUISE MAIN ON).
  3. The brake pedal is not depressed. (normally open switch OFF, normally closed switch ON)
  4. The clutch pedal is not depressed. (clutch switch OFF) (MTX)
  5. The selector lever is in any gear (except at N or P). (Transaxle range switch OFF) (ATX)
  6. The speed of the vehicle is 40 km/h {25 mph} or more.
- If any of the following conditions are satisfied while the cruise control system is in operation, the cruise actuator memorizes the set speed, then cancels the cruise control system (indicator is OFF). If the resume switch is pressed, the vehicle and resumes the set speed:
  1. The brake pedal is depressed. (normally open switch ON, normally closed switch OFF)
  2. The clutch pedal is depressed. (clutch switch ON) (MTX)
  3. Set the selector lever to N range. (transaxle range switch ON) (ATX)
  4. When the vehicle speed is 15 km/h {9.3 mph} slower than the set speed.
  5. When sudden change in vehicle speed causes abnormal fluctuation. The control module in the cruise actuator calculates the fluctuation from vehicle speed.
- If the vehicle speed reaches 11.2 km/h {6.9 mph} or more faster than the set speed the cruise actuator memorizes the set speed and cancels the operation (indicator remains ON). Then the vehicle speed drops to 9.6 km/h {6.0 mph} or more than the set speed, the vehicle automatically resumes the set speed.

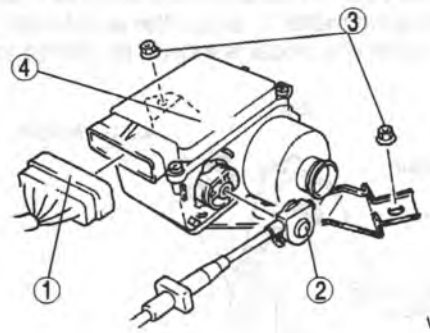
Set speed cancel condition

- When at least one of the following conditions is satisfied, the cruise control system operation is released:
  1. The cruise control switch is turned off (CRUISE MAIN OFF).
  2. The ignition switch is turned to LOCK or ACC position.
  3. When the cruise actuator cannot be properly maintained.
  4. When the cruise control system cannot be properly maintained.

CRUISE ACTUATOR REMOVAL/INSTALLATION

Z6U012066310W02

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.
4. Adjust the actuator cable. (See 01-20-6 ACTUATOR CABLE ADJUSTMENT.)

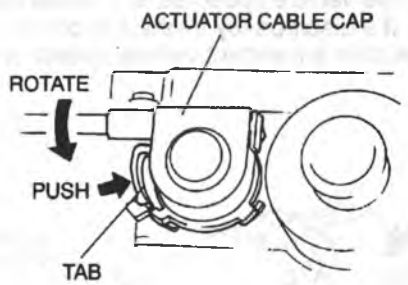


W6U120WA0

1	Connector
2	Actuator cable (See 01-20-4 Actuator Cable Removal Note)
3	Nut
4	Cruise actuator

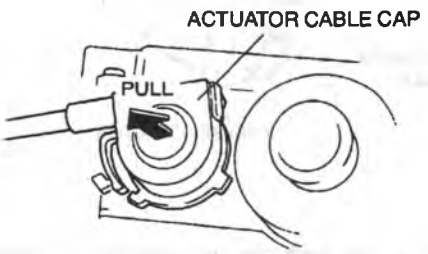
Actuator Cable Removal Note

1. Remove the actuator cable cap from the cruise actuator by pushing the tab and rotating the actuator cable cap counterclockwise.



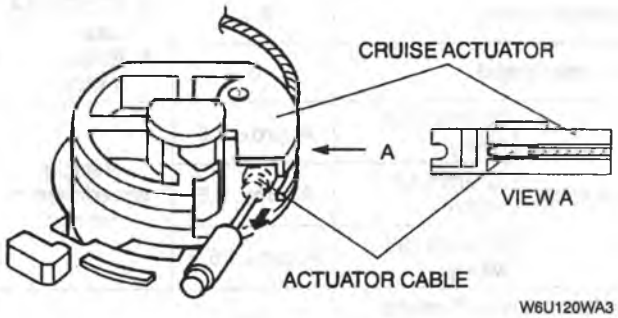
W6U120WA1

2. Pull the actuator cable cap forward.



W6U120WA2

3. Remove the actuator cable from the cruise actuator.



W6U120WA3

CRUISE ACTUATOR INSPECTION

Z6U012066310W03

1. Measure the voltage at the cruise actuator connector terminals as indicated below.
2. Disconnect the cruise actuator connector before checking for continuity at terminal A, E, F, and I.
   - If not as specified, inspect the parts listed under "Inspection area" and the related wiring harnessers.
   - If the parts and wiring harnesses are okay but the system still does not work properly, replace the cruise actuator.

Terminal Voltage List (Reference)



W6U120WA4

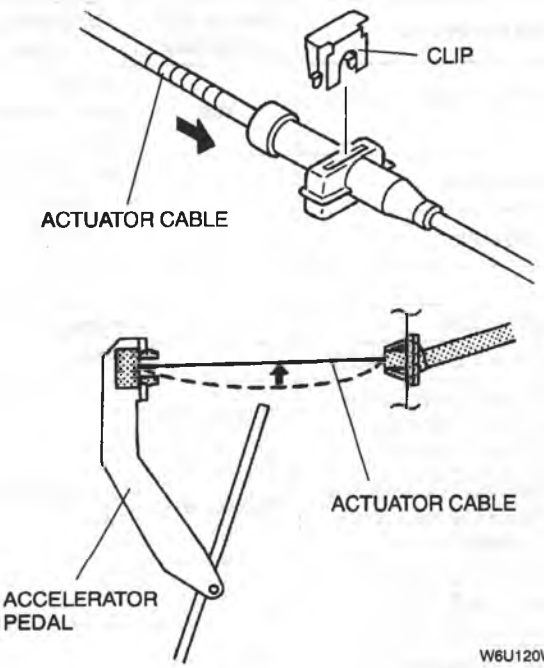
Terminal	Signal	Connection	Test condition	Voltage (V)/ Continuity	Inspection area
A	Cruise actuator ground	Vehicle speedometer sensor	Constant: check for continuity to ground	Yes	Vehicle speedometer sensor
B	Brake switch on/off	Brake switch	Depress brake pedal	0	• STOP 20 A fuse • Brake switch
			Release brake pedal	B+	
C	—	—	—	—	—
D	IG1	TURN 10 A fuse	Ignition switch at ON	B+	TURN 10 A fuse
			Ignition switch at LOCK or ACC	0	
E	Cruise control switch input	Cruise control switch	Hold SET/COAST switch at on and measure the resistance between terminals E and F	Approx. 240 Ω	Cruise control switch
			Hold RESUME/ACCEL switch at on and measure the resistance between terminals E and F	Approx. 910 Ω	
			Other: check for continuity between terminals E and F	No	
F	Cruise control switch output	Cruise control switch	Hold SET/COAST switch at on and measure the resistance between terminals E and F	Approx. 240 Ω	Cruise control switch
			Hold RESUME/ACCEL switch at on and measure the resistance between terminals E and F	Approx. 910 Ω	
			Other: check for continuity between terminals E and F	No	

Terminal	Signal	Connection	Test condition		Voltage (V)/ Continuity	Inspection area
G	Brake switch on/off	Brake switch	Depress brake pedal		B+	• STOP 20 A fuse • Brake switch
			Release brake pedal		0	
H	Vehicle speed	Vehicle speedometer sensor	Vehicle speed	20 km/h {12 MPH}	Approx. 4.5	Vehicle speedometer sensor
				50 km/h {31 MPH}	Approx. 8.5	
				90 km/h {56 MPH}	Approx. 16.5	
I	Selector lever position (ATX)	Transaxle range switch	Selector lever at N or P range: check for continuity to ground		Yes	Transaxle range switch
			Other: check for continuity to ground		No	
	Clutch switch on/off (MTX)	Clutch switch	Depress clutch pedal: check for continuity to ground		Yes	Clutch switch
			Release clutch pedal: check for continuity to ground		No	
J	Cruise set indicator light output	Cruise set indicator light	Ignition switch at ON		B+	• METER 10 A fuse • Instrument cluster
			Ignition switch at LOCK or ACC		0	

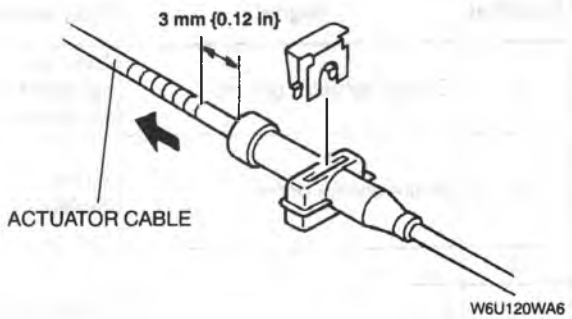
ACTUATOR CABLE ADJUSTMENT

Z6U012066311W01

1. Remove the clip.
2. Pull the actuator cable until the throttle lever starts moving to eliminate the actuator cable play.



3. Then loosen the actuator cable until an **approximately 3 mm {0.12 in}** free play is obtained.

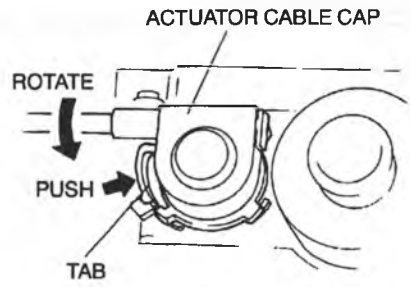


4. Install the clip.

ACTUATOR CABLE REMOVAL/INSTALLATION

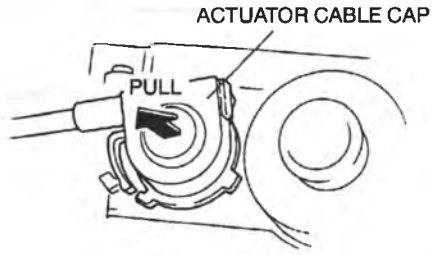
Z6U012066311W02

1. Remove the actuator cable cap from the cruise actuator by pushing the tab and rotating the actuator cable cap counterclockwise.



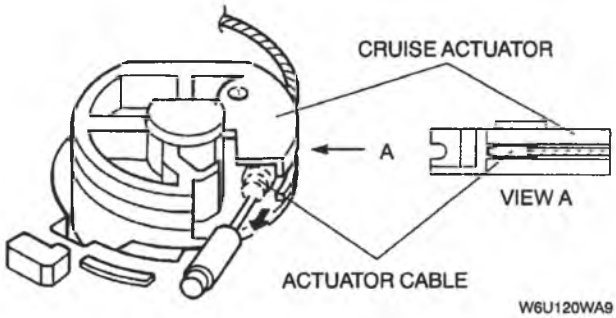
W6U120WA7

2. Pull the actuator cable cap forward.



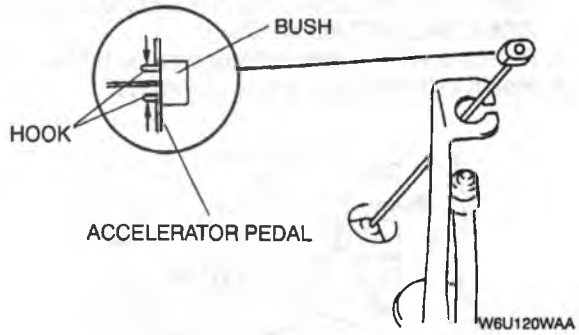
W6U120WA8

3. Remove the actuator cable from the cruise actuator.



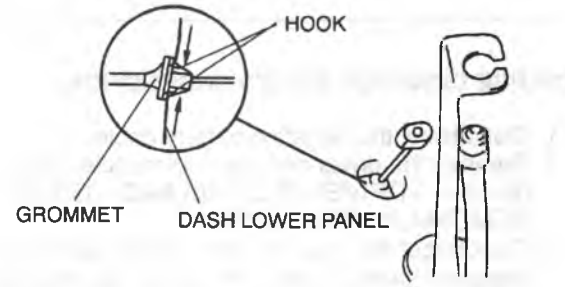
W6U120WA9

4. Press the hooks of the bush, and remove it from the accelerator pedal.



W6U120WAA

5. Press the hooks of the grommet, and remove it from the dash lower panel.



W6U120WAB

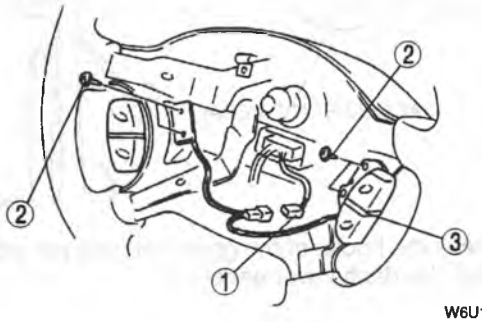
6. Push the actuator cable through the dash lower panel to remove it.
7. Install in the reverse order of removal.
8. Adjust the actuator cable. (See 01-20-6 ACTUATOR CABLE ADJUSTMENT.)

CRUISE CONTROL SWITCH REMOVAL/INSTALLATION

Z6U012066341W01

1. Disconnect the negative battery cable.
2. Remove the driver-side air bag module. (See 08-10-10 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Connector
2	Screw
3	Cruise control switch



W6U120WAC

CRUISE CONTROL SWITCH INSPECTION

Z6U012066341W02

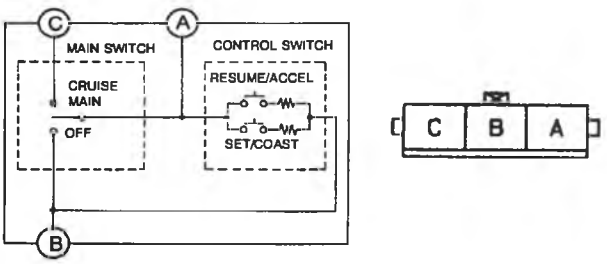
1. Disconnect the negative battery cable.
2. Remove the driver-side air bag module. (See 08-10-10 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
3. Disconnect the cruise control switch connector.
4. Measure the resistance and check for continuity between the cruise control switch terminals by using an ohmmeter.
   - If not as specified, replace the cruise control switch.

O—O : Continuity O-WW-O : Resistance

Switch position	Terminal		
	A	B	C
CRUISE MAIN switch hold at on	O		O
OFF switch hold at on	O	O	
SET/COAST switch hold at on	O	R_1	
RESUME/ACCEL switch hold at on	O	R_2	
Other			

R_1 : approx. 240 Ω R_2: approx. 910 Ω

W6U120WAD



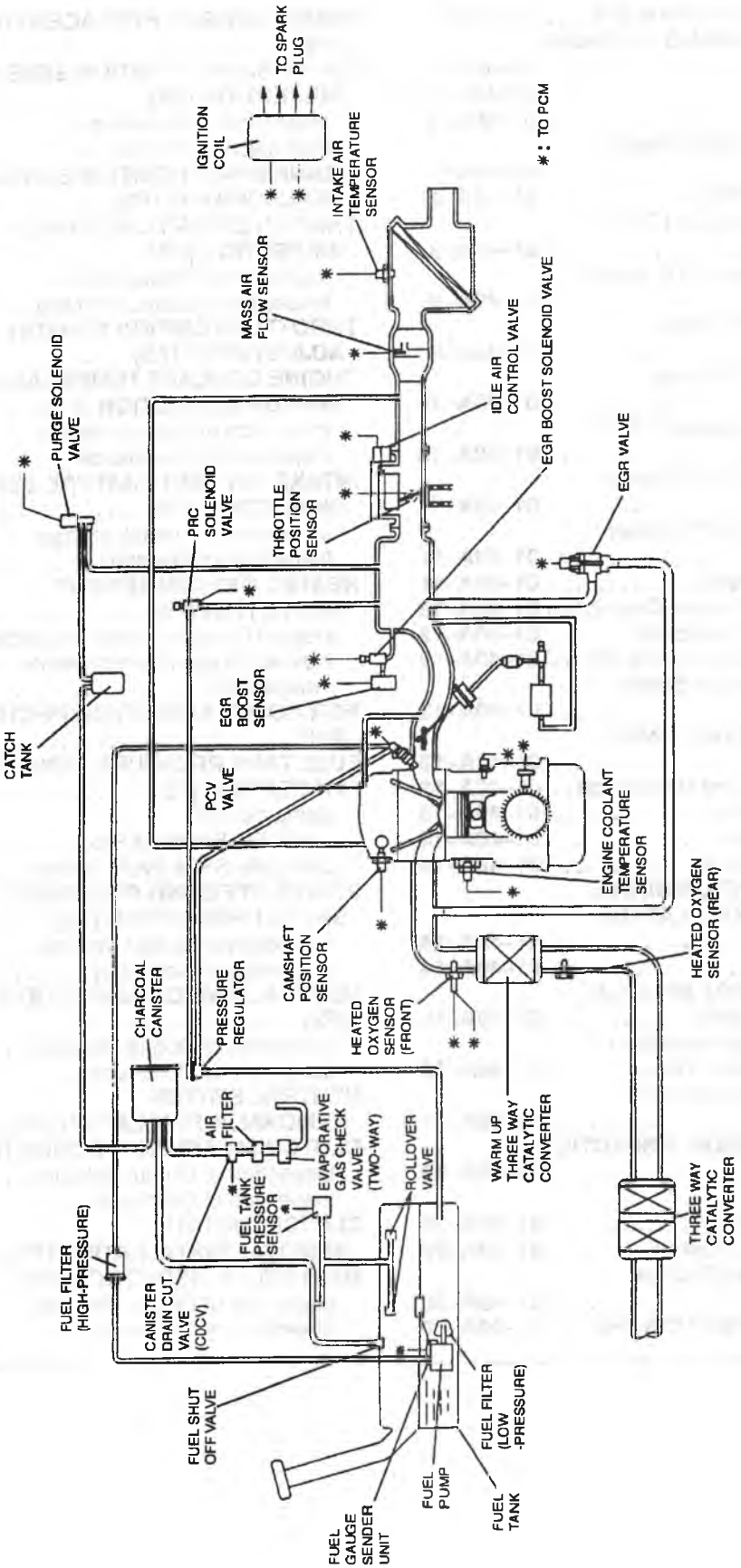
W6U120WAE

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CONTROL SYSTEM DIAGRAM [FS]

Z6U014018881W01

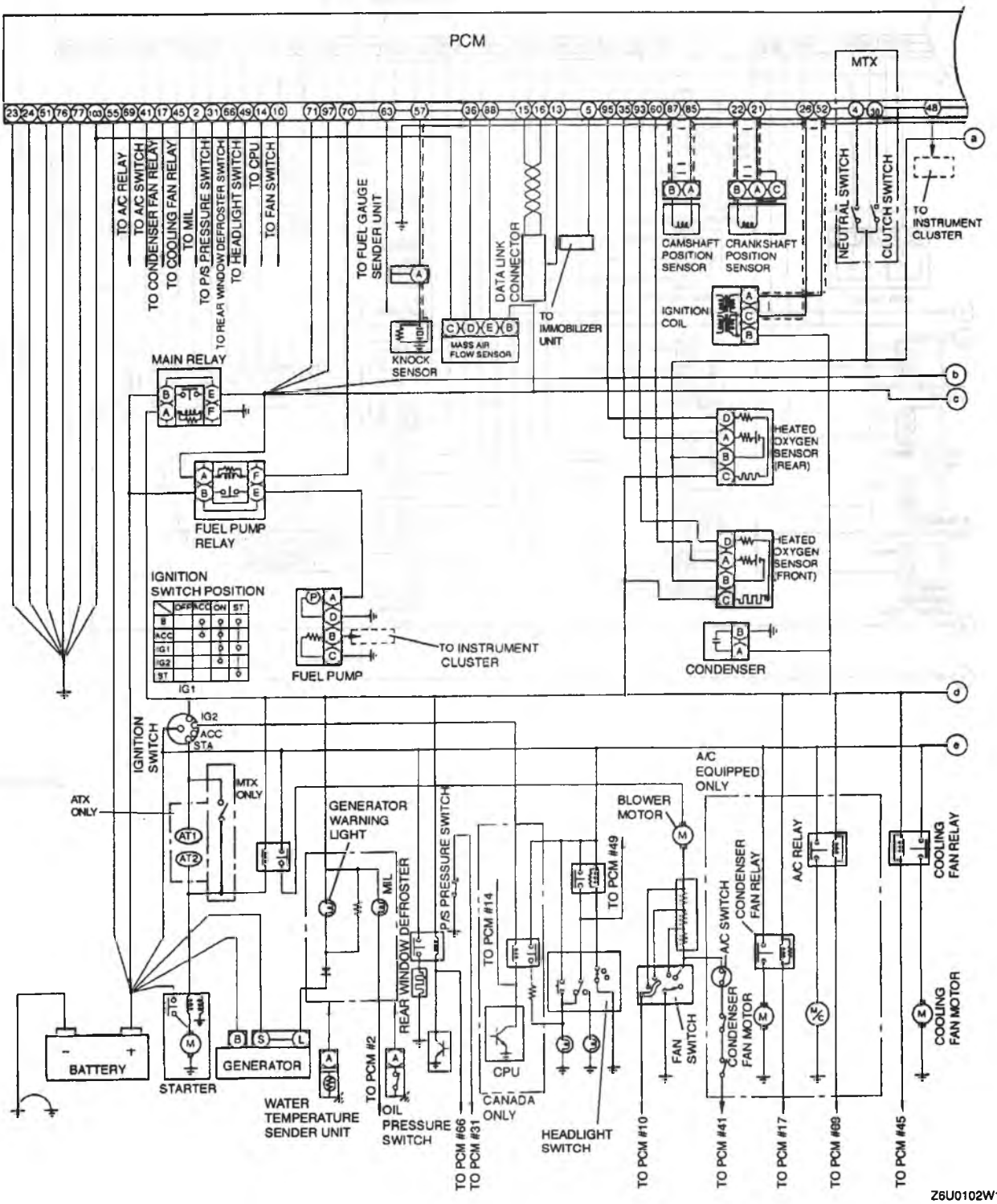


Y6U140WAL

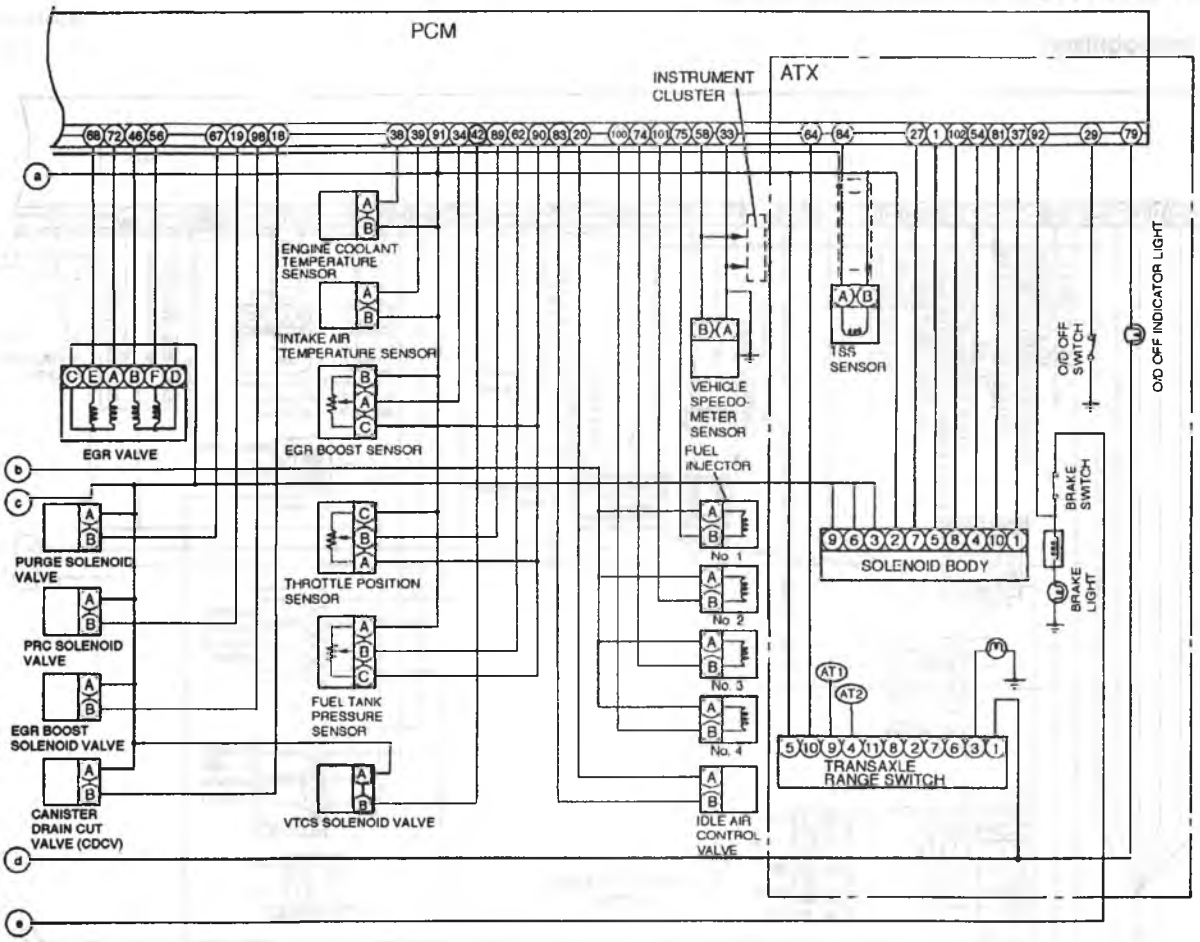
CONTROL SYSTEM WIRING DIAGRAM [FS]

Z6U014018881W02

With Immobilizer

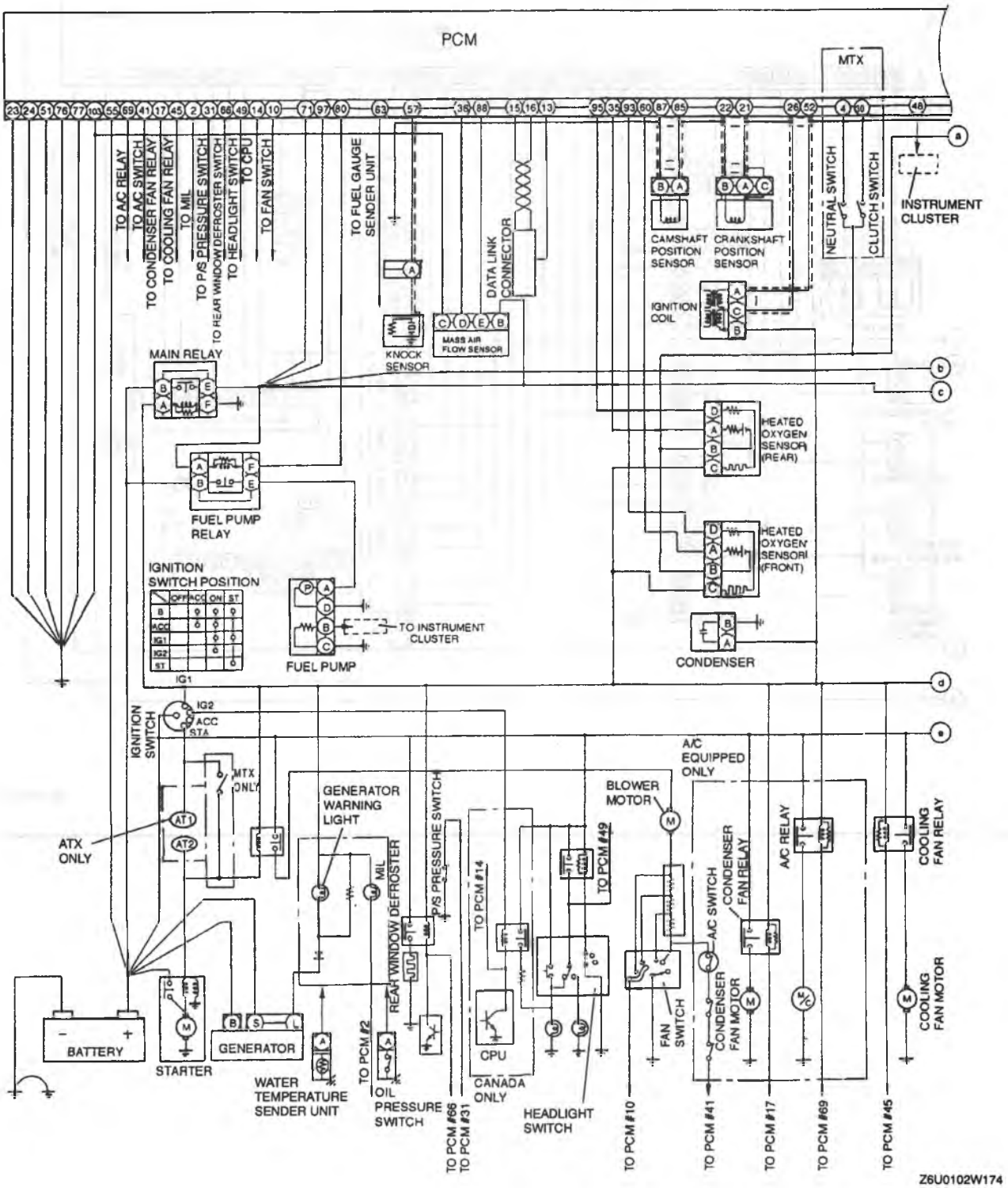


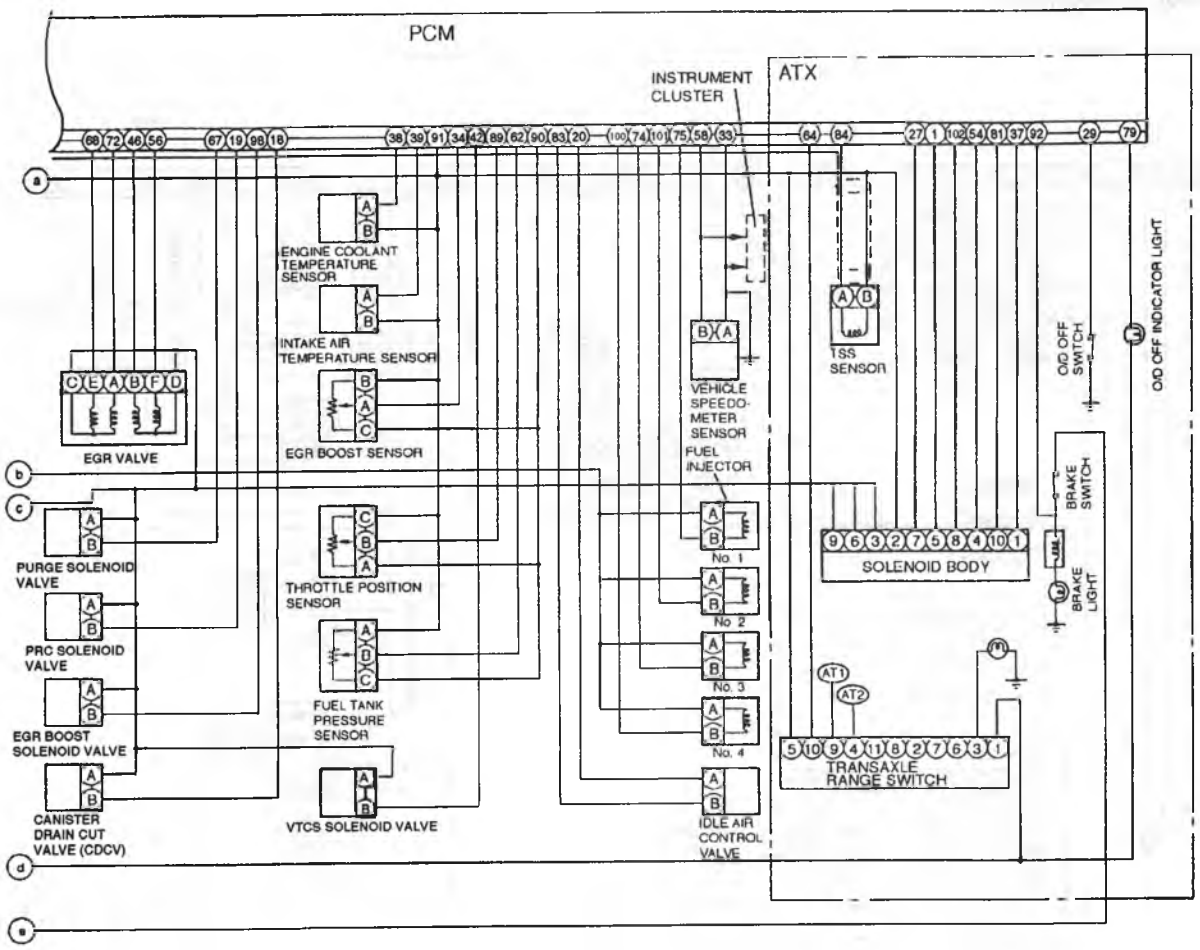
Z6U0102W172



Z6U0102W173

Without Immobilizer

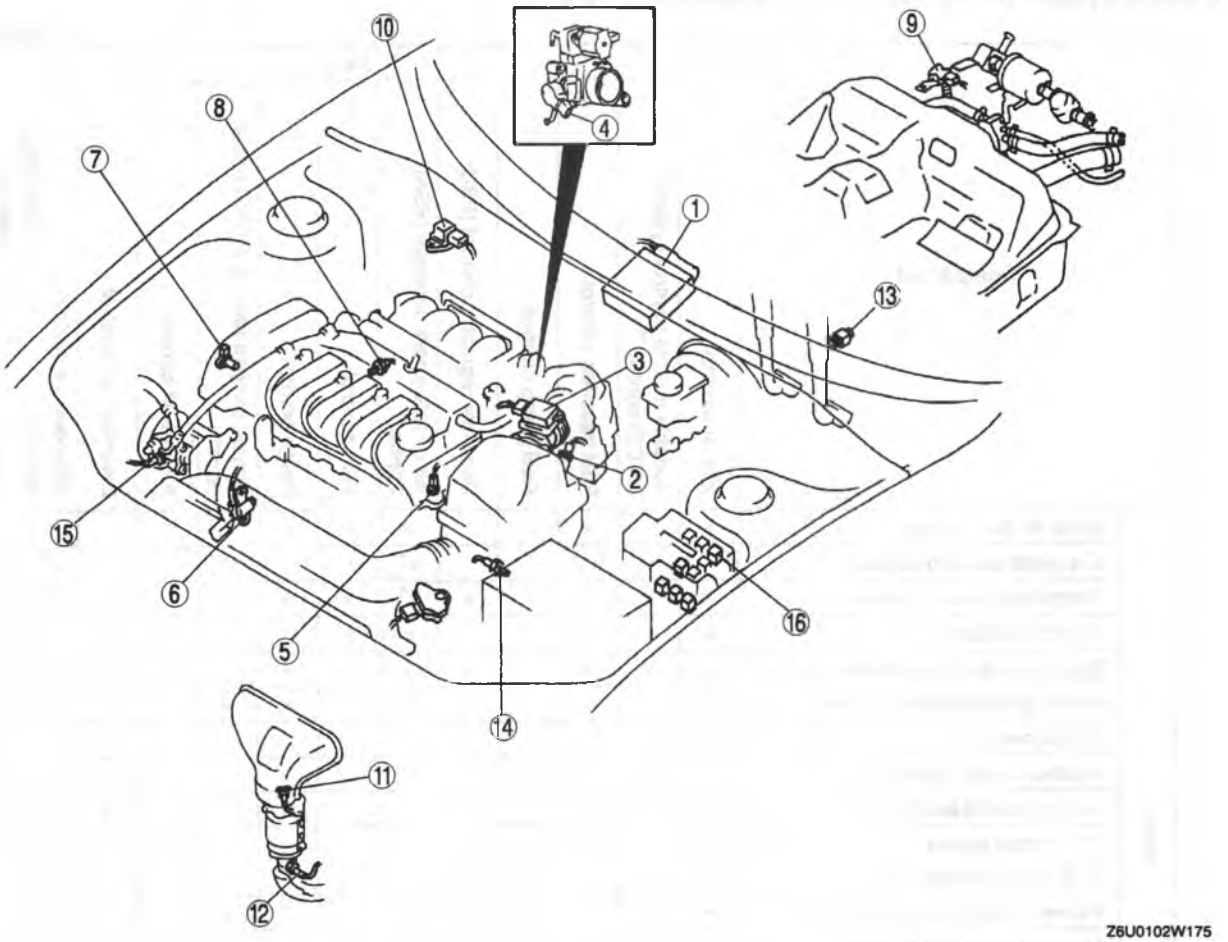




Z6U0102W173

CONTROL SYSTEM COMPONENT LOCATION [FS]

Z6U014018881W03



Z6U0102W175

1	PCM
2	Intake air temperature sensor
3	Mass air flow sensor
4	Throttle position sensor
5	Engine coolant temperature sensor
6	Crankshaft position sensor
7	Camshaft position sensor
8	Knock sensor

9	Fuel tank pressure sensor
10	EGR boost sensor
11	Heated oxygen sensor (Front)
12	Heated oxygen sensor (Rear)
13	Clutch switch (MTX)
14	Neutral switch (MTX)
15	Power steering pressure switch
16	Main relay

CONTROL SYSTEM [FS]

Z6U014018881W04

Control System Device And Control Relationship Chart

× : Applicable

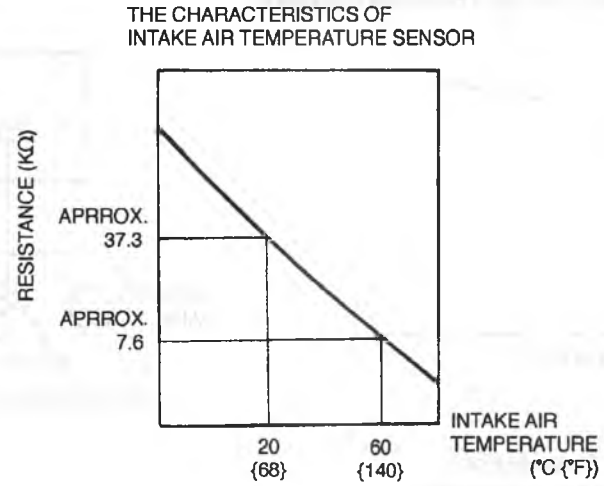
	Component	Item												
		Idle air control	Variable tumble control system (VTCS) control*2	Fuel injection control	Fuel pump control	Pressure regulator control (PRC)	Electronic spark advance (ESA) control	EGR control	Purge control	Heated oxygen sensor (HO2S) heater control	A/C cut-off control	Electrical fan control	Monitoring system: Evaporative system monitor	Monitoring system: EGR system monitor
Input	Mass air flow sensor	×		×			×	×	×				×	×
	Camshaft position sensor			×*			×*						×*	×*
	Crankshaft position sensor	×	×	×*	×	×	×*	×	×		×	×	×*	×*
	Throttle position sensor	×	×	×		×	×	×	×		×		×	×
	Engine coolant temperature sensor	×	×	×		×	×	×	×		×	×	×	×
	Intake air temperature sensor	×		×		×	×		×	×		×	×	
	Knock sensor			×			×							
	Heated oxygen sensor			×					×					
	Vehicle speed sensor			×				×	×			×	×	×
	EGR boost sensor												×	×
	Fuel gauge sender unit												×	
	Power steering pressure switch	×		×						×				
	Neutral switch (MTX only)	×		×		×	×	×	×					
	Clutch switch (MTX only)	×		×		×	×	×	×					
	Transaxle range switch (ATX only)	×		×		×	×	×	×					
	Brake switch	×		×										
	Ignition switch												×	
	A/C switch, Refrigerant pressure switch (A/C equipped only)	×		×							×	×		
Output	Idle air control valve	×												
	VTCS solenoid valve		×											
	Fuel injector			×										
	Fuel pump relay				×									
	CPU					×								
	Ignition coil						×							
	EGR valve							×						
	Purge solenoid valve								×					
	Heated oxygen sensor heater									×				
	EGR boost sensor solenoid valve													×
	Canister drain cut valve (CDCV)												×	
	A/C relay										×			
	Cooling fan relay											×		
	Condenser fan relay											×		

* : The crankshaft position sensor signal has priority in the engine speed detection.

Z6U0102W176

Intake Air Temperature (IAT) Sensor Description

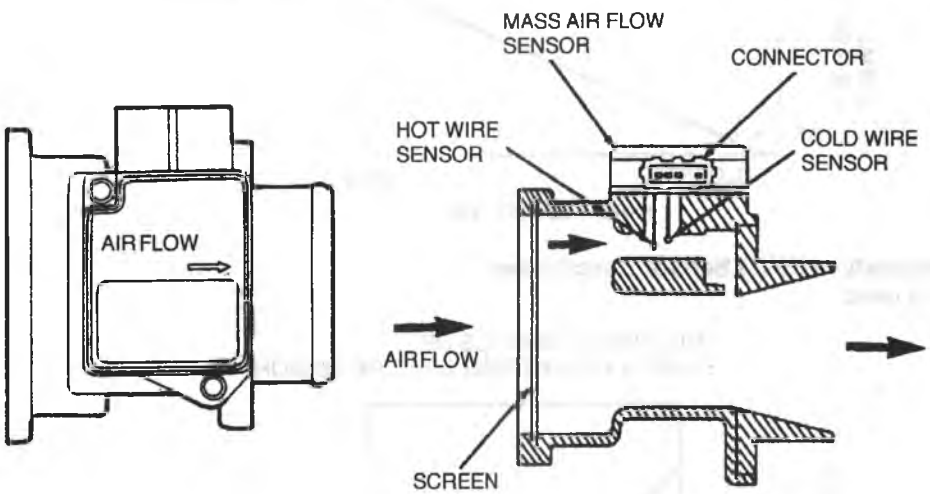
- The intake air temperature sensor detects the intake air temperature as variation in the resistance of the temperature.



Z6U0140W001

Mass Air Flow (MAF) Sensor Description

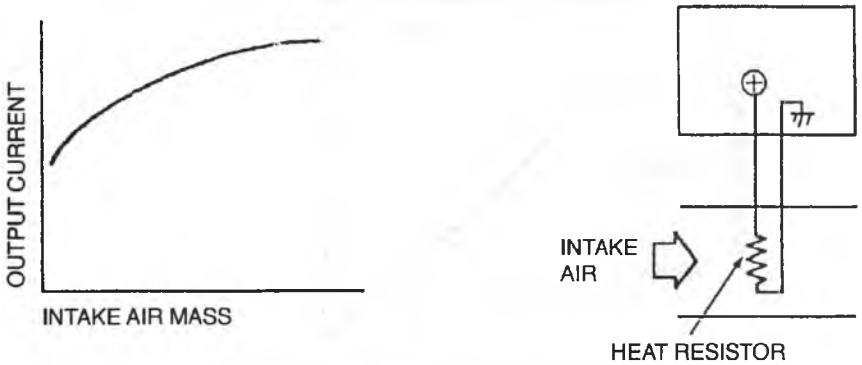
- A hot wire type mass airflow sensor is used.



Z6U0140W002

Structure and operation

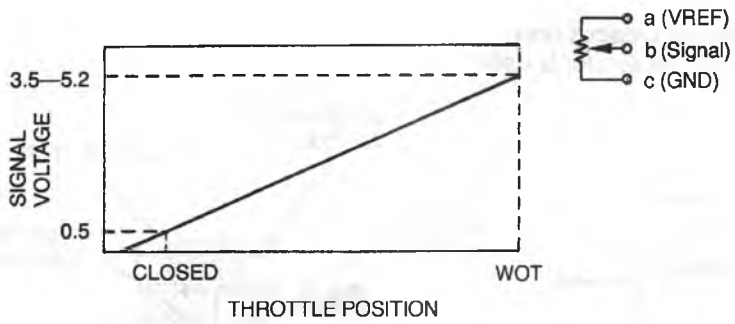
- The mass air flow (MAF) sensor uses a hot wire to measure the amount of mass air intake flow.
- Air passing over the hot wire causes it cool. This hot wire is maintained preprogrammed temperature above ambient temperature.
- Ambient temperature is measured by a constant cold wire.



Z6U0140W003

Throttle Position (TP) Sensor Description

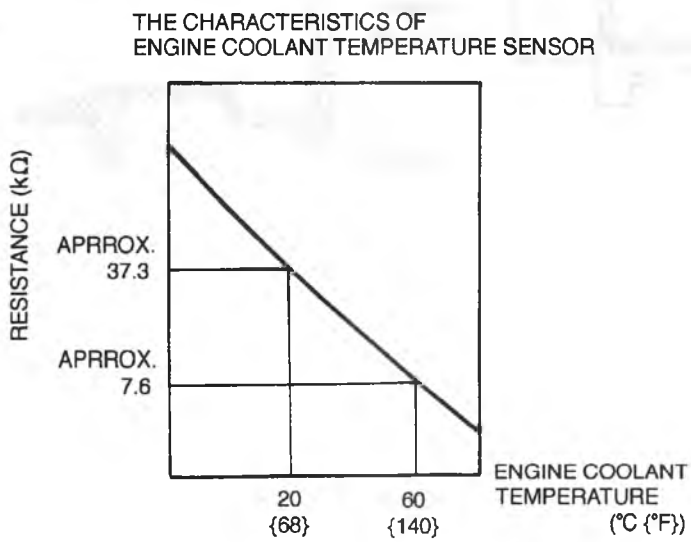
- A linear type throttle position sensor is used.



Z6U0102W180

Engine Coolant Temperature (ECT) Sensor Description

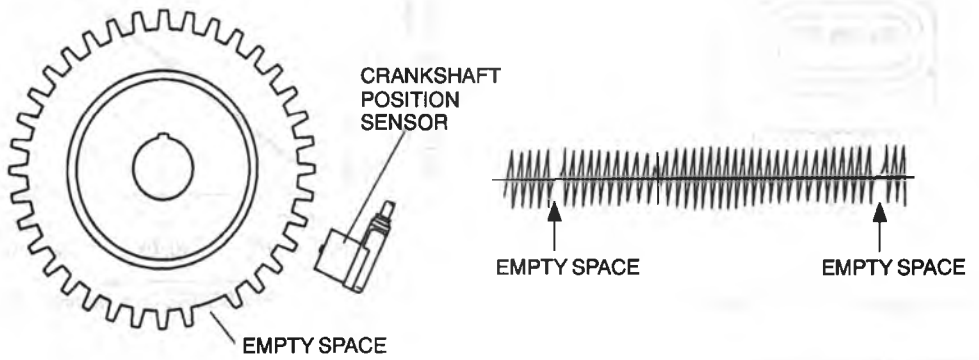
- 2pin type sensor is used.



Z6U0140W004

Crankshaft Position (CKP) Sensor Description

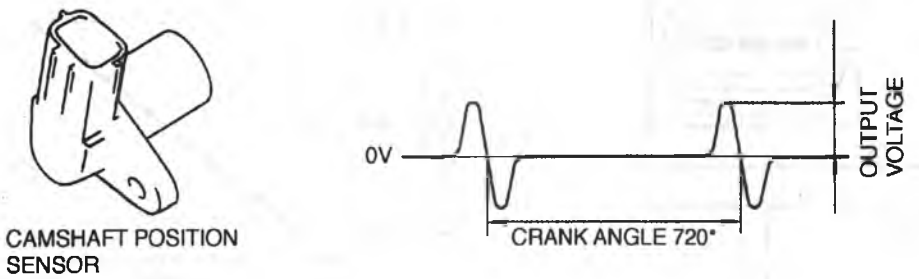
- The magnetic pickup type crankshaft position sensor is located near the crankshaft pulley.
- The crankshaft pulley has a total of 35 teeth spaced 10 degrees apart with one empty space for a missing tooth.
- The crankshaft position sensor detects the pulley rotation signal (NE signal), and outputs it to the PCM.
- Since the NE signal is detected directly by the crankshaft rotation, accuracy is high and is not influenced by timing belt looseness or camshaft pulley misalignment.



Z6U0102W182

Camshaft Position (CMP) Sensor Description

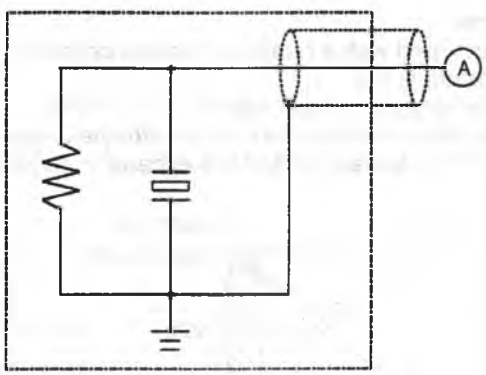
- The camshaft position sensor detects the position of the camshaft.
- The camshaft position sensor identifies when piston number one is on its compression stroke.
- A signal is then sent to the PCM and used for synchronizing the firing of sequential fuel injections.



Z6U0140W005

Knock Sensor Description

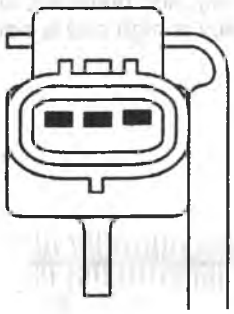
- A piezo-electric type knock sensor (which utilizes the piezo-electric effect) is used.
- It is non-resonant type and has the feature of carrying out flat detection in relation to frequency.



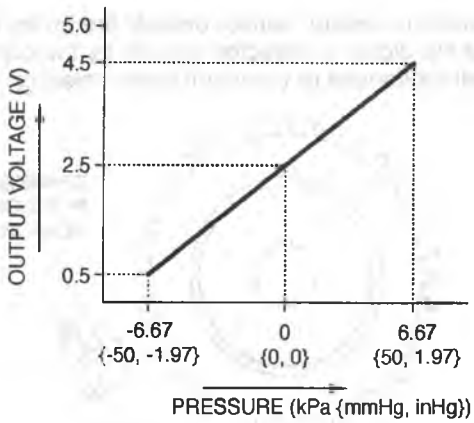
Z6U0102W184

Fuel Tank Pressure Sensor Description

- The fuel tank pressure sensor converts pressure into electric signals by using the piezo-electric effect of the semi-conductor.



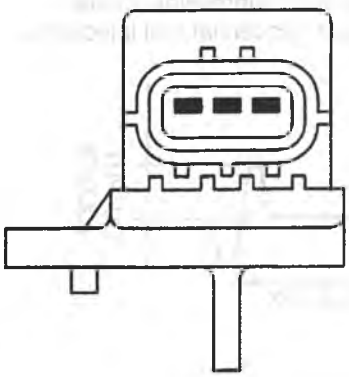
FUEL TANK PRESSURE SENSOR



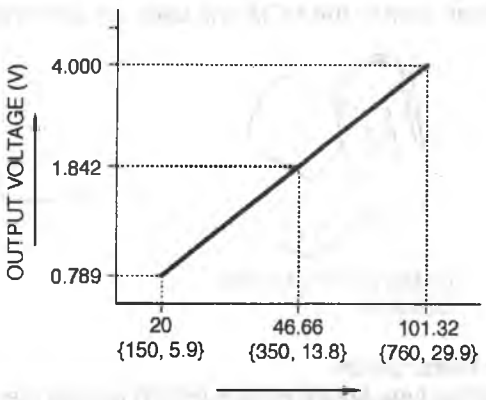
Z6U0102W185

EGR Boost Sensor Description

- The EGR boost sensor uses the piezo-electric effect to convert the intake manifold pressure into voltage values, and outputs the voltage values to the PCM.



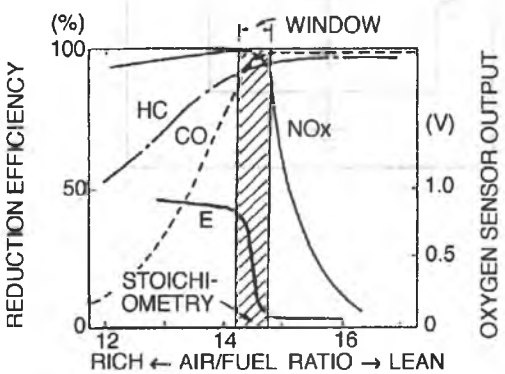
EGR BOOST SENSOR



Z6U0102W186

Heated Oxygen Sensor Description

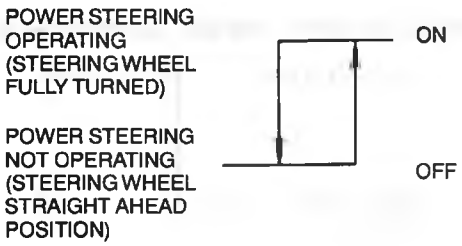
- The heated oxygen sensor is equipped with a heater to provide constant detection of oxygen concentration even when exhaust gas temperature is low.
- The heated oxygen sensor sends oxygen content signals to the PCM.
- The heated oxygen sensor uses the principles of a solid electrolyte oxygen content battery.
- The heated oxygen sensors are fitted to each end of the exhaust manifold, the three way catalytic converter, and the front pipe.



Z6U0140W006

Power Steering Pressure Switch Description

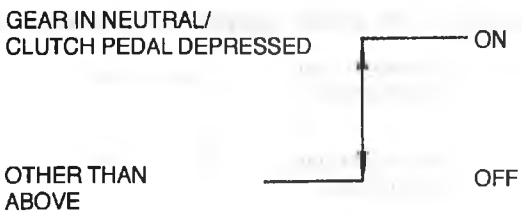
- The power steering pressure switch detects the power steering operating condition by the variation of the oil pressure in the power steering oil pump.



Z6U0102W188

Neutral Switch and Clutch Switch Description

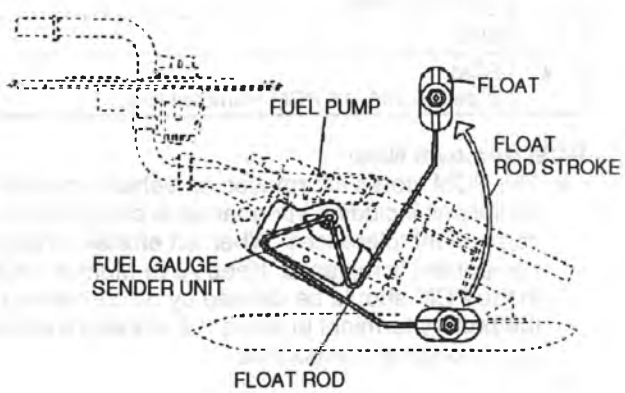
- The neutral switch and the clutch switch are connected in parallel.
- The neutral switch and the clutch switch detect the engine load condition.

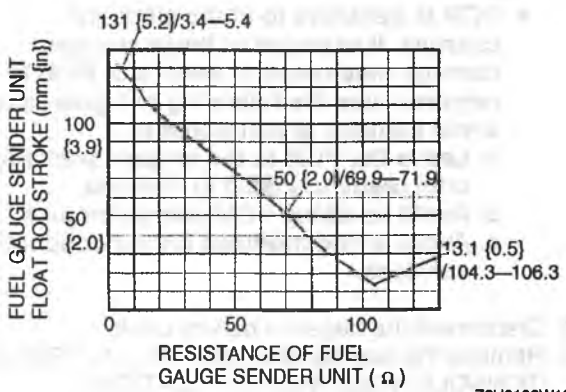


Z6U0140W007

Fuel Gauge Sender Unit Description

- The fuel gauge sender unit is integrated with the fuel pump.
- The fuel gauge sender unit detects the variation in resistance made by the float rod stroke as the amount of fuel remaining in the fuel tank.

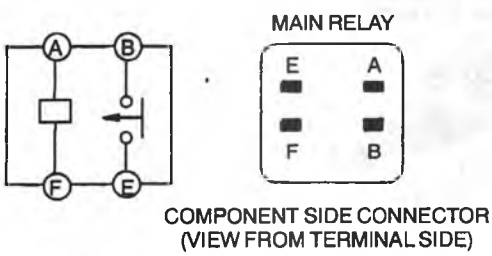




Z6U0102W190

Main Relay Description

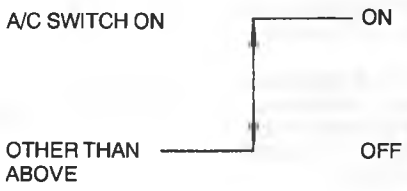
- The main relay controls power to PCM when the ignition switch is turned ON/OFF.



Z6U0102W192

A/C Switch Description
- The A/C switch detects the A/C operating condition.

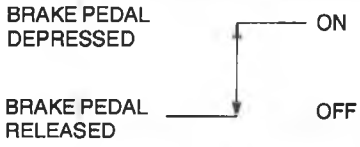
Operation
- The A/C switch operates according to the switch operation condition as shown.



Z6U0102W193

Brake Switch Description
- The Brake switch detects the brake pedal depressed/released condition.

Operation
- The brake switch operates according to the switch operation condition as shown.



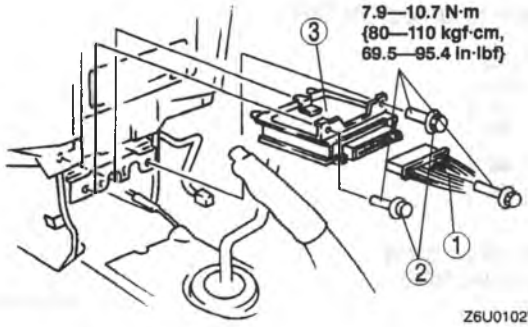
Z6U0102W194

POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS]

Z6U014018880W01

Caution
- **PCM is sensitive to static electrical charges. If exposed to these charges, damage may result. If service of PCM is required, use the following safeguards to avoid damage to components.**
  - **a. Leave the PCM in the original packaging until ready to install in vehicles.**
  - **b. Avoid touching PCM connector pins.**
  - **c. Avoid laying modules on nonconductive surfaces.**

1. Disconnect the negative battery cable.
2. Remove the rear console. (See 09-17-5 REAR CONSOLE REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.



Z6U0102W195

1	PCM connector
2	Bolt
3	PCM (See 01-40A-14 PCM Removal Note)

PCM Removal Note
- The PCM stores information on vehicle operating conditions including information to compensate for component tolerances. When an emission related component is replaced, Keep Alive Memory (KAM) in the PCM should be cleared by disconnecting the battery terminal to erase the stored information on the original component.

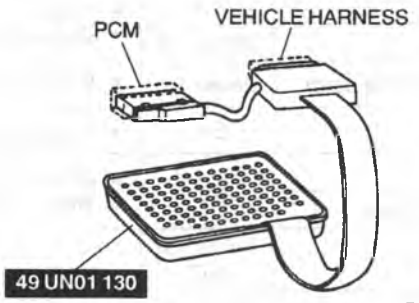
POWERTRAIN CONTROL MODULE (PCM) INSPECTION [FS]

Z6U014018880W02

Caution
- **The PCM terminal voltages vary with change in measuring conditions and vehicle conditions. Always carry out a total inspection of the input systems, output systems, and PCM to determine the cause of trouble. Otherwise, a wrong diagnosis will be made.**

PCM Terminal Voltage Inspection (Using 104 Pin Breakout Box)

1. Disconnect the negative battery cable.
2. Disconnect the PCM connector.
3. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



Z6U0102W196

4. Tighten the connector bolt.

Tightening torque
7.9—10.7 N·m {80—110 kgf·m, 69.5—95.4 in·lbf}

5. Connect the negative battery cable.
6. Measure the voltage at each terminal.
   - If any incorrect voltage is detected, check related systems, wiring harnesses and connectors referring to the possible malfunction in the terminal voltage list.

Terminal voltage table (Reference)

Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
1	Shift solenoid 2 (ATX)	Shift solenoid 2	ON (i.e. idling: R position)		Below 1.0	• Shift solenoid 2 • Related harness
			OFF		B+	
2	MIL	Malfunction indicator lamp	Malfunction indicator lamp OFF		B+	• MIL • Related harness
			Malfunction indicator lamp ON		Below 1.0	
3	—	—	—		—	—
4	—	—	—		—	—
5	Communication (with immobilizer)	Immobilizer unit	Check for signal by using an oscilloscope		—	• PCM*1 • Immobilizer unit • Related harness
6	—	—	—		—	—
7	—	—	—		—	—
8	—	—	—		—	—
9	—	—	—		—	—
10	Blower	Fan switch	Ignition switch ON	Fan switch OFF or at 1st or 2nd	Approx. 10	• Fan switch • Related harness
				Fan switch at 3rd or higher	Below 1.0	
11	—	—	—		—	—
12	—	—	—		—	—
13	PCM reprogramming	Data link connector terminal FEPS	Ignition switch ON		Approx. 0.6	• PCM • Related harness
			Idle			
14	DRL (for CANADA)	DRL unit	Daytime running light ON		Below 1.0	• DRL unit • Headlight relay • Related harness
			Daytime running light OFF		Above 11.0	

Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
15	Diagnostic trouble code output	Data link connector terminal BUS−	Carry out inspection according to diagnostic trouble code Diagnostic trouble code output is a part of serial communication Judgment by terminal voltage is not possible		—	• On-board diagnostic system
16	Diagnostic trouble code input	Data link connector terminal BUS+	Carry out inspection according to diagnostic trouble code Diagnostic trouble code output is a part of serial communication Judgment by terminal voltage is not possible		—	• On-board diagnostic system
17	Condenser fan control	Condenser fan relay	Condenser fan operating		Below 1.0	• Condenser fan relay • Related harness
			Condenser fan stops		B+	
18	CDCV control	CDCV	Ignition switch ON		B+	• CDCV • Related harness
			Diagnosis executed		Below 1.0	
19	Pressure regulator control	PRC solenoid valve	Idle (for 1 minute after hot start)		Below 1.0	• PRC solenoid valve • Related harness
			Other		B+	
20	Idle air control (Positive)	IAC valve	Ignition switch ON		B+	• IAC valve • Related harness
			Idle	No load		
21	NE+	Crankshaft position sensor	Ignition switch ON		Below 1.0 (AC)	• Crankshaft position sensor • Related harness
			Idle		Approx.3.0 (AC)	
22	NE−	Crankshaft position sensor	Ignition switch ON		Below 1.0 (AC)	• Crankshaft position sensor • Related harness
			Idle		Approx.3.0 (AC)	
23	Ground	Ground	Constant		Below 1.0	• PCM 23 terminal harness (Open)
24	Ground	Ground	Constant		Below 1.0	• PCM 24 terminal harness (Open)
25	—	—	—		—	—
26	IGT1	Ignition coil	Ignition switch ON		B+ (DC)	• Ignition coil • Related harness
			Idle		1.0—2.0 (AC)	
27	Shift solenoid 1 (ATX)	Solenoid body	ON (i.e. IG ON: D or 1 range)		Below 1.0	• Solenoid body • Related harness
			OFF		B+	
28	—	—	—		—	—
29	O/D OFF switch (ATX)	O/D OFF switch	Ignition switch ON	O/D OFF switch released	B+	• O/D OFF switch • Related harness
				O/D OFF switch while pushing	Below 1.0	
30	Load/no load distinction (MTX)	Clutch switch	Ignition switch ON	Clutch pedal depressed	Below 1.0	• Clutch switch • Related harness
				Others	B+	
31	Power steering pressure	Power steering pressure switch	Ignition switch ON		B+	• Power steering pressure switch • Power steering system • Related harness
			Idle	Steering wheel in straight ahead position		
				Steering wheel operating	Below 1.0	

Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
32	—	—	—		—	—
33	Ground	Vehicle speedometer sensor –	Constant		Below 1.0	• Vehicle speedometer sensor • Related harness
34	Barometric pressure/EGR boost	EGR boost sensor	Ignition switch ON		Approx. 4.0	• EGR boost sensor • Related harness
			Idle			
35	Heated oxygen sensor (Rear)	Heated oxygen sensor (Rear)	Ignition switch ON		Below 1.0	• Heated oxygen sensor (Rear) • Related harness
			Idle	Engine cold	Approx. 0	
				After warm up	0.1—1.8	
36	Ground	Mass air flow sensor	Constant		Below 1.0	• Mass air flow sensor • Related harness
37	Transaxle fluid temperature (ATX)	Transaxle fluid temperature sensor	After warm up		Approx. 2.0	• Transaxle fluid temperature sensor • Related harness
38	Engine coolant temperature	Engine coolant temperature sensor	Ignition switch ON	Engine coolant temperature 20°C {68°F}	Approx. 3.1	• Engine coolant temperature sensor • Related harness
				After warm up	Below 1.0	
39	Intake air temperature	Intake air temperature sensor	Ignition switch ON	Intake air temperature 20°C {68°F}	Approx. 3.1	• Intake air temperature sensor • Related harness
40	—	—	—		—	—
41	A/C	Climate control unit, Refrigerant pressure switch	Idle	A/C switch and fan switch ON	Below 1.0	• Climate control unit • Refrigerant pressure switch • Related harness
				A/C switch OFF	B+	
42	VTCS control	VTCS solenoid valve	ECT above 65°C {149°F} while idling		B+	• VTCS solenoid valve • Related harness
			ECT below 65°C {149°F} and engine speed at 1,500 rpm		Below 1.0	
43	—	—	—		—	—
44	—	—	—		—	—
45	Cooling fan control	Cooling fan relay	Cooling fan operating		Below 1.0	• Cooling fan relay • Related harness
			Cooling fan stops		B+	
46	EGR valve #3 coil control	EGR valve	Ignition switch ON		B+	• EGR valve • Related harness
			Idle			
47	—	—	—		—	—
48	Engine speed	Instrument cluster	Ignition switch ON		Approx. 12	• Instrument cluster • Related harness
			Idle		Approx. 6.5	
49	Headlight	Headlight relay	Headlight switch ON		B+	• Headlight relay • CPU • Headlight switch • Related harness
			Headlight switch OFF		Below 1.0	
50	—	—	—		—	—
51	Ground	Ground	Constant		Below 1.0	• PCM 51 terminal harness (Open)
52	IGT2	Ignition coil	Ignition switch ON		B+ (DC)	• Ignition coil • Related harness
			Idle		1.0—2.0 (AC)	

Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
53	—	—	—		—	—
54	Torque converter clutch control (ATX)	TCC solenoid	Torque converter clutch operation		Below 1.0	• TCC solenoid • Related harness
			Torque converter clutch non-operation		B+	
55	Back-up power supply	Battery	Constant		B+	• PCM 55 terminal—Battery harness connector
56	EGR valve #4 coil control	EGR valve	Ignition switch ON		B+	• EGR valve • Related harness
			Idle		Below 1.0	
57	Knocking	Knock sensor	Ignition switch ON		Approx. 3.4	• Engine condition • Knock sensor • Related harness
			Idle			
58	Vehicle speed	Vehicle speed sensor +	Idle (AC range)		Approx. 0.1	• Vehicle speed sensor • Related harness
			48 km/h {30 mph} (AC range)		Approx. 8.0	
			88 km/h {55 mph} (AC range)		Approx. 12.7	
59	—	—	—		—	—
60	Heated oxygen sensor (Front)	Heated oxygen sensor (Front)	Ignition switch ON		Below 1.0	• Heated oxygen sensor (Front) • Related harness
			Idle	Engine cold	Below 0.5	
				After warm up	0.1—0.9	
			Acceleration		0.5—1.0	
			Deceleration		0—0.5	
61	—	—	—		—	—
62	Fuel tank pressure	Fuel tank pressure sensor	Ignition switch ON	Fuel tank pressure 0 kPa {0 mmHg, 0 inHg} (Barometric pressure)	2.42—2.58	• Fuel tank pressure sensor • Related harness
63	Fuel tank level	Fuel gauge sender unit	Full fuel		Approx. 6	• Fuel level sender unit • Related harness
			Low fuel		Approx. 0	
64	Load/no load distinction	**MTX** Neutral switch	Neutral position		Below 1.0	• Neutral switch • Related harness
			Others		B+	
		ATX Transaxle range switch	P position		4.5	• Transaxle range switch • Related harness
			R position		3.6	
			N position		2.9	
			D range		2.1	
			2 range		1.4	
			1 range		0.7	
65	—	—	—		—	—
66	Rear window defroster	CPU	Ignition switch ON	Rear window defroster switch OFF	B+	• CPU • Rear window defroster relay • Related harness
				Rear window defroster switch ON	Below 1.0	
67	Purge control	Purge solenoid valve	Ignition switch ON		B+	• Purge solenoid valve • Related harness
			Idle	Purge solenoid valve OFF		
				Purge solenoid valve ON	Approx. 0	

Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
68	EGR valve #1 coil control	EGR valve	Ignition switch ON		B+	• EGR valve • Related harness
			Idle			
69	A/C control	A/C relay	Ignition switch ON		B+	• A/C relay • Related harness
			Idle	A/C operating	Below 1.0	
				A/C stops	B+	
70	Fuel pump control (with immobilizer)	Fuel pump relay	Ignition switch ON		B+	• Fuel pump relay • Related harness
			Cranking		Below 1.0	
			Idle			
71	Power supply	Main relay	Ignition switch	ON	B+	• Main relay • Related harness
				OFF	Below 1.0	
72	EGR valve #2 coil control	EGR valve	Ignition switch ON		B+	• EGR valve • Related harness
			Idle		Below 1.0	
73	—	—	—		—	—
74	Fuel injector control	Fuel injector No.3	Ignition switch ON and Idle		B+	• Fuel injector • Related harness
75		Fuel injector No.1				
76	Ground	Ground	Constant		Below 1.0	• PCM 76 terminal harness (Open)
77	Ground	Ground	Constant		Below 1.0	• PCM 77 terminal harness (Open)
78	—	—	—		—	—
79	O/D OFF indicator light (ATX)	O/D OFF indicator light	Ignition switch ON	SW OFF (O/D ON)	B+	• O/D OFF switch • Related harness
				SW ON (O/D OFF)	Below 1.0	
80	Fuel pump control (without immobilizer)	Fuel pump relay	Ignition switch ON		B+	• Fuel pump relay • Related harness
			Cranking		Below 1.0	
			Idle			
81	Electronic pressure control (ATX)	EPC solenoid	Idle		9.4	• EPC solenoid • Related harness
			48 km/h {30 mph}		9.7	
			88 km/h {55 mph}		11.1	
82	—	—	—		—	—
83	Idle air control (Negative)	IAC valve	Ignition switch ON		B+	• IAC valve • Related harness
			Idle	No load	Approx. 10.0	
84	Turbine shaft speed (ATX)	Turbine shaft speed sensor	Idle (AC range)	2 or 1 range	Below 1.0	• TSS sensor • Related harness
				D or R range		
				P or N range	0.4—0.7	
			Driving (AC range)	48 km/h {30 mph}	0.8	
				88 km/h {55 mph}	1.0	
85	SGC+	Camshaft position sensor	Ignition switch ON		Below 1.0	• Camshaft position sensor • Related harness
			Idle		Below 1.0	
86	—	—	—		—	—
87	SGC–	Camshaft position sensor	Ignition switch ON		Below 1.0	• Camshaft position sensor • Related harness
			Idle			
88	Mass airflow	Mass air flow sensor	Ignition switch ON		Approx. 0.02	• Mass air flow sensor • Related harness
			Idle		0.6—1.1	

Terminal	Signal	Connected to	Test condition		Voltage (V)	Possible malfunction
89	Throttle position	Throttle position sensor	Ignition switch ON	Closed throttle position	0.3—0.7	• Throttle position sensor • Related harness
				Wide open throttle	3.4—5.3	
90	Constant voltage (Vref)	Throttle position sensor EGR boost sensor Fuel tank pressure sensor	Ignition switch ON		Approx. 5.0	• PCM 90 terminal voltage • Related harness
91	Ground	Engine coolant temperature sensor Intake air temperature sensor EGR boost sensor Fuel tank pressure sensor Throttle position sensor Neutral/clutch switch Heated oxygen sensor (Front, Rear) Turbine speed sensor	Constant		Below 1.0	• PCM 91 terminal harness (Open)
92	Brake (ATX)	Brake switch	Brake pedal released		Below 1.0	• Brake switch • Related harness
			Brake pedal depressed		B+	
93	Heated oxygen heater (Front) control	Heated oxygen sensor (Front) heater	Ignition switch ON		B+	• Heated oxygen sensor (Front) heater • Related harness
			Idle		B+ or Below 1.0	
94	—	—	—		—	—
95	Heated oxygen sensor (Rear) heater control	Heated oxygen sensor (Rear) heater	Ignition switch ON		B+	• Heated oxygen sensor (Rear) heater • Related harness
			Idle		Below 1.0⇔B+	
96	—	—	—		—	—
97	Power supply	Main relay	Ignition switch	OFF	Below 1.0	• Main relay • Related harness
				ON	B+	
98	EGR boost sensor switching control	EGR boost sensor solenoid valve	Ignition switch ON		B+	• EGR boost sensor solenoid valve • Related harness
			Idle			
99	—	—	—		—	—
100	Fuel injector control	Fuel injector No.4	Ignition switch ON and Idle		B+	• Fuel injector • Related harness
101		Fuel injector No.2				
102	3-2 timing/coasting clutch solenoid (ATX)	3-2 timing/coasting clutch solenoid	Idle	P/R/N/D range	Approx. 9.0	• 3-2 timing/coasting clutch solenoid • Related harness
				2/1 range	B+	
103	Ground	Ground	Constant		Below 1.0	• PCM 103 terminal harness (Open)
104	—	—	—		—	—

*1 : the immobilizer unit functions normally, replace the PCM.

PCM Inspection Using the SST (NGS Tester)

Note
- PIDs for the following parts are not available on this model. Go to the appropriate part inspection page.
  —CMP sensor (See 01-40A-30 CAMSHAFT POSITION SENSOR INSPECTION [FS].)
  —Main relay (See 01-40A-44 MAIN RELAY INSPECTION [FS].)

1. Connect the NGS tester to the DLC-2. (See 01-02A-11 ON-BOARD DIAGNOSTIC TEST [FS].)
2. Turn the ignition switch to ON position.
3. Select the "PID/DATA MONITOR AND RECORD" function on the NGS display and press TRIGGER. (See 01-02A-11 ON-BOARD DIAGNOSTIC TEST [FS].)
4. Select the appropriate PID on the NGS display and press START.
5. Measure the PID valve.
   - If PID valve is not within the specification, follow the instructions in Action column.

PID/DATA MONITOR item table

Note
- The following PIDs may be displayed on the NGS tester, but they are not used for inspection, because these devices are not applied to this model.

- AIR
- AIRF
- AIRM
- ARC
- ARCF
- BARO
- CCSF
- EGRC
- EGRCF
- EGRFO
- EGRFS
- EGRV
- EGRVF
- EVAPCP
- FANM
- FFFM
- FTP B
- HTR11A
- HTR12A
- HTR21
- HTR21A
- HTR22
- HTR22A
- HTR22A
- HTR22F
- HTRX1
- HTRX2
- IMTVF
- INJ5F
- INJ6F
- INJ7F
- INJ8F
- LFPF
- LONGFT2
- OCTADJ
- PTO
- SHORTFT2
- SS3
- SS3F
- TAR LRN
- TATCF
- TR D
- TRAC
- 4×4L

X : Applied

Monitor item	Full name	Unit/Condition	Application	
			MTX	ATX
ACCS	A/C switch	ON/OFF	×	×
BLWMTR	Fan switch	ON/OFF	×	×
BOO	Brake switch	ON/OFF		×
CCS	Pressure required for 3-2 timing coasting clutch solenoid valve	kPa/psi	×	×
CLT V	Clutch switch signal voltage	V	×	
CPP/PNP	Clutch switch/Neutral switch	ON/OFF	×	×
DRIVECT	Number of OBD II drive cycles completed	#	×	×
DRLMP	Daytime running lights	ON/OFF	×	×
DTC CNT	Total number of codes and pending codes stored	#	×	×
DTCCNTD	Total number of failed code	#	×	×
ECT	Engine coolant temperature	°C/°F	×	×
ECT V	Engine coolant temperature sensor voltage	V	×	×
EGR	EGR (Pressure)	kPa/psi	×	×
EGRBARO	EGR boost solenoid valve	ON/OFF	×	×
EGRCD1	EGR valve (Coil #1)	ON/OFF	×	×
EGRCD2	EGR valve (Coil #2)	ON/OFF	×	×
EGRCD3	EGR valve (Coil #3)	ON/OFF	×	×
EGRCD4	EGR valve (Coil #4)	ON/OFF	×	×
EPC	Line pressure	kPa/psi		×
EPC V	Electric pressure control signal voltage	V		×
EVAPCPF	Purge solenoid vale (Failed detected)	YES/NO	×	×

Monitor item	Full name	Unit/Condition	Application	
			MTX	ATX
EVAPCV	Canister drain cut valve (Duty cycle)	%	×	×
EVAPCVF	Canister drain cut valve (CDCV) (Failed detected)	YES/NO	×	×
EVAPPDC	Purge solenoid valve (Duty cycle)	%	×	×
FLI	Fuel level	%	×	×
FLI V	Fuel gauge sender unit signal voltage	V	×	×
FP	Fuel pump relay	%	×	×
FP M	Fuel pump relay	ON/OFF	×	×
FPF	Fuel pump relay (Failed detected)	YES/NO	×	×
FPRC	PRC solenoid valve	ON/OFF	×	×
FTP	Fuel tank pressure	kPa/psi	×	×
FTP V	Fuel tank pressure sensor signal voltage	V	×	×
FUELPW1	Fuel injector ON time	ms	×	×
GEAR	Gear position (Mode)	Gear position		×
HDLMP	Headlights switch	ON/OFF	×	×
HFC	Condenser fan relay	ON/OFF	×	×
HFCF	Condenser fan relay (Failed detected)	YES/NO	×	×
HTR11	Heated oxygen sensor (Front)	YES/NO	×	×
HTR11F	Heated oxygen sensor (Front) (Failed detected)	YES/NO	×	×
HTR12	Heated oxygen sensor (Rear)	YES/NO	×	×
HTR12F	Heated oxygen sensor (Rear) (Failed detected)	YES/NO	×	×
IAC	Idle air control valve (Duty cycle)	%	×	×
IACF	Idle air control valve (Failed detected)	YES/NO	×	×
IAT	Intake air temperature	°C/°F	×	×
IAT V	Intake air temperature signal voltage	V	×	×
IMRC	VTCS solenoid valve	OPEN/CLS	×	×
IMRCF	VTCS solenoid valve (Failed detected)	YES/NO	×	×
INJ1F	Fuel injector #1 (Failed detected)	YES/NO	×	×
INJ2F	Fuel injector #2 (Failed detected)	YES/NO	×	×
INJ3F	Fuel injector #3 (Failed detected)	YES/NO	×	×
INJ4F	Fuel injector #4 (Failed detected)	YES/NO	×	×
LFC	Cooling fan relay	ON/OFF	×	×
LFCF	Cooling fan relay (Failed detected)	YES/NO	×	×
LOAD	Load (Air charge normalized to sea level)	%	×	×
LONGFT1	Adaptive fuel correction multiplier	%	×	×
LOOP	Open loop fuel conditions met	OPEN/CLS	×	×
MAF	Mass airflow	g/s, lb/min	×	×
MAF V	Mass airflow sensor signal voltage	V	×	×
MIL	Malfunction indicator lamp	ON/OFF	×	×
MILF	Malfunction indicator lamp (Failed detected)	YES/NO	×	×
MISF	Currently misfiring	ON/OFF	×	×
O2S11	Heated oxygen sensor (Front) signal voltage	V	×	×
O2S12	Heated oxygen sensor (Rear) signal voltage	V	×	×
PIP	Profile ignition pickup signal	ON/OFF	×	×
PSP	Power steering pressure switch	ON/OFF	×	×
PSP V	Power steering pressure switch signal voltage	V	×	×
RDEF	Rear window defroster switch	ON/OFF	×	×
RPM	Engine speed	rpm	×	×
SHORTFT1	Bank 1 desired open loop equivalence ratio	%	×	×

Monitor item	Full name	Unit/Condition	Application	
			MTX	ATX
SPRKADV	Spark advance	BTDC	×	×
SS1	Shift solenoid 1	ON/OFF		×
SS1F	Shift solenoid 1 (Failed detected)	YES/NO		×
SS2	Shift solenoid 2	ON/OFF		×
SS2F	Shift solenoid 2 (Failed detected)	YES/NO		×
TCC	Torque converter clutch solenoid	%		×
TCCF	Torque converter clutch solenoid (Failed detected)	YES/NO		×
TCCMACT	Absolute slip of torque converter clutch	rpm		×
TCCMCMD	Desired slip of torque converter clutch	rpm		×
TCCRAT	Speed ratio across torque converter (Output/Input)	ratio		×
TCIL	O/D OFF indicator light	ON/OFF		×
TCIL	O/D OFF indicator light	ON/OFF		×
TCILF	O/D OFF indicator light (Failed detected)	YES/NO		×
TCS	O/D OFF switch	ON/OFF		×
TFT	Transaxle fluid temperature	°C/°F		×
TFT V	Transaxle fluid temperature signal voltage	V		×
TP MODE	Throttle position (Mode)	MODE	×	×
TP V	Throttle position sensor signal voltage	V	×	×
TPREL	Closed throttle position signal voltage	V	×	×
TR	Transaxle range position (Mode)	MODE		×
TRV	Neutral switch (MTX), TR switch (ATX) signal voltage	V	×	×
TRANRAT	Transaxle gear ratio	ratio		×
TRIP	OBD II drive cycle status	YES/NO	×	×
TRIPCNT	Number of OBD II drive cycle completed	#	×	×
TSS	Turbine shaft speed	rpm		×
TSS/ISS	Turbine/Input shaft speed	rpm		×
VPWR	Battery positive voltage	V	×	×
VSS	Vehicle speed	km/h, mph	×	×
WAC	A/C relay	ON/OFF	×	×
WACF	A/C relay (Failed detected)	YES/NO	×	×

PID/DATA MONITOR table (Reference)

Monitor item	Unit	Reference Value/Condition	Action	PCM terminal
ACCS	ON/OFF	A/C switch ON: ON Others: OFF	Inspect climate control unit (See07-40-22 CLIMATE CONTROL UNIT INSPECTION)	41
BLWMTR	ON/OFF	Fan switch ON at 3rd or higher: ON Others: OFF	Inspect fan switch (See07-40-21 FAN SWITCH INSPECTION	10
BOO	ON/OFF	Brake pedal depressed: ON Others: OFF	Inspect brake switch (See 04-11-6 BRAKE SWITCH INSPECTION)	92
CCS	kPa/psi	Indicates pressure required for 3-2 timing coasting clutch solenoid valve	Inspect 3-2 timing coasting clutch solenoid (See05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	102
CLT V	V	Clutch pedal depressed :0 V Clutch pedal released : B+	Inspect Clutch switch (See01-40A-42 CLUTCH SWITCH INSPECTION [FS])	30
CPP/PNP	ON/OFF	Shift lever in neutral position : ON (MTX) Shift lever in P or N position : ON (ATX) Others: OFF	MTX: Inspect clutch switch. (See01-40A-42 CLUTCH SWITCH INSPECTION [FS]) ATX: Inspect TR switch (See05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	64
DRIVECT	#	Indicates total number of OBD II drive mode completed	—	—
DRLMP	ON/OFF	Daytime running lights ON: ON (For CANADA) Others: OFF	Inspect CPU. (See09-40-1 CPU INSPECTION	14
DTC CNT	#	Indicates total number of diagnostic trouble codes (DTC) stored in PCM (Includes pending codes)	—	—
DTCCNTD	#	Indicates total number of diagnostic trouble codes (DTC) (Excludes pending codes)	—	—
ECT	°C/°F	Indicates engine coolant temperature	Inspect ECT sensor (See01-40A-34 ENGINE COOLANT TEMPERATURE SENSOR INSPECTION [FS])	38
ECT V	V	Engine coolant temperature 20°C {68°F}: Approx. 3.1 V After warm up: Below 1.0 V	Inspect ECT sensor (See01-40A-34 ENGINE COOLANT TEMPERATURE SENSOR INSPECTION [FS])	38
EGR	kPa/psi	Indicates barometric pressure (Except during OBD II EGR monitor testing)	Inspect EGR boost sensor (See01-40A-37 EGR BOOST SENSOR INSPECTION [FS])	34
EGRBARO	ON/OFF	During OBD II EGR monitor testing: OFF Others: ON	Inspect EGR boost solenoid valve (See01-16-17 EGR BOOST SOLENOID VALVE INSPECTION)	—
EGRCD1	ON/OFF	Ignition switch ON: OFF Idle: OFF	Verify PIDs (MAF,CPP/PNP, RPM, TP MODE, VSS)	68
EGRCD2	ON/OFF	Ignition switch ON: OFF Idle: ON	Verify PIDs (MAF, CPP/PNP, RPM, TP MODE, VSS)	72
EGRCD3	ON/OFF	Ignition switch ON: OFF Idle: OFF	Verify PIDs (MAF, CPP/PNP, RPM, TP MODE, VSS)	46
EGRCD4	ON/OFF	Ignition switch ON: OFF Idle: ON	Verify PIDs (MAF,CPP/PNP, RPM, TP MODE, VSS)	56
EPC	kPa/psi	Idle (After warm up): 0—5 kPa {0—0.7 psi}	Verify PIDs (MAF,CPP/PNP, RPM, TP MODE, VSS) (See05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	81

Monitor item	Unit	Reference Value/Condition	Action	PCM terminal
EPC V	V	Idle (After warm up): Approx. 8 V	Verify PIDs (MAF,CPP/PNP, RPM, TP MODE, VSS) (See05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	81
EVAPCPF	YES/NO	Purge solenoid valve circuit failed: YES Others: NO	Inspect purge solenoid valve (See01-16-12 PURGE SOLENOID VALVE INSPECTION)	—
EVAPCV	%	Ignition switch ON: 0% During OBD II evaporative monitor testing: 100%	Inspect CDCV (See01-16-11 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION)	18
EVAPCVF	YES/NO	CDCV circuit failed: YES Other: NO	Inspect CDCV (See01-16-11 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION)	—
EVAPPDC	%	Indicates purge solenoid valve opening value	Inspect purge solenoid valve (See01-16-12 PURGE SOLENOID VALVE INSPECTION)	67
FLI	%	Indicates fuel tank level	Inspect fuel gauge sender unit (See09-22-9 FUEL GAUGE SENDER UNIT INSPECTION)	63
FLI V	V	Full fuel: Approx. 6 V	Inspect fuel gauge sender unit (See09-22-9 FUEL GAUGE SENDER UNIT INSPECTION)	63
FP	%	Ignition switch ON: 0% Cranking or idling: 100% (Fuel pump relay ON)	Inspect fuel pump relay (See01-14-29 FUEL PUMP RELAY INSPECTION)	70*1,80*2
FP M	ON/OFF	Ignition switch ON: OFF Cranking or idling: ON	Inspect fuel pump relay (See01-14-29 FUEL PUMP RELAY INSPECTION)	70*1,80*2
FPF	YES/NO	Fuel pump relay circuit failed: YES Others: NO	Inspect fuel pump relay (See01-14-29 FUEL PUMP RELAY INSPECTION)	—
FPRC	ON/OFF	Ignition switch ON: ON Idle (After warm up): OFF Idle (Hot start): ON	Inspect PRC solenoid valve. (See01-14-28 PRC SOLENOID VALVE INSPECTION)	19
FTP	kPa/psi	Fuel tank pressure 0 kPa {0 psi}: 0 kPa {0 psi}	Inspect fuel tank pressure sensor. (See01-40A-38 FUEL TANK PRESSURE SENSOR INSPECTION [FS])	62
FTP V	V	Fuel tank pressure 0 kPa {0 psi}: 2.42—2.58V	Inspect fuel tank pressure sensor. (See01-40A-38 FUEL TANK PRESSURE SENSOR INSPECTION [FS])	62
FUELPW1	ms	Idle (After warm up): 2.0—4.0 msec.	Inspect fuel injector. (See01-14-20 FUEL INJECTOR INSPECTION)	75, 101, 74, 100
GEAR	Gear position	Indicates gear position	–	1, 27, 102
HDLMP	ON/OFF	Headlights ON: ON Others: OFF	Inspect light switch (See09-18-7 LIGHT SWITCH INSPECTION)	49
HFC	ON/OFF	Condenser fan operating: ON Others: OFF	Verify PID (ECT)	17
HFCF	YES/NO	Condenser fan relay circuit failed: YES Others: NO	Inspect condenser fan relay. (See07-40-19 A/C RELAY, BLOWER RELAY, AND CONDENSER FAN RELAY INSPECTION)	—
HTR11	YES/NO	Heated oxygen sensor heater (Front) ON: YES Others: NO	Verify PID (IAT)	93
HTR11F	YES/NO	Heated oxygen sensor heater (Front) failed: YES Others: NO	Inspect heated oxygen sensor (Front) (See01-40A-36 HEATED OXYGEN SENSOR INSPECTION [FS])	—

Monitor item	Unit	Reference Value/Condition	Action	PCM terminal
HTR12	YES/NO	Heated oxygen sensor heater (Rear) ON: YES Others: NO	Verify PID (IAT)	95
HTR12F	YES/NO	Heated oxygen sensor heater (Rear) failed: YES Others: NO	Inspect heated oxygen sensor (Rear (See01-40A-36 HEATED OXYGEN SENSOR INSPECTION [FS])	—
IAC	%	Ignition switch ON: 0 % Idle (After warm up): Approx. 40 % (Indicates IAC valve opening value)	Verify PID (MAF)	20, 83
IACF	YES/NO	IAC valve circuit failed: YES Others: NO	Inspect IAC inspection (See01-13A-8 IDLE AIR CONTROL (IAC) VALVE INSPECTION [FS])	—
IAT	°C/°F	Indicates intake air temperature	Inspect IAT sensor (See01-40A-35 INTAKE AIR TEMPERATURE SENSOR INSPECTION [FS])	39
IAT V	V	Intake air temperature 20°C {68°F}: Approx. 3.1 V	Inspect IAT sensor (See01-40A-35 INTAKE AIR TEMPERATURE SENSOR INSPECTION [FS])	39
IMRC	OPEN/CLS	Engine coolant temperature above 65°C {149°F} while idling: OPEN Engine coolant temperature below 65°C {149°F} and engine speed at 1,500 rpm: CLS	Verifi PID (ECT, RPM)	42
IMRCF	YES/NO	VTCS solenoid valve circuit failed: YES Others: NO	Inspect VTCS solenoid valve (See01-13A-13 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SOLENOID VALVE INSPECTION [FS])	—
INJ1F	YES/NO	Fuel injector #1 circuit failed: YES Others: NO	Inspect fuel injector (See 01-14-20 FUEL INJECTOR INSPECTION)	—
INJ2F	YES/NO	Fuel injector #2 circuit failed: YES Others: NO	Inspect fuel injector (See01-14-20 FUEL INJECTOR INSPECTION)	—
INJ3F	YES/NO	Fuel injector #3 circuit failed: YES Others: NO	Inspect fuel injector (See01-14-20 FUEL INJECTOR INSPECTION)	—
INJ4F	YES/NO	Fuel injector #4 circuit failed: YES Others: NO	Inspect fuel injector (See01-14-20 FUEL INJECTOR INSPECTION)	—
LFC	ON/OFF	Cooling fan operating: ON Others: OFF	Verify PID (ECT)	45
LFCF	YES/NO	Cooling fan relay circuit failed: YES Others: NO	Inspect cooling fan relay. (See07-40-19 A/C RELAY, BLOWER RELAY, AND CONDENSER FAN RELAY INSPECTION)	—
LOAD	%	Idle (After warm up): Approx. 15 % (MTX) Approx. 18 % (ATX)	Inspect knock sensor (See01-40A-30 KNOCK SENSOR INSPECTION [FS])	—
LONGFT1	%	Idle (After warm up): +5 %— -5 %	—	—
LOOP	OPEN/CLS	During feedback control: CLOSED Others: OPEN	—	—
MAF	g/s, lb/min	650—750 rpm: 1.9—3.0 g/s {0.25—0.39 lb/min} (MTX), 2.2—3.1 g/s {0.29—0.40 lb/min} (ATX) 2,460—2,540 rpm: 6.7—9.1 g/s {0.89—1.20 lb/min} (MTX), 8.7—9.8 g/s {1.15—1.29 lb/min} (ATX)	Inspect MAF sensor (See01-40A-29 MASS AIR FLOW SENSOR INSPECTION [FS])	88

Monitor item	Unit	Reference Value/Condition	Action	PCM terminal
MAF V	V	650—750 rpm (After warm up): 0.5—1.1 V	Inspect MAF sensor (See01-40A-29 MASS AIR FLOW SENSOR INSPECTION [FS])	88
MIL	ON/OFF	MIL ON: ON Others: OFF	Inspect MIL circuit	2
MILF	YES/NO	MIL circuit failed: YES Others: NO	Inspect MIL circuit	—
MISF	ON/OFF	When misfire detected: ON Others: OFF	Verify DTC (See01-02A-24 DTC TABLE [FS])	—
O2S11	V	Idle (After warm up): 0.1—0.9 V	Inspect heated oxygen sensor (Front) (See01-40A-36 HEATED OXYGEN SENSOR INSPECTION [FS])	60
O2S12	V	Idle (After warm up): 0.1—0.9 V	Inspect heated oxygen sensor (Rear) (See01-40A-36 HEATED OXYGEN SENSOR INSPECTION [FS])	35
PIP	ON/OFF	Idle: ON⇔OFF	Inspect CMP sensor. (See01-40A-30 CAMSHAFT POSITION SENSOR INSPECTION [FS])	21, 22
PSP	ON/OFF	Power steering operating: ON Others: OFF	Inspect power steering pressure switch (See01-40A-40 POWER STEERING PRESSURE SWITCH INSPECTION [FS])	31
PSP V	V	Power steering operating: 0 V Others: Approx. 4.0 V	Inspect power steering pressure switch (See01-40A-40 POWER STEERING PRESSURE SWITCH INSPECTION [FS])	31
RDEF	ON/OFF	Rear window defroster ON: ON Others: OFF	Inspect climate control unit (See07-40-22 CLIMATE CONTROL UNIT INSPECTION)	66
RPM	rpm	Idle (After warm up): 550—850 (700 ± 150) rpm (MTX), 500—800 (650 ± 150) rpm (ATX)	Inspect CKP sensor. (See01-40A-31 CRANKSHAFT POSITION SENSOR INSPECTION [FS])	21, 22
SHORTFT 1	%	Idle: + 20 %— -20 %	—	—
SPRKADV	BTDC	Idle (After warm up): 6—18° (12 ± 6°)	Inspect CKP sensor. (See01-40A-31 CRANKSHAFT POSITION SENSOR INSPECTION [FS])	26, 52
SS1	ON/OFF	In 1st gear or 4th gear: ON Others: OFF	Inspect shift solenoid 1. (See05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	27
SS1F	YES/NO	Shift solenoid 1 circuit failed: YES Others: NO	Inspect shift solenoid 1. (See05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	—
SS2	ON/OFF	In 1st gear or 2nd gear: ON Others: OFF	Inspect shift solenoid 2. (See05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	1
SS2F	YES/NO	Shift solenoid 2 circuit failed: YES Others: NO	Inspect shift solenoid 2. (See05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	—
TCC	%	Indicates TCC solenoid valve control duty value	Inspect TCC solenoid. (See05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	54
TCCF	YES/NO	Torque converter clutch solenoid circuit failed: YES Others: NO	Inspect shift solenoid 1 (See05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	—
TCCMACT	rpm	Idle (After warm up): Approx. 250 rpm	—	54
TCCMCMD	rpm	Idle (After warm up): Approx. 250 rpm	—	—
TCCRAT	ratio	Speed ratio across torque converter (Output/Input)	—	—

Monitor item	Unit	Reference Value/Condition	Action	PCM terminal
TCIL	ON/OFF	O/D OFF indicator light ON: ON Others: OFF	Inspect O/D OFF switch (See05-17A-32 O/D OFF SWITCH INSPECTION [LA4A-EL])	79
TCILF	YES/NO	O/D OFF indicator light circuit failed: YES Others: NO	Inspect instrument cluster (See09-22-2 INSTRUMENT CLUSTER INSPECTION)	—
TCS	ON/OFF	While O/D OFF switch is being pushed : ON Others: OFF	Inspect O/D OFF switch (See05-17A-32 O/D OFF SWITCH INSPECTION [LA4A-EL])	29
TFT	°C/°F	Indicates transaxle fluid temperature	Inspect TFT sensor. (See05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	37
TFT V	V	After warm up: Approx. 1.9 V	Inspect TFT sensor. (See05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	37
TP MODE	C/T, P/T, WOT	Close throttle position: C/T Half throttle position: P/T Wide open throttle: WOT	Inspect TP sensor. (See01-40A-32 THROTTLE POSITION SENSOR INSPECTION [FS])	89
TP V	V	Closed throttle position: 0.3—0.7 V Wide open throttle: 3.4—5.3 V	Inspect TP sensor. (See01-40A-32 THROTTLE POSITION SENSOR INSPECTION [FS]	89
TPREL	V	Idle: Approx. 0.5 V	Inspect TP sensor. (See01-40A-32 THROTTLE POSITION SENSOR INSPECTION [FS])	89
TR	MODE	Selector lever in P position: PARK Selector lever in R position: REV Selector lever in N position: NTRL Selector lever in D range and O/D ON: O/D Selector lever in D range and O/D OFF: DRIVE Selector lever in 2 range: MAN2 Selector lever in 1 range: MAN1	Inspect TR switch (See05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	—
TR V	V	Neutral shift position: below 1.0 V (MTX) Others: B+ (MTX) P range position: 4.5V (ATX) N range position: 2.9V (ATX)	Inspect TR switch (See05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	64
TRANRAT	ratio	Indicates transaxle gear ratio	—	—
TRIP	YES/NO	OBD II trip cycle completed: YES Others: NO	—	—
TRIPCNT	#	Indicates the total number of OBD II trip cycle completed	—	—
TSS	rpm	Idle (After warm up): Approx. 620 rpm	Inspect turbine shaft speed sensor (See05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	84
TSS/ISS	rpm	Idle (After warm up): Approx. 620 rpm	Inspect turbine shaft speed sensor (See05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	—
VPWR	V	Approx. 13 V	—	71, 97
VSS	km/h, mph	Indicates vehicle speed	Inspect VSS sensor (See05-17A-32 VEHICLE SPEEDOMETER SENSOR INSPECTION [LA4A-EL])	33, 58
WAC	ON/OFF	A/C relay ON: ON Others: OFF	Inspect climate control unit (See07-40-22 CLIMATE CONTROL UNIT INSPECTION)	69

Monitor item	Unit	Reference Value/Condition	Action	PCM terminal
WACF	YES/NO	A/C relay circuit failed: YES others: NO	Inspect A/C relay (See07-40-19 A/C RELAY, BLOWER RELAY, AND CONDENSER FAN RELAY INSPECTION)	—

*1 : With immobilizer system

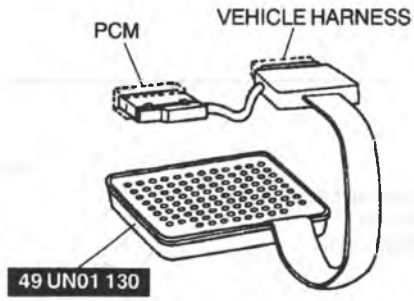
*2 : Without immobilizer system

MASS AIR FLOW SENSOR INSPECTION [FS]

Z6U014013210W01

Using the SST (104 Pin Breakout Box)

1. Check the mass air flow sensor for damage and cracks.
   - If there is damage or cracks, replace mass air flow sensor.
2. Disconnect the PCM connector. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS].)
3. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



Z6U0102W197

4. Tighten the connector bolt.

   Tightening torque
   7.9—10.7 N·m {80—110 kgf·m, 69.5—95.4 in·lbf}

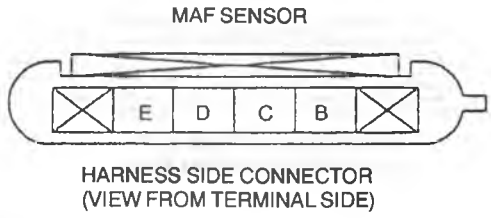
5. Measure the voltage at the PCM terminal 88 as shown in the table.
   - If not as specified, inspect the following harness continuity and terminal voltage.

Specification

Measuring condition	Voltage (V)
Ignition switch ON	Approx. 0.02
Idle	0.5—1.1

   a. Harness continuity
      - Between PCM terminal 88 and mass air flow sensor terminal E
      - Between PCM terminal 36 and mass air flow sensor terminal D
      - Between PCM terminal 103 and mass air flow sensor terminal C
      - Between main relay terminal E and mass air flow sensor terminal B

   b. Terminal voltage
      - Mass air flow sensor terminal B voltage: Battery positive voltage
      - Mass air flow sensor terminal C voltage: Below 1.0 V

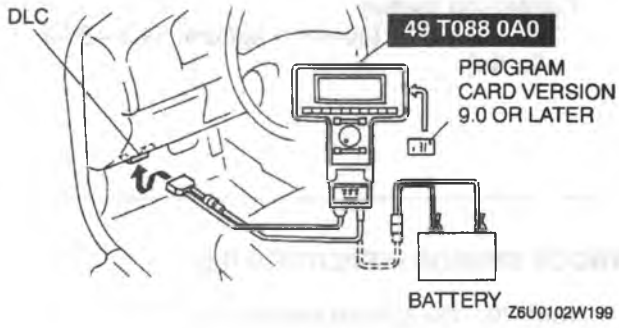


Z6U0102W198

6. If the terminal voltage is correct and there is harness continuity, replace the mass air flow sensor. (See 01-13A-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)

Using the SSTs (NGS Tester)

1. Check the mass air flow sensor for damage and cracks.
2. Connect the **SSTs** (NGS tester) to the data link connector.



Z6U0102W199

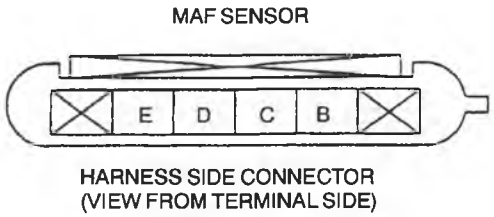
3. Turn the ignition switch to ON.
4. Select the "PID/DATA MONITOR AND RECORD" function on the NGS tester display and press TRIGGER.
5. Select "MAF V" on the NGS tester display and press START. The NGS tester measures and shows the voltage.
   - If not as specified, perform the MAF sensor circuit open/short inspection.

Specification

Measuring condition	Voltage (V)
Ignition switch ON	Approx. 0.02
Idle	0.5—1.1

a. Harness continuity
   - Between PCM terminal 88 and mass air flow sensor terminal E
   - Between PCM terminal 36 and mass air flow sensor terminal D
   - Between PCM terminal 103 and mass air flow sensor terminal C
   - Between main relay terminal E and mass air flow sensor terminal B

b. Terminal voltage
   - Mass air flow sensor terminal B voltage: Battery positive voltage
   - Mass air flow sensor terminal C voltage: Below 1.0 V



Z6U0102W198

6. If the terminal voltage is correct and there is harness continuity, replace the mass air flow sensor. (See 01-13A-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)

MAF rate and load valve

Note
- The NGS shows the mass air flow rate and load value.

Specification

Engine speed (rpm)	Intake mass air flow (g/s {lb/min})		Engine load calculated value (%)	
	MTX	ATX	MTX	ATX
650—750 (Idle)	1.9—3.0 {0.25—0.39}	2.2—3.1 {0.29—0.40}	15.0—19.0	18.0—23.0
2,460—2,540*	6.7—9.1 {0.89—1.20}	8.7—9.8 {1.15—1.29}	14.0—18.0	17.0—20.0

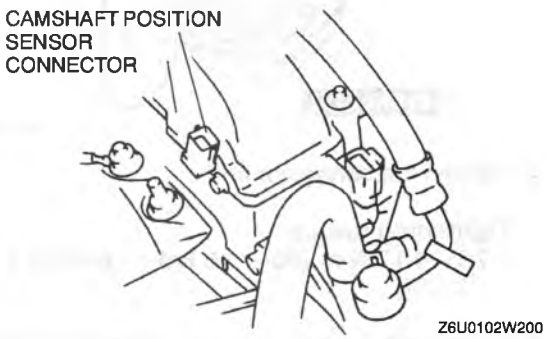
* : No load, in neutral

CAMSHAFT POSITION SENSOR INSPECTION [FS]

1. Disconnect the camshaft position sensor connector.
2. Measure the resistance between terminals A and B by using an ohmmeter.
   - If not as specified, check related wiring harness. If they are okay, replace the camshaft position sensor.

Tightening torque
7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}

Z6U014018200W01



Z6U0102W200

Specification
Approx. 0.95—1.25 kΩ

KNOCK SENSOR INSPECTION [FS]

1. Verify that the ignition switch is at OFF.
2. Disconnect knock sensor connector.
3. Measure the resistance between knock sensor terminal and the knock sensor body by using an ohmmeter.

Z6U014018921W01

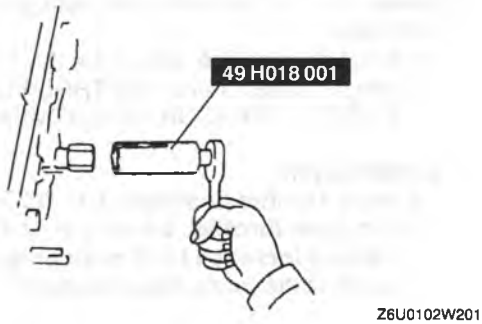
- If not as specified, replace the knock sensor. (See 01-40A-31 KNOCK SENSOR REPLACEMENT [FS].)

Specification
Approx. 560 kΩ [20°C {68°F}]

KNOCK SENSOR REPLACEMENT [FS]

Z6U014018921W02

1. Remove the oil filter element.
2. Use the **SST** to remove and install the knock sensor (located above oil filter).



Z6U0102W201

Tightening torque
19.6—34.3 N·m {2.0—3.5 kgf·m, 15—25 ft·lbf}

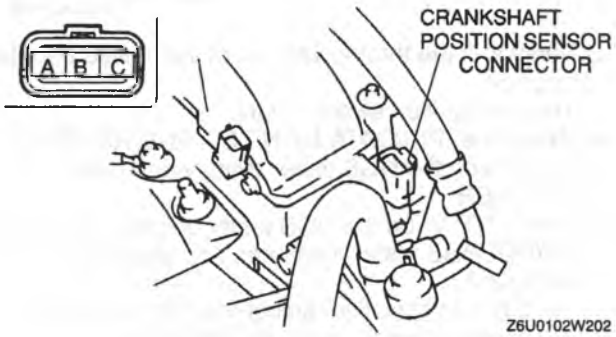
3. Install the oil filter element.

CRANKSHAFT POSITION SENSOR INSPECTION [FS]

Z6U014018230W01

Inspection of Resistance

1. Disconnect the battery negative cable.
2. Disconnect the crankshaft position sensor connector.
3. Measure the resistance between terminals A and B by using an ohmmeter.
   - If not as specified, check related wiring harness. If they are okay, replace the crankshaft position sensor. (See 01-40A-31 CRANKSHAFT POSITION SENSOR REPLACEMENT [FS].)

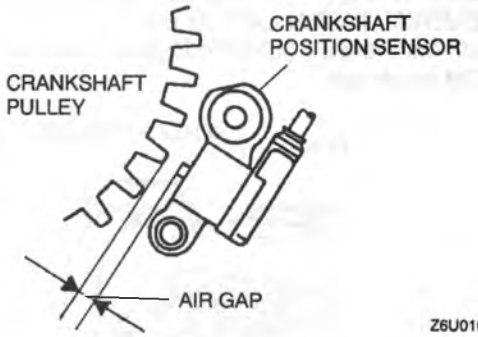


Z6U0102W202

Specification
Approx. 550 Ω

Inspection of Air Gap

1. Verify that the crankshaft position sensor is installed correctly and securely.
2. Measure the air gap between the crankshaft pulley teeth and the crankshaft position sensor by using a feeler gauge.
   - If not as specified, replace the crankshaft pulley or the crankshaft position sensor. (See 01-40A-31 CRANKSHAFT POSITION SENSOR REPLACEMENT [FS].)



Z6U0102W203

Specification
0.5—1.5 mm {0.020—0.059 in}

CRANKSHAFT POSITION SENSOR REPLACEMENT [FS]

Z6U014018230W02

1. Disconnect the negative battery cable.
2. Disconnect the crankshaft position sensor connector.
3. Remove the crankshaft position sensor.
4. Install in the reverse order of removal.

Tightening torque
7.9—10.7 N·m {80—100 kgf·cm, 69.5—95.4 in·lbf}

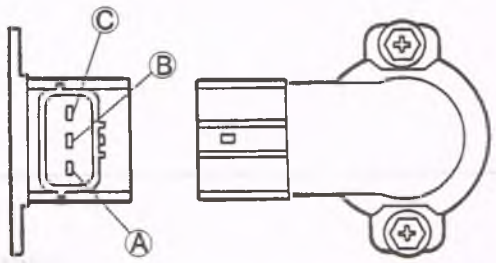
5. Inspect the air gap. (See 01-40A-31 Inspection of Air Gap.)

THROTTLE POSITION SENSOR INSPECTION [FS]

Z6U014018910W01

Inspection of Resistance

1. Disconnect the battery negative cable.
2. Disconnect the throttle position sensor connector.
3. Using an ohmmeter, measure the resistance between throttle position sensor terminals A and C.
   - If not as specified, replace the throttle position sensor.



Z6U0102W204

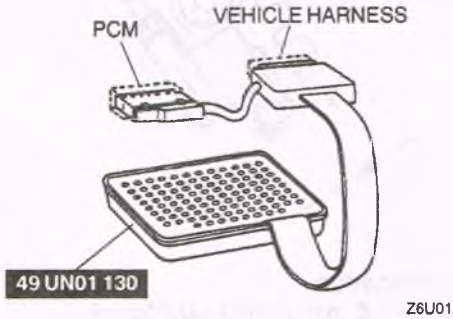
Specification
4.0—6.0 kΩ

4. Reconnect the throttle position sensor connector.

Inspection of Output Voltage

Using the SST (104 pin breakout box)

1. Disconnect the PCM connector. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



Z6U0102W205

3. Tighten the connector attaching screws.

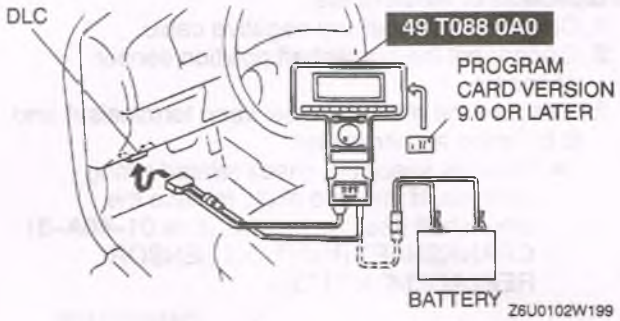
Tightening torque
7.9—10.7 N·m {80—100 kgf·cm, 69.5—95.4 in·lbf}

4. Verify that the throttle valve is at the closed throttle position.
5. Turn the ignition switch to ON.
6. Measure the PCM terminal 89 voltage by using a voltmeter.
   - If not as specified, adjust the throttle position sensor. (See 01-40A-33 THROTTLE POSITION SENSOR ADJUSTMENT [FS].)

Specification
Closed throttle position: 0.3—0.7 V
Wide open throttle: 3.4—5.3 V (Verify that the voltage increase is directly proportioned to the throttle valve opening angle.)

Using the SSTs (NGS tester)

1. Connect the **SSTs** (NGS tester) to the data link connector.



Z6U0102W199

2. Verify that the throttle valve is at the closed throttle position.
3. Turn the ignition switch to ON.
4. Select the "PID/DATA MONITOR AND RECORD" function on the NGS tester display and press TRIGGER.
5. Select "TP V" on the NGS tester display and press START. NGS tester measures and shows the voltage.
   - If not as specified, adjust the throttle position sensor. (See 01-40A-33 THROTTLE POSITION SENSOR ADJUSTMENT [FS].)

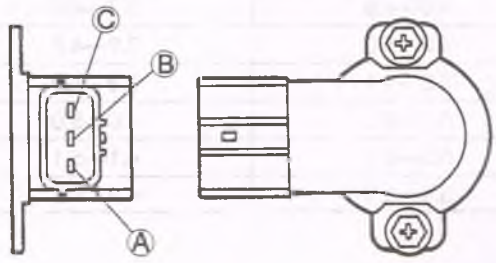
Specification
Closed throttle position: 0.3—0.7 V
Wide open throttle: 3.4—5.3 V (Verify that the voltage increase is directly proportioned to the throttle valve opening angle.)

THROTTLE POSITION SENSOR ADJUSTMENT [FS]

Z6U014018910W02

Caution
- **The throttle position sensor is adjusted at the factory before shipment. Unnecessary adjustment will negatively affect the engine performance.**
- **Adjusting the throttle position sensor by using the throttle adjusting screw (TAS) will negatively affect the engine performance.**

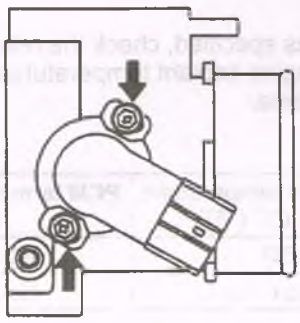
1. Verify that the throttle valve is at the closed throttle position.
2. Disconnect the throttle position sensor connector.
3. Turn the ignition switch to ON.
4. Measure the voltage at harness side connector terminal A by using a voltmeter and record it.



Z6U0102W206

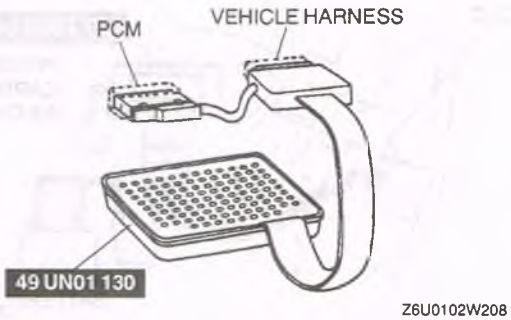
Specification
4.5—5.5 V

5. Turn the ignition switch to OFF.
6. Connect the throttle position sensor connector.
7. Loosen the attaching screws.



Z6U0102W207

8. If the **SST** (104 Pin Breakout Box) is used, check in the following order.
   (1) Disconnect the PCM connector. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS].)
   (2) Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



Z6U0102W208

   (3) Tighten the connector bolt.

Tightening torque
7.9—10.7 N·m {80—100 kgf·cm, 69.5—95.4 in·lbf}

   (4) Verify that the throttle valve is at the closed throttle position.
   (5) Turn the ignition switch to ON.
   (6) Rotate the throttle linkage by hand and adjust the PCM terminal 89 voltage to specification.

Specification (At closed throttle position)

Voltage at step 4 (V)	PCM terminal 89 voltage (V)
4.5—4.9	0.4—0.5
4.9—5.1	0.4—0.6
5.1—5.5	0.5—0.6

   (7) Tighten the attaching screws.

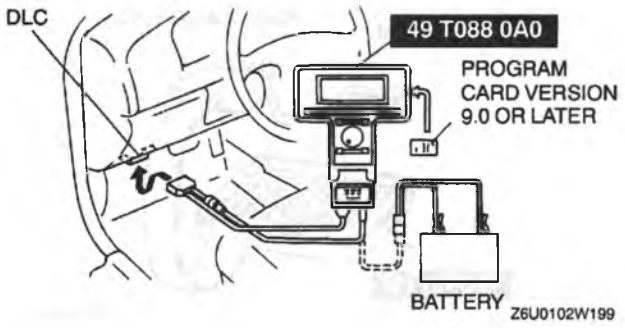
Tightening torque
1.6—2.3 N·m {16—24 kgf·cm, 14—21 in·lbf}

   (8) When the throttle valve is at the wide open throttle, verify that the PCM terminal 89 voltage is in the specification.
   - If not as specified, check related wiring harness.
   - If they are okay, replace the throttle body. (See 01-13A-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)

Specification (At wide open throttle)

Voltage at step 4 (V)	PCM terminal 89 voltage (V)
4.5—4.7	3.5—4.4
4.7—4.8	3.6—4.5
4.8—4.9	3.7—4.6
4.9—5.0	3.7—4.8
5.0—5.1	3.8—4.9
5.1—5.3	4.0—5.0
5.3—5.4	4.1—5.1
5.4—5.5	4.2—5.2

9. If the **SSTs** (NGS tester) are used, check in the following order.
   (1) Connect the **SSTs** (NGS tester) to the data link connector.



   (2) Verify that the throttle valve is at the closed throttle position.
   (3) Turn the ignition switch to ON.
   (4) Select the "PID/DATA MONITOR AND RECORD" function on the NGS tester display and press TRIGGER.
   (5) Select "TP V" on the NGS tester display and press START. The NGS tester measures and shows the voltage.

Specification (At closed throttle position)

Voltage at step 4 (V)	"TP V" voltage (V)
4.5—4.9	0.4—0.5
4.9—5.1	0.4—0.6
5.1—5.5	0.5—0.6

   (6) Tighten the attaching screws.

Tightening torque
1.6—2.3 N·m {16—24 kgf·cm, 14—21 in·lbf}

   (7) When the throttle valve is at the wide open throttle, verify that the "TP V" voltage is in the specification.
   - If not as specified, check related wiring harness.
   - If they are okay, replace the throttle body. (See 01-13A-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)

Specification (At wide open throttle)

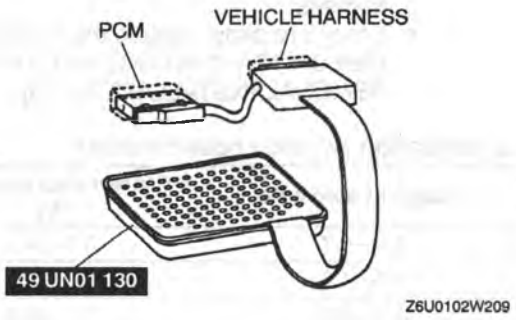
Voltage at step 4 (V)	"TP V" voltage (V)
4.5—4.7	3.5—4.4
4.7—4.8	3.6—4.5
4.8—4.9	3.7—4.6
4.9—5.0	3.7—4.8
5.0—5.1	3.8—4.9
5.1—5.3	4.0—5.0
5.3—5.4	4.1—5.1
5.4—5.5	4.2—5.2

ENGINE COOLANT TEMPERATURE SENSOR INSPECTION [FS]

Z6U014018840W01

Inspection of Output Voltage
Using the SST (104 pin breakout box)

1. Disconnect the PCM connector. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



3. Tighten the connector bolt.

Tightening torque
7.9—10.7 N·m {80—100 kgf·cm, 69.5—95.4 in·lbf}

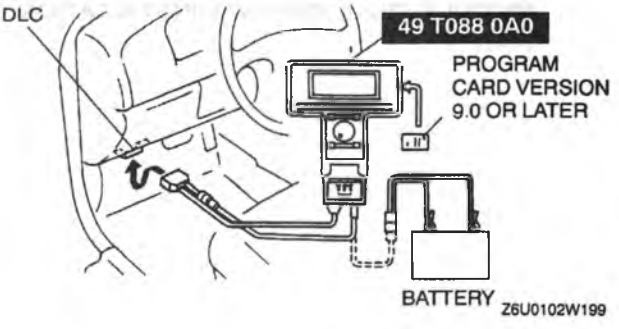
4. Turn the ignition switch to ON.
5. Measure the voltage at PCM terminal 38.
   - If not as specified, check the related harness and engine coolant temperature sensor resistance.

Specification

Engine coolant temperature condition (°C {°F})	PCM terminal 38 voltage (V)
20 {68}	Approx. 3.1
After warm up	Below 1.0

Using the SSTs (NGS tester)

1. Connect the **SSTs** (NGS tester) to the data link connector.



2. Turn the ignition switch to ON.
3. Select the "PID/DATA MONITOR AND RECORD" function on the NGS tester display and press TRIGGER.
4. Select "ECT V" on the NGS tester display and press START. The NGS tester measures and shows the voltage.
   - If not as specified, check the related harness and engine coolant temperature sensor resistance.

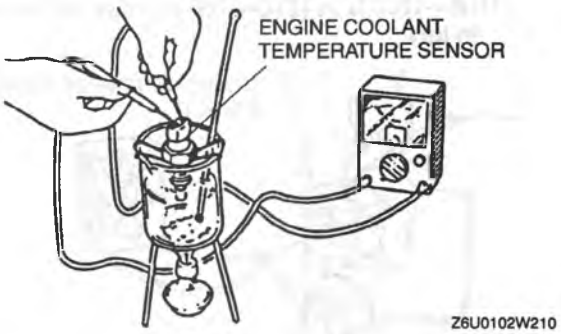
Specification

Engine coolant temperature condition (°C {°F})	"ECT V" voltage (V)
20 {68}	Approx. 3.1
After warm up	Below 1.0

Inspection of Resistance

1. Remove the engine coolant temperature sensor.
2. Place the engine coolant temperature sensor in water with a thermometer, and heat the water gradually.
3. Measure the resistance of the sensor by using an ohmmeter.
   - If not as specified, replace the engine coolant temperature sensor.

Tightening torque
15.7—23.5 N·m {1.6—2.4 kgf·m, 11.6—17.3 ft·lbf}



Z6U0102W210

Specification

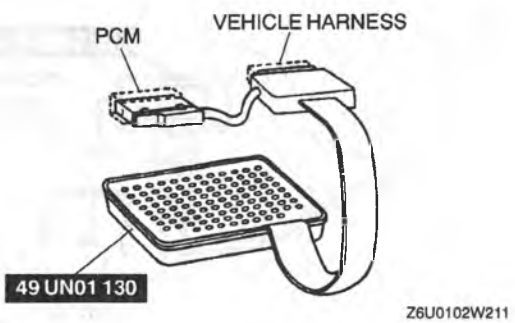
Water temperature (°C {°F})	Resistance (kΩ)
20 {68}	35.5—39.2
60 {140}	7.18—7.92

INTAKE AIR TEMPERATURE SENSOR INSPECTION [FS]

Z6U014018845W01

Inspection of Output Voltage
Using the SST (104 pin breakout box)

1. Disconnect the PCM connector. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



Z6U0102W211

3. Tighten the connector bolt.

Tightening torque
7.9—10.7 N·m {80—100 kgf·cm, 69.5—95.4 in·lbf}

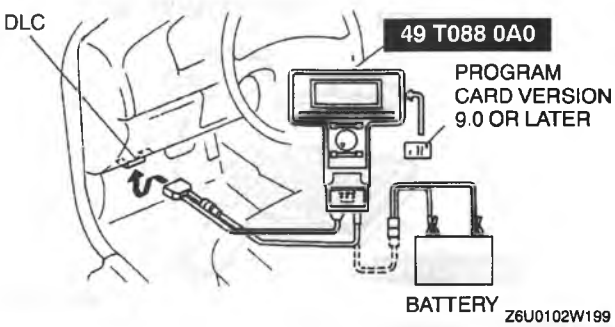
4. Turn the ignition switch to ON.
5. Measure the voltage at PCM terminal 39.
   - If not as specified, check the related harness and intake air temperature sensor resistance.

Specification

Intake air temperature condition (°C {°F})	PCM terminal 39 voltage (V)
20 {68}	Approx. 3.1

Using the SSTs (NGS tester)

1. Connect the **SSTs** (NGS tester) to the data link connector.



Z6U0102W199

2. Turn the ignition switch to ON.
3. Select the "PID/DATA MONITOR AND RECORD" function on the NGS tester display and press TRIGGER.
4. Select "IAT V" on the NGS tester display and press START. The NGS tester measures and shows the voltage.
   - If not as specified, check the related harness and intake air temperature sensor resistance.

Specification

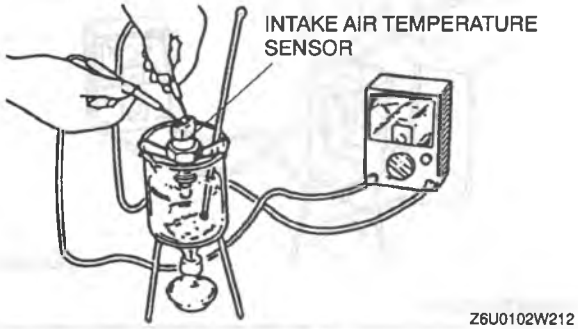
Intake air temperature condition (°C {°F})	"IAT V" voltage (V)
20 {68}	Approx. 3.1

Inspection of Resistance

1. Remove the intake air temperature sensor.
2. Place the intake air temperature sensor in water with a thermometer, and heat the water gradually.

3. Measure the resistance of the intake air temperature sensor by using an ohmmeter.
   - If not as specified, replace the intake air temperature sensor.

Tightening torque
10.8—16.2 N·m {110—166 kgf·cm, 95.5—144 in·lbf}



Z6U0102W212

Specification

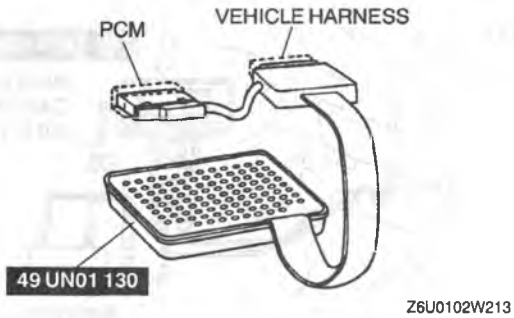
Water temperature (°C {°F})	Resistance (kΩ)
20 {68}	35.5—39.2
60 {140}	7.18—7.92

HEATED OXYGEN SENSOR INSPECTION [FS]

Z6U014018861W01

Heated Oxygen Sensor Inspection
Using the SST (104 pin breakout box)

1. Disconnect the PCM connector. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



Z6U0102W213

3. Tighten the connector bolt.

Tightening torque
7.9—10.7 N·m {80—100 kgf·cm, 69.5—95.4 in·lbf}

4. Warm up the engine to normal operating temperature.
5. Measure the voltage at PCM terminals 35 and 60.

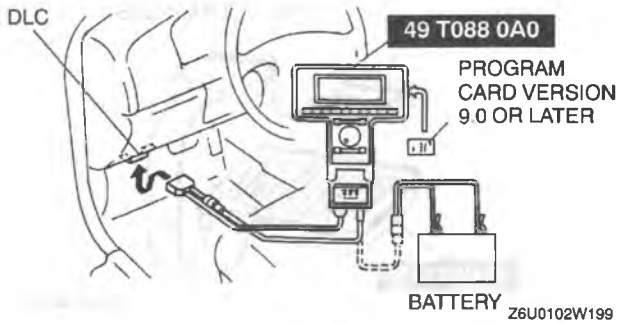
Specification

Engine condition		PCM terminal voltage (V)	
		60	35
		Heated oxygen sensor (Front)	Heated oxygen sensor (Rear)
IG-ON		Below 1.0	
Idle	After warm up	0.1—0.9	
	Engine cold	Below 0.5	Approx. 0
Deceleration		0—0.5	—
Acceleration		0.5—1.0	—

6. If not as specified, inspect the following.
   - Intake-air system
   - Fuel system
   - On-board diagnostic system
   - Related harnesses
7. If these systems are okay, replace the heated oxygen sensor. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [FS].)

Using the SSTs (NGS tester)

1. Connect the **SSTs** (NGS tester) to the data link connector.



Z6U0102W199

2. Select the "PID/DATA MONITOR AND RECORD" function on the NGS tester display and press TRIGGER.
3. Select "O2S11", and "O2S12" on the NGS tester display and press START. The NGS tester measures and shows the voltage.

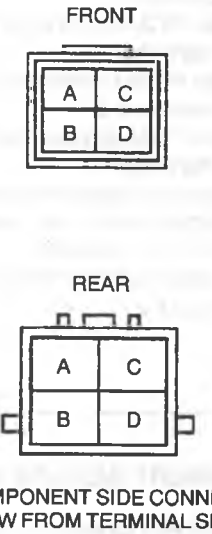
Specification

Engine condition		Voltage (V)	
		O2S11	O2S12
IG-ON		Below 1.0	
Idle	After warm up	0.1—0.9	
	Engine cold	Below 0.5	Approx. 0
Deceleration		0—0.5	—
Acceleration		0.5—1.0	—

4. If not as specified, inspect the following.
   - Intake-air system
   - Fuel system
   - On-board diagnostic system
5. If these systems are okay, replace the heated oxygen sensor. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [FS].)

Heated Oxygen Sensor Heater Inspection

1. Disconnect the heated oxygen sensor connector.
2. Measure the resistance between heated oxygen sensor terminals C and D by using an ohmmeter.
   - If not as specified, replace the heated oxygen sensor. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [FS].)
   - If okay, inspect related harness or connectors.



COMPONENT SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

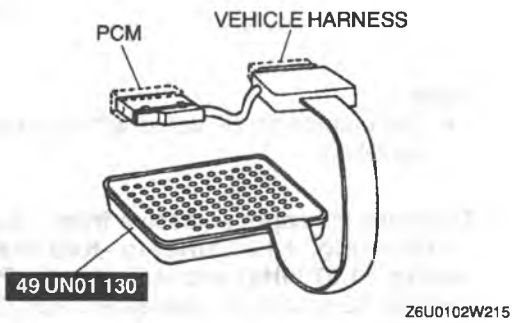
Z6U0102W214

Specification
Approx. 6 Ω

EGR BOOST SENSOR INSPECTION [FS]

Z6U014018211W01

1. Disconnect the PCM connector. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



Z6U0102W215

3. Tighten the connector bolt.

   Tightening torque
   7.9—10.7 N·m {80—100 kgf·cm, 69.5—95.4 in·lbf}

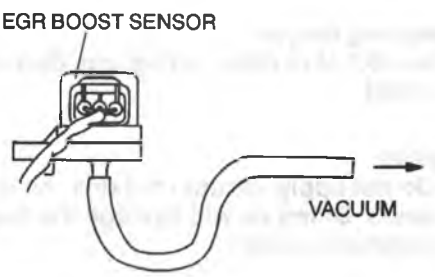
4. Turn the ignition switch to ON.

   Caution
   - **Do not apply a vacuum or pressure outside the specified limits. Doing so will damage the EGR boost sensor.**

5. Disconnect the vacuum hose between the EGR boost sensor and intake manifold.
6. Verify that the PCM terminal 34 voltage is as specified.
   Measuring condition
   - Input voltage: **4.5—5.5 V**
   - Outside temperature: **10—50°C {50—122°F}**
   - Sea level: **-200—3,000 m {-656—9,840 ft}**

   Specification
   2.3—4.7 V

7. Apply the vacuum of **-26.6 kPa {200 mmHg, -7.85 inHg}** to EGR boost sensor and verify that the PCM terminal 34 voltage from step 6 changes as specified.
   - If not as specified, inspect the following harness continuity and terminal voltage.

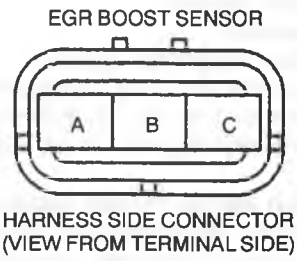


Z6U0102W216

Specification
PCM terminal 34 voltage variation: 0.8—1.3 V

a. Harness continuity
   - Between PCM terminal 34 and EGR boost sensor terminal A
   - Between PCM terminal 91 and EGR boost sensor terminal B
   - Between PCM terminal 90 and EGR boost sensor terminal C

b. Terminal voltage (Ignition switch ON)
   - EGR boost sensor terminal B voltage: Below 1.0 V (constant)
   - EGR boost sensor terminal C voltage: Approx. 5.0 V



Z6U0102W217

8. If terminal voltage is correct and there is harness continuity, replace the EGR boost sensor.

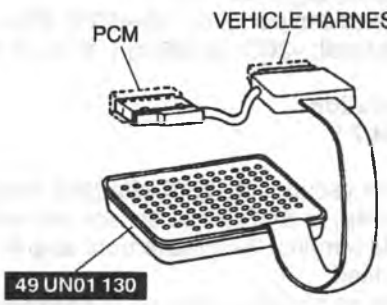
FUEL TANK PRESSURE SENSOR INSPECTION [FS]

Z6U014018212W01

Using the SST (104 Pin Breakout Box)

Note
- The following vacuum values are indicated by relative pressure from atmospheric pressure.

1. Disconnect the PCM connector. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



Z6U0102W218

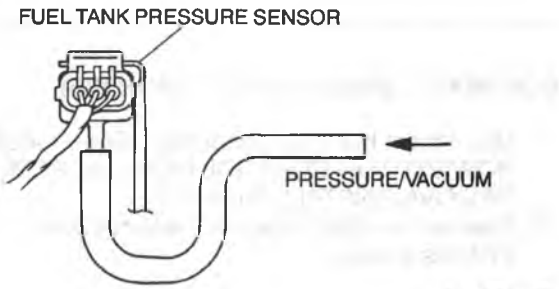
3. Tighten the connector bolt.

Tightening torque
7.9—10.7 N·m {80—100 kgf·cm, 69.5—95.4 in·lbf}

Caution
- **Do not apply vacuum outside the specified limits. Doing so will damage the fuel tank pressure sensor.**

4. Turn the ignition switch to ON.

5. Apply pressure then vacuum to the fuel tank pressure sensor according to the following procedure.



Z6U0102W219

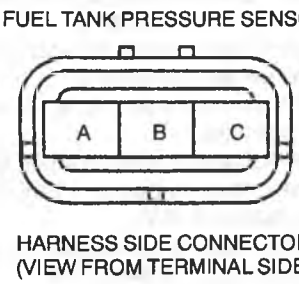
Note
- The output voltage varies with the measuring condition.

6. Decrease the applied pressure **from +6.66 kPa {+50 mmHg, +1.97 inHg} to -6.66 kPa {-50 mmHg, -1.97 inHg}** and verify that the PCM terminal 62 voltage decreases accordingly as specified.
   - If not as specified, inspect the following harness continuity and terminal voltage.

Specification

Applied vacuum	Output voltage (V)*
-6.66 kPa {-50 mmHg, -1.97 inHg}	0.38—0.62
0 kPa {0 mmHg, 0 inHg}	2.42—2.58
+6.66 kPa {+50 mmHg, +1.97 inHg}	4.38—4.62

* : Measuring condition is as follows.
- Input voltage: **5.0 V**
- Atmospheric pressure: **101.3 kPa {760 mmHg, 29.9 in Hg}** (absolute pressure)
- Atmospheric temperature: **30—100 °C {0—182 °F}**



a. Harness continuity
   - Between PCM terminal 91 and fuel tank pressure sensor terminal A
   - Between PCM terminal 62 and fuel tank pressure sensor terminal B
   - Between PCM terminal 90 and fuel tank pressure sensor terminal C
   - If there is no continuity, repair or replace related harness.

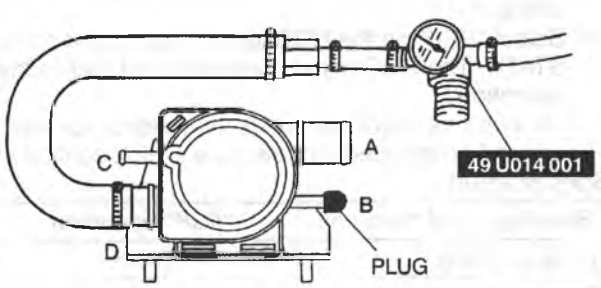
b. Terminal voltage (Ignition switch ON)
   - Fuel tank pressure sensor terminal A voltage: Ground (**below 1.0 V**)
   - Fuel tank pressure sensor terminal C voltage: Constant voltage (**4.5—5.5 V**)
   - If terminal voltage is incorrect, check the PCM.

7. If terminal voltage is correct and if there is harness continuity, replace the fuel tank pressure sensor. (See 01-16-5 EMISSION SYSTEM (FUEL TANK SIDE) COMPONENT REMOVAL/INSTALLATION.)

Using the SSTs (NGS Tester)

Note
- The following vacuum values are indicated by relative pressure from atmospheric pressure.

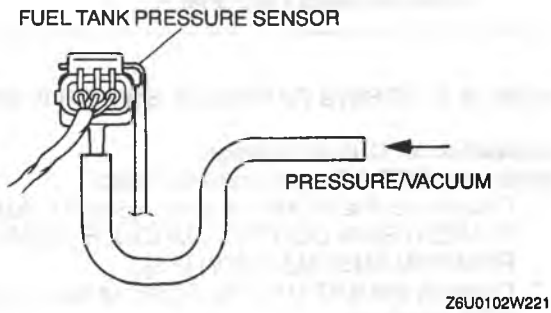
1. Connect the **SSTs** (NGS tester) to the data link connector.



2. Select the "PID/DATA MONITOR AND RECORD" function on the NGS tester display and press TRIGGER.
3. Select "FTP V" on the NGS tester display and press START. The NGS tester measures and shows the voltage.
4. Turn the ignition switch to ON.

Caution
- **Do not apply a vacuum outside the specified limits. Doing so will damage the fuel tank pressure sensor.**

5. Apply pressure then a vacuum to the fuel tank pressure sensor according to the following procedure.



Note
- The output voltage varies with the measuring condition.

6. Decrease the applied pressure **from +6.66 kPa {+50 mmHg, +1.97 inHg} to -6.66 kPa {-50 mmHg, -1.97 inHg}** and verify that the "FTP V" voltage decreases accordingly as specified.
   - If not as specified, inspect the following harness continuity and terminal voltage.

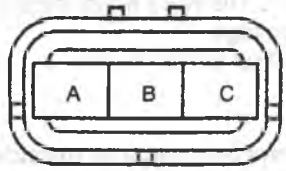
Specification

Applied vacuum	"FTP V" voltage (V)*
-6.66 kPa {-50 mmHg, -1.97 inHg}	0.38—0.62
0 kPa {0 mmHg, 0 inHg}	2.42—2.58
+6.66 kPa {+50 mmHg, +1.97 inHg}	4.38—4.62

* : Measuring condition is as follows.
- Input voltage: **5.0 V**
- Atmospheric pressure: **101.3 kPa {760 mmHg, 29.9 in Hg}** (absolute pressure)

- Atmospheric temperature: **30—100 °C {0—182 °F}**

FUEL TANK PRESSURE SENSOR



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

Z6U0102W220

a. Harness continuity
- Between PCM terminal 91 and fuel tank pressure sensor terminal A
- Between PCM terminal 62 and fuel tank pressure sensor terminal B
- Between PCM terminal 90 and fuel tank pressure sensor terminal C

– If there is no continuity, repair or replace related harness.

b. Terminal voltage (Ignition switch ON)
- Fuel tank pressure sensor terminal A voltage: Ground (**below 1.0 V**)
- Fuel tank pressure sensor terminal C voltage: Constant voltage (**4.5—5.5 V**)

– If terminal voltage is incorrect, check the PCM.

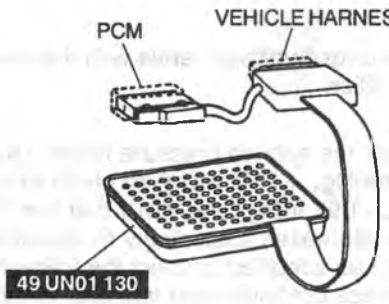
7. If terminal voltage is correct and if there is harness continuity, replace the fuel tank pressure sensor. (See 01-16-5 EMISSION SYSTEM (FUEL TANK SIDE) COMPONENT REMOVAL/INSTALLATION.)

POWER STEERING PRESSURE SWITCH INSPECTION [FS]

Z6U014032230W01

Inspection of Output Voltage
Using the SST (104 pin breakout box)

1. Disconnect the PCM connector. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



Z6U0102W222

3. Tighten the connector bolt.

Tightening torque
7.9—10.7 N·m {80—100 kgf·cm, 69.5—95.4 in·lbf}

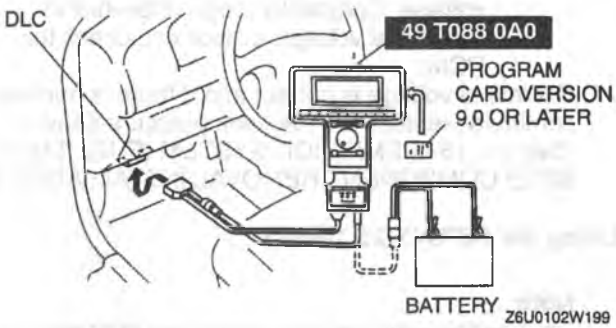
4. Warm up the engine to normal operating temperature.
5. Turn the ignition switch to ON.
6. Measure the voltage at PCM terminal 31.
   - If not as specified, check the related harness and power steering pressure switch continuity.

Specification

Steering wheel condition	PCM terminal 31 voltage (V)
While operating	Below 1.0
Steering wheel straight ahead position	B+

Using the SSTs (NGS tester)

1. Connect the **SSTs** (NGS tester) to the data link connector.



Z6U0102W199

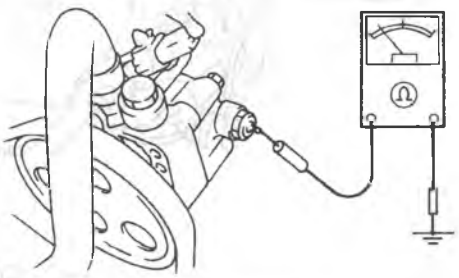
2. Warm up the engine to normal operating temperature.
3. Turn the ignition switch to ON.
4. Select the "PID/DATA MONITOR AND RECORD" function on the NGS tester display and press TRIGGER.
5. Select "PSP" on the NGS tester display and press START. The NGS tester measures and shows the operation.
   - If not as specified, check the related harness and power steering pressure switch continuity.

Specification

Steering wheel condition	"PSP" operation
While operating	HIGH
Steering wheel straight ahead position	LOW

Inspection of Continuity

1. Disconnect the power steering pressure switch connector.
2. Connect an ohmmeter to the power steering pressure switch.



Z6U0102W223

3. Start the engine and let it at idle.
4. Check continuity of the power steering pressure switch while turning steering wheel.
   - If not as specified, replace the power steering pressure switch. (See 06-12-15 POWER STEERING OIL PUMP DISASSEMBLY/ASSEMBLY.)
   - If okay, inspect related harness or connectors.

Note

- Visually check wire and connector in wiring diagram. It is easier to test from connector than the power steering pressure switch on the power steering oil pump.

○—○ : Continuity

Steering wheel condition	Terminal	
	A	Ground
Steering wheel fully turned	○	○
Steering wheel straight ahead position		

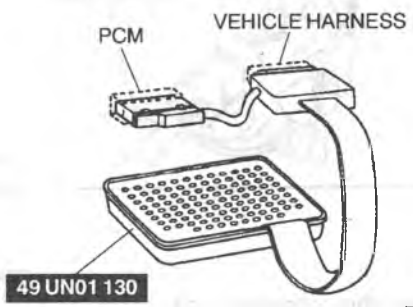
Z6U0102W224

NEUTRAL SWITCH INSPECTION [FS]

Z6U014017640W01

Inspection of Output Voltage
Using the SST (104 pin breakout box)

1. Disconnect the PCM connector. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



Z6U0102W225

3. Tighten the connector bolt.

   Tightening torque
   7.9—10.7 N·m {80—100 kgf·cm, 69.5—95.4 in·lbf}

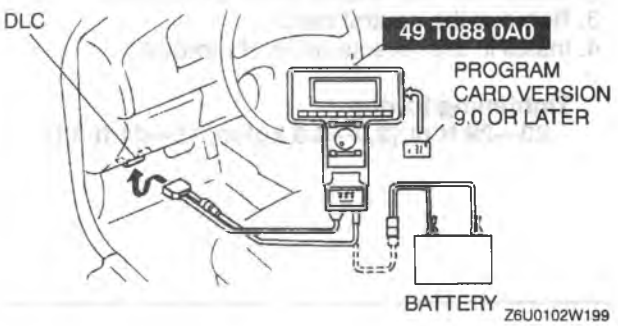
4. Turn the ignition switch to ON.
5. Measure the voltage at PCM terminal 64.
   - If not as specified, check the related harness and neutral switch continuity.

Specification

Condition	PCM terminal 64 voltage (V)
Neutral position or clutch pedal depressed	Below 1.0
Others	B+

Using the SSTs (NGS tester)

1. Connect the **SSTs** (NGS tester) to the data link connector.



Z6U0102W199

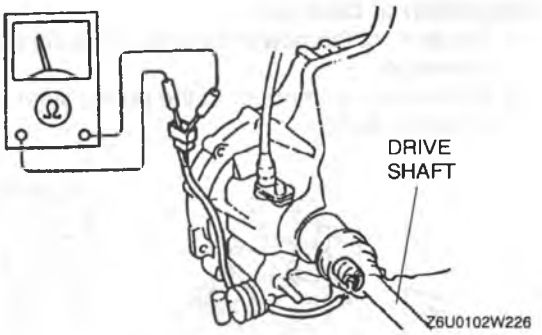
2. Turn the ignition switch to ON.
3. Select the "PID/DATA MONITOR AND RECORD" function on the NGS tester display and press TRIGGER.
4. Select "CPP/PNP" on the NGS tester display and press START. The NGS tester measures and shows the operation.
   - If not as specified, check the related harness and neutral switch continuity.

Specification

Condition	"CPP/PNP" operation
Neutral position or clutch pedal depressed	ON
Others	OFF

Inspection of Continuity

1. Disconnect the neutral switch connector.
2. Check continuity of the switch by using an ohmmeter.
   - If not as specified, check the related harness and neutral switch continuity.
   - If okay, inspect related harness and connectors.



○—○ : Continuity

Condition	Terminal	
	A	B
Neutral	○	○
Other		

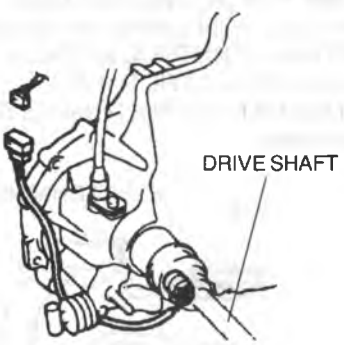
Z6U0102W227

NEUTRAL SWITCH REMOVAL/INSTALLATION [FS]

Z6U014017640W02

1. Disconnect the battery negative cable.
2. Disconnect the neutral switch connector.
3. Remove the neutral switch.
4. Install in the reverse order of removal.

Tightening torque
20—29 N·m {2.0—3.0 kgf·m, 15—21 ft·lbf}

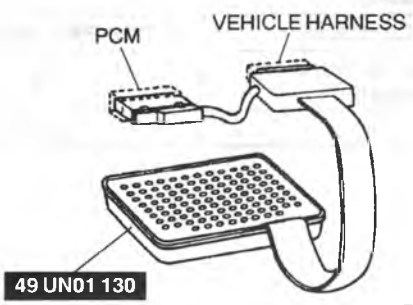


CLUTCH SWITCH INSPECTION [FS]

Z6U014018660W01

Inspection of Output Voltage
Using the SST (104 pin breakout box)

1. Disconnect the PCM connector. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



3. Tighten the connector bolt.

Tightening torque
7.9—10.7 N·m {80—100 kgf·cm, 69.5—95.4 in·lbf}

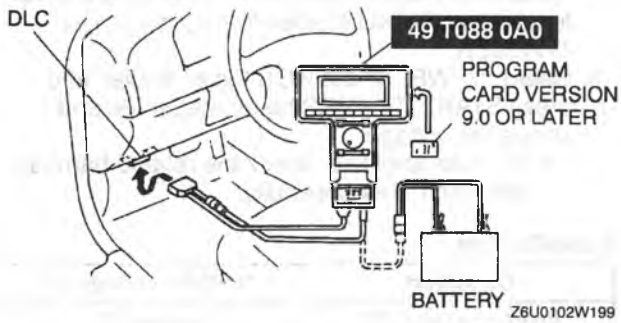
4. Turn the ignition switch to ON.
5. Measure the voltage at PCM terminal 64.
   - If not as specified, check the related harness and clutch switch continuity.

Specification

Condition	PCM terminal 64 voltage (V)
Neutral position or clutch pedal depressed	Below 1.0
Others	B+

Using the SSTs (NGS tester)

1. Connect the **SSTs** (NGS tester) to the data link connector.



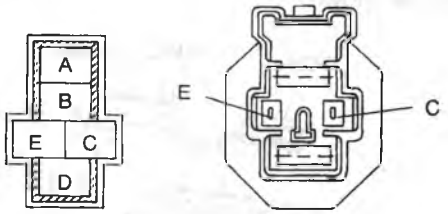
2. Turn the ignition switch to ON.
3. Select the "PID/DATA MONITOR AND RECORD" function on the NGS tester display and press TRIGGER.
4. Select "CPP/PNP" on the NGS tester display and press START. The NGS tester measures and shows the operation.
   - If not as specified, check the related harness and clutch switch continuity.
   - If okay, check the neutral switch.

Specification

Condition	"CPP/PNP" operation
Neutral position or clutch pedal depressed	ON
Others	OFF

Inspection of Continuity

1. Disconnect the clutch switch connector.
2. Check continuity of the clutch switch by using an ohmmeter.
   - If okay, inspect related harness and connectors.



Z6U0102W230

○—○ : Continuity

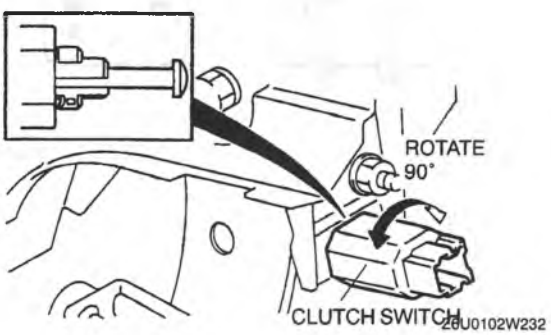
Condition	Terminal	
	C	E
Clutch pedal depressed	○	○
Clutch pedal released		

Z6U0102W231

CLUTCH SWITCH REMOVAL/INSTALLATION [FS]

Z6U014018660W02

1. Disconnect the battery negative cable.
2. Disconnect the clutch switch connector.
3. Remove the clutch switch.
4. Install the clutch switch as shown in the figure.



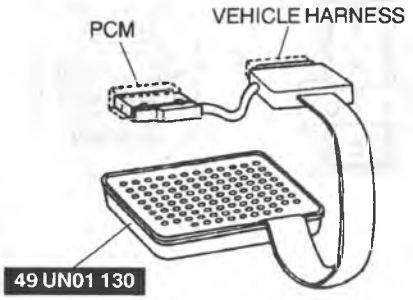
MAIN RELAY INSPECTION [FS]

Z6U014018811W01

Inspection of Output Voltage

Using the SST (104 pin breakout box)

1. Disconnect the PCM connector. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



Z6U0102W233

3. Tighten the connector bolt.

Tightening torque
7.9—10.7 N·m {80—100 kgf·cm, 69.5—95.4 in·lbf}

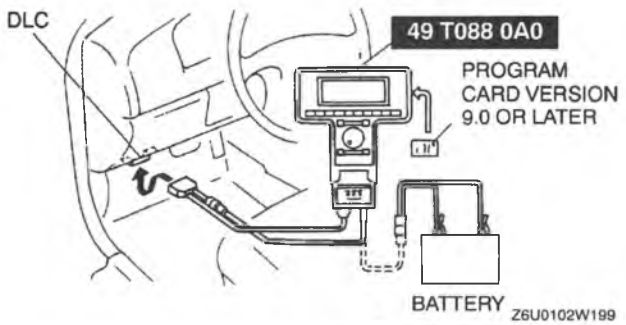
4. Turn the ignition switch to ON.
5. Measure the voltage at PCM terminals 71 and 97.
   - If not as specified, check the related harness and main relay continuity.

Specification

Condition	PCM terminal 71 or 97 voltage (V)
Ignition switch OFF	Below 1.0
Ignition switch ON	B+

Using the SSTs (NGS tester)

1. Connect the **SSTs** (NGS tester) to the data link connector.



Z6U0102W199

2. Turn the ignition switch to ON.
3. Select the "PID/DATA MONITOR AND RECORD" function on the NGS tester display and press TRIGGER.
4. Select "VPWR" on the NGS tester display and press START. The NGS tester measures and shows the voltage.
   - If not as specified, check the related harness and main relay continuity.

Specification

Condition	"VPWR" voltage (V)
Ignition switch OFF	Below 1.0
Ignition switch ON	B+

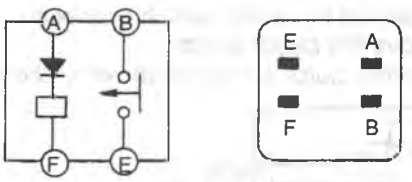
Inspection of Continuity

1. Remove the main relay.
2. Apply battery positive voltage and check continuity between terminals of the relay by using an ohmmeter.
   - If not as specified, replace the main relay.
   - If okay, inspect related harness and connectors.

○—○ : Continuity

Step	Terminal			
	A	F	B	E
1	○	○		
2	B+	GND	○	○

Z6U0102W234



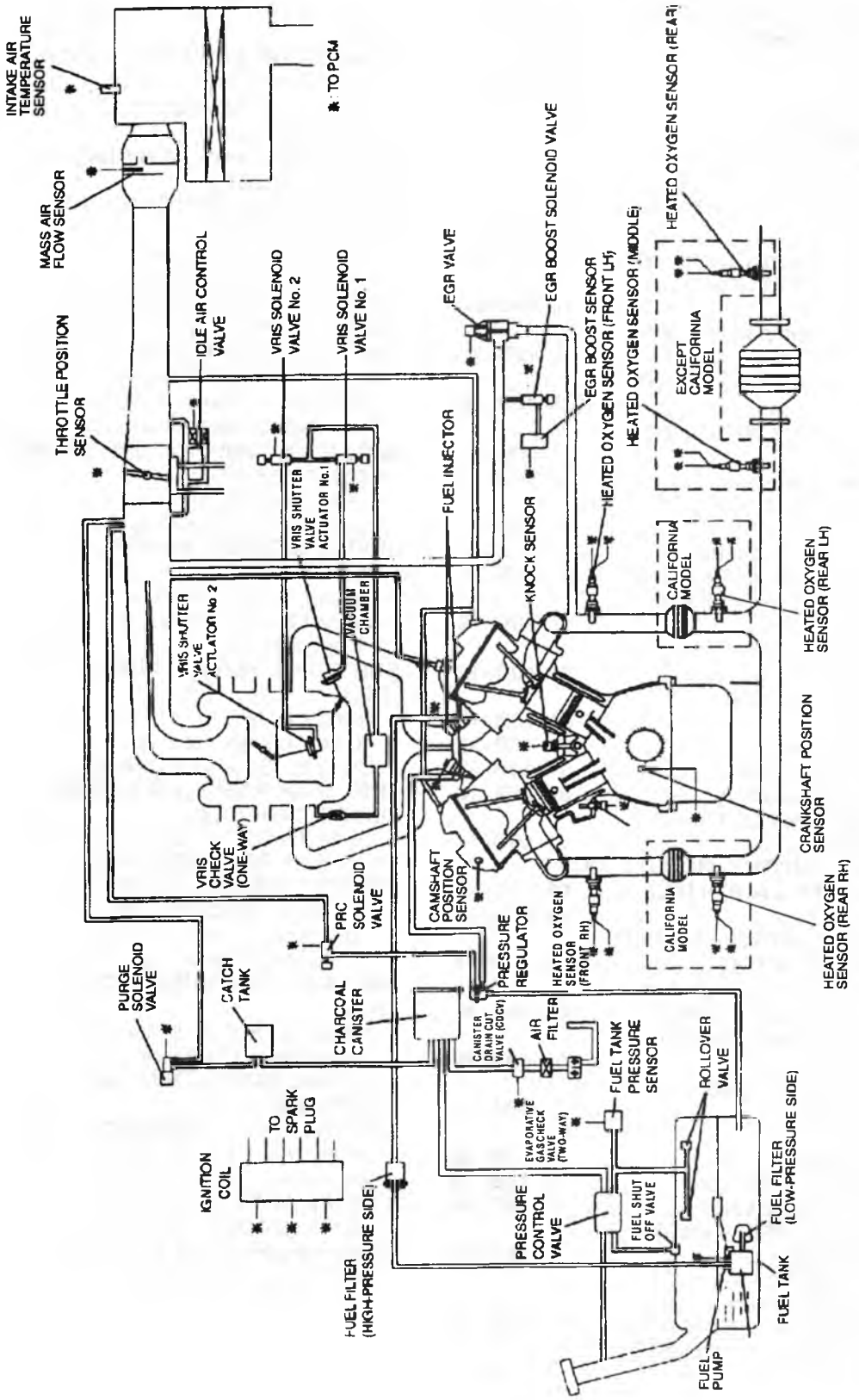
Z6U0102W235

01-40B CONTROL SYSTEM [KL]

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CONTROL SYSTEM DIAGRAM [KL]

Y6U14018881W05

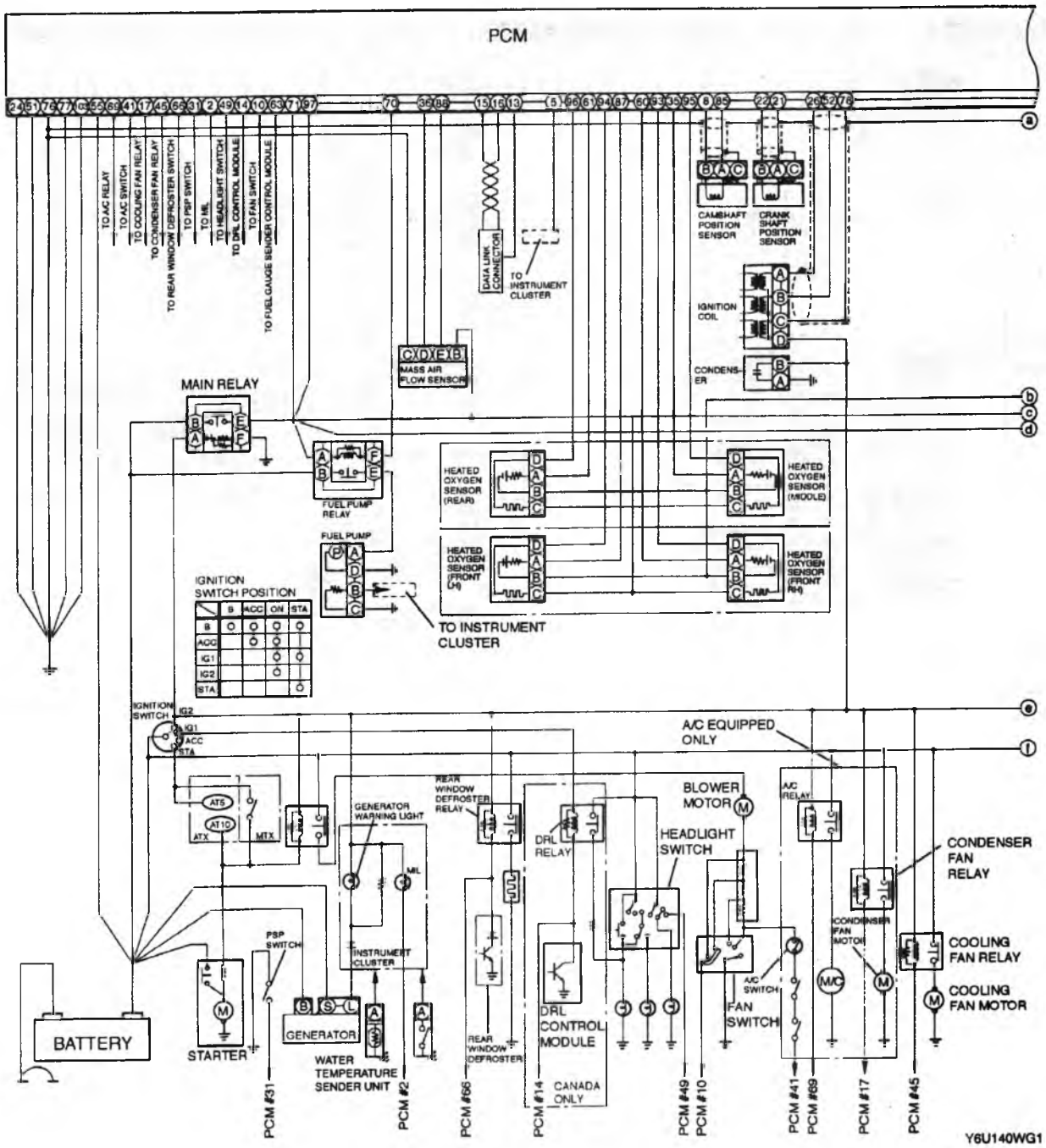


Y6U140WG0

CONTROL SYSTEM WIRING DIAGRAM [KL]

Y6U14018881W06

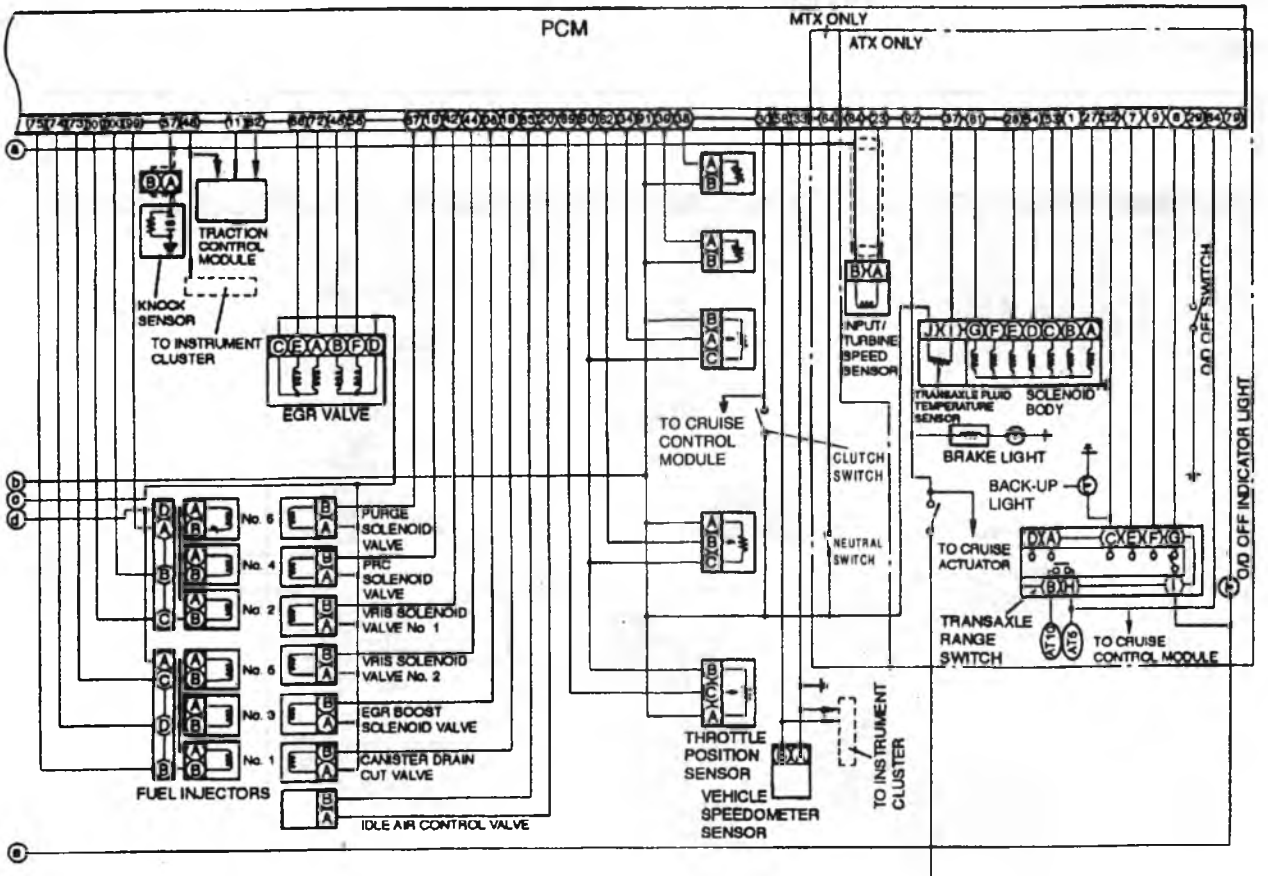
With Immobillzer



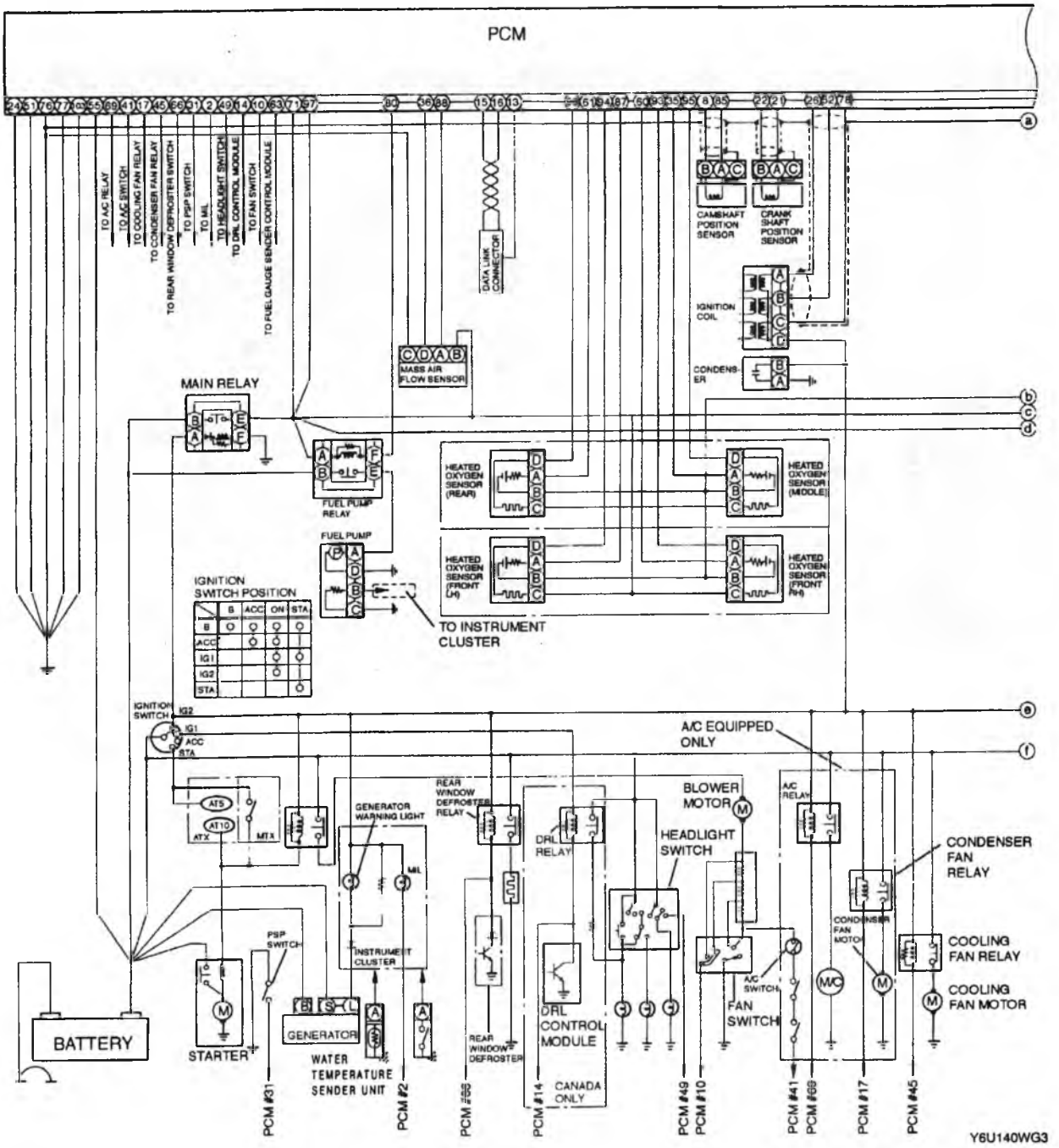


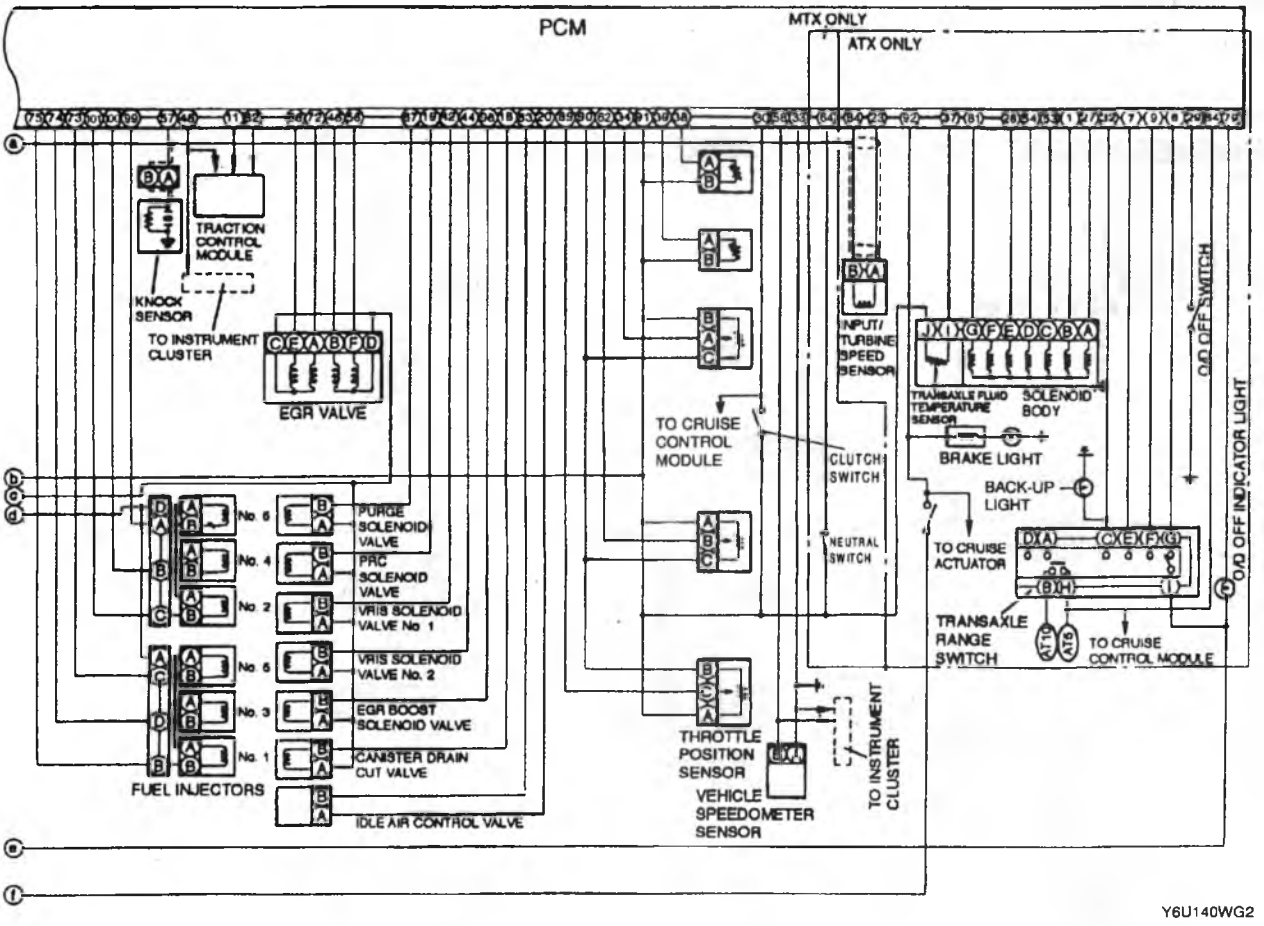
Y6U140WG2

CONTROL SYSTEM [KL]



Without Immobilizer




PCM
MTX ONLY
ATX ONLY
TRACTION CONTROL MODULE
KNOCK SENSOR
TO INSTRUMENT CLUSTER
EGR VALVE
TO CRUISE CONTROL MODULE
CLUTCH SWITCH
NEUTRAL SWITCH
INPUT/ TURBINE SPEED SENSOR
TRANSAXLE FLUID TEMPERATURE SENSOR
SOLENOID BODY
BRAKE LIGHT
BACK-UP LIGHT
TO CRUISE ACTUATOR
TRANSAXLE RANGE SWITCH
TO CRUISE CONTROL MODULE
O/D OFF SWITCH
O/D OFF INDICATOR LIGHT
No. 6
PURGE SOLENOID VALVE
No. 4
PRC SOLENOID VALVE
No. 2
VRIS SOLENOID VALVE No. 1
No. 5
VRIS SOLENOID VALVE No. 2
No. 3
EGR BOOST SOLENOID VALVE
No. 1
CANISTER DRAIN CUT VALVE
FUEL INJECTORS
IDLE AIR CONTROL VALVE
THROTTLE POSITION SENSOR
VEHICLE SPEEDOMETER SENSOR
TO INSTRUMENT CLUSTER
Y6U140WG2

CONTROL SYSTEM [KL]

Y6U14018881W07

Control System Device and Control Relationship Chart

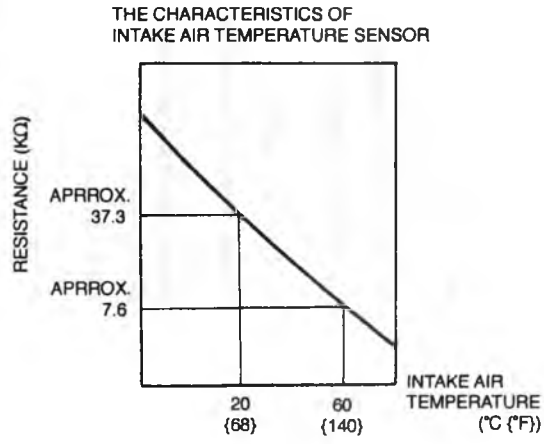
	Component	Item													
		Idle air control	Variable resonance induction (VRIS) control	Fuel injection control	Fuel pump control	Pressure regulator control (PRC)	Electronic spark advance (ESA) control	EGR control	Purge control	Heated oxygen sensor (HO2S) heater control	A/C cut-off control	Electrical fan control	Traction control	Monitoring system	
														Evaporative system monitor	EGR system monitor
Input	Mass air flow sensor			×			×	×	×				×	×	×
	Camshaft position sensor			×*			×*						×*	×*	×*
	Crankshaft position sensor	×	×	×*	×	×	×*	×	×		×	×	×*	×*	×*
	Throttle position sensor	×		×		×	×	×	×		×		×	×	×
	Engine coolant temperature sensor	×		×		×	×	×	×		×	×	×	×	×
	Intake air temperature sensor	×		×		×	×	×	×	×		×	×	×	
	Knock sensor			×			×								
	Heated oxygen sensor			×				×	×				×		
	Vehicle speed sensor			×				×	×			×		×	×
	EGR boost sensor													×	×
	Fuel gauge sender unit													×	
	Power steering pressure switch	×		×							×				
	Neutral switch (MTX only)	×		×		×	×	×	×						
	Clutch switch (MTX only)	×		×		×	×	×	×						
	Transaxle range switch (ATX only)	×		×		×	×	×	×						
	Brake switch	×		×											
	Ignition switch													×	
	A/C switch, Refrigerant pressure switch (A/C equipped only)	×		×							×	×			
	ABS/TCS control module											×			
Output	Idle air control valve	×													
	VRIS solenoid valve No.1, No.2		×												
	Fuel injector			×									×		
	Fuel pump relay				×										
	PRC solenoid valve					×									
	Ignition coil						×						×		
	EGR valve							×							
	Purge solenoid valve								×						
	Heated oxygen sensor heater									×					
	EGR boost sensor solenoid valve														×
	Canister drain cut valve (CDCV)													×	
	A/C relay	•									×				
	Cooling fan relay											×			
	Condenser fan relay											×			
	ABS/TCS control module											×			

* The crankshaft position sensor signal has priority to detect the engine speed for these control.

Y6U140WZX

Intake Air Temperature (IAT) Sensor Description

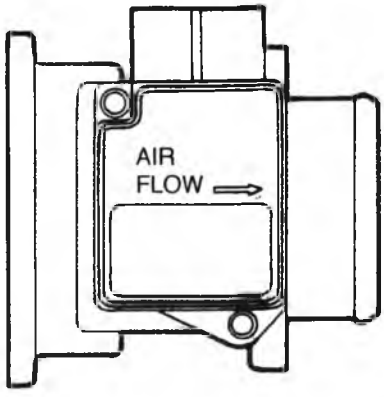
- The intake air temperature sensor detects the intake air temperature as variation in the resistance of the temperature.

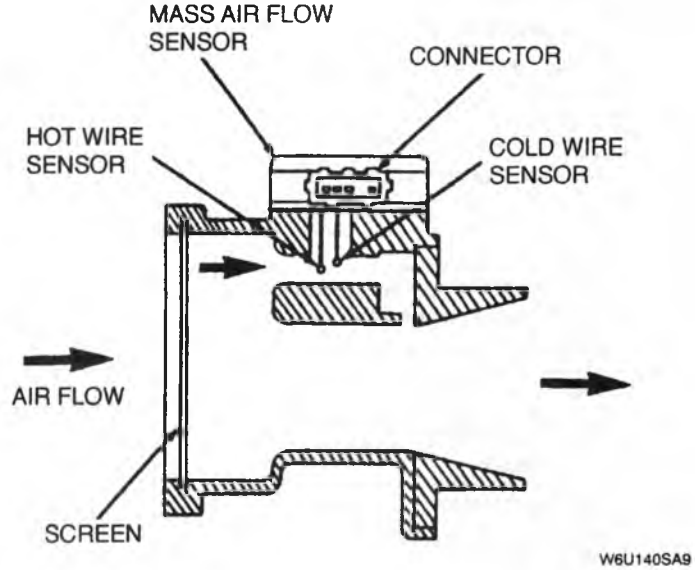


W6U140SA8

Mass Air Flow Sensor Description

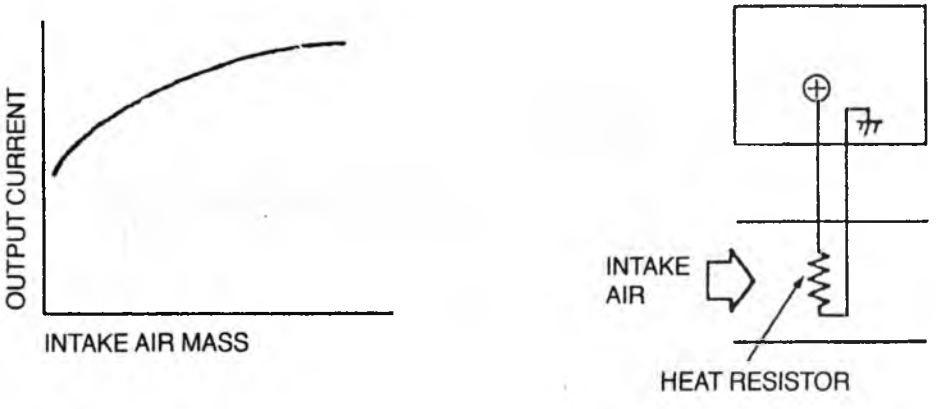
- A hot wire type mass air flow sensor is used.





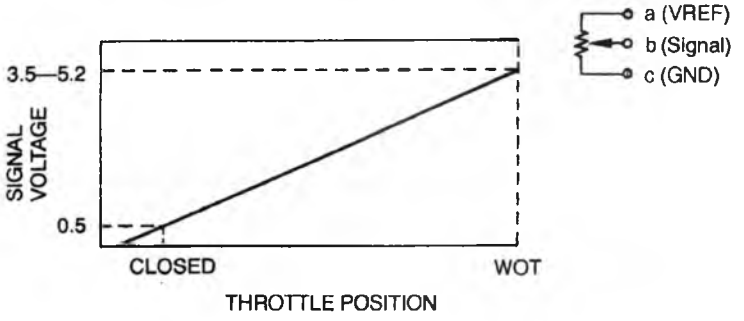
W6U140SA9

Structure and operation
- The mass air flow (MAF) sensor uses a hot wire to measure the amount of mass air intake flow.
- Air passing over the hot wire causes it to cool. This hot wire is maintained preprogrammed temperature above ambient temperature.
- Ambient temperature is measured by a constant cold wire.



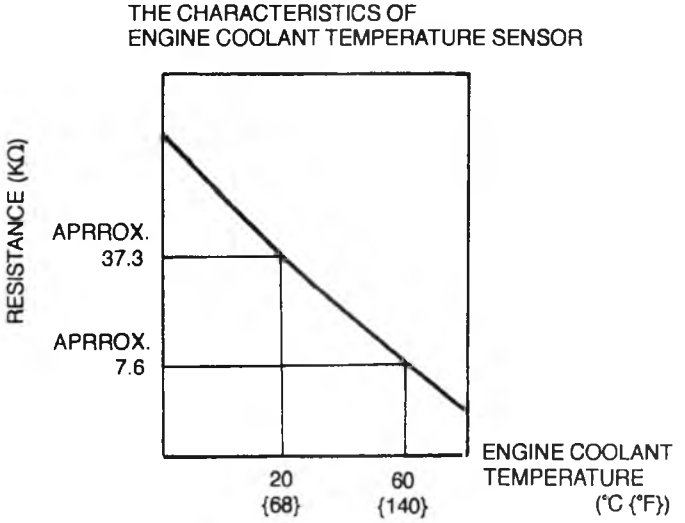
W6U140SAA

Throttle Position (TP) Sensor Description
- A linear type throttle position sensor is used.
- The throttle position sensor detects the throttle position.



Y6U140WAB

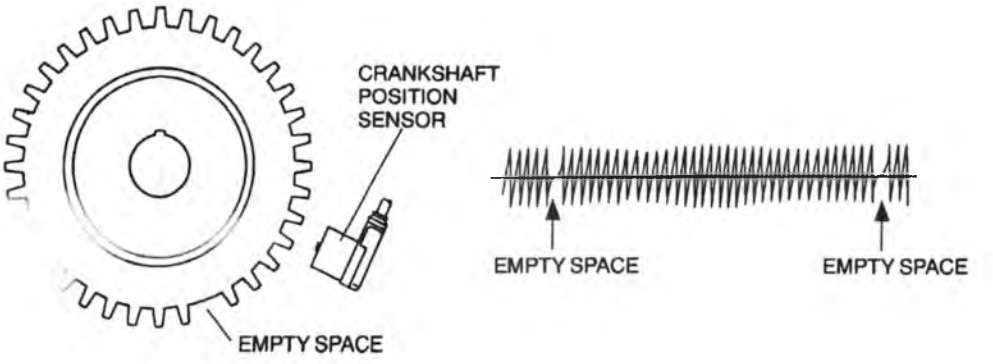
Engine Coolant Temperature (ECT) Sensor Description
- The engine coolant temperature sensor detects the temperature of the engine coolant



W6U140SAC

Crankshaft Position (CKP) Sensor Description

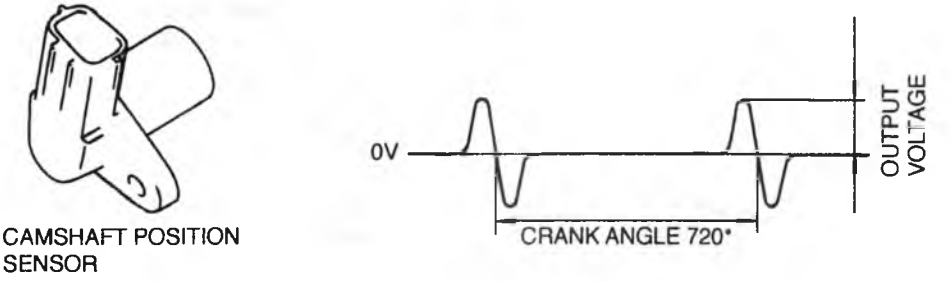
- The magnetic pickup type crankshaft position sensor is located near the crankshaft pulley.
- The crankshaft pulley has a total of 35 teeth spaced 10 degrees apart with one empty space for a missing tooth.
- The crankshaft position sensor detects the pulley rotation signal (NE signal), and outputs it to the PCM.
- Since the NE signal is detected directly by the crankshaft rotation, accuracy is high and is not influenced by timing belt looseness or camshaft pulley misalignment.



W6U140SAD

Camsh n (CMP) Sensor Description

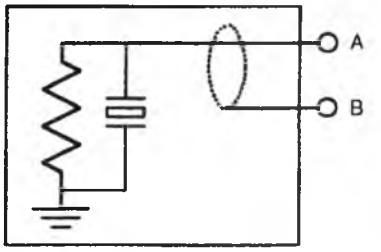
- Th sition sensor detects the position of the camshaft.
- camsha ensor identifies when piston number one is on its compression stroke.
- signal is the he PCM and used for synchronizing the firing of sequential fuel injections.



W6U140SC4

Knock Sensor Description

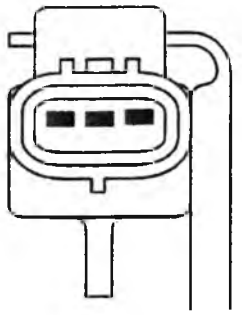
- A piezo-electric type knock sensor (which utilizes the piezo-electric effect) is used.
- It is non-resonant type and has the feature of carrying out flat detection in relation to frequency.



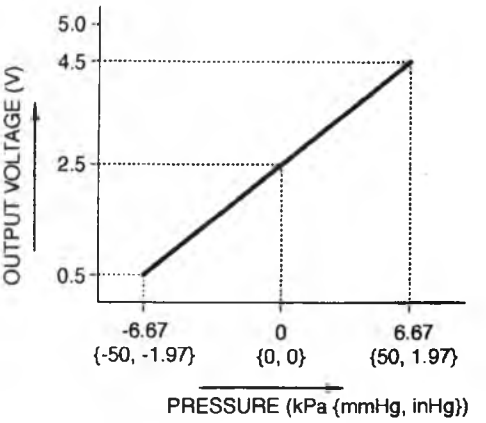
Y6U140WZZ

Fuel Tank Pressure Sensor Description

- The fuel tank pressure sensor converts pressure into electric signals by using the piezo-electric effect of the semi-conductor.



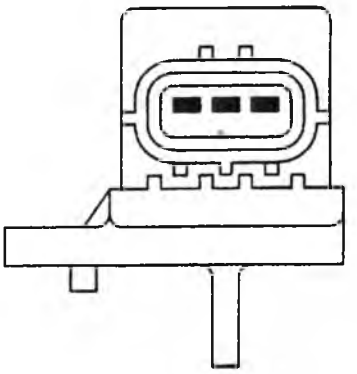
FUEL TANK PRESSURE SENSOR



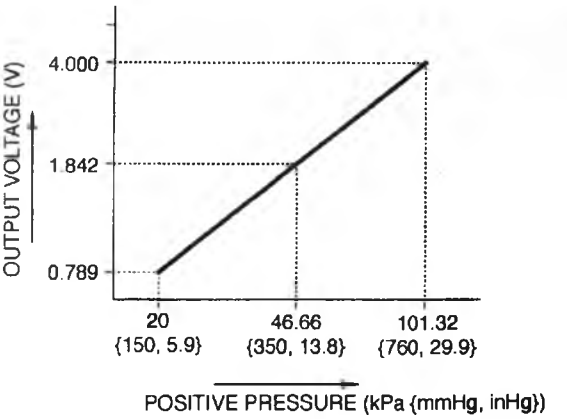
W6U140SAG

EGR Boost Sensor Description

- The EGR boost sensor uses the piezo-electric effect to convert the intake manifold pressure into voltage values, and outputs the voltage values to the PCM.



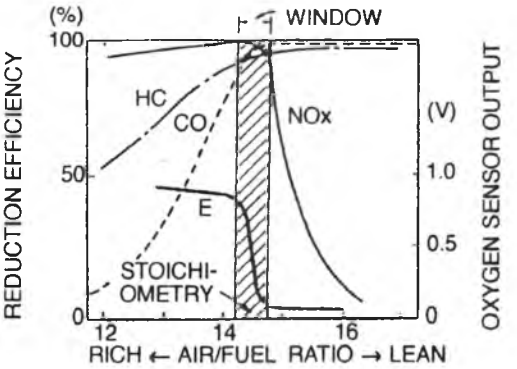
EGR BOOST SENSOR



W6U140SAH

Heated Oxygen Sensor Description

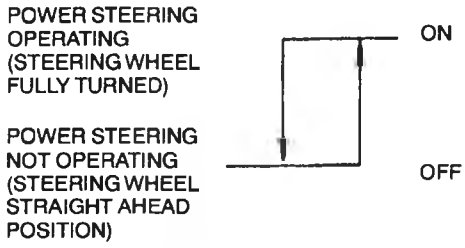
- The heated oxygen sensor is equipped with a heater to provide constant detection of oxygen concentration even when exhaust gas temperature is low.
- The heated oxygen sensor sends oxygen content signals to the PCM.
- The heated oxygen sensor uses the principles of a solid electrolyte oxygen content battery.
- The heated oxygen sensors are fitted to each end of the exhaust manifold, the three way catalytic converter, and the front pipe.



W6U140SAJ

Power Steering Pressure Switch Description

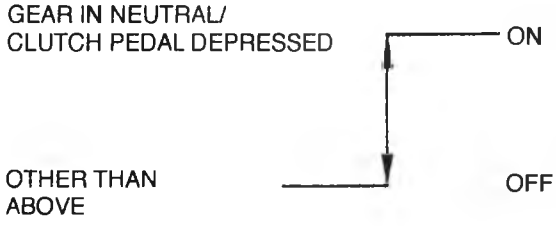
- The power steering switch detects the power steering operating condition by the variation of the oil pressure in the power steering oil pump.



W6U140SAK

Neutral Switch and Clutch Switch Description

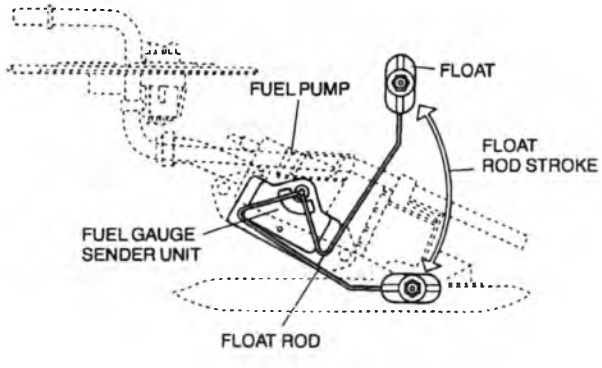
- The neutral switch and the clutch switch detect the engine load condition.



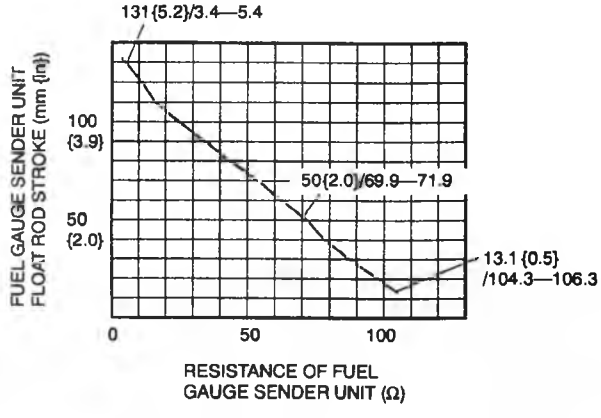
W6U140SAL

Fuel Gauge Sender Unit Description

- The fuel gauge sender unit is integrated with the fuel pump.
- The fuel gauge sender unit detects the variation in resistance made by the float rod stroke as the amount of fuel remaining in the fuel tank.

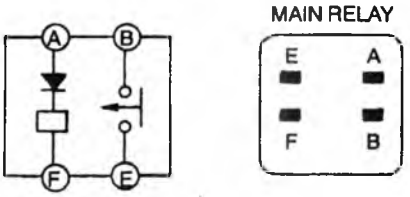


Y6U140WAG



Y6U140WBF

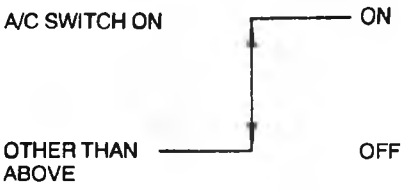
Main Relay Description
- The main relay controls power to PCM when the ignition switch is turned ON/OFF.



Y6U140WAE

A/C Switch Description
- The A/C switch detects the A/C operating condition.

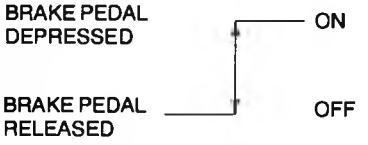
Operation
- The A/C switch operates according to the switch operation condition as shown.



Y6U140WAF

Brake Switch Description
- The Brake switch detects the brake pedal depressed/released condition.

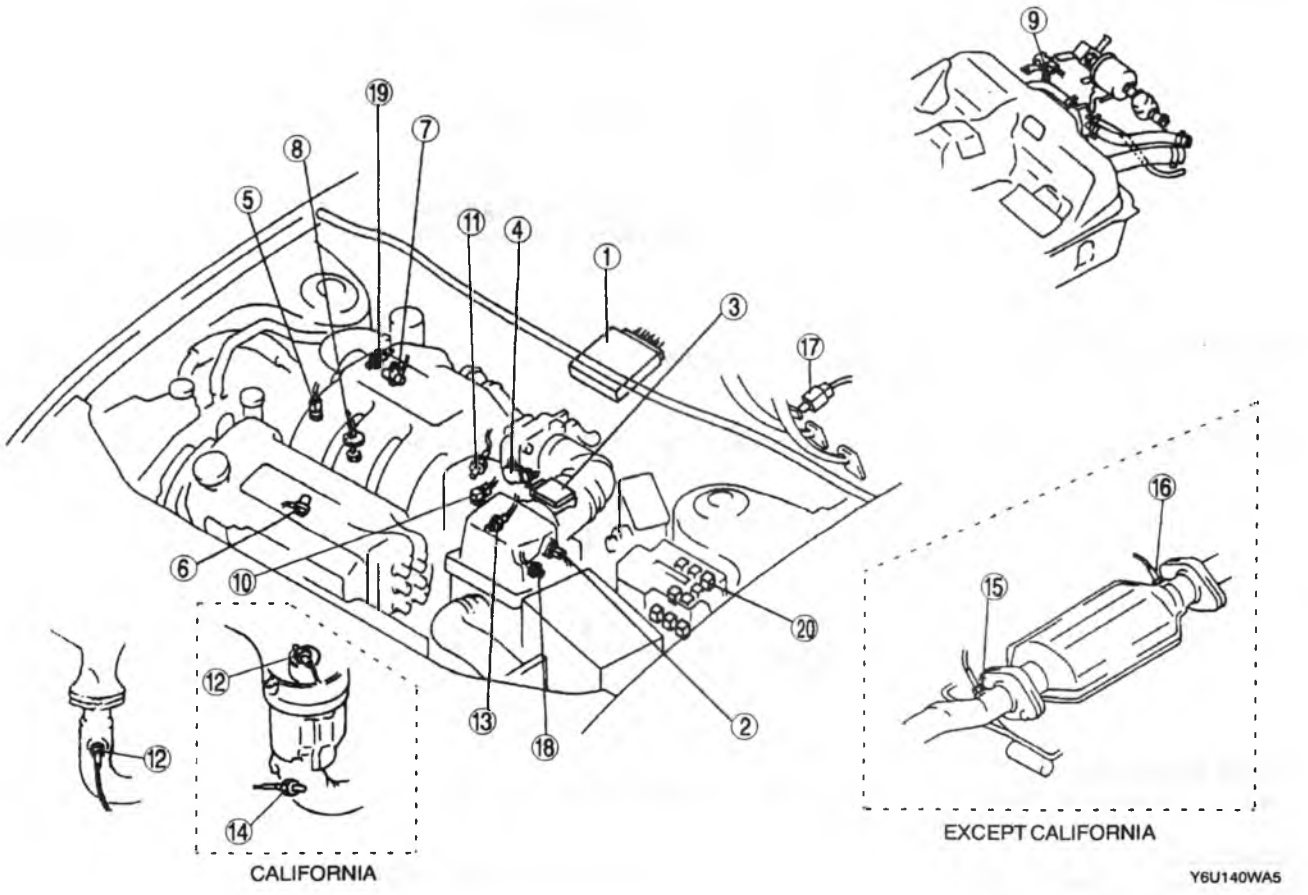
Operation
- The brake switch operates according to the switch operation condition as shown.



Y6U140WAJ

CONTROL SYSTEM COMPONENT LOCATION [KL]

Y6U14018881W08



1	PCM
2	Intake air temperature sensor
3	Mass air flow sensor
4	Throttle position sensor
5	Engine coolant temperature sensor
6	Crankshaft position sensor
7	Camshaft position sensor
8	Knock sensor
9	Fuel tank pressure sensor
10	EGR boost sensor

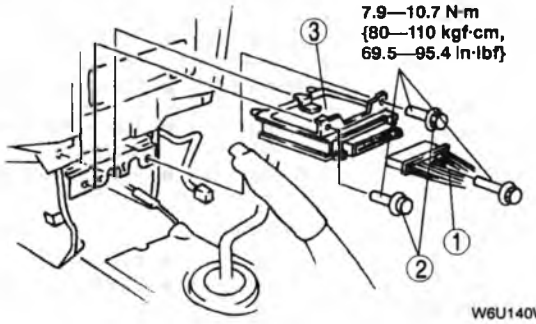
11	Heated oxygen sensor (Front RH)
12	Heated oxygen sensor (Front LH)
13	Heated oxygen sensor (Rear RH)
14	Heated oxygen sensor (Rear LH)
15	Heated oxygen sensor (Middle)
16	Heated oxygen sensor (Rear)
17	Clutch switch (MTX)
18	Neutral switch (MTX)
19	Power steering pressure switch
20	Main relay

POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL]

Y6U14018880W03

Caution
- **PCM is sensitive to static electrical charges. If exposed to these charges, damage may result. If service of PCM is required, use the following safeguards to avoid damage to components.**
  1. **Leave the PCM in their original packaging until ready to install into vehicles.**
  2. **Avoid touching PCM connector pins.**
  3. **Avoid laying modules on nonconductive surfaces.**

1. Disconnect the negative battery cable.
2. Remove the rear console. (See 09-17-5 REAR CONSOLE REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.



W6U140WM1

1	PCM connector
2	Bolt
3	PCM (See 01-40B-15 PCM Removal Note)

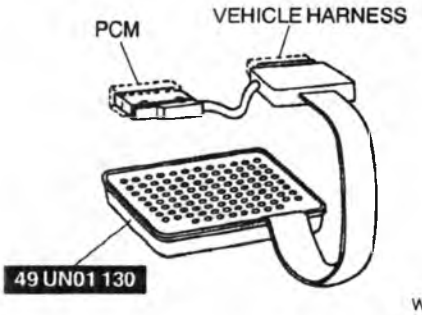
PCM Removal Note
- The PCM stores information on vehicle operating conditions including information to compensate for component tolerances. When an emission related component is replaced, Keep Alive Memory (KAM) in the PCM should be cleared by disconnecting the battery terminal to erase the stored information on the original component.

POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]

Y6U14018880W04

Caution
- **The PCM terminal voltages vary with change in measuring conditions and vehicle conditions. Always carry out a total inspection of the input systems, output systems, and PCM to determine the cause of trouble. Otherwise, some incorrect diagnosis would be made.**

PCM Terminal Voltage Inspection (Using 104 Pin Breakout Box)
1. Disconnect the negative battery cable.
2. Disconnect the PCM connector.
3. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



W6U140WM2

4. Tighten the connector bolt.

   Tightening torque
   7.9—10.7 N·m
   {80—110 kgf·m, 69.5—95.4 in·lbf}

5. Connect the negative battery cable.
6. Measure the voltage at each terminal.
   - If any incorrect voltage is detected, check related systems, wiring harnesses and connectors referring to the possible malfunction in the terminal voltage list.

Terminal voltage (Reference)

Terminal	Signal	Connection	Test condition		Voltage (V)	Possible malfunction
1	Shift solenoid B (ATX)	Shift solenoid B	ON		B+	• Shift solenoid B • Related harness
			OFF		Below 1.0	
2	MIL	Malfunction indicator lamp	Malfunction indicator lamp OFF		B+	• MIL • Related harness
			Malfunction indicator lamp ON		Below 1.0	
3	—	—	—		—	—
4	—	—	—		—	—
5	Communication (With immobilizer)	Immobilizer unit	Check the signal by using an oscilloscope		—	• PCM* • Immobilizer unit • Related harness
6	Transaxle range position (D range) (ATX)	Transaxle range switch (D range)	Ignition switch ON	D range	B+	• Transaxle range switch • Related harness
				Other	Below 1.0	
7	Transaxle range position (1 range) (ATX)	Transaxle range switch (1 range)	Ignition switch ON	1 range	B+	• Transaxle range switch • Related harness
				Other	Below 1.0	
8	Cylinder identification (–)	Camshaft position sensor	Ignition switch ON		Below 1.0	• Camshaft position sensor • Related harness
			Idle		Below 1.0	
9	Transaxle range position (2 range) (ATX)	Transaxle range switch (2 range)	Ignition switch ON	2 range	B+	• Transaxle range switch • Related harness
				Other	Below 1.0	
10	Blower	Fan switch	Ignition switch ON	Fan switch OFF or at 1st or 2nd	Approx. 10	• Fan switch • Related harness
				Fan switch ON at 3rd or higher	Below 1.0	
11	Torque reduction (request)	ABS/TCS-CM	Ignition switch ON		Approx. 10	• ABS/TCS control module • Related harness
			Idle		B+	
12	—	—	—		—	—
13	PCM reprogramming	Data link connector	Ignition switch ON		Approx. 0.6	• PCM • Related harness
			Idle		Approx. 0.6	
14	DRL (for CANADA)	DRL unit	Daytime running light ON		Below 1.0	• DRL unit • Headlight relay • Related harness
			Daytime running light OFF		Approx. 8.0	
15	Diagnostic trouble code output	Data link connector terminal BUS–	Carry out inspection according to diagnostic trouble code Diagnostic trouble code output is a part of serial communication Judgment by terminal voltage is not possible		—	• On-board diagnostic system • Related harness
16	Diagnostic trouble code output	Data link connector terminal BUS+	Carry out inspection according to diagnostic trouble code Diagnostic trouble code output is a part of serial communication Judgment by terminal voltage is not possible		—	• On-board diagnostic system • Related harness
17	Condenser fan control	Condenser fan relay	Condenser fan stops		B+	• Condenser fan relay • Related harness
			Condenser fan operating		Below 1.0	
18	CDCV control	CDCV	Ignition switch ON		B+	• CDCV • Related harness
			Diagnosis executed		Below 1.0	
19	Pressure regulator control	PRC solenoid valve	Idle (for 1 minute after hot start)		Below 1.0	• PRC solenoid valve • Related harness
			Other		B+	

Terminal	Signal	Connection	Test condition		Voltage (V)	Possible malfunction
20	Idle air control	IAC valve	Ignition switch ON		B+	• IAC valve • Related harness
			Idle	After warm up (No load)	B+	
21	NE+	Crankshaft position sensor	Ignition switch ON		Approx. 1.5	• Crankshaft position sensor • Related harness
			Idle		Approx. 1.5	
22	NE−	Crankshaft position sensor	Ignition switch ON		Approx. 1.5	• Crankshaft position sensor • Related harness
			Idle		Approx. 1.5	
23	Ground (Input/turbine speed sensor) (ATX)	Input/turbine speed sensor	Constant		Below 1.0	• Input/turbine speed sensor • Related harness
24	Ground	Ground	Constant		Below 1.0	• Related harness
25	—	—	—		—	—
26	Ignition	Ignition coil (#1, #4)	Ignition switch ON		B+ (DC)	• Ignition coil • Related harness
			Idle		1.5—2.5 (AC)	
27	Shift solenoid A (ATX)	Shift solenoid A	Solenoid valve OFF		Below 1.0	• Shift solenoid A • Related harness
			Solenoid valve ON		B+	
28	3–2 timing solenoid valve (ATX)	3–2 timing solenoid valve	Solenoid valve OFF		Below 1.0	• 3–2 timing solenoid valve • Related harness
			Solenoid valve ON		B+	
29	O/D OFF switch (ATX)	O/D OFF switch	O/D OFF switch released		B+	• O/D OFF switch • Related harness
			O/D OFF switch depressed		Below 1.0	
30	Clutch switch (MTX)	Clutch switch	Ignition switch ON	clutch pedal depressed	Below 1.0	• Clutch switch • Related harness
				clutch pedal released	B+	
31	Power steering pressure	Power steering pressure switch	Ignition switch ON		B+	• Power steering pressure switch • Related harness
			Idle	Steering wheel in straight ahead position	B+	
				Steering wheel operating	Below 1.0	
32	Transaxle range position (R position) (ATX)	Transaxle range switch (R switch)	Ignition switch ON	R position	Approx. 12	• Transaxle range switch • Related harness
				Other	Below 1.0	
33	Ground	Vehicle speedometer sensor (−)	Constant		Below 1.0	• Vehicle speedometer sensor • Related harness
34	Barometric pressure/EGR boost	EGR boost sensor	Ignition switch ON		Approx. 4.0	• EGR boost sensor • Related harness
			Idle		Approx. 4.0	

Terminal	Signal	Connection	Test condition		Voltage (V)	Possible malfunction
35	Heated oxygen sensor (Middle)*2	Heated oxygen sensor (Middle)	Ignition switch ON		Below 1.0	• Heated oxygen sensor (Middle) • Related harness
			Idle	Engine cold	Below 0.5	
				After warm up	0.1—1.0	
			Acceleration		0.5—1.0	
			Deceleration		0—0.5	
	Heated oxygen sensor (Rear RH)*1	Heated oxygen sensor (Rear RH)	Ignition switch ON		Below 1.0	• Heated oxygen sensor (Rear RH) • Related harness
			Idle	Engine cold	Approx. 0	
				After warm up	0.1—1.0	
			Acceleration		Approx. 0	
			Deceleration			
36	Ground	Mass air flow sensor	Constant		Below 1.0	• Mass air flow sensor • Related harness
37	Transaxle fluid temperature (ATX)	Transaxle fluid temperature sensor	Verify that voltage decreases according to ATF temperature rise For reference, if the ATF is 20 °C {68 °F} the voltage should be 3.5 V If the ATF is 130 °C {260 °F} the voltage should be 0.6 V		Approx. 0.6—4.8	• Transaxle fluid temperature sensor • Related harness
38	Engine coolant temperature	Engine coolant temperature sensor	Ignition switch ON	Engine coolant temperature 20 °C {68 °F}	Approx. 3.1	• Engine coolant temperature sensor • Related harness
				After warm up	Below 1.0	
39	Intake air temperature	Intake air temperature sensor	Ignition switch ON	Intake air temperature 20 °C {68 °F}	Approx. 3.1	• Intake air temperature sensor • Related harness
40	—	—	—		—	—
41	A/C	Climate control unit Refrigerant pressure switch	Idle	A/C switch ON and fan switch ON	Below 1.0	• Climate control unit • Refrigerant pressure switch • Related harness
				A/C switch OFF	B+	
42	VRIS control	VRIS solenoid valve No.1	Ignition switch ON		B+	• VRIS solenoid valve No.1 • Related harness
			Engine speed above 3,500 rpm		Below 1.0	
43	—	—	—		—	—
44	VRIS control	VRIS solenoid valve No.2	Ignition switch ON		B+	• VRIS solenoid valve No.2 • Related harness
			Engine speed above 4,500 rpm		Below 1.0	
45	Cooling fan control	Cooling fan relay	Cooling fan not operating		B+	• Cooling fan relay • Related harness
			Cooling fan operating		Below 1.0	
46	EGR control	EGR valve (Coil #3)	Ignition switch ON		B+	• EGR valve • Related harness
			Idle		B+	
47	—	—	—		—	—
48	Engine speed	Instrument cluster, ABS/TCS CM	Ignition switch ON		Approx. 10	• Instrument cluster • Related harness
			Idle		Approx. 6.5	
49	Headlight	Headlight relay	Headlight switch OFF		Below 1.0	• Headlight relay • CPU • Headlight switch • Related harness
			Headlight switch ON		B+	
50	—	—	—		—	—

Terminal	Signal	Connection	Test condition		Voltage (V)	Possible malfunction
51	Ground	Ground	Constant		Below 1.0	• Related harness
52	Ignition	Ignition coil (#2, #5)	Ignition switch ON		B+ (DC)	• Ignition coil • Related harness
			Idle		1.5—2.5 (AC)	
53	Shift solenoid C (ATX)	Shift solenoid C	Solenoid valve OFF		B+	• Shift solenoid C • Related harness
			Solenoid valve ON		Below 1.0	
54	Torque converter clutch control (ATX)	TCC control solenoid	Torque converter clutch not operating		Below 1.0	• TCC control solenoid • Related harness
			Torque converter clutch operating		B+	
55	Back-up Power supply	Battery	Constant		B+	• Battery • Related harness
56	EGR control	EGR valve (Coil #4)	Ignition switch ON		B+	• EGR valve • Related harness
			Idle		Below 1.0	
57	Knocking	Knock sensor	Ignition switch ON		Approx. 3.5	• Engine condition • Knock sensor • Related harness
			Idle		Approx. 3.5	
58	Vehicle speed	Vehicle speedometer sensor (+)	Idle (AC range)		Approx. 0.1	• Vehicle speedometer sensor • Related harness
			48 km/h {30 mph} (AC range)		Approx. 8.0	
			88 km/h {55 mph} (AC range)		Approx. 12.7	
59	—	—	—		—	—
60	Heated oxygen sensor (Front RH)	Heated oxygen sensor (Front RH)	Ignition switch ON		Below 1.0	• Heated oxygen sensor (Front RH) • Related harness
			Idle	Engine cold	Below 0.5	
				After warm up	0.1—1.0	
			Acceleration		0.5—1.0	
			Deceleration		0—0.5	
61	Heated oxygen sensor (Rear)*2	Heated oxygen sensor (Rear)	Ignition switch ON		Below 1.0	• Heated oxygen sensor (Rear) • Related harness
			Idle	Engine cold	Approx. 0	
				After warm up	0.1—1.0	
	Heated oxygen sensor (Rear LH)*1	Heated oxygen sensor (Rear LH)	Ignition switch ON		Below 1.0	• Heated oxygen sensor (Rear LH) • Related harness
			Idle	Engine cold	Approx. 0	
				After warm up	0.1—1.0	
			Acceleration		Approx. 0	
			Deceleration			
62	Fuel tank pressure	Fuel tank pressure sensor	Ignition switch ON	Fuel tank pressure 0 kPa {0 mmHg, 0 inHg} (Barometric pressure)	2.42—2.58	• Fuel tank pressure sensor • Related harness
63	Fuel level	Fuel gauge sender unit	Full fuel		Approx. 6	• Fuel level sender unit • Related harness
			Low fuel		Approx. 0	
64	Load/No load distinction	Neutral switch (MTX), Transaxle range switch (ATX)	**MTX** Other than neutral position		B+	• Neutral switch • Transaxle range switch • Related harness
			ATX Other than P and N positions			
			MTX Neutral position		Below 1.0	
			ATX P or N position			

Terminal	Signal	Connection	Test condition		Voltage (V)	Possible malfunction
65	—	—	—		—	—
66	Rear window defroster	CPU	Ignition switch ON	Rear window defroster switch OFF	B+	• CPU • Rear window defroster relay • Related harness
				Rear window defroster switch ON	Below 1.0	
67	Purge control	Purge solenoid valve	Ignition switch ON		B+	• Purge solenoid valve • Related harness
			Idle		B+	
68	EGR control	EGR valve (Coil #1)	Ignition switch ON		B+	• EGR valve • Related harness
			Idle		B+	
69	A/C control	A/C relay	Idle	A/C switch OFF	B+	• A/C relay • Related harness
				A/C switch ON and fan switch ON	Below 1.0	
70	Fuel pump control (With immobilizer)	Fuel pump relay	Ignition switch ON		B+	• Fuel pump relay • Related harness
			Cranking		Below 1.0	
			Idle		Below 1.0	
71	Power supply	Main relay	Ignition switch OFF		Below 1.0	• Main relay • Related harness
			Ignition switch ON		B+	
72	EGR control	EGR valve (Coil #2)	Ignition switch ON		B+	• EGR valve • Related harness
			Idle		Below 1.0	
73	Fuel injector control #5	Fuel injector No.5	Ignition switch ON		B+	• Fuel injector No.5 • Related harness
			Idle		B+	
74	Fuel injector control #3	Fuel injector No.3	Ignition switch ON		B+	• Fuel injector No.3 • Related harness
			Idle		B+	
75	Fuel injector control #1	Fuel injector No.1	Ignition switch ON		B+	• Fuel injector No.1 • Related harness
			Idle		B+	
76	Ground	Ground	Constant		Below 1.0	• Related harness
77	Ground	Ground	Constant		Below 1.0	• Related harness
78	Ignition	Ignition coil (#3, #6)	Ignition switch ON		B+ (DC)	• Ignition coil • Related harness
			Idle		1.5—2.5 (AC)	
79	O/D OFF indicator light (ATX)	O/D OFF indicator light	Except O/D OFF mode		B+	• O/D OFF indicator light • Related harness
			O/D OFF mode		Below 1.0	
80	Fuel pump control (Without immobilizer)	Fuel pump relay	Ignition switch ON		B+	• Fuel pump relay • Related harness
			Cranking		Below 1.0	
			Idle		Below 1.0	
81	Pressure control solenoid (ATX)	Pressure control solenoid	P position	Closed throttle position	Approx. 7	• Pressure control solenoid • Related harness
				Wide open throttle	Approx. 1.6	
82	Torque reduction (Engine condition)	ABS/TCS CM	Ignition switch ON		Below 1.0	• ABS/TCS control module • Related harness
			Idle		Approx. 4.0	
83	Idle air control	IAC valve	Ignition switch ON		B+	• IAC valve • Related harness
			Idle	After warm up (No load)	Approx. 11	

Terminal	Signal	Connection	Test condition		Voltage (V)	Possible malfunction
84	Input/turbine speed (ATX)	Input/turbine speed sensor	Ignition switch ON (AC range)		Below 1.0	• Input/turbine speed sensor • Related harness
			Engine running at P position (AC range)		Below 1.0	
85	Cylinder identification (+)	Camshaft position sensor	Ignition switch ON		Below 1.0	• Camshaft position sensor • Related harness
			Idle		Below 1.0	
86	—	—	—		—	—
87	Heated oxygen sensor (Front LH)	Heated oxygen sensor (Front LH)	Ignition switch ON		Below 1.0	• Heated oxygen sensor (Front LH) • Related harness
			Idle	Engine cold	Below 0.5	
				After warm up	0.1—1.0	
			Acceleration		0.5—1.0	
			Deceleration		0—0.5	
88	Mass air flow	Mass air flow sensor	Ignition switch ON		Below 1.0	• Mass air flow sensor • Related harness
			Idle		1.0—2.0	
89	Throttle position	Throttle position sensor	Ignition switch ON	Closed throttle position	0.3—1.0	• Throttle position sensor • Related harness
				Wide open throttle	2.8—4.5	
90	Constant voltage (Vref)	EGR boost sensor, Fuel tank pressure sensor, Throttle position sensor	Ignition switch ON		Approx. 5.0	• Related harness
91	Ground	Engine coolant temperature sensor, Intake air temperature sensor, EGR boost sensor, Fuel tank pressure sensor, Throttle position sensor, Neutral/clutch switch, Heated oxygen sensor (Front RH, Front LH, Middle, Rear) and Input/turbine speed sensor	Constant		Below 1.0	• Related harness
92	Brake	Brake switch	Brake pedal released		Below 1.0	• Brake switch • Related harness
			Brake pedal depressed		B+	
93	Heated oxygen sensor heater (Front RH)	Heated oxygen sensor (Front RH) heater	Ignition switch ON		B+	• Heated oxygen sensor (Front RH) heater • Related harness
			Idle		Below 1.0	
94	Heated oxygen sensor heater (Front LH)	Heated oxygen sensor (Front LH) heater	Ignition switch ON		B+	• Heated oxygen sensor (Front LH) heater • Related harness
			Idle		Below 1.0	
95	Heated oxygen sensor heater (Middle or Rear RH)	Heated oxygen sensor (Middle) heater	Ignition switch ON		B+	• Heated oxygen sensor (Middle) heater • Related harness
			Idle		Below 1.0	
96	Heated oxygen sensor heater (Rear or Rear LH)	Heated oxygen sensor (Rear) heater	Ignition switch ON		B+	• Heated oxygen sensor (Rear) heater • Related harness
			Idle		Below 1.0	
97	Power supply 2	Main relay	Ignition switch OFF		Below 1.0	• Main relay • Related harness
			Ignition switch ON		B+	

Terminal	Signal	Connection	Test condition	Voltage (V)	Possible malfunction
98	EGR boost sensor switching control	EGR boost solenoid valve	Ignition switch ON	B+	• EGR boost solenoid valve • Related harness
			Idle	B+	
99	Fuel injection control #6	Fuel injector No.6	Ignition switch ON	B+	• Fuel injector No.6 • Related harness
			Idle	B+	
100	Fuel injection control #4	Fuel injector No.4	Ignition switch ON	B+	• Fuel injector No.4 • Related harness
			Idle	B+	
101	Fuel injection control #2	Fuel injector No.2	Ignition switch ON	B+	• Fuel injector No.2 • Related harness
			Idle	B+	
102	—	—	—	—	—
103	Ground	Ground	Constant	Below 1.0	• Related harness
104	—	—	—	—	—

* : If the immobilizer unit functions normally, replace the PCM.
*1 : California emission regulations applicable model
*2 : Except California emission regulations applicable model

PCM Inspection Using the SST (NGS Tester)

Note
- PIDs for the following pats are not available on this model. Go to the appropriate part inspection page.
  - — CMP sensor (See 01-40B-31 CAMSHAFT POSITION SENSOR INSPECTION [KL].)
  - — Main relay (See 01-40B-49 MAIN RELAY INSPECTION [KL].)

1. Connect the NGS tester to the DLC-2. (See 01-02B-11 ON-BOARD DIAGNOSTIC TEST [KL].)
2. Turn the ignition switch to ON.
3. Select the "PID/DATA MONITOR AND RECORD" function on the NGS display and press TRIGGER. (See 01-02B-11 ON-BOARD DIAGNOSTIC TEST [KL].)
4. Select the appropriate PID on the NGS display and press START.
5. Measure the PID value.
   - If PID value is not within the specification, follow the instructions in Action column.

PID/DATA MONITOR item table

Note
- The following PIDs may be displayed on the NGS tester, but they are not used for inspection, because these device are not applied to this model.

- ACP
- ACP V
- AIRA
- AIRF
- AIRM
- ARCF
- BARO
- CCS
- EGRC
- EGRCF
- EGRFO
- EGRFS
- EGRV
- EGRVF
- EGRVP
- EGRVR
- EVAPCP
- EVAPVMA
- FANM
- FFFM
- FP
- FP F
- FTP B
- HFCA
- HTR11A
- HTR12A
- HTR21A
- HTR22A
- HTRX1
- HTRX2
- IMRC
- IMRCF
- IMTVF
- INJ7F
- INJ8F
- LFCA
- LFPF
- OCTADJ
- PTO
- TAR_LRN
- TATCF
- TCCA
- TRAC
- TRD
- WACA
- 4 × 4L

X : Applied

Monitor Item	Full name	Unit/Condition	Application	
			MTX	ATX
3-2TIME	3-2 timing solenoid valve	ON/OFF		×
ACCS	A/C switch	ON/OFF	×	×
BLWMTR	Fan switch	ON/OFF	×	×
BPP/BOO	Brake switch	ON/OFF		×
CPP/PNP	Neutral position	ON/OFF	×	×
CLT V	Clutch switch signal voltage	V	×	
DPFEGR	EGR boost sensor signal voltage	V	×	×
DRIVECT	Total number of OBD II drive mode completed	—	×	×
DRLMP	Daytime running lights (for CANADA)	ON/OFF	×	×
DTC CNT	Total number of diagnostic trouble codes (DTC) stored in PCM (Include pending codes)	—	×	×
DTCCNTD	Total number of diagnostic trouble codes (QTC) stored in PCM	—	×	×
ECT	Engine coolant temperature	°C/°F	×	×
ECT V	Engine coolant temperature sensor signal voltage	V	×	×
EGR	Barometric pressure or EGR pressure	PSI	×	×
EGRBARO	EGR boost solenoid valve	ON/OFF	×	×
EGRCD1	EGR valve (Coil #1)	ON/OFF	×	×
EGRCD2	EGR valve (Coil #2)	ON/OFF	×	×
EGRCD3	EGR valve (Coil #3)	ON/OFF	×	×
EGRCD4	EGR valve (Coil #4)	ON/OFF	×	×
EPC	Line pressure control solenoid valve duty value	%		×
EVAPCPF	Purge control system output circuit failed	YES/NO	×	×
EVAPCV	CDCV operation condition	%	×	×
EVAPPDC	Purge solenoid valve duty value	%	×	×
EVAPCVF	CDCV failed detected	YES/NO	×	×
FLI	Fuel level	%	×	×
FLI V	Fuel gage sender unit signal voltage	V	×	×
FPA	Fuel pump relay ON/OFF condition	YES/NO	×	×
FP M	Fuel pump relay control signal	ON/OFF	×	×
FPRC	PRC solenoid valve	ON/OFF	×	×
FTP	Fuel tank inside pressure	PSI	×	×
FTP V	Fuel tank pressure sensor signal voltage	V	×	×
FUELPW1	Fuel injector ON time (RH)	ms	×	×
FUELPW2	Fuel injector ON time (LH)	ms	×	×
GEAR	Selector lever position	—		×
HDLMP	Headlight switch	ON/OFF	×	×
HFC	Condenser fan	ON/OFF	×	×
HFCF	Condenser fan circuit failure detected	YES/NO	×	×
HTR11	Heated oxygen sensor heater (Front RH)	ON/OFF	×	×
HTR11F	Heated oxygen sensor heater (Front RH) failed	YES/NO	×	×
HTR12	Heated oxygen sensor heater (Middle)	ON/OFF	×	×
HTR12F	Heated oxygen sensor heater (Middle) failed	YES/NO	×	×
HTR21	Heated oxygen sensor heater (Front LH)	ON/OFF	×	×
HTR21F	Heated oxygen sensor heater (Front LH) failed	YES/NO	×	×
HTR22	Heated oxygen sensor heater (Rear)	ON/OFF	×	×
HTR22F	Heated oxygen sensor heater (Rear) failed	YES/NO	×	×
IAC	IAC valve duty value	%	×	×

Monitor item	Full name	Unit/Condition	Application	
			MTX	ATX
IACF	IAC system failed	YES/NO	×	×
IAT	Intake air temperature	°C/°F	×	×
IAT V	Intake air temperature sensor signal voltage	V	×	×
INJ1F	Fuel injector #1 circuit failed	YES/NO	×	×
INJ2F	Fuel injector #2 circuit failed	YES/NO	×	×
INJ3F	Fuel injector #3 circuit failed	YES/NO	×	×
INJ4F	Fuel injector #4 circuit failed	YES/NO	×	×
INJ5F	Fuel injector #5 circuit failed	YES/NO	×	×
INJ6F	Fuel injector #6 circuit failed	YES/NO	×	×
KSV	KNOCK sensor signal voltage	V	×	×
LFC	Cooling fan	ON/OFF	×	×
LFCF	Cooling fan circuit failed	YES/NO	×	×
LOAD	Calculated engine load value	%	×	×
LONGFT1	Long fuel trim (RH)	%	×	×
LONGFT2	Long fuel trim (LH)	%	×	×
LOOP	Feedback control condition	OPEN/CLOSED	×	×
MAF	Mass air flow amount	gm/s/lb/m	×	×
MIL	MIL	ON/OFF	×	×
MILF	MIL circuit failed	YES/NO	×	×
MISF	Misfiring	ON/OFF	×	×
O2S11	Heated oxygen sensor (Front RH) signal voltage	V	×	×
O2S12	Heated oxygen sensor (Middle) signal voltage	V	×	×
O2S21	Heated oxygen sensor (Front LH) signal voltage	V	×	×
O2S22	Heated oxygen sensor (Rear) signal voltage	V	×	×
PIP	IG coil signal	ON/OFF	×	×
PSP	Power steering pressure switch	HIGH/LOW	×	×
PSP V	Power steering pressure switch signal voltage	V	×	×
RDEF	Rear window defroster switch	ON/OFF	×	×
RPM	Engine speed	rpm	×	×
SHRTFT1	Short fuel trim (RH)	%	×	×
SHRTFT2	Short fuel trim (LH)	%	×	×
SPRKADV	Ignition timing	BTDC	×	×
SS1	Shift solenoid A	ON/OFF		×
SS2	Shift solenoid B	ON/OFF		×
SS3	Shift solenoid C	ON/OFF		×
TCC	Torque converter clutch solenoid valve duty value	%		×
TCC MACT	TCC slip value	rpm		×
TCC RAT	Speed ratio across Torgue converter (Output/Input)	—		×
TCS	O/D OFF switch	ON/OFF		×
TFT	Transaxle fluid temperature	°C/°F		×
TFT V	Transaxle fluid temperature sensor signal voltage	V		×
TP V	Throttle position sensor signal voltage	V	×	×
TP MODE	Throttle position	C/T, P/T, WOT	×	×
TR	Transaxle range	—		×
TRAN RAT	Transaxle gear ratio	—		×
TR V	Transaxle range switch signal voltage	V		×
TRIP	OBD II drive cycle status	YES/NO	×	×
TRIPCNT	Total number of OBD II drive cycle completed	—	×	×

Monitor item	Full name	Unit/Condition	Application	
			MTX	ATX
TSS	Turbine shaft speed	rpm		×
TSS/ISS	Turbine/Input shaft speed	rpm		×
VPWR	Battery positive voltage	V	×	×
VRISV1	VRIS solenoid valve No.1	—	×	×
VRISV2	VRIS solenoid valve No.2	—	×	×
VSS	Vehicle speed	km/h, mph	×	×
WAC	A/C Relay	ON/OFF	×	×
WACF	Magnet clutch(A/C) circuit failure detected	YES/NO	×	×

PID/DATA MONITOR table (Reference)

Monitor item (Definition)	Unit/ Condition	Condition/Specification (Reference)	Action	PCM terminal
3-2 TIME	ON/OFF	Ignition switch ON: OFF Engine running: Indicates solenoid valve control signal status	Verify PIDs (MAF, CPP/PNP, RPM, TP MODE, VSS)	28
ACCS	ON/OFF	A/C switch ON: ON Others: OFF	Inspect A/C switch (See 07-40-23 CLIMATE CONTROL UNIT INSPECTION)	41
BLWMTR	ON/OFF	Fan switch ON at 3rd or higher: ON Others: OFF	Inspect fan switch (See 07-40-22 FAN SWITCH INSPECTION)	10
BPP/BOO	ON/OFF	Brake pedal depressed: ON Others: OFF	Inspect brake switch (See 04-11-6 BRAKE SWITCH INSPECTION)	92
CPP/PNP	ON/OFF	For MTX Shift lever at N: ON Others: OFF For ATX Shift lever at N or P: ON Others: OFF	Inspect clutch switch or neutral switch or transaxle range switch (See 01-40B-46 NEUTRAL SWITCH INSPECTION [KL]) (See 01-40B-47 CLUTCH SWITCH INSPECTION [KL]) (See 05-17B-24 TRANSAXLE RANGE SWITCH INSPECTION [GF4A-EL])	64
CLT V	Volts	Clutch pedal depressed: Below 1.0 Others: Battery voltage	Inspect Clutch switch (See 01-40B-47 CLUTCH SWITCH INSPECTION [KL])	30
DPFEGR	Volts	Ignition switch ON: Approx. 4.0 Idle: Approx. 4.0	Inspect EGR boost sensor (See 01-40B-41 EGR BOOST SENSOR INSPECTION [KL])	34
DRIVECT	#	Indicates number of OBD-II drive cycle completed	—	—
DRLMP	ON/OFF	DRL ON: ON (for Canada) Others: OFF	Inspect CPU (See 09-40-1 CPU INSPECTION)	14
DTC CNT	#	Indicates total number of DTC and pending codes stored in PCM	—	—
DTCCNTD	#	Indicates total number of DTC stored in PCM	—	—
ECT	Deg.F	Indicates engine coolant temperature	Inspect ECT sensor (See 01-40B-37 ENGINE COOLANT TEMPERATURE SENSOR INSPECTION [KL])	38
ECT V	Volts	Ignition switch ON: Approx. 3.1 After warm up: Below 1.0	Inspect ECT sensor (See 01-40B-37 ENGINE COOLANT TEMPERATURE SENSOR INSPECTION [KL])	38

Monitor item (Definition)	Unit/ Condition	Condition/Specification (Reference)	Action	PCM terminal
EGR	PSI	Ignition switch ON: Approx. 4.0 Idle: Approx. 4.0	Inspect EGR boost sensor (See 01-40B-41 EGR BOOST SENSOR INSPECTION [KL])	34
EGRBARO	ON/OFF	During OBD-II EGR monitor testing: OFF Others: OFF	Inspect EGR boost solenoid valve (See 01-16-17 EGR BOOST SOLENOID VALVE INSPECTION)	44
EGRCD1	ON/OFF	Ignition switch ON: OFF Idle: OFF	Verify PIDs (MAF,CPP/PNP, RPM, TP MODE, VSS)	68
EGRCD2	ON/OFF	Ignition switch ON: OFF Idle: ON	Verify PIDs (MAF, CPP/PNP, RPM, TP MODE, VSS)	72
EGRCD3	ON/OFF	Ignition switch ON: OFF Idle: OFF	Verify PIDs (MAF, CPP/PNP, RPM, TP MODE, VSS)	46
EGRCD4	ON/OFF	Ignition switch ON: OFF Idle: ON	Verify PIDs (MAF,CPP/PNP, RPM, TP MODE, VSS)	56
EPC	%	Idle: (After warm up): Approx. 55%	Verify PIDs (MAF,CPP/PNP, RPM, TP MODE, VSS)	81
EVAPCPF	YES/NO	Purge solenoid valve circuit failed: YES Others: NO	Inspect purge solenoid valve (See 01-16-12 PURGE SOLENOID VALVE INSPECTION)	67
EVAPCV	%	Idle: 0%	Inspect CDCV (See 01-16-11 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION)	18
EVAPCVF	YES/NO	CDCV circuit failed: YES Others: NO	Inspect CDCV (See 01-16-11 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION)	18
EVAPPDC	%	Ignition switch ON: 0% Idle: Below 10%	Verify PIDs (MAF,CPP/PNP, RPM, TP MODE, VSS)	67
FLI	%	Indicates fuel tank level	Inspect fuel gauge sender unit (See 09-22-9 FUEL GAUGE SENDER UNIT INSPECTION)	63
FLI V	V	Full fuel: Approx. 6	Inspect fuel gauge sender unit (See 09-22-9 FUEL GAUGE SENDER UNIT INSPECTION)	63
FP M	ON/OFF	Fuel pump relay ON: ON	Inspect CKP sensor (See 01-40B-34 CRANKSHAFT POSITION SENSOR INSPECTION [KL])	80
FPA	ON/OFF	Fuel pump relay ON: ON	Inspect CKP sensor (See 01-40B-34 CRANKSHAFT POSITION SENSOR INSPECTION [KL])	80
FPRC	ON/OFF	Idle (Hot start): ON Others: OFF	Verify PIDs (MAF,CPP/PNP, IAT, RPM, TP MODE, VSS)	19
FTP V	V	Fuel tank pressure 0 kPa {0 mmHg, 0 inHg}: 2.42—2.58 V	Inspect fuel tank pressure sensor (See 01-40B-42 FUEL TANK PRESSURE SENSOR INSPECTION [KL])	82
FUELPW1	ms	Idle: 2.0-4.0 msec	Verify PIDs (MAF, RPM, TP MODE, ECT, IAT, O2S11, O2S12, O2S21, O2S22)	73, 74, 75
FUELPW2	ms	Idle: 2.0-4.0 msec	Verify PIDs (MAF, RPM, TP MODE, ECT, IAT, O2S11, O2S12, O2S21, O2S22)	99, 100, 101
GEAR	DECIMAL	Indicates gear position	—	—
HDLMP	ON/OFF	Head light ON: ON	Inspect light switch (See 09-18-7 LIGHT SWITCH INSPECTION)	49
HFC	ON/OFF	Condenser fan operating: ON	Verify PIDs (ECT, IAT, RPM, TP MODE)	17

Monitor item (Definition)	Unit/ Condition	Condition/Specification (Reference)	Action	PCM terminal
HFCF	YES/NO	Condenser fan circuit failed: YES Others: NO	Inspect condenser fan relay (See 07-40-20 A/C RELAY, BLOWER RELAY, AND CONDENSER FAN RELAY INSPECTION)	17
HTR11	YES/NO	Heated Oxygen sensor heater (Front RH) ON: ON	Verify PID (IAT)	93
HTR11F	YES/NO	Heated Oxygen sensor heater (Front RH) circuit failed	Inspect heated oxygen sensor (Front RH) (See 01-40B-39 HEATED OXYGEN SENSOR INSPECTION [KL])	93
HTR12	YES/NO	Heated Oxygen sensor heater (Front LH) ON: ON	Verify PID (IAT)	94
HTR12F	YES/NO	Heated Oxygen sensor heater (Front LH) circuit failed	Inspect heated oxygen sensor (Front LH) (See 01-40B-39 HEATED OXYGEN SENSOR INSPECTION [KL])	94
HTR21	YES/NO	Heated Oxygen sensor heater (Middle or rear RH) ON: ON	Verify PID (IAT)	95
HTR21F	YES/NO	Heated Oxygen sensor heater (Middle or rear RH) circuit failed	Inspect heated oxygen sensor (Middle or rear RH) (See 01-40B-39 HEATED OXYGEN SENSOR INSPECTION [KL])	95
HTR22	YES/NO	Heated Oxygen sensor heater (Rear or rear LH) ON: ON	Verify PID (IAT)	96
HTR22F	YES/NO	Heated Oxygen sensor heater (Rear or rear LH) circuit failed	Inspect heated oxygen sensor (Rear or rear LH) (See 01-40B-39 HEATED OXYGEN SENSOR INSPECTION [KL])	96
IAC	%	Ignition switch ON: 0% Idle: Approx. 23% (E/L ON: Approx. 30%)	Verify PIDs (ACCS, BLWMTR, MAF, CPP/PNP)	20, 89
IACF	YES/NO	IAC circuit failed: YES Others: NO	Inspect IAC valve (See 01-13B-8 IDLE AIR CONTROL (IAC) VALVE INSPECTION [KL])	20, 89
IAT	Deg.F	Indicates intake air temperature	Inspect IAT sensor (See 01-40B-38 INTAKE AIR TEMPERATURE SENSOR INSPECTION [KL])	39, 91
IAT V	Volts	Intake air temperature 20Deg.C {68Deg.F}: Approx. 3.1	Inspect IAT sensor (See 01-40B-38 INTAKE AIR TEMPERATURE SENSOR INSPECTION [KL])	39, 91
INJ1F	YES/NO	Fuel injector circuit failed: YES Others: NO	Inspect fuel injector (See 01-14-20 FUEL INJECTOR INSPECTION)	75
INJ2F	YES/NO	Fuel injector circuit failed: YES Others: NO	Inspect fuel injector (See 01-14-20 FUEL INJECTOR INSPECTION)	101
INJ3F	YES/NO	Fuel injector circuit failed: YES Others: NO	Inspect fuel injector (See 01-14-20 FUEL INJECTOR INSPECTION)	74
INJ4F	YES/NO	Fuel injector circuit failed: YES Others: NO	Inspect fuel injector (See 01-14-20 FUEL INJECTOR INSPECTION)	100
INJ5F	YES/NO	Fuel injector circuit failed: YES Others: NO	Inspect fuel injector (See 01-14-20 FUEL INJECTOR INSPECTION)	73
INJ6F	YES/NO	Fuel injector circuit failed: YES Others: NO	Inspect fuel injector (See 01-14-20 FUEL INJECTOR INSPECTION)	99
KS V	V	Ignition switch ON: Approx. 3.5 Idle: Approx. 3.5	Inspect knock sensor (See 01-40B-32 KNOCK SENSOR INSPECTION [KL])	57

Monitor item (Definition)	Unit/ Condition	Condition/Specification (Reference)	Action	PCM terminal
LFC	ON/OFF	Cooling fan operating: ON	Verify PIDs (ACCS, RPM, ECT, IAT)	45
LFCF	YES/NO	Cooling fan circuit failed	Inspect cooling fan relay (See 01-12-8 COOLING FAN RELAY INSPECTION)	45
LOAD	%	Ignition switch ON: 0% Idle: Approx. 20%, Indicates engine load	—	—
LONGFT1	%	Idle: +-20%	Verify PIDs (MAF, ECT, IAT, O2S11, O2S12, O2S21, O2S22)	—
LONGFT2	%	Idle: +-20%	Verify PIDs (MAF, ECT, IAT, O2S11, O2S12, O2S21, O2S23)	—
LOOP	OPEN/CLS	During feedback control: CLOSED Others: OPEN	—	—
MAF	Gm/sec	For MTX Engine speed 600-700rpm: 2.9-3.7 Gm/s Engine speed 2500 rpm: 9.9-12.1 Gm/s For ATX Engine speed 600-700rpm: 2.9-4.0 Gm/s Engine speed 2500 rpm: 9.9-12.7 Gm/s"	Inspect MAF sensor (See 01-40B-30 MASS AIR FLOW SENSOR INSPECTION [KL])	36, 88
MIL	ON/OFF	MIL ON: ON Others: OFF	Inspect MIL circuit	2
MILF	YES/NO	MIL circuit failed: YES Others: NO	Inspect MIL circuit	2
MISF	ON/OFF	Misfiring detected: ON Others: OFF	—	—
O2S11	Volts	Idle (After warm up): 0.1-0.9	Inspect heated oxygen sensor (See 01-40B-39 HEATED OXYGEN SENSOR INSPECTION [KL])	60
O2S12	Volts	Idle (After warm up): 0.1-0.9	Inspect heated oxygen sensor (See 01-40B-39 HEATED OXYGEN SENSOR INSPECTION [KL])	87
O2S21	Volts	Idle (After warm up): 0.1-0.9	Inspect heated oxygen sensor (See 01-40B-39 HEATED OXYGEN SENSOR INSPECTION [KL])	35
O2S22	Volts	Idle (After warm up): 0.1-0.9	Inspect heated oxygen sensor (See 01-40B-39 HEATED OXYGEN SENSOR INSPECTION [KL])	61
PIP	ON/OFF	Idle: Fluctuates between ON and OFF	—	—
PSP	HIGH/LOW	Power Steering operating: HIGH Others: LOW	Inspect power steering pressure switch (See 01-40B-45 POWER STEERING PRESSURE SWITCH INSPECTION [KL])	31
PSP V	Volts	Power Steering operating: 0 Others: Approx. 4	Inspect power steering pressure switch (See 01-40B-45 POWER STEERING PRESSURE SWITCH INSPECTION [KL])	31
RDEF	ON/OFF	Rear Window Defroster ON: ON	Inspect rear window defroster switch	66
RPM	RPM	Indicates engine speed	Inspect CKP sensor (See 01-40B-34 CRANKSHAFT POSITION SENSOR INSPECTION [KL])	21, 22
SHORTFT 1	%	Idle: +-20%	Verify PIDs (MAF, ECT, IAT, O2S11, O2S12, O2S21, O2S22)	—
SHORTFT 2	%	Idle: +-21%	Verify PIDs (MAF, ECT, IAT, O2S11, O2S12, O2S21, O2S22)	—
SPRKADV	BTDC	Idle: (After warm up): 4-16 Deg.	Verify PIDs (MAF, ECT, IAT, O2S11, O2S12, O2S21, O2S22)	—
SS1	ON/OFF	Gear position is in 2nd or 3rd or 4th: ON	—	—
SS2	ON/OFF	Gear position is in 1st or 2nd: ON	—	—
SS3	ON/OFF	Gear position is in 1st 4th: ON	—	—
TCC	%	Indicates TCC solenoid valve control duty value	—	—

Monitor item (Definition)	Unit/ Condition	Condition/Specification (Reference)	Action	PCM terminal
TCCMACT	RPM	Indicates TCC slip value	—	—
TCCRAT	—	indicates speed ratio across torque converter(Output/Input)	—	—
TCS	ON/OFF	While O/D OFF switch is being pushed: ON	Inspect O/D OFF switch inspection (See 05-17B-23 O/D OFF SWITCH INSPECTION [GF4A-EL])	29
TFT	Deg.F	Idle (After warm up): Approx. 60 Deg.F {140 Deg.F}	Inspect transaxle fluid temperature sensor (See 05-17B-26 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION [GF4A-EL])	37
TFT V	V	Transaxle fluid temperature 20	Inspect transaxle fluid temperature sensor (See 05-17B-26 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION [GF4A-EL])	37
TP MODE	MODE	Close throttle position: C/T Half throttle position: P/T Wide open throttle: WOT	Inspect throttle position sensor (See 01-40B-34 THROTTLE POSITION SENSOR INSPECTION [KL])	89
TP V	Volts	Close throttle position: 0.3—1.0 Wide open throttle: 2.8—4.5	Inspect throttle position sensor (See 01-40B-34 THROTTLE POSITION SENSOR INSPECTION [KL])	89
TR	MODE	Selector lever in P/N position: NTR Selector lever in R position: REV Selector lever in D range and O/D ON: O/D Selector lever in D range and O/D OFF: DRIVE Selector lever in 2 range: MAN2 Selector lever in 1 range: MAN1	Inspect transaxle range switch (See 05-17B-24 TRANSAXLE RANGE SWITCH INSPECTION [GF4A-EL])	6, 7 9, 32, 29
TR V	V	Shift lever in D, 2 or 1 range and R position: Approx. 3.5 Others: 0	Inspect transaxle range switch (See 05-17B-24 TRANSAXLE RANGE SWITCH INSPECTION [GF4A-EL])	6, 7, 9, 32, 29
TRANRAT	ratio	indicates transaxle gear ratio	—	—
TRIP	YES/NO	OBD II trip cycle completed: YES Others: NO	—	—
TRIPCNT	#	Indicates the total number of OBD II trip cycle completed	—	—
TSS	RPM	Idle (After warm up): Approx. 700	Inspect input/turbine speed sensor (See 05-17B-27 INPUT/TURBINE SPEED SENSOR INSPECTION [GF4A-EL])	23, 84
TSS/ISS	RPM	Idle (After warm up): Approx. 700	Inspect input/turbine speed sensor (See 05-17B-27 INPUT/TURBINE SPEED SENSOR INSPECTION [GF4A-EL])	23, 84
VPWR	Volts	Ignition switch ON: Battery voltage	Inspect battery	71, 97
VRISV1	—	Engine speed above 3500 rpm: ON	Inspect CKP sensor (See 01-40B-34 CRANKSHAFT POSITION SENSOR INSPECTION [KL])	21, 22
VRISV2	—	Engine speed above 4500 rpm: ON	Inspect CKP sensor (See 01-40B-34 CRANKSHAFT POSITION SENSOR INSPECTION [KL])	21, 22
VSS	MPH	Indicates vehicle speed	Inspect transaxle fluid temperature sensor (See 05-17B-29 VEHICLE SPEEDOMETER SENSOR INSPECTION [GF4A-EL])	33, 58

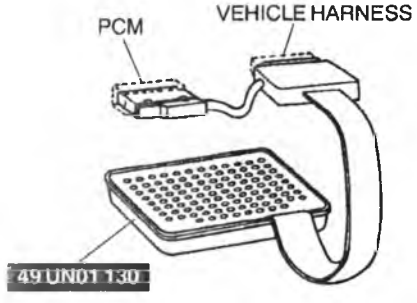
Monitor item (Definition)	Unit/ Condition	Condition/Specification (Reference)	Action	PCM terminal
WAC	ON/OFF	A/C ON: ON	Inspect A/C relay (See 07-40-20 A/C RELAY, BLOWER RELAY, AND CONDENSER FAN RELAY INSPECTION)	69
WACF	YES/NO	A/C relay circuit failed: ON	Inspect A/C relay (See 07-40-20 A/C RELAY, BLOWER RELAY, AND CONDENSER FAN RELAY INSPECTION)	69

MASS AIR FLOW SENSOR INSPECTION [KL]

Y6U14013210W02

Using the SST (104 Pin Breakout Box)

1. Check the mass air flow sensor for damage and cracks.
   - If there is damage or cracks, replace mass air flow sensor.
2. Disconnect the PCM connector. (See 01-40B-15 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
3. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



W6U140WM4

4. Tighten the connector bolt.

   Tightening torque
   7.9—10.7 N·m
   {80—110 kgf·m, 69.5—95.4 in·lbf}

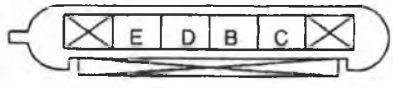
5. Measure the voltage at the PCM terminal 88 as shown in the table.
   - If not as specified, perform the MAF sensor circuit open/short inspection.

Specification

Measuring condition	Voltage (V)
Ignition switch ON	Below 1.0
Idle	1.0—2.0

   a. Harness continuity
      - Between PCM terminal 88 and mass air flow sensor terminal E
      - Between PCM terminal 36 and mass air flow sensor terminal D
      - Between PCM terminal 76 and mass air flow sensor terminal C
      - Between main relay terminal E and mass air flow sensor terminal B

   b. Terminal voltage
      - Mass air flow sensor terminal B voltage: Battery positive voltage
      - Mass air flow sensor terminal C voltage: Below 1.0 V

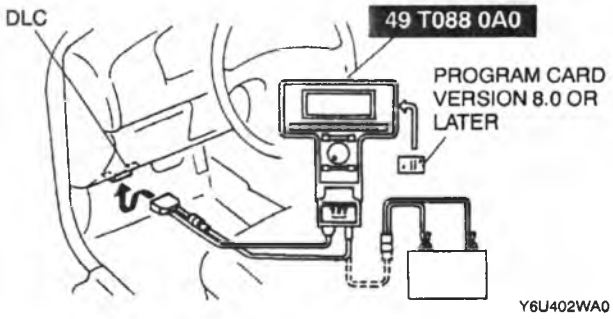


W6U140WM5

6. If the terminal voltage is correct and there is harness continuity, replace the mass air flow sensor. (See 01-13B-4 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [KL].)

Using the SSTs (NGS Tester)

1. Check the mass air flow sensor for damage and cracks.
2. Connect the **SSTs** (NGS tester) to the data link connector.



Y6U402WA0

3. Turn the ignition switch to ON.
4. Select the "PID/DATA MONITOR AND RECORD" function on the NGS tester display and press TRIGGER.
5. Select "MAF V" on the NGS tester display and press START. The NGS tester measures and show the voltage.
   - If not as specified, inspect following harness continuity and terminal voltage.

— If the terminal voltage is correct and there is harness continuity, replace the mass air flow sensor. (See 01-13B-4 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [KL].)

Specification

Measuring condition	Voltage (V)
Ignition switch ON	Below 1.0
Idle	1.0—2.0

a. Harness continuity
- Between PCM terminal 88 and mass air flow sensor terminal E
- Between PCM terminal 36 and mass air flow sensor terminal D
- Between PCM terminal 76 and mass air flow sensor terminal C
- Between main relay terminal E and mass air flow sensor terminal B

b. Terminal voltage
- Mass air flow sensor terminal B voltage: Battery positive voltage
- Mass air flow sensor terminal C voltage: Below 1.0 V



W6U140WM7

MAF Rate and Load Value

Note
- The scan total shows the mass air flow rate and load value.

Specification

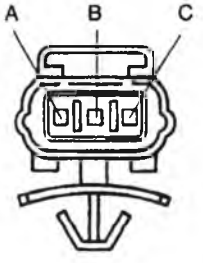
Engine speed (rpm)	Intake mass air MAF (g/s{1b/min})		Engine load calculated value (%)	
	MAF		LOAD	
	MTX	ATX	MTX	ATX
600—700 (Idle)	2.9—3.7 {0.39—0.48}	2.9—4.0 {0.39—0.52}	19.0—22.0	19.0—23.0
Approx. 2,500*	9.9—12.1 {1.31—1.59}	9.9—12.7 {1.31—1.67}	16.0—19.0	16.0—20.0

* : No load, in neutral

CAMSHAFT POSITION SENSOR INSPECTION [KL]

Y6U14018200W02

1. Disconnect the camshaft position sensor connector.
2. Measure the resistance between terminals A and B by using an ohmmeter.
   - If not as specified, check related wiring harness.
   - If they are okay, replace the camshaft position sensor. (See 01-40B-32 CAMSHAFT POSITION SENSOR REMOVAL/INSTALLATION [KL].)



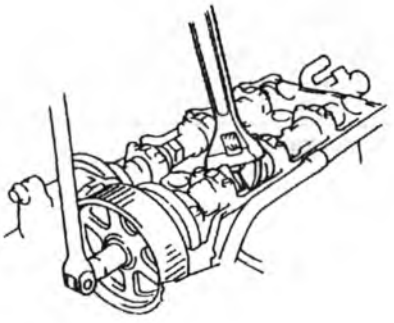
W6U140WM8

Specification
Approx. 550 Ω

CAMSHAFT POSITION SENSOR REMOVAL/INSTALLATION [KL]

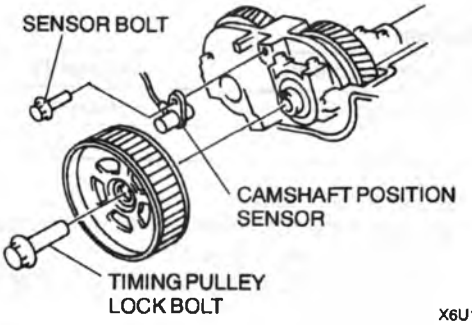
Y6U14018200W03

1. Disconnect the battery negative cable.
2. Disconnect the camshaft position sensor connector.
3. Remove the timing belt cover and timing belt. (See 01-10B-6 TIMING BELT REMOVAL/INSTALLATION [KL].)
4. Remove the cylinder head cover. (See 01-10B-10 CYLINDER HEAD GASKET REPLACEMENT [KL].)
5. Hold the camshaft by using a wrench on the cast hexagon as shown, loosen the camshaft pulley lock bolt.



W6U140WM9

6. Remove the camshaft pulley lock bolt.
7. Remove the camshaft pulley.
8. Remove the camshaft position sensor.



X6U140WMA

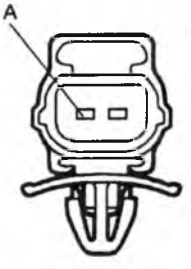
9. Install in the reverse order of removal.

Tightening torque
Timing pulley bolt: 123—140 N·m {12.5—14.3 kgf·m, 91—103 ft·lbf}
Sensor bolt: 7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 ft·lbf}

KNOCK SENSOR INSPECTION [KL]

Y6U14018921W03

1. Verify that the ignition switch is OFF.
2. Disconnect knock sensor connector.
3. Measure the resistance between knock sensor terminal A and the knock sensor body by using an ohmmeter.
   - If not as specified, replace the knock sensor. (See 01-40B-33 KNOCK SENSOR REPLACEMENT [KL].)



W6U140WNE

Specification
Approx. 560 kΩ [20 °C {68 °F}]

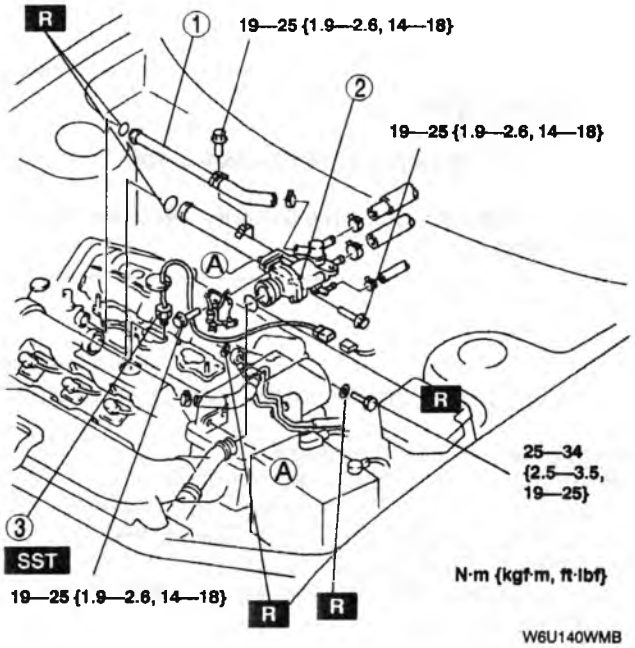
KNOCK SENSOR REPLACEMENT [KL]

Y6U14018921W04

Warning

- **Fuel vapor is hazardous. It can vary easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "BEFORE REPAIR PROCEDURE" (See 01-14-3 BEFORE REPAIR PROCEDURE [KL].)**

1. Disconnect the negative battery cable.
2. Drain the coolant from the radiator. (See 01-12-2 ENGINE COOLANT REPLACEMENT.)
3. Remove the intake manifold. (See 01-13B-4 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [KL].)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. Install the intake manifold. (See 01-13B-4 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [KL].)
7. Refill the radiator with the specified engine coolant. (See 01-12-2 ENGINE COOLANT REPLACEMENT.)

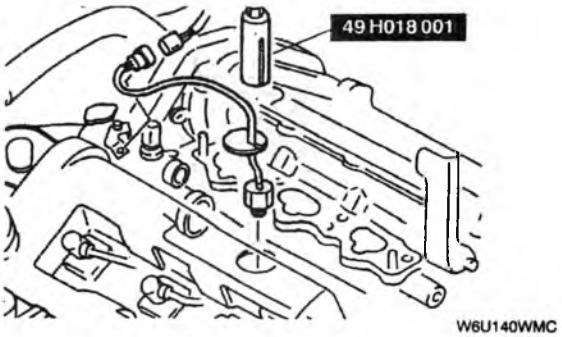


W6U140WMB

1	Bypass pipe
2	Water pipe
3	Knock sensor (See 01-40B-33 Knock Sensor Removal/Installation Note)

Knock Sensor Removal/Installation Note

- Use the **SST** to remove and install the knock sensor.



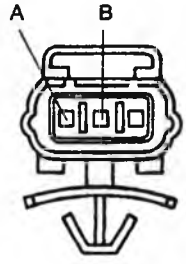
W6U140WMC

CRANKSHAFT POSITION SENSOR INSPECTION [KL]

Y6U14018230W03

Inspection of Resistance

1. Disconnect the battery negative cable.
2. Disconnect the crankshaft position sensor connector.
3. Measure the resistance between terminals A and B by using an ohmmeter.
   - If not as specified, check related wiring harness. If they are okay, replace the crankshaft position sensor.

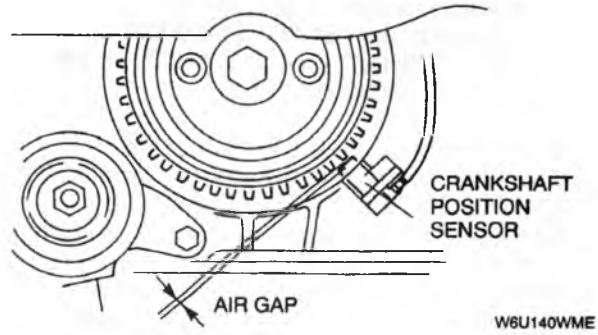


W6U140WMD

Specification
Approx. 550 Ω

Inspection of Air Gap

1. Verify that the crankshaft position sensor is installed correctly and securely.
2. Measure the air gap between the crankshaft pulley teeth and the crankshaft position sensor by using a feeler gauge.
   - If not as specified, replace the crankshaft pulley or the crankshaft position sensor.



W6U140WME

Specification
0.5—1.5 mm {0.020—0.059 in}

CRANKSHAFT POSITION SENSOR REPLACEMENT [KL]

Y6U14018230W04

1. Disconnect the negative battery cable.
2. Disconnect the crankshaft position sensor connector.
3. Remove the crankshaft position sensor.
4. Install in the reverse order of removal.

Tightening torque
7.9—10.7 N·m
{80—100 kgf·cm, 69.5—95.4 in·lbf}

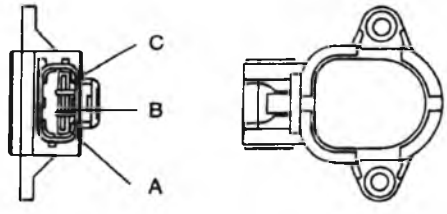
5. Inspect the air gap. (See 01-40B-34 Inspection of Air Gap.)

THROTTLE POSITION SENSOR INSPECTION [KL]

Y6U14018910W03

Inspection of Resistance

1. Disconnect the battery negative cable.
2. Disconnect the throttle position sensor connector.
3. Using an ohmmeter, measure the resistance between throttle position sensor terminal A and B.
   - If not as specified, replace the throttle position sensor.



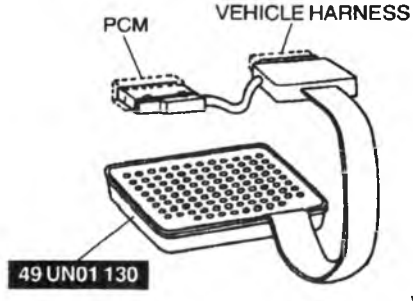
W6U140WMF

Specification
2.5—5.0 kΩ

4. Reconnect the throttle position sensor connector.

Inspection of Output Voltage
Using the SST (104 pin breakout box)

1. Disconnect the PCM connector. (See 01-40B-15 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



W6U140WMG

3. Tighten the connector attaching screws.

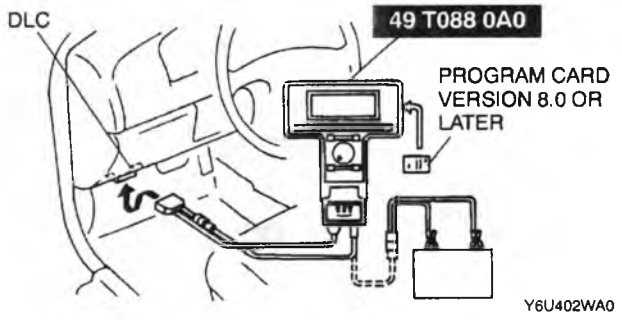
Tightening torque
7.9—10.7 N·m
{80—100 kgf·cm, 69.5—95.4 in·lbf}

4. Verify that the throttle valve is at the closed throttle position.
5. Turn the ignition switch to ON.
6. Measure the PCM terminal 89 voltage by using a voltmeter.
   - If not as specified, adjust the throttle position sensor. (See 01-40B-35 THROTTLE POSITION SENSOR ADJUSTMENT [KL].)

Specification
Closed throttle position: 0.3—1.0 V
Wide open throttle: 2.8—4.5 V (Verify that the voltage increase is directly proportioned to the throttle valve opening angle.)

Using the SSTs (NGS tester)

1. Connect the **SSTs** (NGS tester) to the data link connector.



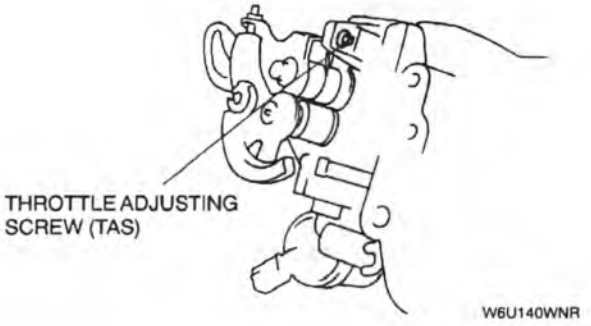
Y6U402WA0

2. Verify that the throttle valve is at the closed throttle position.
3. Turn the ignition switch to ON.
4. Select the "PID/DATA MONITOR AND RECORD" function on the NGS tester display and press TRIGGER.
5. Select "TP V" on the NGS tester display and press START. NGS tester measures and shows the voltage.
   - If not as specified, adjust the throttle position sensor. (See 01-40B-35 THROTTLE POSITION SENSOR ADJUSTMENT [KL].)

Specification
Closed throttle position: 0.3—1.0 V
Wide open throttle: 2.8—4.5 V (Verify that the voltage increase is directly proportioned to the throttle valve opening angle.)

THROTTLE POSITION SENSOR ADJUSTMENT [KL]

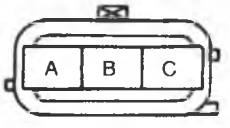
Caution
- **The throttle position sensor is adjusted at the factory before shipment. Unnecessary adjustment will negatively affect the engine performance.**
- **Adjusting the throttle position sensor by using the throttle adjusting screw (TAS) will negatively affect the engine performance.**



W6U140WNR

Y6U14018910W04

1. Verify that the throttle valve is at the closed throttle position.
2. Disconnect the throttle position sensor connector.
3. Turn the ignition switch to ON.
4. Measure the voltage at harness side connector terminal B by using an ohmmeter and record it.



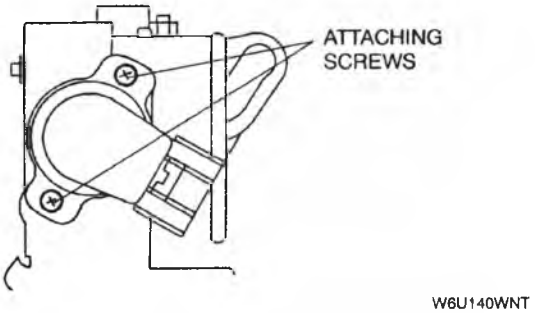
HARNESS SIDE CONNECTOR (VIEW FROM VEHICLE HARNESS CONNECTOR)

Y6U140WG4

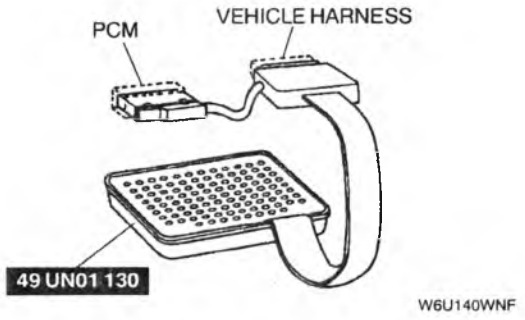
Specification
4.5—5.5 V

5. Turn the ignition switch to OFF.

6. Connect the throttle position sensor connector.
7. Loosen the attaching screws.



8. If the **SST** (104 Pin Breakout Box) is used, PERFORM THE Following:
   (1) Disconnect the PCM connector. (See 01-40B-15 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
   (2) Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



   (3) Tighten the connector bolt.

Tightening torque
7.9—10.7 N·m
{80—100 kgf·cm, 69.5—95.4 in·lbf}

   (4) Verify that the throttle valve is at the closed throttle position.
   (5) Turn the ignition switch to ON.
   (6) Rotate the throttle linkage by hand and adjust the PCM terminal 89 voltage to specification.

Specification (At closed throttle position)

Throttle position sensor harness side connector terminal B voltage (V)	PCM terminal 89 voltage (V)
4.5—4.9	0.4—0.5
4.9—5.1	0.4—0.6
5.1—5.5	0.5—0.6

   (7) Tighten the attaching screws.

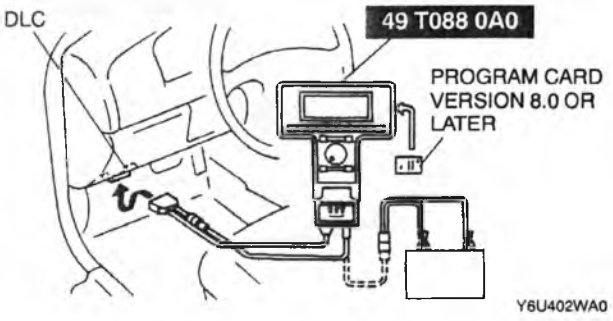
Tightening torque
1.6—2.3 N·m {16—24 kgf·m, 14—20 in·lbf}

   (8) When the throttle valve is at the wide open throttle, verify that the PCM terminal 89 voltage is in the specification.
   - If not as specified, check related wiring harness.
   - If they are okay, replace the throttle body. (See 01-13B-4 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [KL].)

Specification (At wide open throttle)

Throttle position sensor harness side connector terminal B voltage (V)	PCM terminal 89 voltage (V)
4.5—4.7	3.5—4.4
4.7—4.8	3.6—4.5
4.8—4.9	3.7—4.6
4.9—5.0	3.7—4.8
5.0—5.1	3.8—4.9
5.1—5.3	4.0—5.0
5.3—5.4	4.1—5.1
5.4—5.5	4.2—5.2

9. If the **SSTs** (NGS tester) are used, check in the following order.
   (1) Connect the **SSTs** (NGS tester) to the data link connector.



   (2) Verify that the throttle valve is at the closed throttle position.
   (3) Turn the ignition switch to ON.
   (4) Select the "PID/DATA MONITOR AND RECORD" function on the NGS display and press TRIGGER.
   (5) Select "TP V" on the NGS tester display and press START. The NGS tester measures and shows the voltage.

Specification (At closed throttle position)

Throttle position sensor harness side connector terminal B voltage (V)	"TP V" voltage (V)
4.5—4.9	0.4—0.5
4.9—5.1	0.4—0.6
5.1—5.5	0.5—0.6

   (6) Tighten the attaching screws.

Tightening torque
1.6—2.3 N·m {16—24 kgf·m, 14—20 in·lbf}

   (7) When the throttle valve is at the wide open throttle, verify that the "TP V" voltage is in the specification.

- If not as specified, check related wiring harness.
- If they are okay, replace the throttle body. (See 01-13B-4 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [KL].)

Specification (At wide open throttle)

Throttle position sensor harness side connector terminal B voltage (V)	"TP V" voltage (V)
4.5—4.7	3.5—4.4
4.7—4.8	3.6—4.5
4.8—4.9	3.7—4.6
4.9—5.0	3.7—4.8
5.0—5.1	3.8—4.9
5.1—5.3	4.0—5.0
5.3—5.4	4.1—5.1
5.4—5.5	4.2—5.2

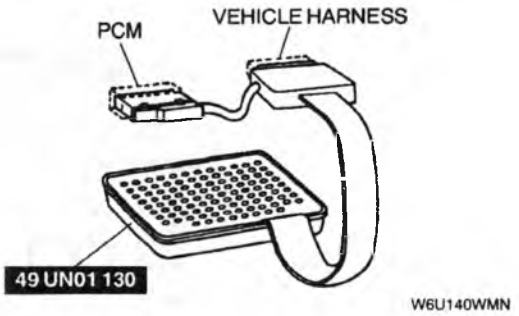
ENGINE COOLANT TEMPERATURE SENSOR INSPECTION [KL]

Y6U14018840W02

Inspection of Output Voltage

Using the SST (104 pin breakout box)

1. Disconnect the PCM connector. (See 01-40B-15 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



W6U140WMN

3. Tighten the connector bolt.

Tightening torque
7.9—10.7 N·m
{80—100 kgf·cm, 69.5—95.4 in·lbf}

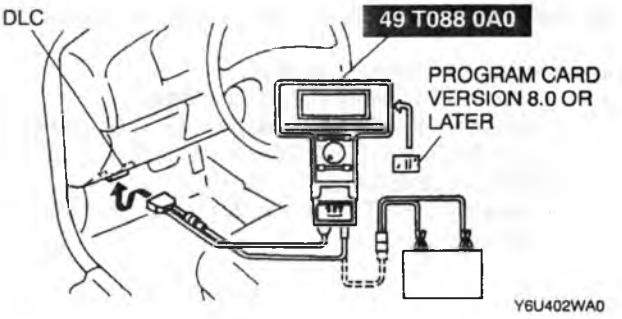
4. Turn the ignition switch to ON.
5. Measure the voltage at PCM terminal 38.
   - If not as specified, check the related harness and engine coolant temperature sensor resistance.

Specification

Engine coolant temperature condition (°C {°F})	PCM terminal 38 voltage (V)
20 {68}	Approx. 3.1
After warm up	Below 1.0

Using the SSTs (NGS tester)

1. Connect the **SSTs** (NGS tester) to the data link connector.



Y6U402WA0

2. Turn the ignition switch to ON.
3. Select the "PID/DATA MONITOR AND RECORD" function on the NGS tester display and press TRIGGER.
4. Select "ECT V" on the NGS tester display and press START. The NGS tester measures and shows the voltage.
   - If not as specified, check the related harness and engine coolant temperature sensor resistance.

Specification

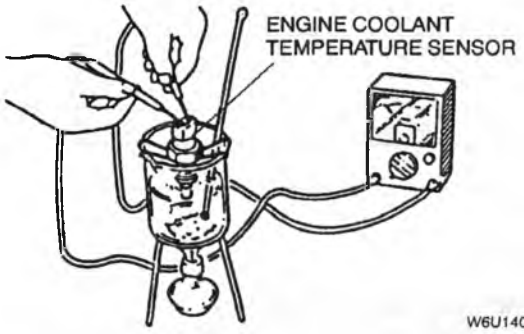
Engine coolant temperature condition (°C {°F})	"ECT V" voltage (V)
20 {68}	Approx. 3.1
After warm up	Below 1.0

Inspection of Resistance

1. Remove the engine coolant temperature sensor.
2. Place the engine coolant temperature sensor in water with a thermometer, and heat the water gradually.

3. Measure the resistance of the sensor by using an ohmmeter.
   - If not as specified, replace the engine coolant temperature sensor.

Tightening torque
15.7—23.5 N·m
{1.6—2.4 kgf·m, 11.6—17.3 ft·lbf}



Specification

Water temperature (°C {°F})	Resistance (kΩ)
20 {68}	35.5—39.2
60 {140}	7.18—7.92

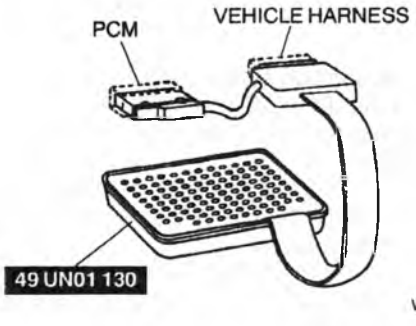
INTAKE AIR TEMPERATURE SENSOR INSPECTION [KL]

Y6U14018845W02

Inspection of Output Voltage

Using the SST (104 pin breakout box)

1. Disconnect the PCM connector. (See 01-40B-15 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



3. Tighten the connector bolt.

Tightening torque
7.9—10.7 N·m
{80—100 kgf·cm, 69.5—95.4 in·lbf}

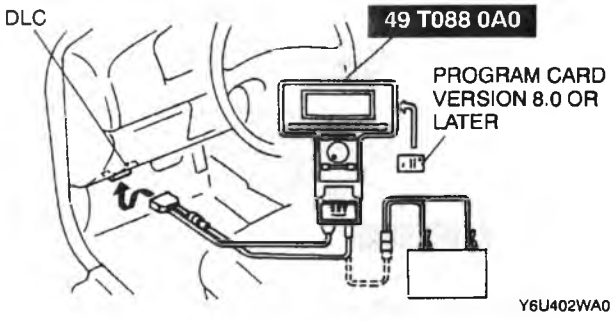
4. Turn the ignition switch to ON.
5. Measure the voltage at PCM terminal 39.
   - If not as specified, check the related harness and intake air temperature sensor resistance.

Specification

Intake air temperature condition (°C {°F})	PCM terminal 39 voltage (V)
20 {68}	Approx. 3.1

Using the SSTs (NGS tester)

1. Connect the **SSTs** (NGS tester) to the data link connector.



2. Turn the ignition switch to ON.
3. Select the "PID/DATA MONITOR AND RECORD" function on the NGS tester display and press TRIGGER.
4. Select "IAT V" on the NGS tester display and press START. The NGS tester measures and shows the voltage.
   - If not as specified, check the related harness and intake air temperature sensor resistance.

Specification

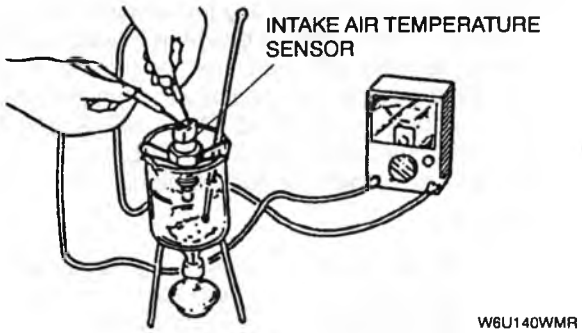
Intake air temperature condition (°C {°F})	"IAT V" voltage (V)
20 {68}	Approx. 3.1

Inspection of Resistance

1. Remove the intake air temperature sensor.
2. Place the intake air temperature sensor in water with a thermometer, and heat the water gradually.

3. Measure the resistance of the intake air temperature sensor by using an ohmmeter.
   - If not as specified, replace the intake air temperature sensor.

Tightening torque
10.8—16.2 N·m
{110—166 kgf·cm, 95.5—144 in·lbf}



W6U140WMR

Specification

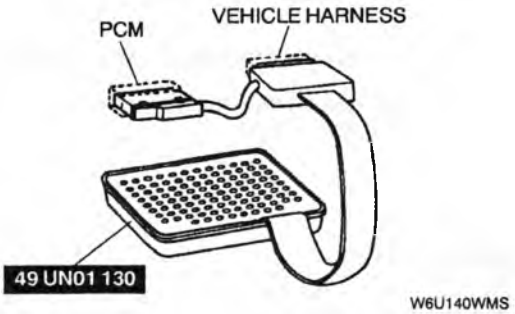
Water temperature (°C {°F})	Resistance (kΩ)
20 {68}	35.5—39.2
60 {140}	7.18—7.92

HEATED OXYGEN SENSOR INSPECTION [KL]

Y6U14018861W02

Heated Oxygen Sensor Inspection Using the SST (104 pin breakout box)

1. Disconnect the PCM connector. (See 01-40B-15 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



W6U140WMS

3. Tighten the connector bolt.

Tightening torque
7.9—10.7 N·m
{80—100 kgf·cm, 69.5—95.4 in·lbf}

4. Warm up the engine to normal operating temperature.
5. Measure the voltage at PCM terminal 35, 60, 61 and 87.

Specification except for California emissions regulations applicable model

Engine condition	PCM terminal voltage (V)			
	60	87	35	61
	Heated oxygen sensor (Front RH)	Heated oxygen sensor (Front LH)	Heated oxygen sensor (Middle)	Heated oxygen sensor (Rear)
IG-ON	Below 1.0			
After warm up	0.1—0.9			
Engine cold	Below 0.5	Below 0.5	Below 0.5	Approx. 0
Deceleration	0—0.5	0—0.5	0—0.5	—
Acceleration	0.5—1.0	0.5—1.0	0.5—1.0	—

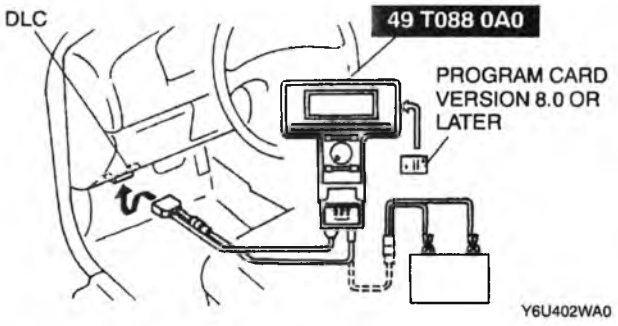
Specification for California emissions regulations applicable model

Engine condition	PCM terminal voltage (V)			
	60	87	35	61
	Heated oxygen sensor (Front RH)	Heated oxygen sensor (Front LH)	Heated oxygen sensor (Rear RH)	Heated oxygen sensor (Rear LH)
IG-ON	Below 1.0			
After warm up	0.1—0.9			
Engine cold	Below 0.5	Below 0.5	Approx. 0	Approx. 0
Deceleration	0—0.5	0—0.5	Approx. 0	Approx. 0
Acceleration	0.5—1.0	0.5—1.0	Approx. 0	Approx. 0

6. If not as specified, inspect the following.
   - Intake-air system
   - Fuel system
   - On-board diagnostic system
   - Related harnesses
7. If these systems are okay, replace the heated oxygen sensor. (See 01-15-3 EXHAUST SYSTEM REMOVAL/INSTALLATION [KL].)

Using the SSTs (NGS tester)

1. Connect the **SSTs** (NGS tester) to the data link connector.



2. Select the "PID/DATA MONITOR AND RECORD" function on the NGS tester display and press TRIGGER.
3. Select "O2S11", "O2S21", "O2S12" and "O2S13" on the NGS tester display and press START. The NGS tester measures and shows the voltage.

Specification except for California emissions regulations applicable model

Engine condition	Voltage (V)			
	O2S11	O2S21	O2S12	O2S22
IG-ON	Below 1.0			
After warm up	0.1—0.9			
Engine cold	Below 0.5	Below 0.5	Below 0.5	Approx. 0
Deceleration	0—0.5	0—0.5	0—0.5	—
Acceleration	0.5—1.0	0.5—1.0	0.5—1.0	—

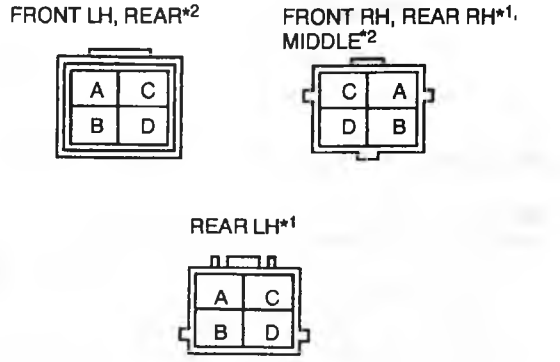
Specification for California emissions regulations applicable model

Engine condition	Voltage (V)			
	O2S11	O2S21	O2S12	O2S22
IG-ON	Below 1.0			
After warm up	0.1—0.9			
Engine cold	Below 0.5	Below 0.5	Approx. 0	Approx. 0
Deceleration	0—0.5	0—0.5	Approx. 0	Approx. 0
Acceleration	0.5—1.0	0.5—1.0	Approx. 0	Approx. 0

4. If not as specified, inspect the following.
   - Intake-air system
   - Fuel system
   - On-board diagnostic system
5. If these systems are okay, replace the heated oxygen sensor. (See 01-15-3 EXHAUST SYSTEM REMOVAL/INSTALLATION [KL].)

Heated Oxygen Sensor Heater Inspection

1. Disconnect the heated oxygen sensor connector.
2. Measure the resistance between heated oxygen sensor terminals C and D by using an ohmmeter.
   - If not as specified, replace the heated oxygen sensor. (See 01-15-3 EXHAUST SYSTEM REMOVAL/INSTALLATION [KL].)
   - If okay, inspect related harness or connectors.



*1: CALIFORNIA EMISSION REGULATIONS APPLICABLE MODEL
*2: EXCEPT CALIFORNIA EMISSION REGULATIONS APPLICABLE MODEL

Y6U140WE0

Specification

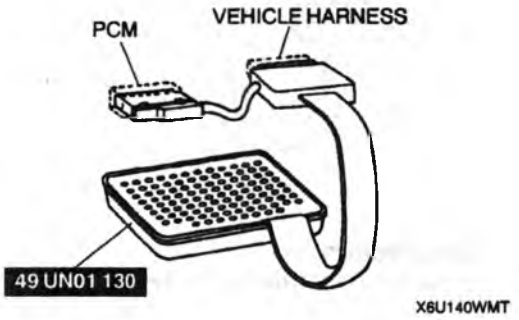
Sensor	Resistance
Front RH and LH for California model	Approx. 3.3Ω
Except above	Approx. 6Ω

EGR BOOST SENSOR INSPECTION [KL]

Y6U14018211W02

Using the SST (104 Pin Breakout Box)

1. Disconnect the PCM connector. (Refer to 01-40B-15 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



X6U140WMT

3. Tighten the connector bolt.

Tightening torque
7.9—10.7 N·m
{80—100 kgf·cm, 69.5—95.4 in·lbf}

4. Turn the ignition switch to ON.

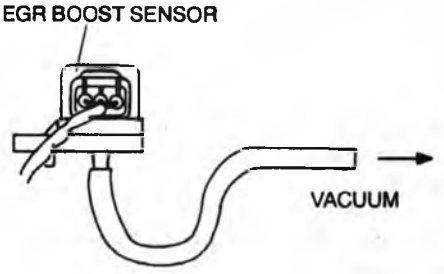
Caution
- **Do not apply a vacuum or pressure outside of the specified limits. Doing so will damage the EGR boost sensor.**

5. Disconnect the vacuum hose between the EGR boost sensor and intake manifold.
6. Verify that the PCM terminal 34 voltage as specified.

Measuring condition
- Input voltage: 4.5—5.5 V
- Outside temperature: 10—50 °C {50—122 °F}
- Sea level: -200—3,000 m {-656—9,840 ft}

Specification
2.3—4.7 V

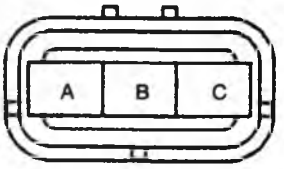
7. Apply the vacuum of -26.6 kPa {200 mmHg, -7.85 inHg} to EGR boost sensor and verify that the PCM terminal 34 voltage from step 6 changes as specified.
   - If not as specified, inspect the following harness continuity and terminal voltage.
     — If terminal voltage is correct and there is harness continuity, replace the EGR boost sensor.



X6U140WMU

Specification
PCM terminal 34 voltage variation: 1.0—1.3 V

a. Harness continuity
   — Between PCM terminal 34 and EGR boost sensor terminal A
   — Between PCM terminal 91 and EGR boost sensor terminal B
   — Between PCM terminal 90 and EGR boost sensor terminal C
b. Terminal voltage (Ignition switch ON)
   — EGR boost sensor terminal B voltage: Below 1.0 V(constant)
   — EGR boost sensor terminal C voltage: Approx. 5.0 V

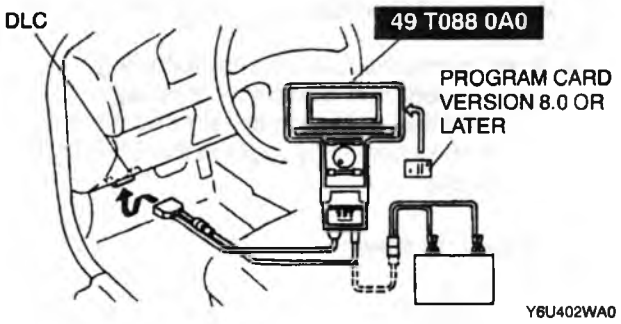


HARNESS SIDE CONNECTOR
(VIEW FROM VEHICLE HARNESS CONNECTOR)

X6U140WNH

Using the SSTs (NGS tester)

1. Connect the **SSTs** (NGS tester) to the data link connector.



2. Select the "PID/DATA MONITOR AND RECORD" function on the NGS tester display and press TRIGGER.
3. Select "DPFEGR" on the NGS tester display and press START. The NGS tester measures and shows the voltage.

Caution

- **Do not apply a vacuum or pressure outside of the specified limits. Doing so will damage the EGR boost sensor.**

4. Disconnect the vacuum hose between the EGR boost sensor and intake manifold.
5. Verify that the PID status is as specified.

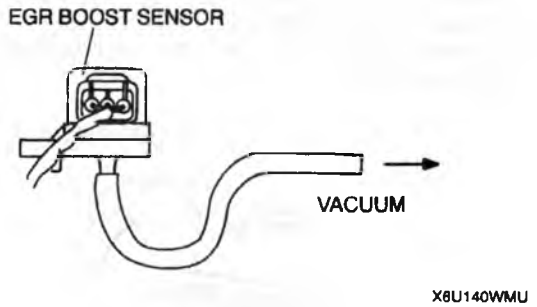
Measuring condition

- Input voltage: 4.5—5.5 V
- Outside temperature: 10—50 °C {50—122 °F}
- Sea level: -200—3,000 m {-656—9,840 ft}

Specification

2.3—4.7 V

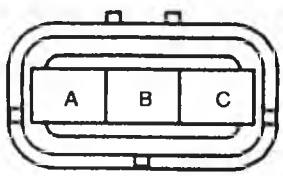
6. Then apply the vacuum of -26.6 kPa {200 mmHg, -7.85 inHg} to EGR boost sensor and verify that the PID status from step 6 changes as specified.
   - If not as specified, inspect the following harness continuity and terminal voltage.
   — If PID status is correct and there is harness continuity, replace the EGR boost sensor.



Specification

PID status variation: 1.0—1.3 V

a. Harness continuity
   — Between PCM terminal 34 and EGR boost sensor terminal A
   — Between PCM terminal 91 and EGR boost sensor terminal B
   — Between PCM terminal 90 and EGR boost sensor terminal C
b. Terminal voltage (Ignition switch ON)
   — EGR boost sensor terminal B voltage: Below 1.0 V(constant)
   — EGR boost sensor terminal C voltage: Approx. 5.0 V



HARNESS SIDE CONNECTOR
(VIEW FROM VEHICLE HARNESS CONNECTOR)

X6U140WNH

FUEL TANK PRESSURE SENSOR INSPECTION [KL]

Y6U14018212W02

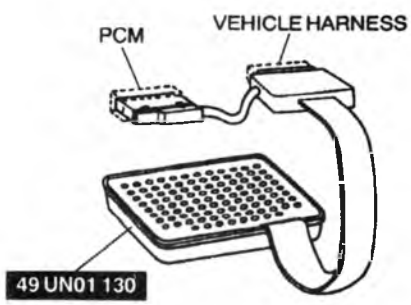
Using the SST (104 Pin Breakout Box)

Note

- The following vacuum values are indicated by relative pressure from atmospheric pressure.

1. Disconnect the PCM connector. (See 01-40B-15 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)

2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.

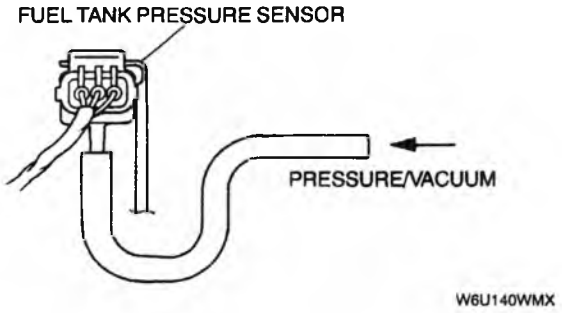


3. Tighten the connector bolt.

Tightening torque
7.9—10.7 N·m
{80—100 kgf·cm, 69.5—95.4 in·lbf}

Caution
- **Do not apply vacuum outside of the specified limits. Doing so will damage the fuel tank pressure sensor.**

4. Turn the ignition switch to ON.
5. Apply pressure then vacuum to the fuel tank pressure sensor according to the following procedure.



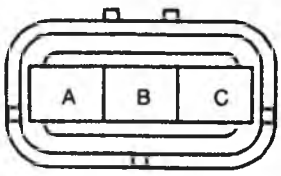
Note
- The output voltage varies with the measuring condition.

6. Decrease the applied pressure from +6.66 kPa {+50 mmHg, +1.97 inHg} to -6.66 kPa {-50 mmHg, -1.97 inHg} and verify that the PCM terminal 62 voltage decreases accordingly as specified.
   - If not as specified, inspect the following harness continuity and terminal voltage.
     — If terminal voltage is correct and if there is harness continuity, replace the fuel tank pressure sensor. (See 01-16-5 EMISSION SYSTEM (FUEL TANK SIDE) COMPONENT REMOVAL/INSTALLATION.)

Specification

Applied vacuum	Output voltage (V)*
-6.66 kPa {-50 mmHg, -1.97 inHg}	0.38—0.62
0 kPa {0 mmHg, 0 inHg}	2.42—2.58
+6.66 kPa {+50 mmHg, +1.97 inHg}	4.38—4.62

* : Measuring condition is as follows.
- Input voltage: 5.0 V
- Atmospheric pressure: 101.3 kPa {760 mmHg, 29.9 inHg} (Absolute pressure)
- Outside temperature: 30—100 °C {0—182 °F}



HARNESS SIDE CONNECTOR
(VIEW FROM VEHICLE HARNESS CONNECTOR)

W6U140WNJ

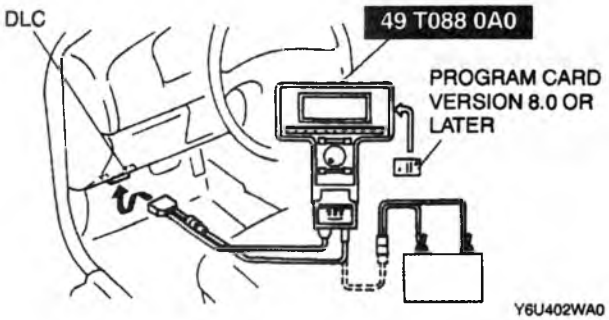
a. Harness continuity
   - Between PCM terminal 91 and fuel tank pressure sensor terminal A
   - Between PCM terminal 62 and fuel tank pressure sensor terminal B
   - Between PCM terminal 90 and fuel tank pressure sensor terminal C
     — If there is no continuity, repair or replace related harness.

b. Terminal voltage (Ignition switch ON)
   - Fuel tank pressure sensor terminal A voltage: Ground (Below 1.0 V)
   - Fuel tank pressure sensor terminal C voltage: Constant voltage (4.5—5.5 V)
     — If terminal voltage is incorrect, check the PCM.

Using the SSTs (NGS Tester)

Note
- The following vacuum values are indicated by relative pressure from atmospheric pressure.

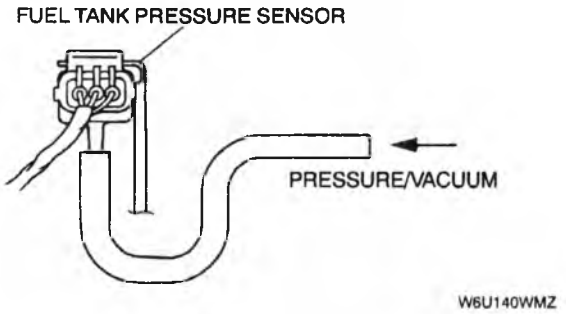
1. Connect the **SSTs** (NGS tester) to the data link connector.



2. Select the "PID/DATA MONITOR AND RECORD" function on the NGS tester display and press TRIGGER.
3. Select "FTP V" on the NGS tester display and press START. The NGS tester measures and shows the voltage.
4. Turn the ignition switch to ON.

Caution
- **Do not apply vacuum outside of the specified limits. Doing so will damage the fuel tank pressure sensor.**

5. Apply pressure then vacuum to the fuel tank pressure sensor according to the following procedure.



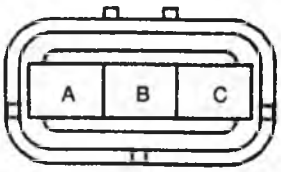
Note
- The output voltage varies with the measuring condition.

6. Decrease the applied pressure from +6.66 kPa {+50 mmHg, +1.97 inHg} to -6.66 kPa {-50 mmHg, -1.97 inHg} and verify that the "FTP V" voltage decreases accordingly as specified.
   - If not as specified, inspect the following harness continuity and terminal voltage.
     — If terminal voltage is correct and if there is harness continuity, replace the fuel tank pressure sensor. (See 01-16-5 EMISSION SYSTEM (FUEL TANK SIDE) COMPONENT REMOVAL/INSTALLATION.)

Specification

Applied vacuum	"FTP V" voltage (V)*
-6.66 kPa {-50 mmHg, -1.97 inHg}	0.38—0.62
0 kPa {0 mmHg, 0 inHg}	2.42—2.58
+6.66 kPa {+50 mmHg, +1.97 inHg}	4.38—4.62

* : Measuring condition is as follows.
- Input voltage: 5.0 V
- Atmospheric pressure: 101.3 kPa {760 mmHg, 29.9 inHg} (Absolute pressure)
- Outside temperature: 30—100 °C {0—182 °F}



HARNESS SIDE CONNECTOR
(VIEW FROM VEHICLE HARNESS CONNECTOR)

W6U140WNK

a. Harness continuity
- Between PCM terminal 91 and fuel tank pressure sensor terminal A
- Between PCM terminal 62 and fuel tank pressure sensor terminal B
- Between PCM terminal 90 and fuel tank pressure sensor terminal C
  — If there is no continuity, repair or replace related harness.

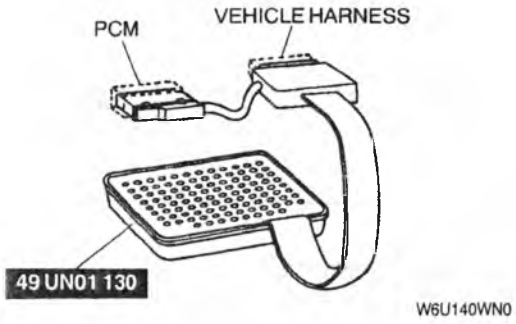
b. Terminal voltage (Ignition switch ON)
- Fuel tank pressure sensor terminal A voltage: Ground (Below 1.0 V)
- Fuel tank pressure sensor terminal C voltage: Constant voltage (4.5—5.5 V)
  — If terminal voltage is incorrect, check the PCM.

POWER STEERING PRESSURE SWITCH INSPECTION [KL]

Y6U14032230W02

Inspection of Output Voltage
Using the SST (104 pin breakout box)

1. Disconnect the PCM connector. (See 01-40B-15 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



3. Tighten the connector bolt.

Tightening torque
7.9—10.7 N·m
{80—100 kgf·cm, 69.5—95.4 in·lbf}

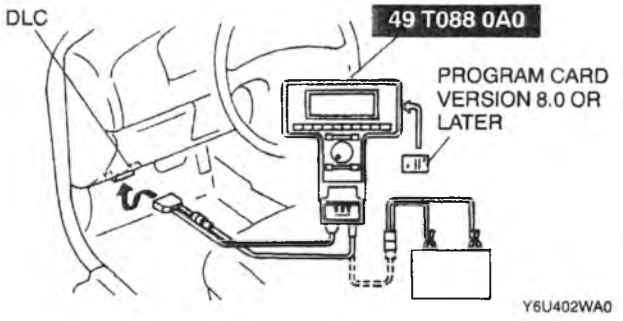
4. Warm up the engine to normal operating temperature.
5. Turn the ignition switch to ON.
6. Measure the voltage at PCM terminal 31.
   - If not as specified, check the related harness and power steering pressure switch continuity.

Specification

Steering wheel condition	PCM terminal 31 voltage (V)
While operating	Below 1.0
Steering wheel straight ahead position	B+

Using the SSTs (NGS tester)

1. Connect the **SSTs** (NGS tester) to the data link connector.



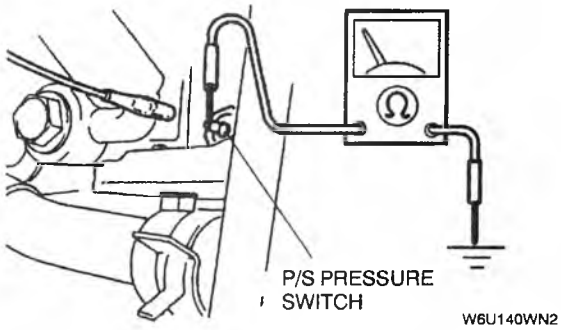
2. Warm up the engine to normal operating temperature.
3. Turn the ignition switch to ON.
4. Select the "PID/DATA MONITOR AND RECORD" function on the NGS tester display and press TRIGGER.
5. Select "PSP" on the NGS tester display and press START. The NGS tester measures and shows the operation.
   - If not as specified, check the related harness and power steering pressure switch continuity.

Specification

Steering wheel condition	"PSP" operation (V)
While operating	HIGH
Steering wheel straight ahead position	LOW

Inspection of Continuity

1. Disconnect the power steering pressure switch connector.
2. Connect an ohmmeter to the power steering pressure switch.



3. Start the engine and let it idle. Check continuity of the power steering pressure switch while turning steering wheel.
   - If not as specified, replace the power steering pressure switch. (See 06-12-14 POWER STEERING OIL PUMP DISASSEMBLY/ASSEMBLY.)
   - If okay, inspect related harness and connectors.

Note

- Visually check wire and connector in wiring diagram. It is easier to test from connector than the power steering pressure switch on the power steering oil pump.

○—○ : Continuity

Steering wheel condition	Terminal	
	A	Ground
Steering wheel fully turned	○	○
Steering wheel straight ahead position		

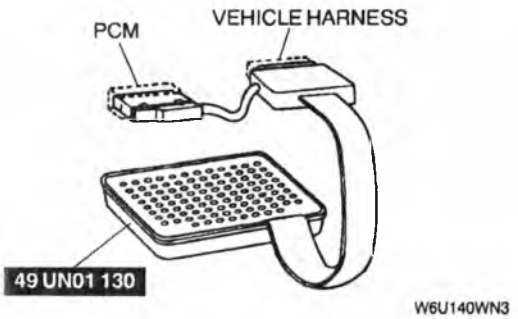
W6U140WNL

NEUTRAL SWITCH INSPECTION [KL]

Y6U14017640W03

Inspection of Output Voltage
Using the SST (104 pin breakout box)

1. Disconnect the PCM connector. (See 01-40B-15 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



3. Tighten the connector bolt.

Tightening torque
7.9—10.7 N·m
{80—100 kgf·cm, 69.5—95.4 in·lbf}

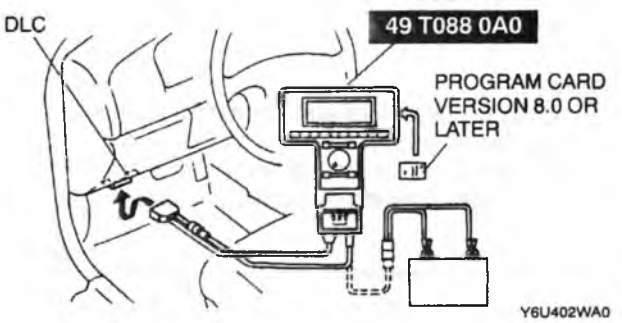
4. Turn the ignition switch to ON.
5. Measure the voltage at PCM terminal 64.
   - If not as specified, check the related harness and neutral switch continuity.

Specification

Condition	PCM terminal 64 voltage (V)
Neutral position	Below 1.0
Others	B+

Using the SSTs (NGS tester)

1. Connect the **SSTs** (NGS tester) to the data link connector.



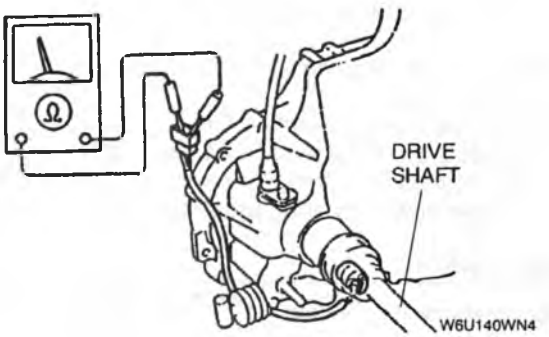
2. Turn the ignition switch to ON.
3. Select the "PID/DATA MONITOR AND RECORD" function on the NGS tester display and press TRIGGER.
4. Select "CPP/PNP" on the NGS tester display and press START. The NGS tester measures and shows the operation.
   - If not as specified, check the related harness and neutral switch continuity.

Specification

Condition	"CPP/PNP" value
Neutral position	ON
Others	OFF

Inspection of Continuity

1. Disconnect the neutral switch connector.
2. Check continuity of the switch by using an ohmmeter.
   - If not as specified, replace the neutral switch.
   - If okay, inspect related harness and connectors.



○—○ : Continuity

Condition	Terminal	
	A	B
Neutral	○	○
Other		

W6U140WN5

NEUTRAL SWITCH REMOVAL/INSTALLATION [KL]

Y6U14017640W04

1. Disconnect the battery negative cable.
2. Disconnect the neutral switch connector.
3. Remove the neutral switch.
4. Install the reverse order of removal.

Tightening torque
20—29 N·m {2.0—3.0 kgf·m, 15—21 ft·lbf}



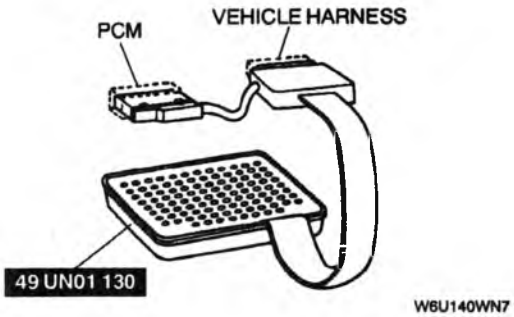
W6U140WN6

CLUTCH SWITCH INSPECTION [KL]

Y6U14018660W03

Inspection of Output Voltage
Using the SST (104 pin breakout box)

1. Disconnect the PCM connector. (See 01-40B-15 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



W6U140WN7

3. Tighten the connector bolt.

Tightening torque
7.9—10.7 N·m
{80—100 kgf·cm, 69.5—95.4 in·lbf}

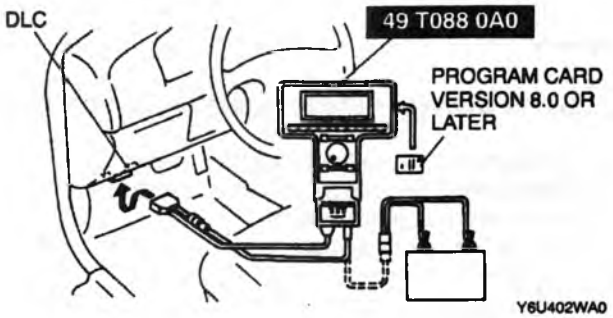
4. Turn the ignition switch to ON.
5. Measure the voltage at PCM terminal 30.
   - If not as specified, check the related harness and clutch switch continuity.
   - If okay, check the neutral switch.

Specification

Condition	PCM terminal 30 voltage (V)
Clutch pedal depressed	Below 1.0
Others	B+

Using the SSTs (NGS tester)

1. Connect the **SSTs** (NGS tester) to the data link connector.



Y6U402WA0

2. Turn the ignition switch to ON.
3. Select the "PID/DATA MONITOR AND RECORD" function on the NGS tester display and press TRIGGER.
4. Select "CPP/PNP" on the NGS tester display and press START. The NGS tester measures and shows the operation.
   - If not as specified, check the related harness and clutch switch continuity.
   - If okay, check the neutral switch.

Specification

Condition	"CPP/PNP" operation (V)
Clutch pedal depressed	ON
Others	OFF

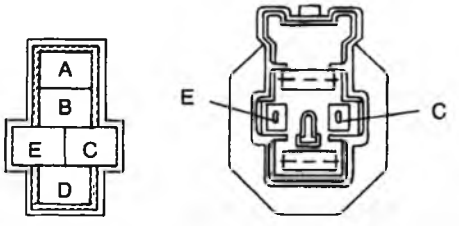
Inspection of Continuity

1. Disconnect the clutch switch connector.
2. Check continuity of the clutch switch by using an ohmmeter.
   - If not as specified, replace the clutch switch.
   - If okay, inspect related harness and connectors.

O—O : Continuity

Condition	Terminal	
	C	E
Clutch pedal depressed	O	O
Clutch pedal released		

W6U140WN9

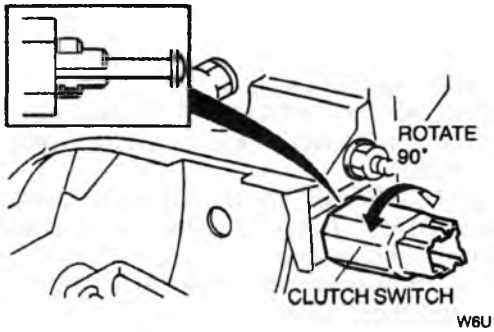


W6U140WN8

CLUTCH SWITCH REMOVAL/INSTALLATION [KL]

Y6U14018660W04

1. Disconnect the battery negative cable.
2. Disconnect the clutch switch connector.
3. Remove the clutch switch.
4. Install the clutch switch as shown in the figure.



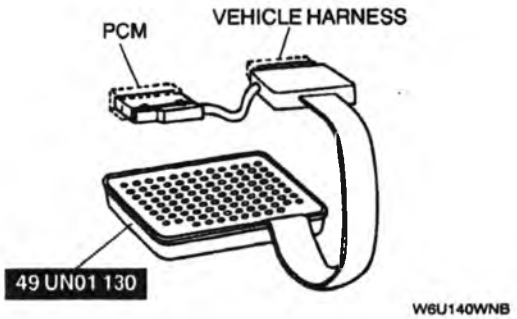
W6U140WNA

MAIN RELAY INSPECTION [KL]

Y6U14018811W02

Inspection of Output Voltage
Using the SST (104 pin breakout box)

1. Disconnect the PCM connector. (See 01-40B-15 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
2. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.



W6U140WNB

3. Tighten the connector bolt.

   Tightening torque
   7.9—10.7 N·m
   {80—100 kgf·cm, 69.5—95.4 in·lbf}

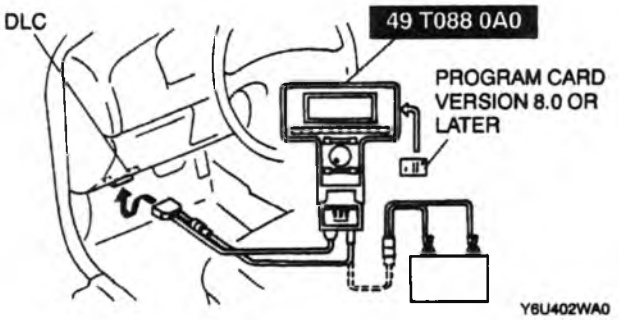
4. Turn the ignition switch to ON.
5. Measure the voltage at PCM terminal 71 and 97.
   - If not as specified, check the related harness and main relay continuity.

Specification

Condition	PCM terminal 71 or 97 voltage (V)
Ignition switch OFF	Below 1.0
Ignition switch ON	B+

Using the SSTs (NGS tester)

1. Connect the **SSTs** (NGS tester) to the data link connector.



Y6U402WA0

2. Turn the ignition switch to ON.
3. Select the "PID/DATA MONITOR AND RECORD" function on the NGS tester display and press TRIGGER.
4. Select "VPWR" on the NGS tester display and press START. The NGS tester measures and shows the voltage.
   - If not as specified, check the related harness and main relay continuity.

Specification

Condition	"VPWR" voltage (V)
Ignition switch OFF	Below 1.0
Ignition switch ON	B+

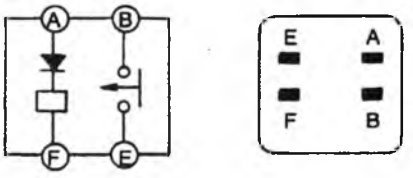
Inspection of Continuity

1. Remove the main relay.
2. Apply battery positive voltage and check continuity between terminals of the main relay by using an ohmmeter.
   - If not as specified, replace the main relay.
   - If okay, inspect related harness and connectors.

○—○ : Continuity

Step	Terminal			
	A (86)	F (85)	B (87)	E (30)
1	○	○		
2	B+	GND	○	○

W6U140WND



W6U140WNC

01-50 TECHNICAL DATA

ENGINE TECHNICAL DATA 01-50-1

ENGINE TECHNICAL DATA

Y6U15001001W01

Item			Engine			
			FS		KL	
			MTX	ATX	MTX	ATX
MECHANICAL						
Drive belt deflection (mm {in}/98 N {10 kgf, 22 lbf})	Generator	New	6.5—7.0 {0.26—0.27}		6.0—7.0 {0.24—0.27}	
		Used	7.0—9.0 {0.28—0.35}		7.0—8.0 {0.28—0.31}	
		Limit	10.0 {0.39}		10.0 {0.39}	
	P/S	New	7.5—9.0 {0.30—0.35}		6.0—7.0 {0.24—0.27}	
		Used	8.0—9.5 {0.31—0.37}		7.0—8.0 {0.28—0.31}	
		Limit	11.0 {0.43}		9.0 {0.35}	
	P/S+A/C	New	5.5—6.5 {0.22—0.25}		—	
		Used	6.5—7.5 {0.26—0.29}		—	
		Limit	8.0 {0.31}		—	
	Generator + A/C	New	—		5.5—6.5 {0.22—0.25}	
		Used	—		6.5—7.5 {0.26—0.29}	
		Limit	—		9.0 {0.35}	
Drive belt tension (N {kgf, lbf})	Generator	New	736—833 {75—85, 165—187}		687—882 {70—90, 154—198}	
		Used	491—686 {50—70, 110—154}		491—686 {50—70, 110—154}	
		Limit	392 {40, 88}		294 {30, 66}	
	P/S	New	589—784 {60—80, 132—176}		540—686 {55—70, 121—154}	
		Used	491—686 {50—70, 110—154}		393—539 {40—55, 88—121}	
		Limit	392 {40, 88}		343 {35, 77}	
	P/S+A/C	New	687—882 {70—90, 154—198}		—	
		Used	491—686 {50—70, 110—154}		—	
		Limit	441 {45, 99}		—	
	Generator + A/C	New	—		687—882 {70—90, 154—198}	
		Used	—		491—686 {50—70, 110—154}	
		Limit	—		294 {30, 66}	
Valve clearance [Engine cold] (mm {in})	IN		0.225—0.295 {0.0089—0.0116} (0.26±0.035 {0.010±0.0014})		0.245—0.315 {0.0097—0.0124} (0.28±0.035 {0.011±0.0014})	
	EX		0.225—0.295 {0.0089—0.0116} (0.26±0.035 {0.010±0.0014})		0.265—0.335 {0.0105—0.0131} (0.30±0.035 {0.012±0.0014})	
Compression pressure (kPa {kgf/cm^2, psi}) [rpm]	Standard		1177 {12.0, 171} [300]		1393 {14.2, 202} [250]	
	Minimum		824 {8.4, 119} [300]		971 {9.9, 141} [250]	
	Maximum difference between cylinders		196 kPa {2.0 kgf/cm^2, 28 psi}			

Item				Engine			
				FS		KL	
				MTX	ATX	MTX	ATX
Tensioner spring free length			(mm {in})	36.6 {1.44}		—	
Timing belt auto tensioner projection			(mm {in})	—		Type A: 14.3—15.1 {0.563—0.594} Type B: 12.0—13.0 {0.473—0.511}	
Pushing distance of the camshaft oil seal			(mm {in})	0.3—0.7 {0.012—0.027} (from the edge of the cylinder head)		0—0.5 {0—0.019} (from the edge of the cylinder head)	
Pushing distance of the front oil seal			(mm {in})	0—0.5 {0—0.019} (from the edge of the oil pump body)		0—0.7 {0—0.027} (from the edge of the oil pump body)	
Pushing distance of the rear oil seal			(mm {in})	0—0.5 {0—0.019} (from the edge of the rear cover)		0—0.7 {0—0.027} (from the edge of the cylinder block)	
Cylinder head bolt length		(mm {in})	Standard	104.2—104.8 {4.103—4.125}		131.2—131.8 {5.166—5.188}	
			Maximum	105.5 {4.154}		132.5 {5.217}	
Idle speed			(rpm)	550—850	500—800	550—750	
Ignition timing			(BTDC/rpm)	6—18°/ 550—850	6—18°/ 500—800	4—16°/550—750	
Idle-up speed*1		(rpm)	E/L ON*2	625—925	500—800	500—800	
			A/C ON*3	625—925	500—800	650—950	600—900
			P/S ON*4	550—850	550—850	550—850	
Idle mixture			HC concentration	within the regulation			
			CO concentration	within the regulation			
LUBRICATION SYSTEM							
Oil pressure			(kPa {kgf/cm², psi}) [3000 rpm]	393—490 {4.0—5.0, 57—71}		334—490 {3.4—5.0, 49—71}	
Oil capacity	Total (dry engine)		(L {US qt, Imp qt})	3.7 {3.9, 3.3}		4.9 {5.2, 4.3}	
	Oil replacement		(L {US qt, Imp qt})	3.3 {3.5, 2.9}		3.7 {3.9, 3.3}	
	Oil and oil filter replacement		(L {US qt, Imp qt})	3.5 {3.7, 3.1}		4.0 {4.2, 3.5}	
Engine oil				API Service SG (Energy Conserving II), SH (Energy Conserving II), SJ or ILSAC (GF-I, GF-II)			
Viscosity	Above -25 °C {-13 °F}			SAE 10W-30			
	-30 °C— 37 °C {-22 °F— 98 °F}			SAE 5W-30			
COOLING SYSTEM							
Coolant capacity			(L {US qt, Imp qt})	7.5 {7.9, 6.6}			
Radiator cap valve opening pressure			(kPa {kgf/cm², psi})	94—122 {0.95—1.25, 13.5—17.7}			
Thermostat	Initial-opening temperature		(°C {°F})	80—84 {176—183}			
	Full-opening temperature		(°C {°F})	95 {203}			
	Full-open lift		(mm {in})	8.5 {0.33} min.			
Cooling fan motor current			(A)	4.3—7.3			
FUEL SYSTEM							
Fuel line hold pressure			(kPa {kgf/cm², psi})	More than 343 {3.50, 49.8}		More than 147 {1.50, 21.3}	
Fuel pump maximum pressure			(kPa {kgf/cm², psi})	480—630 {4.8—6.5, 69—92}			
Fuel injector	Leakage			Less than 1 drop/2 minutes			
	Volume		(ml {cc, floz}/15 sec.)	47—68 {47—68, 1.4—2.0}		48—56 {48—56, 1.7—1.8}	
	Resistance		(Ω)	12—16 [at 20 °C {68 °F}]			

Item					Engine			
					FS		KL	
					MTX	ATX	MTX	ATX
Pressure regulator kPa {kgf/cm^2, psi}	PRC solenoid valve ON*5				210—260 {2.1—2.7, 30—38}		210—250 {2.1—2.6, 30—36}	
	PRC solenoid valve OFF				260—320 {2.6—3.3, 37—46}		270—310 {2.7—3.2, 39—45}	
CHARGING SYSTEM								
Battery	Electrolyte gravity				1.275—1.295 [20 °C {68 °F}]			
	Back-up current*6 (mA)				Max. 20			
	Test load chart (A)	Battery type	GROUP 36R		240			
	Slow charge (A)	Battery type (5-hour rate)	GROUP 36R (48)		4.5—5.5			
	Quick charge (A/30 min)	Battery type (5-hour rate)	GROUP 36R (48)		30			
Generator	Rotor resistance (Between slip rings) (Ω)				2.5—2.9 [20 °C {68 °F}]		2.8—3.2 [20 °C {68 °F}]	
	Brush length	Standard (mm {in})			18.5 {0.73}			
		Minimum (mm {in})			5.0 {0.20}			
	Brush spring force	Standard (N {kgf, lbf})			5.2 {0.53, 1.17}			
		Minimum (N {kgf, lbf})			2.7 {0.28, 0.62}			
	Standard voltage (V)	Ignition switch ON	Terminal	B	B+			
				L	Approx. 1			
				S	B+			
		Idle [20 °C {68 °F}]	Terminal	B	14.1—14.7			
				L	13.2—13.8			
				S	14.1—14.7			
	Generated current (Reference) (A)	Engine speed (rpm)	1000	Terminal B current	Approx. 58 or below (must not be 0)		Approx. 70 or below (must not be 0)	
			2000	Terminal B current	Approx. 77 or below (must not be 0)		Approx. 90 or below (must not be 0)	
IGNITION SYSTEM								
Ignition coil	Resistance [20 °C {68 °F}]	Primary coil (Ω)			0.45—0.55			
		Secondary coil (kΩ)			11.5—15.5			
High-tension lead	Resistance (kΩ)			No.1 lead	5.9—13.6		10.3—22.4	
				No.2 lead	4.9—11.5		5.3—11.5	
				No.3 lead	3.8—8.9		10.3—22.5	
				No.4 lead	3.6—8.5		4.1—8.9	
				No.5 lead	—		10.1—22.1	
				No.6 lead	—		4.1—8.8	
Spark plug	Type	NGK			BKR5E-11*7, BKR6E-11*8		—	
		DENSO			K16PR-U11*7, K20PR-U11*8		PKJ16CR8*7, PKJ20CR8*8	
	Plug gap (mm {in})				1.0—1.1 {0.040—0.043}		0.7—0.8 {0.028—0.031}	
	Resistance (kΩ)				3.0—7.5 [20 °C {68 °F}]			
	Tightening torque (N·m {kgf·m, ft·lbf})				15—22 {1.5—2.3, 11—16}			

Item				Engine			
				FS		KL	
				MTX	ATX	MTX	ATX
STARTING SYSTEM							
Starter	Commutator diameter	Standard	(mm {in})	29.4 {1.16}			29.2 {1.15}
		Minimum	(mm {in})	28.8 {1.14}			28.6 {1.13}
	Brush length	Standard	(mm {in})	16.5 {0.65}			
		Minimum	(mm {in})	7.0 {0.28}			
	Brush spring force	Standard	(N {kgf, lbf})	20.6 {2.10, 4.62}			
		Minimum	(N {kgf, lbf})	6.87 {0.70, 1.54}			
	Pinion gap		(mm {in})	0.5—2.0 {0.020—0.078}			0 {0}
	No load test	Voltage	(V)	11			
		Current	(A)	Below 90			

*1 : Excludes temporary idle speed drop just after the loads (E/L, A/C, P/S) are turned on.

*2 : Headlight, fan switch (3rd or higher) and cooling fan are turned on.

*3 : A/C switch and fan switch are tuned on.

*4 : Steering wheel fully turned.

*5 : Hot condition at the staring.

*6 : Back-up current is the constant flow of current present (for the audio unit, clock, PCM, etc.) when the ignition switch is at OFF and with the ignition key removed.

*7 : Standard plug.

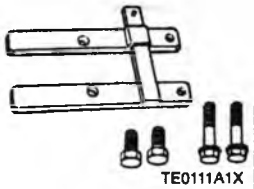
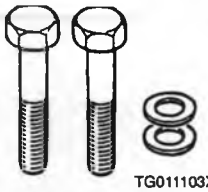
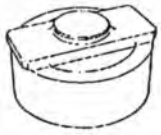
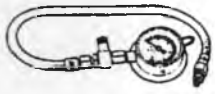
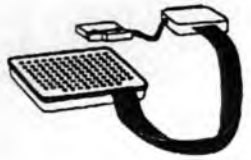
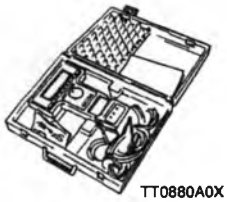
*8 : Cold type plug.

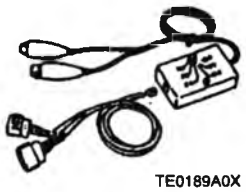
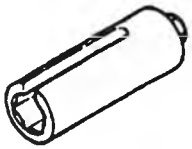
01-60 SERVICE TOOLS

ENGINE SST 01-60-1

ENGINE SST

Y6U16001001W01

49 9200 020A V-ribbed belt tension gauge  T9200020A	49 T012 0A0A Tappet holder set  TT0120A0A	49 S120 710 Coupling flange holder  TS120710X
49 E011 1A1 Holder set  TE0111A1X	49 G011 103 Bolts <FS>  TG011103X	49 B014 001 Oil seal installer <FS>  TB014001X
49 H010 401 Oil seal installer  TH010401X	49 G033 107A Dust cover installer <FS>  TG033107A	49 P005 204 Oil seal installer <KL>  TP005204X
49 G019 017 Oil seal installer <KL>  TG019017X	49 0187 280 Oil pressure gauge  T0187280X	49 G014 001 Oil filter wrench  TG014001X
49 9200 145 Radiator cap tester adapter set  T9200145X	49 L018 901 Injector checker <FS>  TL018901X	49 UN01 130 104-Pin breakout box  TUN01130X
49 T088 0A0 NGS set  TT0880A0X	49 T088 010J or later Program card  TT088010E	49 T088 002 Vehicle interface module (Part of 49 T088 0A0)  TT088002X
49 T088 001 Control unit (Part of 49 T088 0A0)  TT088001X	49 T088 004 NGS OBD II adapter (Part of 49 T088 0A0)  TT088004X	49 T088 006 Battery hookup adapter (Part of 49 T088 0A0)  TT088006X

49 E018 9A0 Injector checker set <KL>  TE0189A0X	49 H018 001 Knock sensor wrench  TH018001X	49 H010 103 Compression gauge  TH010103X
49 H010 104 Adapter  TH010104X	49 U014 001 Air pressure tester  TU014001X	MZ254AT3641 Evaporative emission system tester  T0000000X

SUSPENSION

02
SECTION

GENERAL PROCEDURES 02-10
WHEEL ALIGNMENT 02-11
FRONT SUSPENSION 02-13
REAR SUSPENSION 02-14
TECHNICAL DATA 02-50
SERVICE TOOLS 02-60

02-10 GENERAL PROCEDURES

PRECAUTION (SUSPENSION) 02-10-1

PRECAUTION (SUSPENSION)

Z6U021001013W01

Wheels and tires removal/installation

- The removal and installation procedures for the wheels and tires are not mentioned in this section. When a wheel is removed, retighten it to **89—117 N·m {9.0—12.0 kgf·m, 65.1—86.7 ft·lbf}**.

Suspension links removal/installation

- Tighten any part of the suspension that uses rubber bushings only after the vehicle has been lowered and unloaded.

Note

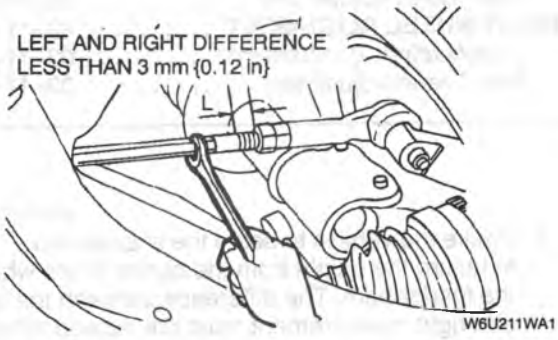
- Unloaded ... Fuel tank full; engine coolant and engine oil at specified levels; spare tire, jack and tools in designated position.

Power steering components removal/installation

- If any power steering fluid line has been disconnected anytime during the procedure, add ATF M-III or equivalent (e.g. DexronIII/Mercon®), bleed the fluid line, and inspect for leakage after the procedure has been completed.

Maximum Steering Angle Adjustment

1. Loosen the tie-rod end locknuts.
2. Remove the steering gear boot clamp.
3. Turn the tie rods to equalize the length L.



Maximum left/right difference
3 mm {0.12 in}

Note
- Turn the tie rods equally.

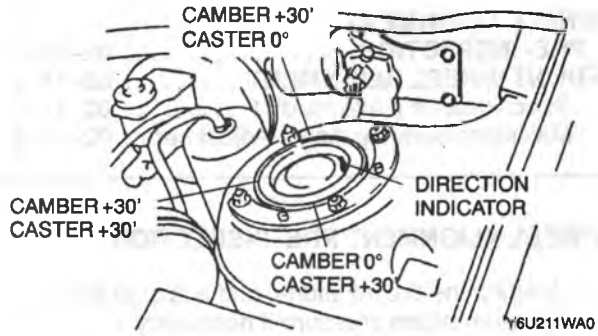
4. Turn the tie rod to provide the correct maximum steering angle.
5. Tighten the tie-rod end locknuts.

Tightening torque
69—98 N·m {7.0—10.0 kgf·m, 51—72 ft·lbf}

6. Verify that the boot is not twisted, and install the boot clamp.
7. Adjust the toe-in after adjusting the steering angle.

Camber and Caster Adjustment

1. Jack up the front of the vehicle and support it on safety stands.
2. Remove the mounting block nuts.
3. Push the mounting block downward, and turn it to the desired position.



4. Install and tighten the mounting nuts to the specified torque.

Tightening torque
47—62 N·m {4.7—6.4 kgf·m, 33—46 ft·lbf}

Total Toe-in Adjustment

1. Adjust the steering angle.
2. Remove the steering gear boot clamp.
3. Loosen the left and right tie rod locknuts and turn the tie rods equally. Both tie rods are right threaded, so turning the right tie rod toward the front of the vehicle and the left toward the rear increases toe-in.

Note
- Turning both tie rods one complete turn changes toe-in by **about 6 mm {0.24 in} (0°36')**.

4. Tighten the tie rod locknuts to the specified torque.

Tightening torque
69—98 N·m {7.0—10.0 kgf·m, 51—72 ft·lbf}

5. Verify that the boot is not twisted, and install the boot clamp.

REAR WHEEL ALIGNMENT

Z6U021101016W01

Specifications (Unloaded)*1

Fuel gauge indication		Empty	1/4	1/2	3/4	Full
Total toe-in	(mm {in})	3 ± 4 {0.12 ± 0.16}				
	Degree	0°20' ± 0°23'			0°17' ± 0°23'	
Camber angle*2 (reference value)		0°03' ± 1°	0°01' ± 1°	–0°02' ± 1°	–0°04' ± 1°	–0°06' ± 1°
Thrust angle (reference value)		0° ± 0°48'				

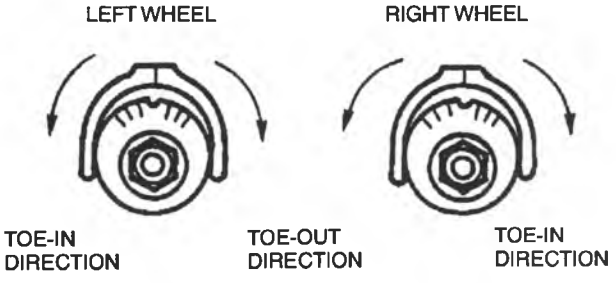
*1 : Engine coolant and engine oil at specified level; spare tire, jack, and tools in designated position. Adjust to the median when carrying out wheel alignment.

*2 : Difference between left and right must not exceed 1.5°.

Total Toe-In Adjustment

1. Remove the access hole caps of the rear crossmember.
2. Loosen the cam nut on the lateral link.
3. Turn the adjusting cam bolt as indicated to adjust the toe-in.

	Left wheel	Right wheel
Toe-in direction	Counterclockwise	Clockwise
Toe-out direction	Clockwise	Counterclockwise



Note

- Turning the adjusting cam bolt one graduation changes the toe-in **about 2.9 mm {0.11 in} (0°18')**.

4. Tighten the cam nut.

Tightening torque
79—116 N·m
{8.0—11.9 kgf·m, 57.8—86.0 ft·lbf}

5. Install the caps.

02-13 FRONT SUSPENSION

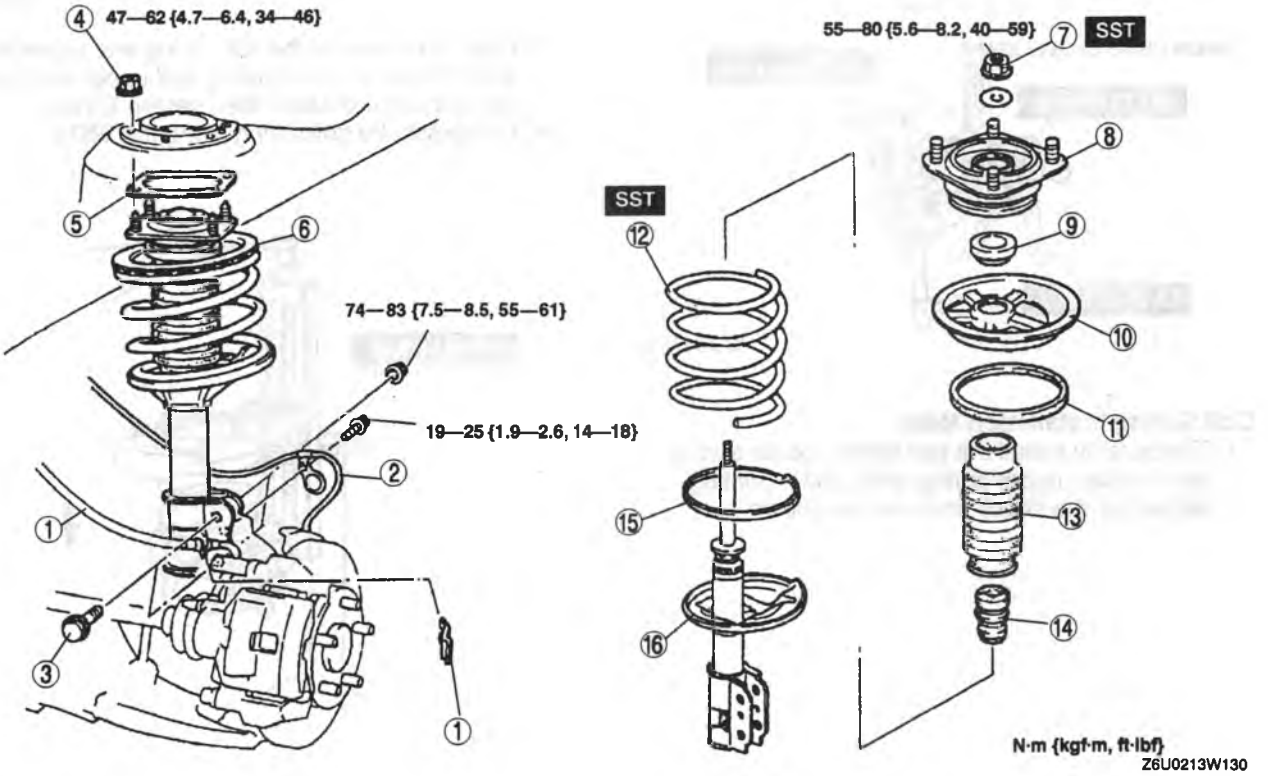
FRONT SHOCK ABSORBER AND COIL SPRING REMOVAL/INSTALLATION .. 02-13-1
Piston Rod Nut Removal Note 02-13-2
Coil Spring Installation Note 02-13-2
Front Shock Absorber and Coil Spring Installation Note 02-13-3
FRONT SHOCK ABSORBER INSPECTION 02-13-3
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Dust Boot Removal Note 02-13-4
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STABILIZER CONTROL LINK INSPECTION 02-13-6
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02

FRONT SHOCK ABSORBER AND COIL SPRING REMOVAL/INSTALLATION

Z6U021304910W01

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. Inspect the front wheel alignment and adjust it if necessary.



Z6U0213W130

1	Clip and brake hose
2	ABS wheel-speed sensor harness (if equipped)
3	Shock absorber bolt
4	Nut
5	Sheet
6	Front shock absorber and coil spring (See 02-13-3 Front Shock Absorber and Coil Spring Installation Note)
7	Piston rod nut (See 02-13-2 Piston Rod Nut Removal Note)
8	Mounting rubber

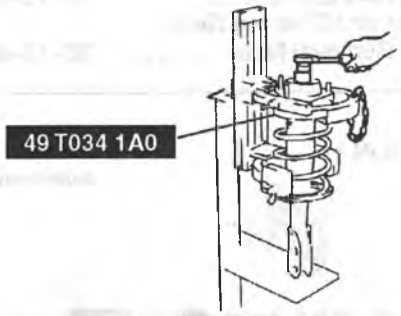
9	Thrust bearing
10	Upper spring seat
11	Upper spring seat rubber
12	Coil spring (See 02-13-2 Coil Spring Installation Note)
13	Dust cover
14	Bound stopper
15	Lower spring seat rubber
16	Shock absorber

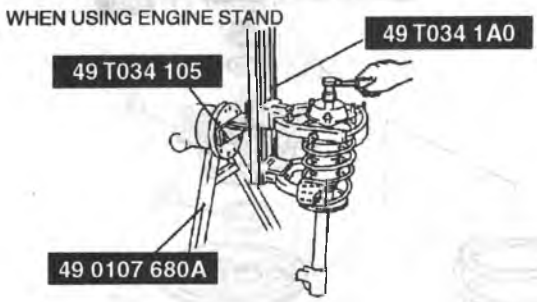
Piston Rod Nut Removal Note

Warning

- **Removing the piston rod nut is dangerous. The shock absorber and spring could fly off under tremendous pressure and cause serious injury or death. Secure the shock absorber in the SSTs before removing the coil spring nut.**

1. Protect the coil spring using a piece of cloth, then set the **SSTs**.
2. Compress the coil spring using the **SSTs**, and remove the piston rod nut.

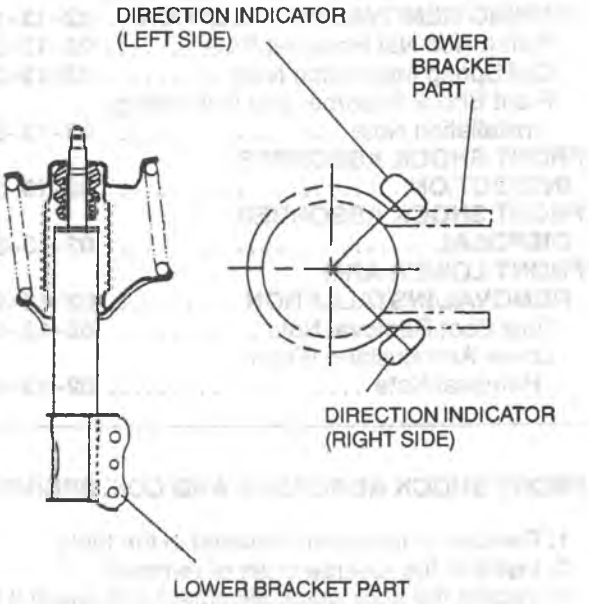




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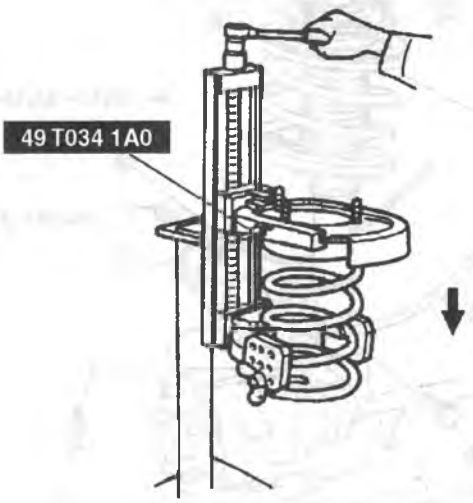
Coil Spring Installation Note

1. Temporarily install the coil spring, upper spring seat rubber, upper spring seat, and mounting rubber on the shock absorber as shown.
2. Mark the coil spring and upper spring seat for proper installation.



W6U213WA2

3. Align the marks of the coil spring and upper spring seat. Protect the coil spring and upper seat spring using a piece of cloth, then set the **SSTs**.
4. Compress the coil spring using the **SSTs**.



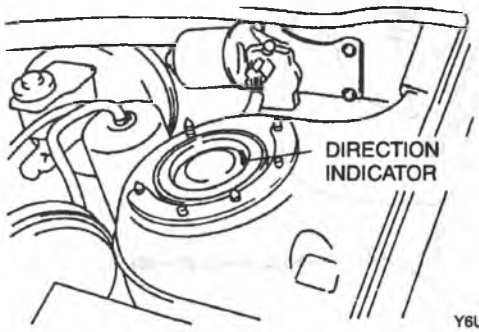
ZMU0213W131

5. Install the shock absorber so that the lower end of the coil spring is seated on the step of the lower spring seat.
6. Make sure that the marks on the shock absorber and upper spring seat are aligned.

7. Install the thrust bearing, mounting rubber, and piston rod nut, then remove the **SSTs**.

Piston rod nut tightening torque
55—80 N·m {5.6—8.2 kgf·m, 40—59 ft·lbf}

Front Shock Absorber and Coil Spring Installation
Note
- Face the mounting block direction indicator toward the rear outboard position, and install the shock absorber.



Y6U213WA1

FRONT SHOCK ABSORBER INSPECTION

Z6U021334700W01

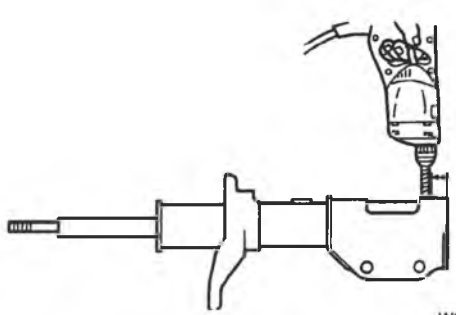
1. Remove the front shock absorber from the vehicle.
2. Inspect for damage and oil leakage.
3. Inspect the rubber bushing for deterioration and wear.
4. Compress and extend the shock piston at least three times. Verify that the operational force does not change and that there is no unusual noise.
   (1) Compress the shock absorber piston and release it.
   (2) Verify that the piston extends fully at a normal speed.
   - Replace the shock absorber if necessary.

FRONT SHOCK ABSORBER DISPOSAL

Z6U021334700W02

Warning
- **The gas in the shock absorber is pressurized, and could spray metal chips into the eyes and face when drilling. Whenever drilling into a shock absorber, wear protective eye wear.**

1. Clamp a shock absorber flat or with the piston downwards.
2. Drill a **2—3 mm {0.08—0.11 in}** hole at a point of **20—30 mm {0.8—1.1 in}** from the bottom of the tube, so that the gas can escape.


W6U213WA5

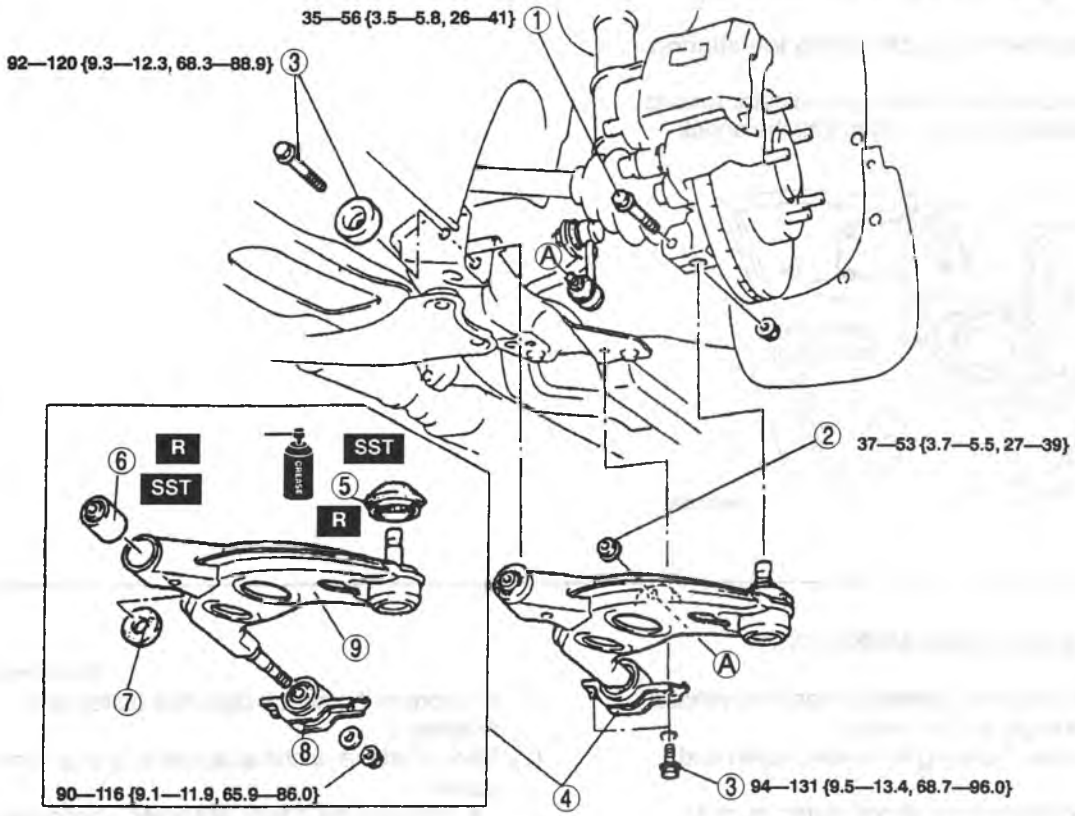
3. Turn the hole downwards.
4. The oil can be collected by moving the piston rod up and down several times and cutting the tube at the end.
5. Dispose of waste oil according to local waste disposal laws.

Note
- Shock absorber gas is nitrogen gas.
- Shock absorber oil is mineral oil.

FRONT LOWER ARM REMOVAL/INSTALLATION

Z6U021334300W01

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



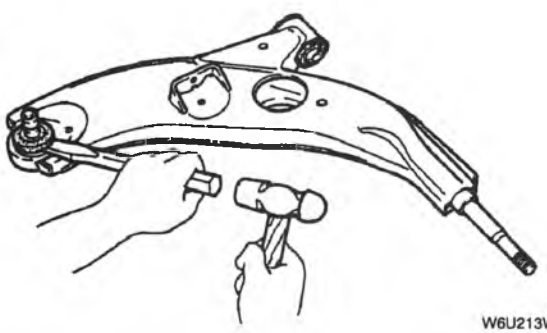
N·m {kgf·m, ft·lbf}

X6U213WA0

1	Bolt (Lower arm ball joint)
2	Nut (Stabilizer control link)
3	Bolt and dynamic damper
4	Lower arm component
5	Dust boot (See 02-13-4 Dust Boot Removal Note) (See 02-13-5 Dust Boot Installation Note)
6	Lower arm bushing (front) (See 02-13-4 Lower Arm Bushing (Front) Removal Note) (See 02-13-5 Lower Arm Bushing (Front) Installation Note)
7	Stopper
8	Lower arm bushing (rear)
9	Lower arm

Dust Boot Removal Note

- Remove the dust boot using a chisel, being careful not to damage the ball joint and the arm.

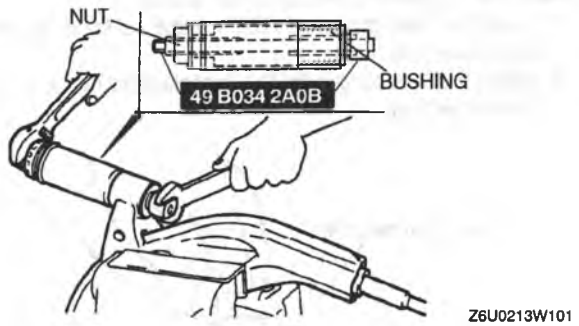


W6U213WA7

Lower Arm Bushing (Front) Removal Note

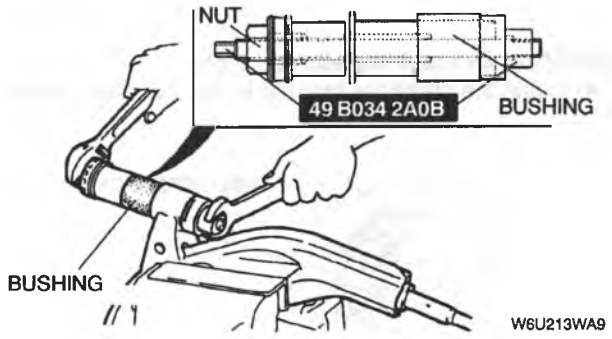
1. Cut away the projecting rubber of the lower arm bushing.

2. Set the **SST** onto the lower arm, and remove the bushing.



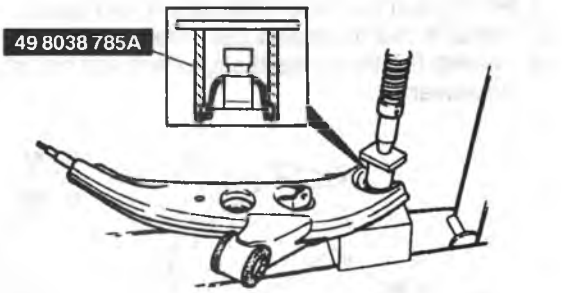
Lower Arm Bushing (Front) Installation Note

- Install the new bushing, and pull it into the lower arm using the **SST**.



Dust Boot Installation Note

1. Wipe the grease off the ball stud.
2. Fill the inside of the new dust boot with grease.
3. Press the boot onto the ball joint using the **SST**.
4. Wipe away the excessive grease.



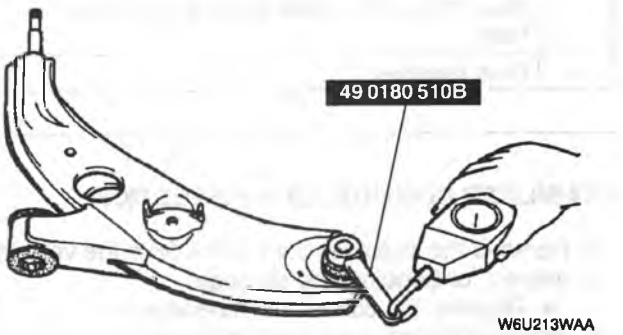
FRONT LOWER ARM INSPECTION

1. Remove the lower arm from the vehicle.
2. Inspect for damage, cracks, and bending.
   - Replace the lower arm if necessary.
3. Inspect the ball joint rotation torque.
   (1) Rotate the ball joint five times.
   (2) Connect the **SST** to the ball stud, and measure the rotation torque using a pull scale.
   - Replace the lower arm if not within the specification.

Ball joint preload
1.0—4.9 N·m {10—50 kgf·cm, 9—43 in·lbf}

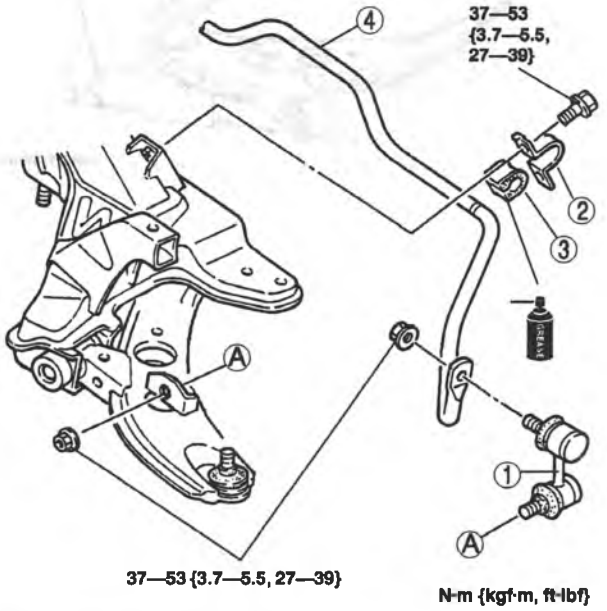
Z6U021334300W02

Pull scale reading
9.8—49 N {1.0—5.0 kgf, 3—11 lbf}



FRONT STABILIZER REMOVAL/INSTALLATION

1. Remove the crossmember and steering gear component. (See 02-13-7 TRANSVERSE MEMBER AND FRONT CROSSMEMBER REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.
4. Inspect the front wheel alignment and adjust it if necessary.



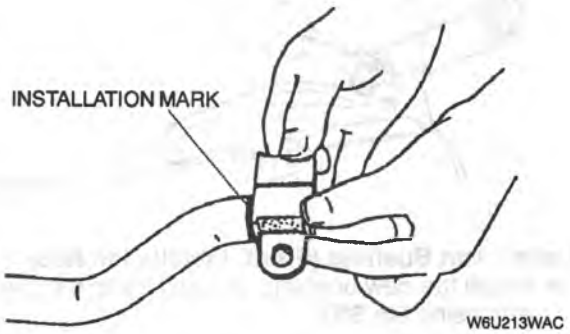
W6U213WAB

1	Stabilizer control link
2	Stabilizer bracket (See 02-13-6 Stabilizer Bracket Installation Note)
3	Stabilizer bushing (See 02-13-6 Stabilizer Bushing Installation Note)
4	Front stabilizer

Z6U021334100W01

Stabilizer Bushing Installation Note

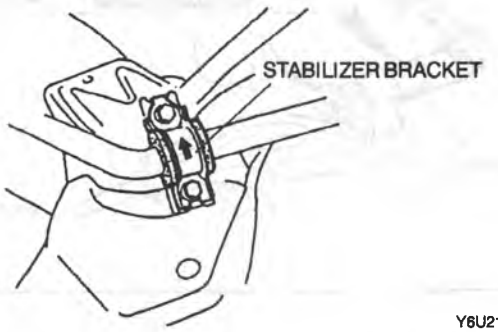
1. Apply rubber grease to the inside surface of the stabilizer bushing.
2. Align the bushing with the installation mark on the stabilizer bar.



W6U213WAC

Stabilizer Bracket Installation Note

- Install the stabilizer bracket in the direction shown.



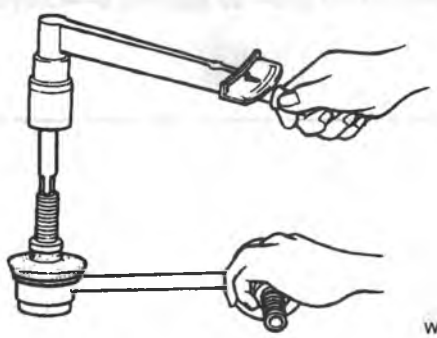
Y6U213WA2

STABILIZER CONTROL LINK INSPECTION

1. Remove the stabilizer control link from the vehicle.
2. Inspect for bending and damage.
   - Replace the control link if necessary.
3. Measure the ball joint starting torque.
   (1) Rock the ball joint stud side to side 10 times.
   (2) Rotate the ball joint stud 10 times.
   (3) Measure the starting torque using a suitable Allen socket and a torque wrench.
   - Replace the control link if not within the specification.

Starting torque
0.2—1.5 N·m {2—15 kgf·cm, 2—13 in·lbf}

Z6U021334150W01

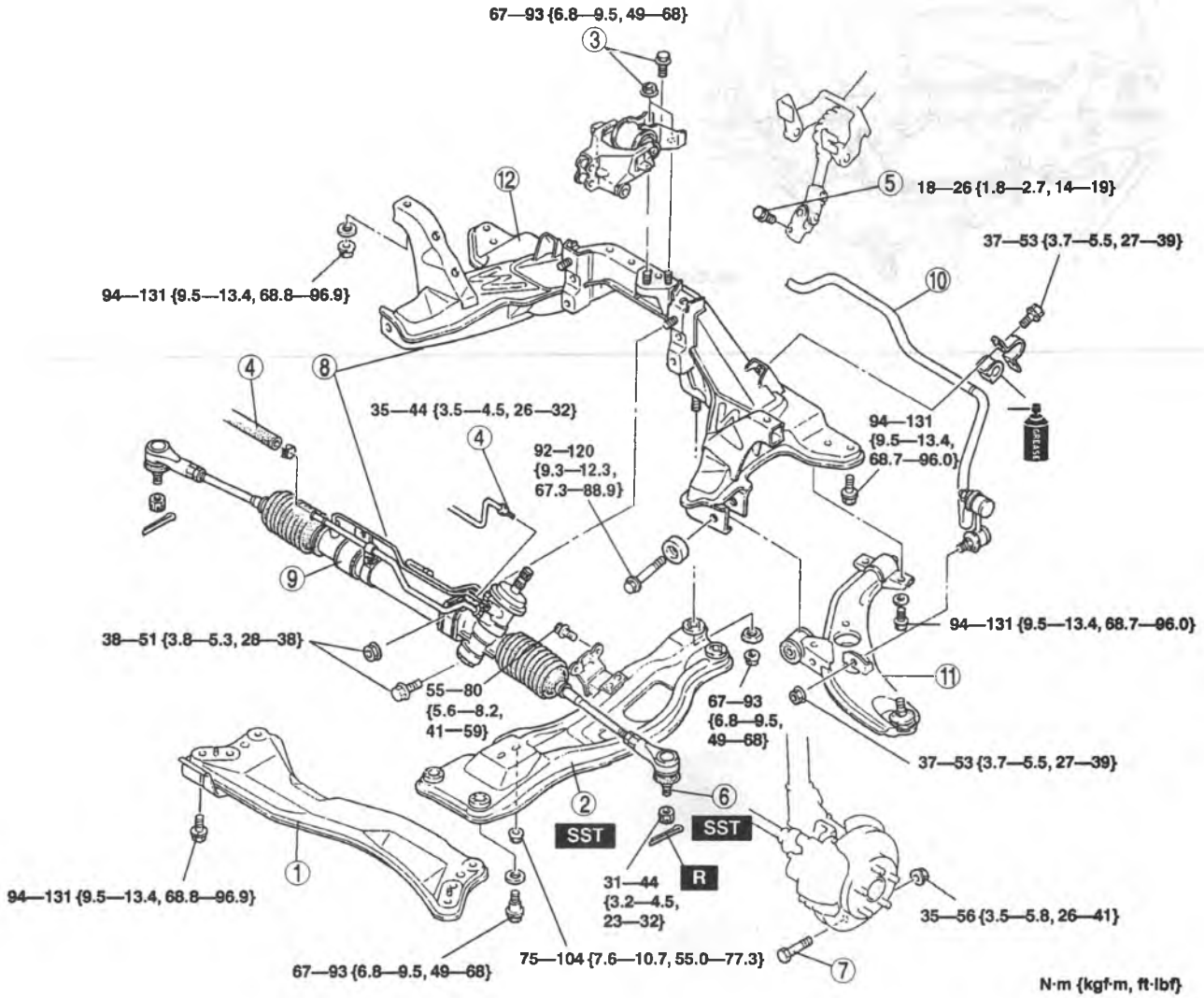


W6U213WAE

TRANSVERSE MEMBER AND FRONT CROSSMEMBER REMOVAL/INSTALLATION

Z6U021334800W01

1. Remove the front exhaust pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [FS].) (See 01-15-3 EXHAUST SYSTEM REMOVAL/INSTALLATION [KL].)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.
4. Inspect the front wheel alignment and adjust it if necessary.



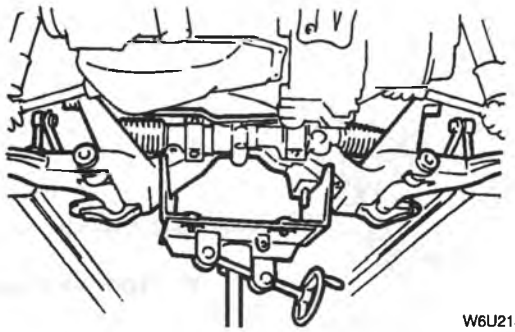
Z6U0213W131

1	Transverse member
2	Engine mount member (See 05-15-7 Engine Mount Member Removal Note) (See 05-15-7 Engine Mount Member Installation Note)
3	No.1 engine mount nut and bolt
4	Pressure pipe and return hose
5	Intermediate shaft bolt
6	Tie-rod end ball joint (See 06-12-10 Tie-rod End Ball Joint Removal Note)

7	Lower arm ball joint bolt
8	Crossmember and steering gear component (See 02-13-8 Crossmember and Steering Gear Component Removal Note)
9	Steering gear and linkage
10	Front stabilizer (See 02-13-6 FRONT STABILIZER REMOVAL/INSTALLATION)
11	Front lower arm
12	Front crossmember

Crossmember and Steering Gear Component Removal Note

1. Support the crossmember using a jack and remove the bolts and nuts.
2. Remove the crossmember and steering gear component.



W6U213WAG

02-14 REAR SUSPENSION

REAR SHOCK ABSORBER AND COIL SPRING
REMOVAL/INSTALLATION 02-14-2
Coil Spring Installation Note 02-14-3
REAR SHOCK ABSORBER
INSPECTION 02-14-3
REAR SHOCK ABSORBER
DISPOSAL 02-14-3
REAR STABILIZER
REMOVAL/INSTALLATION 02-14-4
Stabilizer Bushing And Bracket Installation Note 02-14-4
STABILIZER CONTROL LINK
INSPECTION 02-14-4
LATERAL LINK AND TRAILING LINK
REMOVAL/INSTALLATION 02-14-5
Nut, Cam Plate, and Adjusting Cam Bolt Removal Note 02-14-6
Front Lateral Link Removal Note 02-14-6
Nut, Cam Plate, and Adjusting Cam Bolt Installation Note 02-14-6
REAR CROSSMEMBER
REMOVAL/INSTALLATION 02-14-7

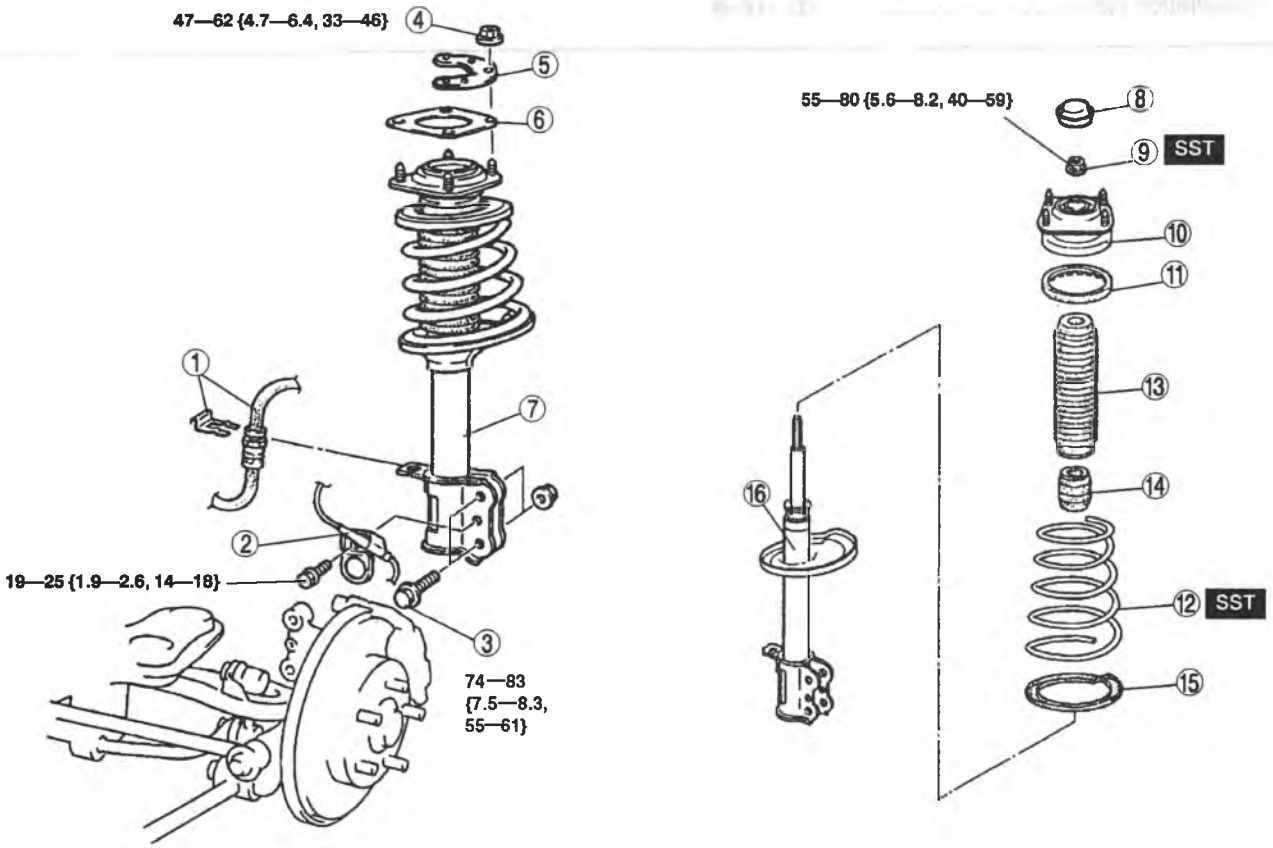
REAR SHOCK ABSORBER AND COIL SPRING REMOVAL/INSTALLATION

Z6U021405910W01

Note

- During routine inspection, varying degrees of oil wetness may be noticed on the rear shock absorber. If there is a thin oily film or sheen on the top of the shock absorber near the piston, it may be a normal condition, with no ride or handling performance concerns. If this is the case, do not replace the shock absorber. A heavy oil film along with droplets of oil below the lower spring seat is considered an abnormal condition. The shock absorber should be replaced if this condition is detected.

1. Remove the rear package trim. (See 09-17-12 REAR PACKAGE TRIM REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



N·m {kgf·m, ft·lbf}

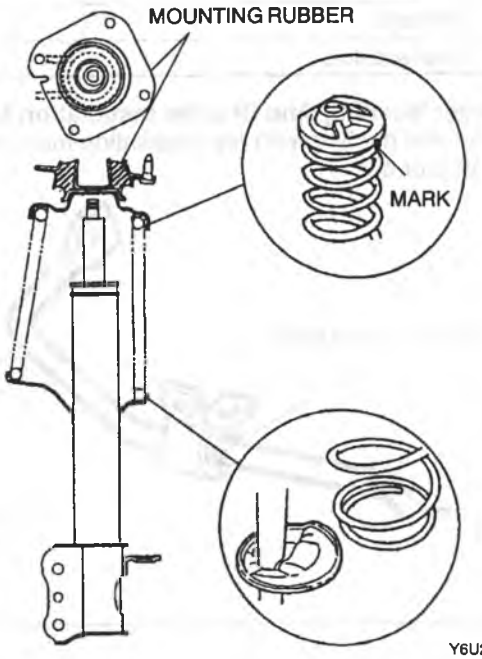
Z6U0214W130

1	Clip and brake hose
2	ABS wheel-speed sensor harness (if equipped)
3	Shock absorber bolt
4	Nut
5	Stiffener
6	Sheet
7	Rear shock absorber and coil spring
8	Cap
9	Piston rod nut (See 02-13-2 Piston Rod Nut Removal Note)

10	Mounting rubber
11	Upper spring seat
12	Coil spring (See 02-14-3 Coil Spring Installation Note)
13	Dust cover
14	Bound stopper
15	Lower spring seat
16	Rear shock absorber

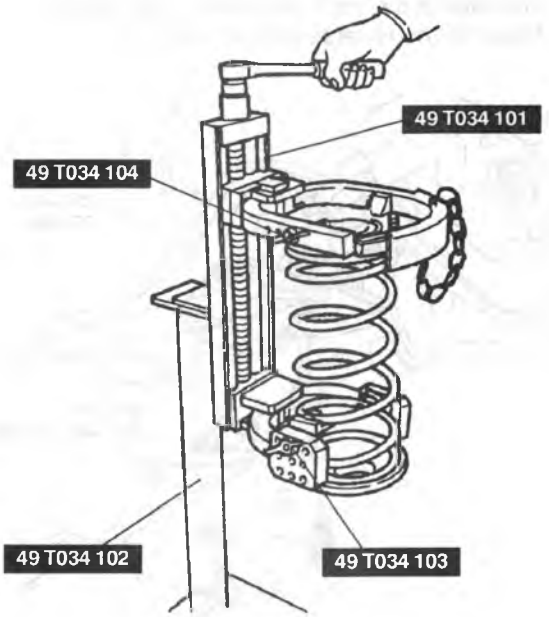
Coil Spring Installation Note

1. Temporarily install the coil spring, upper spring seat, and mounting rubber on the shock absorber as shown.
2. Mark the coil spring, upper spring seat, and mounting rubber for proper installation.



Y6U214WA1

3. Align the marks of the coil spring and upper spring seat. Protect the coil spring and upper seat spring using a piece of cloth, then set the **SSTs**.
4. Compress the coil spring using the **SSTs**.



W6U214WA2

5. Install the shock absorber so that the lower end of the coil spring is seated on the step of the lower spring seat.
6. Align the marks of the coil spring and the mounting rubber. Install the mounting rubber and piston rod nut, then remove the **SSTs**.

Piston rod nut tightening torque
50—80 N·m {5.6—8.2 kgf·m, 40—59 ft·lbf}

REAR SHOCK ABSORBER INSPECTION

Z6U021428700W01

- Inspect the rear shock absorber in the same manner as the front shock absorber. (See 02-13-3 FRONT SHOCK ABSORBER INSPECTION.)

REAR SHOCK ABSORBER DISPOSAL

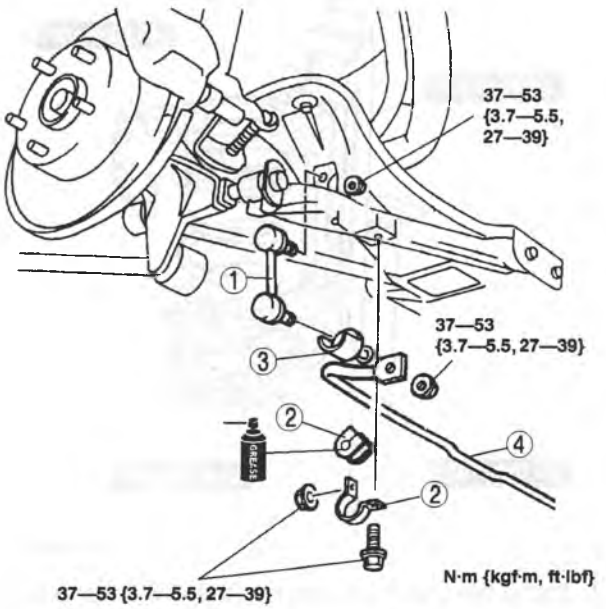
Z6U021428700W02

- Dispose of the rear shock absorber in the same manner as the front shock absorber. (See 02-13-3 FRONT SHOCK ABSORBER DISPOSAL.)

REAR STABILIZER REMOVAL/INSTALLATION

Z6U021428100W01

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.

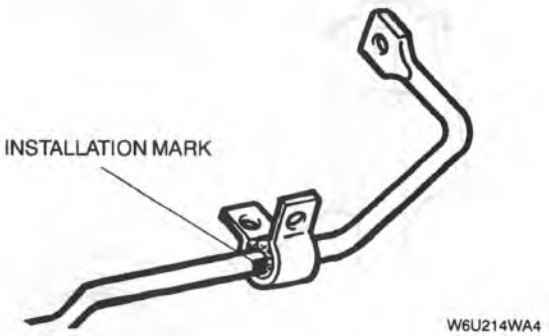


W6U214WA3

1	Stabilizer control link
2	Stabilizer bushing and bracket (See 02-14-4 Stabilizer Bushing And Bracket Installation Note)
3	Protector
4	Rear stabilizer

Stabilizer Bushing And Bracket Installation Note

- Align the bushing with the installation mark on the stabilizer bar.



W6U214WA4

STABILIZER CONTROL LINK INSPECTION

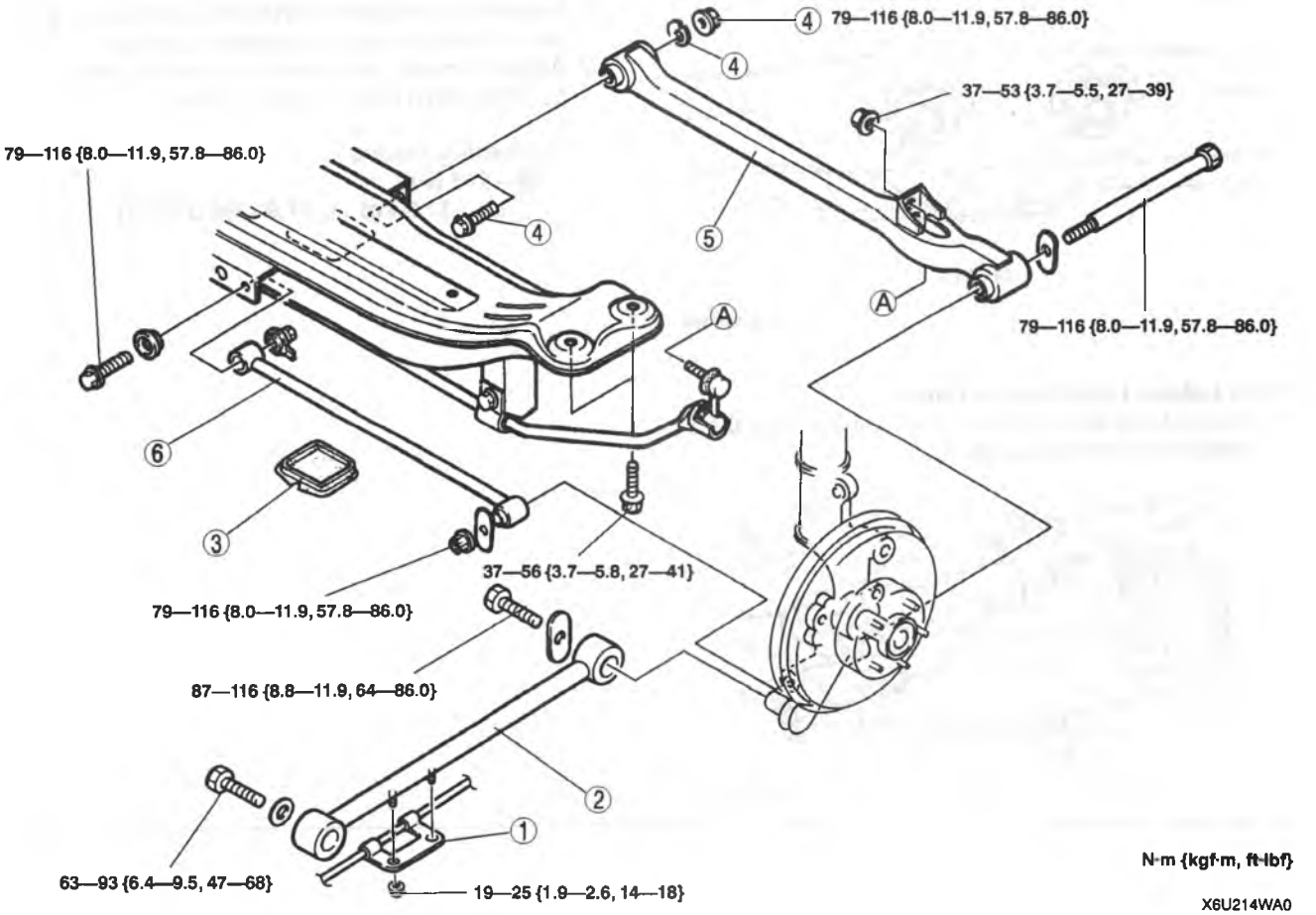
Z6U021434150W01

(See 02-13-6 STABILIZER CONTROL LINK INSPECTION.)

LATERAL LINK AND TRAILING LINK REMOVAL/INSTALLATION

Z6U021434333W01

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. Inspect the rear wheel alignment and adjust it if necessary.

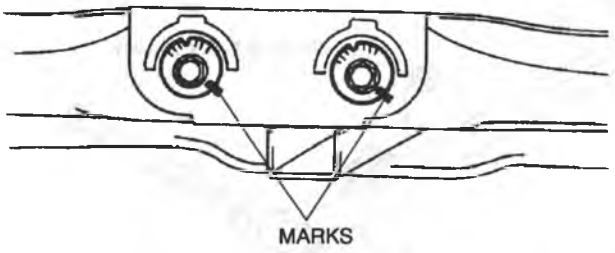


1	Parking brake cable bracket
2	Trailing link
3	Cap
4	Nut, cam plate, and adjusting cam bolt (See 02-14-6 Nut, Cam Plate, and Adjusting Cam Bolt Removal Note) (See 02-14-6 Nut, Cam Plate, and Adjusting Cam Bolt Installation Note)

5	Rear lateral link
6	Front lateral link (See 02-14-6 Front Lateral Link Removal Note)

Nut, Cam Plate, and Adjusting Cam Bolt Removal Note

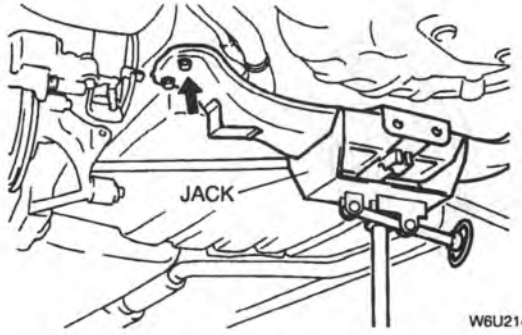
- Before loosening the nut, make a mark on the cam plate and the crossmember for reference during installation.



W6U214WA6

Front Lateral Link Removal Note

1. Support the rear crossmember using a jack, then remove the crossmember bolts.



W6U214WA7

2. Lower the crossmember to remove the lateral link bolt.

Nut, Cam Plate, and Adjusting Cam Bolt Installation Note

1. Install the cam plate so that the notch faces the same direction as the adjusting cam bolt.
2. Align the marks made before removing the adjusting cam bolt. Tighten the nut.

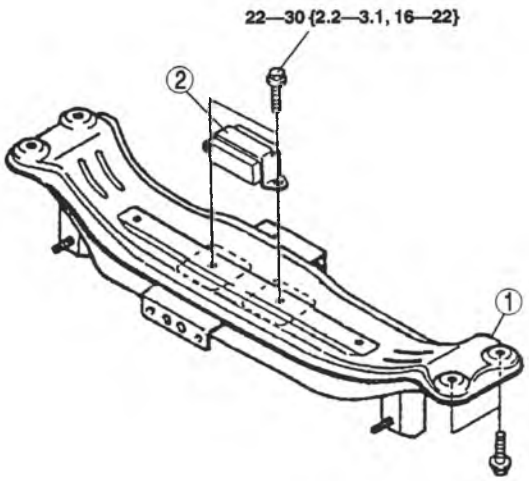
Tightening torque
79—116 N·m
{8.0—11.9 kgf·m, 57.8—86.0 ft·lbf}

REAR CROSSMEMBER REMOVAL/INSTALLATION

Z6U021428400W01

1. Remove the rear stabilizer. (See 02-14-4 REAR STABILIZER REMOVAL/INSTALLATION.)
2. Remove the front and rear lateral links. (See 02-14-5 LATERAL LINK AND TRAILING LINK REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.
5. Inspect the rear wheel alignment and adjust it if necessary.

1	Rear crossmember
2	Dynamic damper



N·m {kgf·m, ft·lbf}

Y6U214WA2

02-50 TECHNICAL DATA

SUSPENSION TECHNICAL DATA 02-50-1
SUSPENSION TIGHTENING TORQUE . 02-50-3

SUSPENSION TECHNICAL DATA

Z6U025001013W01

Item				Specification		
WHEEL ALIGNMENT						
Front wheel alignment (Unloaded)*1	Maximum steering angle	Inner		37° ±3°		
		Outer		32° ±3°		
	Total toe-in	(mm {in})		3±4 {0.12±0.16}		
		(degree)		0°17′±0°23′		
	Camber angle*2			–0°43′±1°		
	Caster angle*2			14 inch wheel: 2°08′±1°, 15 inch wheel: 2°09′±1°, 16 inch wheel: 2°03′±1°		
	Steering axis inclination (Reference value)			15°02′		
Rear wheel alignment (Unloaded)*1	Total toe-in	(mm {in})		3±4 {0.12±0.16}		
		(degree)		0°17′±0°23′		
	Camber angle*2 (Reference value)			–0°06′±1°		
	Thrust angle (Reference value)			0°±0°48′		
WHEELS AND TIRES						
Standard tire wheel	Size			14×5 1/2JJ	15×6JJ	16×6.5JJ
	Offset	(mm {in})		35 {1.38}	45 {1.77}	45 {1.77}
	Pitch circle diameter	(mm {in})		114.3 {4.500}		
	Material			Steel	Steel or aluminum alloy	aluminum alloy
Standard tire	Size			P185/70R14 87S	P205/60R15 90H	P205/55R16 89H
	Air pressure (kPa {kgf/cm^2, psi})		Front	220 {2.2, 32}		
			Rear	180 {1.8, 26}		200 {2.0, 28}
	Remaining tread	(mm {in})		1.6 {0.063}		
Standard tire wheel and tire	Wheel and tire runout	Radial direction	(mm {in})	Max. 1.5 {0.06}		
		Lateral direction	(mm {in})	Max. 2.5 {0.10} Steel, Max. 2.0 {0.08} Aluminum		
	Wheel unbalance*3		(g {oz})	Max. 10 {0.35} 14-inch wheel, Max. 9 {0.32} 15-inch wheel, Max. 8 {0.28} 16-inch wheel		
Temporary spare tire wheel	Size			15×4T		
	Offset	(mm {in})		45 {1.77}		
	Pitch circle diameter	(mm {in})		114.3 {4.500}		
	Material			Steel		
Temporary spare tire	Size			T125/70 D15		
	Air pressure	(kPa {kgf/cm^2, psi})		415 {4.2, 60}		
Temporary spare tire wheel and tire	Wheel and tire runout	Radial direction	(mm {in})	Max. 2.5 {0.10}		
		Lateral direction	(mm {in})	Max. 2.0 {0.08}		
FRONT SUSPENSION						
Lower arm ball joint rotation torque (Pull scale reading) (N {kgf, lbf})				9.8—49 {1.0—5.0, 3—11}		

Item	Specification
Stabilizer control link rotation torque (N·m {kgf·cm, in·lbf})	0.2—1.5 {2—15, 2—13}
REAR SUSPENSION	
Stabilizer control link rotation torque (N·m {kgf·cm, in·lbf})	0.2—1.5 {2—15, 2—13}

*1 : Fuel tank full; engine coolant and engine oil at specified level; spare tire, jack, and tools in designated position. Adjust to the median when carrying out wheel alignment.

*2 : Difference between left and right must not exceed 1.5°.

*3 : One balance weight: max. 60 g {2.0 oz}. If the total weight exceeds 100 g {3.5 oz} on each side, rebalance after moving the tire around on the rim. Do not use more than two balance weights on the inner or outer side of the wheel.

SUSPENSION TIGHTENING TORQUE

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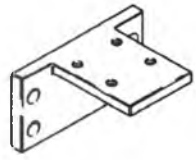
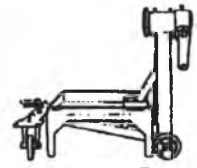
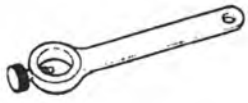
Item		Tightening torque (N·m {kgf·m, ft·lbf})
GENERAL PROCEDURES		
Wheel nut		89—117 {9.0—12.0, 65.1—86.7}
WHEEL ALIGNMENT		
Tie-rod end locknut		69—98 {7.0—10.0, 51—72}
Shock absorber mounting rubber		47—62 {4.7—6.4, 33—46}
Lateral link cam nut		79—116 {8.0—11.9, 57.8—86.0}
FRONT SUSPENSION		
Shock absorber mounting rubber		47—62 {4.7—6.4, 33—46}
Shock absorber bottom		74—83 {7.5—8.3, 55—61}
Piston rod nut		55—80 {5.6—8.2, 40—59}
Lower arm	front	92—120 {9.3—12.3, 68.3—88.9}
	rear	94—131 {9.5—13.4, 68.7—96.0}
Lower arm bushing		92—120 {9.3—12.3, 67.3—88.9}
Lower arm ball joint		35—56 {3.5—5.8, 26—41}
Stabilizer control link		37—53 {3.7—5.5, 27—39}
Stabilizer bracket		37—53 {3.7—5.5, 27—39}
No.1 engine mount to crossmember		67—93 {6.8—9.5, 49—68]
Engine mount member	front	67—93 {6.8—9.5, 49—68}
	center	75—104 {7.6—10.7, 55.0—77.3}
	rear	67—93 {6.8—9.5, 49—68}
	side	55—80 {5.6—8.2, 41—59}
Transverse member		94—131 {9.5—13.4, 68.8—96.9}
Intermediate shaft bolt		18—26 {1.8—2.7, 14—19}
Tie-rod end ball joint		31—44 {3.2—4.5, 23—32}
Steering gear bracket		38—51 {3.8—5.3, 28—38}
Steering gear pressure pipe		35—44 {3.5—4.5, 26—32}
Front crossmember		94—131 {9.5—13.4, 68.7—96.0}
REAR SUSPENSION		
Shock absorber mounting rubber		47—62 {4.7—6.4, 33—46}
Shock absorber bottom		74—83 {7.5—8.3, 55—61}
Piston rod nut		55—80 {5.6—8.2, 40—59}
Stabilizer control link		37—53 {3.7—5.5, 27—39}
Stabilizer bracket		37—53 {3.7—5.5, 27—39}
Trailing link	front	63—93 {6.4—9.5, 47—68}
	rear	87—116 {8.8—11.9, 64—86.0}
Front lateral link		79—116 {8.0—11.9, 57.8—86.0}
Rear lateral link		79—116 {8.0—11.9, 57.8—86.0}
Adjusting cam bolt		79—116 {8.0—11.9, 57.8—86.0}
Rear crossmember		37—56 {3.7—5.8, 27—41}
Dynamic damper		22—30 {2.2—3.1, 16—22}

02-60 SERVICE TOOLS

SUSPENSION SST 02-60-1

SUSPENSION SST

Z6U026001013W01

49 T034 1A0 Coil spring compressor set  TT0341A0X	49 T034 105 Attachment  TT034105X	49 0107 680A Engine stand  T0107680A
49 0180 510B Preload measuring attachment  T0180510B	49 B034 2A0B Rubber bushing replacer  TB0342A0B	49 8038 785A Dust boot installer  T8038785A

DRIVELINE/AXLE

03
SECTION

GENERAL PROCEDURES 03-10
FRONT AXLE 03-11
REAR AXLE 03-12
DRIVE SHAFT 03-13
TECHNICAL DATA 03-50
SERVICE TOOLS 03-60

03-10 GENERAL PROCEDURES

PRECAUTION (DRIVELINE/AXLE) 03-10-1
Wheel and Tire
Removal/Installation **03-10-1**
Brake Line
Disconnection/Connection **03-10-1**
Suspension Arm
Removal/Installation **03-10-1**

PRECAUTION (DRIVELINE/AXLE)

Z6U031001018W01

Wheel and Tire Removal/Installation

- The removal and installation procedure for the wheels and tires is not mentioned in this section. When a wheel is removed, tighten it to **89—117 N·m {9.0—12.0 kgf·m, 65.1—86.7 ft·lbf}**.

Brake Line Disconnection/Connection

Caution

- **Brake fluid will damage painted surfaces. If brake fluid gets on a painted surface, wipe it off immediately.**

- Tighten the brake pipe flare nut using the **SST** (49 0259 770B). Be sure to modify the brake pipe flare nut tightening torque to allow for use of a torque wrench-**SST** combination. (See 00-00-15 Torque Formulas.)
- If any brake line has been disconnected at any time during the procedure, add brake fluid, bleed the brakes, and inspect for leakage after the procedure has been completed.

Suspension Arm Removal/Installation

- Tighten any part of the suspension that uses rubber bushings only after vehicle has been lowered and unloaded.

Note

- Unloaded ... Fuel tank full; engine coolant and engine oil at specified level; spare tire, jack, and tools in designated position.

03-11 FRONT AXLE

WHEEL HUB, STEERING KNUCKLE
PRE-INSPECTION 03-11-1
Wheel Bearing Play Inspection **03-11-1**
WHEEL HUB BOLT
REPLACEMENT 03-11-1
WHEEL HUB, STEERING KNUCKLE
REMOVAL/INSTALLATION 03-11-2
Locknut Removal Note **03-11-3**
Wheel Hub Component
Removal Note **03-11-3**
Wheel Bearing Removal Note **03-11-3**
Dust Cover Removal Note **03-11-3**
Hub Bolt Removal Note **03-11-4**
Hub Bolt Installation Note **03-11-4**
Dust Cover Installation Note **03-11-4**
Wheel Bearing Installation Note **03-11-4**
Wheel Hub Component
Installation Note **03-11-4**
Oil Seal Installation Note **03-11-4**
Locknut Installation Note **03-11-4**

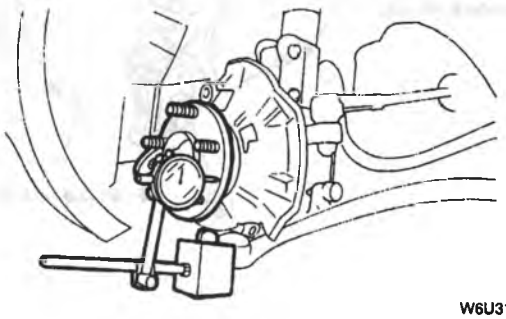
WHEEL HUB, STEERING KNUCKLE PRE-INSPECTION

Z6U031104000W01

Wheel Bearing Play Inspection

1. Position a dial indicator against the wheel hub. Push and pull the wheel hub by hand in the axial direction and measure the wheel bearing play.
   - If the bearing play exceeds the specification, first replace and tighten the locknut to the specified torque, then replace the wheel bearing if necessary.

Wheel bearing play
0.1 mm {0.004 in}

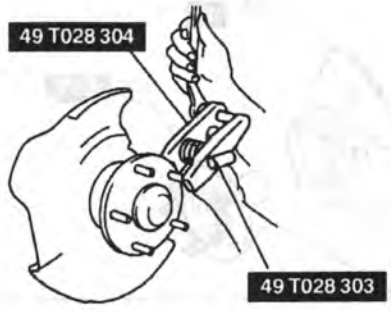


W6U311WA0

WHEEL HUB BOLT REPLACEMENT

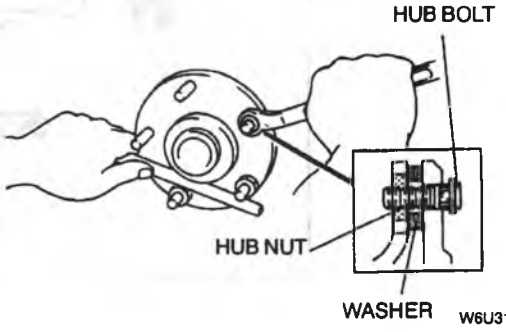
Z6U031104000W02

1. Remove the hub bolt by using the **SSTs**.



W6U311WA1

2. As shown in the figure, install the hub bolt into the wheel hub and set a washer and hub nut on the hub bolt.
3. Tighten the hub nut while holding the wheel hub by using the brass bar.



W6U311WA2

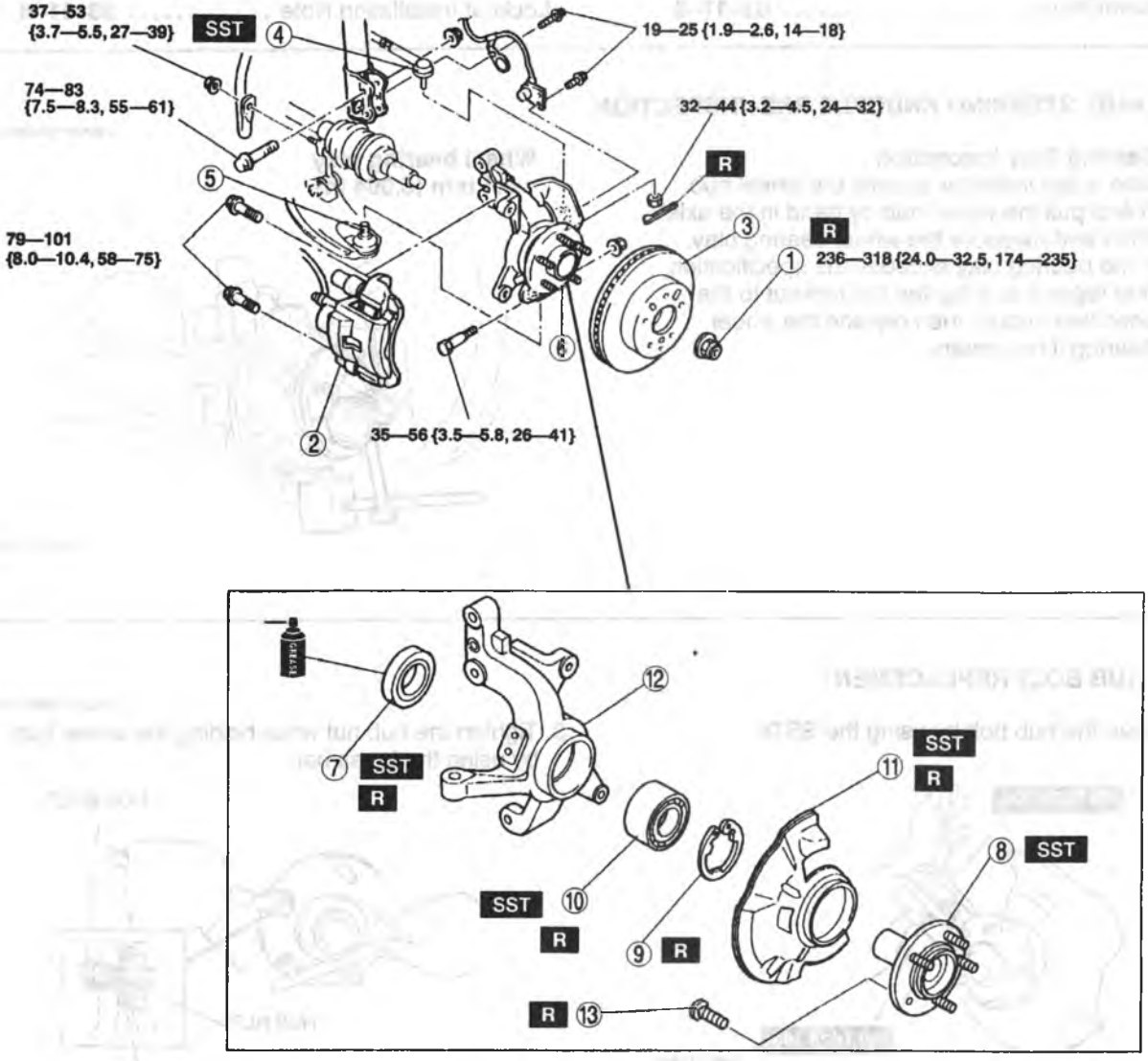
WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION

Z6U031104000W03

Caution

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.**

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



N·m {kgf·m, ft·lbf}

Z6U0311W130

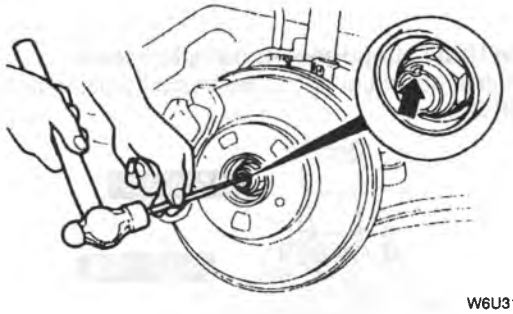
1	Locknut (See 03-11-3 Locknut Removal Note) (See 03-11-4 Locknut Installation Note)
2	Brake caliper component
3	Disc plate
4	Tie-rod end ball joint (See 06-12-10 Tie-rod End Ball Joint Removal Note)
5	Lower arm ball joint
6	Wheel hub, steering knuckle, dust cover

7	Oil seal (See 03-11-4 Oil Seal Installation Note)
8	Wheel hub component (See 03-11-3 Wheel Hub Component Removal Note) (See 03-11-4 Wheel Hub Component Installation Note)
9	Retaining ring
10	Wheel bearing (See 03-11-3 Wheel Bearing Removal Note) (See 03-11-4 Wheel Bearing Installation Note)

11	Dust cover (See 03-11-3 Dust Cover Removal Note) (See 03-11-4 Dust Cover Installation Note)
12	Steering knuckle
13	Hub bolt (See 03-11-4 Hub Bolt Removal Note) (See 03-11-4 Hub Bolt Installation Note)

Locknut Removal Note

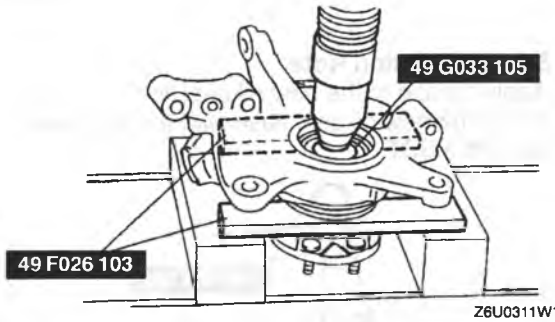
1. Knock the crimped portion of the locknut outward by using a small chisel and a hammer.
2. Lock the hub by applying the brakes.
3. Remove the locknut.



W6U311WA4

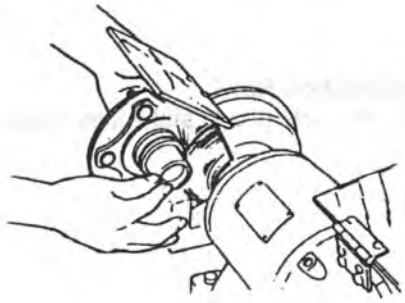
Wheel Hub Component Removal Note

1. Remove the wheel hub component by using the **SSTs**.



Z6U0311W131

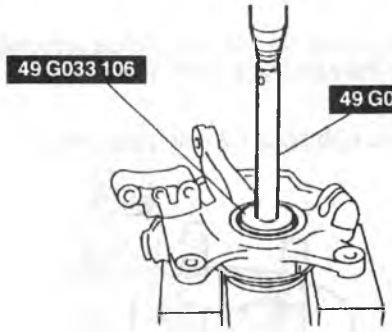
2. If the bearing inner race remains on the front wheel hub component, grind a section of the bearing inner race until **approx. 0.5 mm {0.02 in}** remains. Then remove it by using a chisel.



W6U311WA6

Wheel Bearing Removal Note

- Remove the wheel bearing by using the **SSTs**.



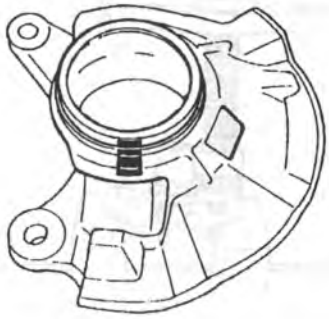
W6U311WA7

Dust Cover Removal Note

Note

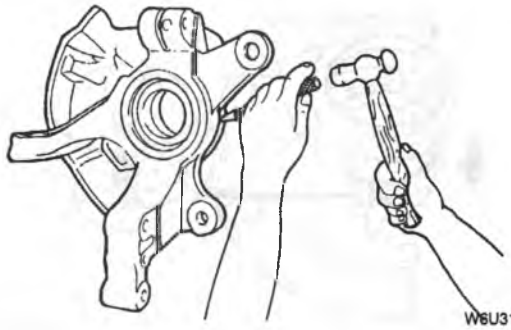
- The dust cover does not need to be removed unless it is being replaced.

1. Mark the dust cover and steering knuckle for proper installation.



W6U311WA8

2. Remove the dust cover by using a chisel.

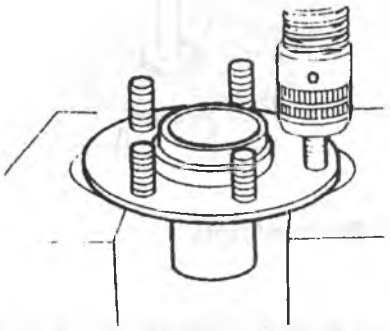


W6U311WA9

Hub Bolt Removal Note

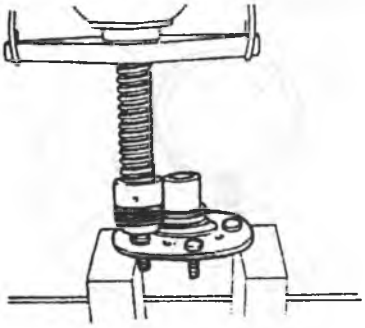
Note
- The hub bolts do not need to be removed unless they are being replaced.

- Remove the hub bolts by using a press.



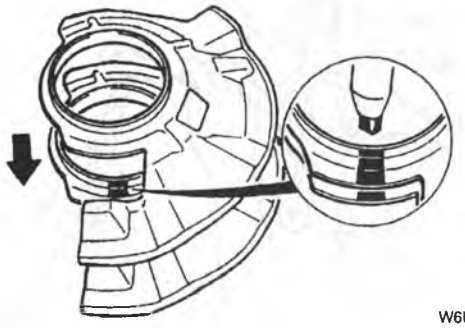
W6U311WAA

Hub Bolt Installation Note
- Install the new hub bolts by using a press.



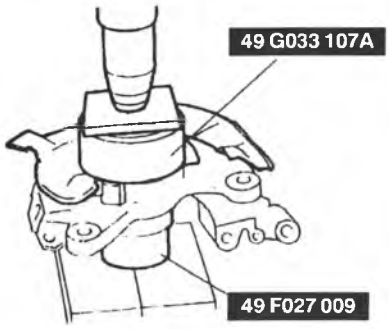
W6U311WAB

Dust Cover Installation Note
1. Mark the new dust cover as the removed one.



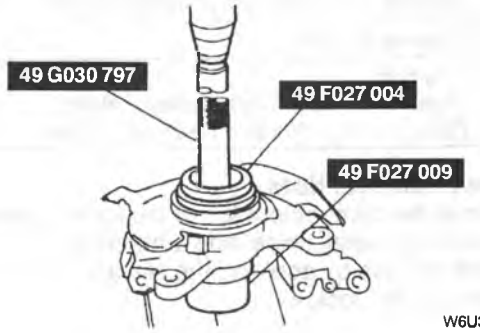
W6U311WAC

2. Align the marks of the new dust cover and the knuckle.
3. Install the new dust cover by using the **SSTs**.



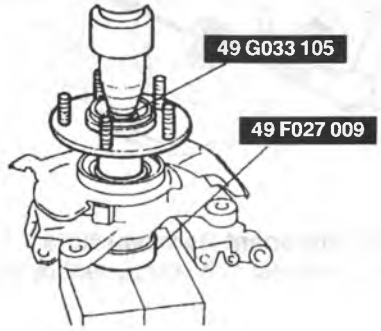
W6U311WAD

Wheel Bearing Installation Note
- Install the new wheel bearing by using the **SSTs**.



W6U311WAE

Wheel Hub Component Installation Note
- Install the wheel hub component by using the **SSTs**.



W6U311WAF

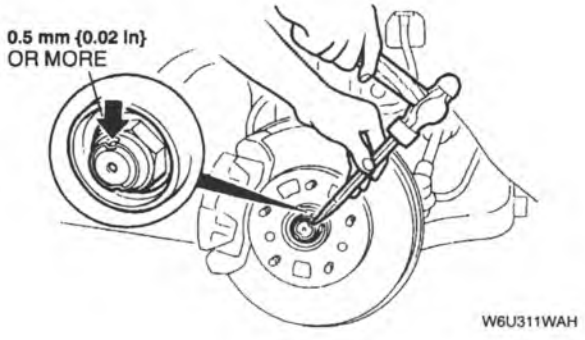
Oil Seal Installation Note
1. Apply grease to the new oil seal lip.
2. Install the new oil seal flush with the knuckle by using the **SST**.



W6U311WAG

Locknut Installation Note
- Install a new locknut and stake it as shown.

Tightening torque
236—318 N·m
{24.0—32.5 kgf·m, 174—235 ft·lbf}



03-12 REAR AXLE

WHEEL HUB, HUB SPINDLE PRE-INSPECTION (DRUM BRAKE MODEL) 03-12-1
Wheel Bearing Play Inspection 03-12-1
WHEEL HUB, HUB SPINDLE REMOVAL/INSTALLATION (DRUM BRAKE MODEL) 03-12-2
Locknut Removal Note 03-12-3
ABS Sensor Rotor (With ABS) Removal Note 03-12-3
ABS Sensor Rotor (With ABS) Installation Note 03-12-3
Locknut Installation Note 03-12-3
WHEEL HUB, HUB SPINDLE PRE-INSPECTION (DISC BRAKE MODEL) 03-12-3
Wheel Bearing Play Inspection 03-12-3
WHEEL HUB BOLT REPLACEMENT 03-12-3
WHEEL HUB, HUB SPINDLE REMOVAL/INSTALLATION (DISC BRAKE MODEL) 03-12-4

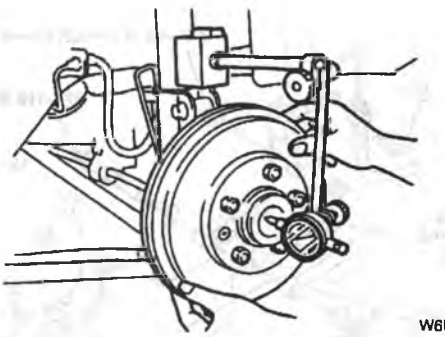
WHEEL HUB, HUB SPINDLE PRE-INSPECTION (DRUM BRAKE MODEL)

Z6U031205000W01

Wheel Bearing Play Inspection

1. Position a dial indicator against the brake drum. Push and pull the rear brake component by hand in the axial direction and measure the wheel bearing play.
   - If the bearing play exceeds the specification, first, replace and tighten the locknut to the specified torque, then replace the wheel hub component if necessary.

Wheel bearing play
0.1 mm {0.004 in}



W6U312WA0

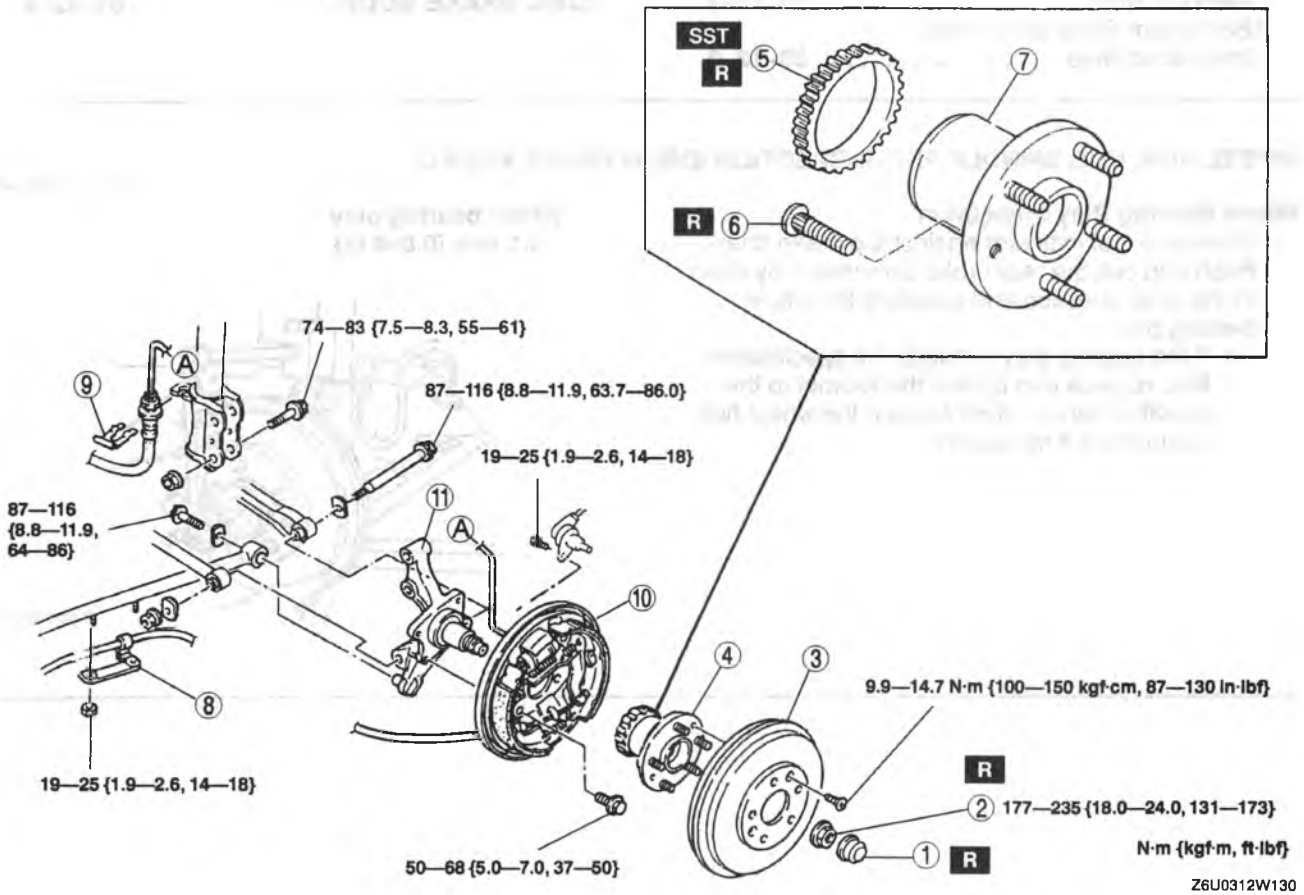
WHEEL HUB, HUB SPINDLE REMOVAL/INSTALLATION (DRUM BRAKE MODEL)

Z6U031205000W02

Caution

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.**

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



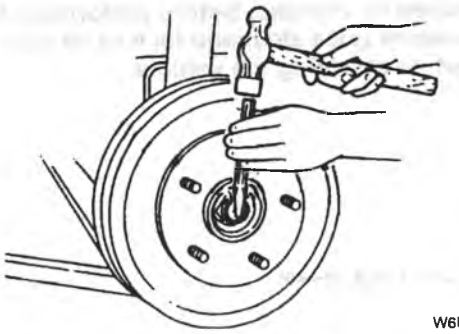
Z6U0312W130

1	Hub Cap
2	Locknut (See 03-12-3 Locknut Removal Note) (See 03-12-3 Locknut Installation Note)
3	Brake drum
4	Wheel hub component and ABS sensor rotor (with ABS)
5	ABS sensor rotor (with ABS) (See 03-12-3 ABS Sensor Rotor (With ABS) Removal Note) (See 03-12-3 ABS Sensor Rotor (With ABS) Installation Note)

6	Hub bolt (See 03-11-4 Hub Bolt Removal Note) (See 03-11-4 Hub Bolt Installation Note)
7	Wheel hub component
8	Parking brake cable bracket
9	Clip
10	Rear brake component
11	Hub spindle

Locknut Removal Note

1. Raise the staked portion of the locknut by using a small cape chisel and a hammer.
2. Lock the hub by applying the brakes.
3. Remove the locknut.



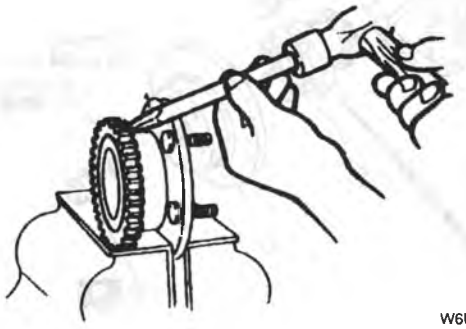
W6U312WA1

ABS Sensor Rotor (With ABS) Removal Note

Note

- The sensor rotor does not need to be removed unless replacing it.

- Remove the sensor rotor by using a chisel.



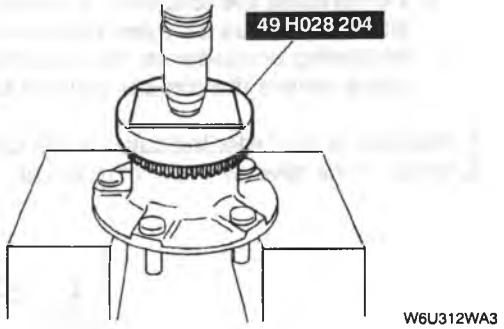
W6U312WA2

ABS Sensor Rotor (With ABS) Installation Note

Note

- The ABS sensor rotor can be installed in either direction.

1. Install a new rear ABS sensor rotor onto the wheel hub.
2. Using a steel plate and the **SST**, press the rotor until it is flush with the wheel hub.

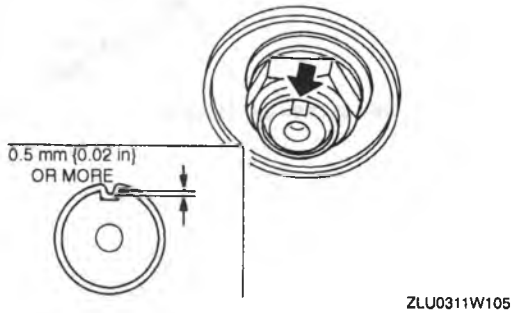


W6U312WA3

Locknut Installation Note

- Install a new locknut and stake it as shown.

Tightening torque
177—235 N·m
{18.0—24.0 kgf·m, 131—173 ft·lbf}



ZLU0311W105

WHEEL HUB, HUB SPINDLE PRE-INSPECTION (DISC BRAKE MODEL)

Z6U031205000W03

Wheel Bearing Play Inspection
(See 03-11-1 Wheel Bearing Play Inspection.)

WHEEL HUB BOLT REPLACEMENT

Z6U031205000W04

(See 03-11-1 WHEEL HUB BOLT REPLACEMENT.)

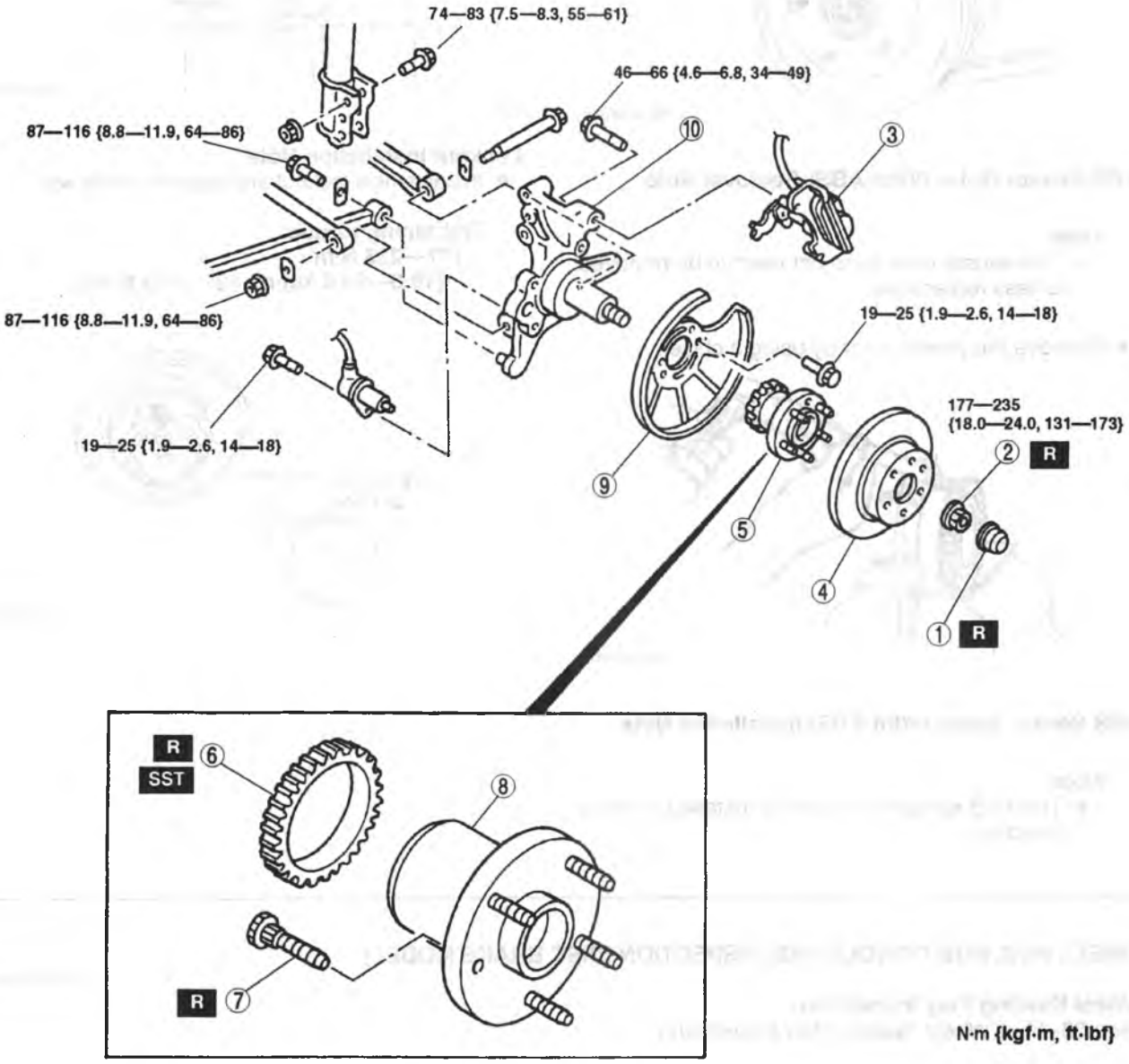
WHEEL HUB, HUB SPINDLE REMOVAL/INSTALLATION (DISC BRAKE MODEL)

Z6U031205000W05

Caution

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.**

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



Z6U0312W101

1	Hub Cap
2	Locknut (See 03-12-3 Locknut Removal Note) (See 03-12-3 Locknut Installation Note)
3	Brake caliper component
4	Disc plate

5	Wheel hub component and ABS sensor rotor (with ABS)
6	ABS sensor rotor (with ABS) (See 03-12-3 ABS Sensor Rotor (With ABS) Removal Note) (See 03-12-3 ABS Sensor Rotor (With ABS) Installation Note)

7	Hub bolt (See 03-11-4 Hub Bolt Removal Note) (See 03-11-4 Hub Bolt Installation Note)
8	Wheel hub component
9	Dust cover
10	Hub spindle

03-13 DRIVE SHAFT

JOINT SHAFT PRE-INSPECTION 03-13-1
JOINT SHAFT
REMOVAL/INSTALLATION 03-13-2
Right Drive Shaft and Axle Removal Note 03-13-2
Joint Shaft Removal Note 03-13-3
Clip Installation Note 03-13-3
Joint Shaft Installation Note 03-13-3
Right Drive Shaft and Axle Installation Note 03-13-3
JOINT SHAFT
DISASSEMBLY/ASSEMBLY 03-13-4
Dust Cover Disassembly Note 03-13-4
Joint Shaft Disassembly Note 03-13-4
Dust Seal (Left) Disassembly Note ... 03-13-5
Dust Seal (Right) Assembly Note 03-13-5
Bearing Assembly Note 03-13-5
Dust Seal (Left) Assembly Note 03-13-5
Joint Shaft Assembly Note 03-13-5
Dust Cover Assembly Note 03-13-5
DRIVE SHAFT PRE-INSPECTION 03-13-6
DRIVE SHAFT
REMOVAL/INSTALLATION 03-13-7
Engine Mounting Member Removal Note 03-13-8
Drive Shaft Removal Note 03-13-8
Drive Shaft Installation Note 03-13-8
DRIVE SHAFT
(MTX, DOUBLE OFFSET TYPE)
DISASSEMBLY/ASSEMBLY 03-13-10
Boot Band Disassembly Note 03-13-10
Clip Disassembly Note 03-13-10
Snap Ring Disassembly Note 03-13-11
Balls Disassembly Note 03-13-11
Boot Disassembly Note 03-13-11
ABS Sensor Rotor (With ABS) Disassembly Note 03-13-11
ABS Sensor Rotor (With ABS) Assembly Note 03-13-11
Boot Assembly Note 03-13-12
Cage Assembly Note 03-13-12
Outer Ring Assembly Note 03-13-12
Boot Band Assembly Note 03-13-13
DRIVE SHAFT (ATX, TRIPOD TYPE)
DISASSEMBLY/ASSEMBLY 03-13-14
Boot Band Disassembly Note 03-13-14
Outer Ring Disassembly Note 03-13-15
Snap Ring Disassembly Note 03-13-15
Boot Disassembly Note 03-13-15
ABS Sensor Rotor (With ABS) Disassembly Note 03-13-15
ABS Sensor Rotor (With ABS) Assembly Note 03-13-15
Boot Assembly Note 03-13-15
Dynamic Damper (FS engine) Assembly Note 03-13-16
Tripod Joint Assembly Note 03-13-16
Outer Ring Assembly Note 03-13-16
Boot Band Assembly Note 03-13-16

JOINT SHAFT PRE-INSPECTION

Z6U031325700W01

1. Verify that the joint shaft is not twisted or cracked. Replace it if necessary.
2. Turn the joint shaft by hand and verify that the bearing rotates smoothly and freely.
   - Replace it if necessary.

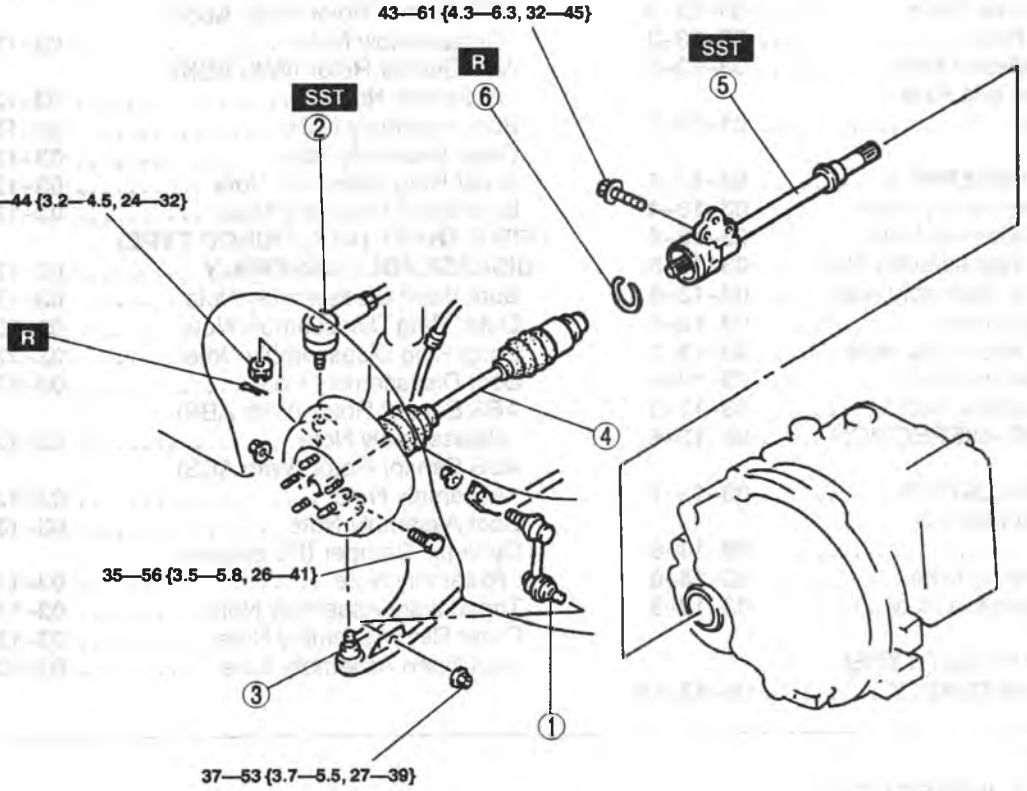


W6U313WA0

JOINT SHAFT REMOVAL/INSTALLATION

Z6U031325700W02

1. Drain the transaxle oil. (See 05-15-1 TRANSAXLE OIL REPLACEMENT.) (See 05-17A-23 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [LA4A-EL].) (See 05-17B-21 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [GF4A-EL].)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



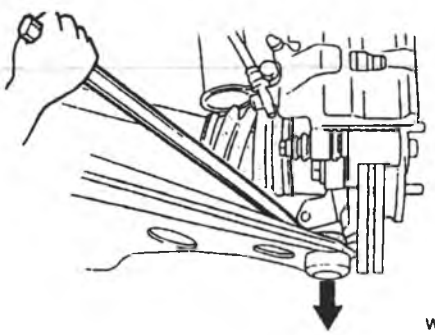
N·m {kgf·m, ft·lbf}

Z6U0313W106

1	Stabilizer control link
2	Tie-rod end ball joint (See 06-12-10 Tie-rod End Ball Joint Removal Note)
3	Lower arm ball joint
4	Right drive shaft and axle (See 03-13-2 Right Drive Shaft and Axle Removal Note) (See 03-13-3 Right Drive Shaft and Axle Installation Note)
5	Joint shaft (See 03-13-3 Joint Shaft Removal Note) (See 03-13-3 Joint Shaft Installation Note)
6	Clip (See 03-13-3 Clip Installation Note)

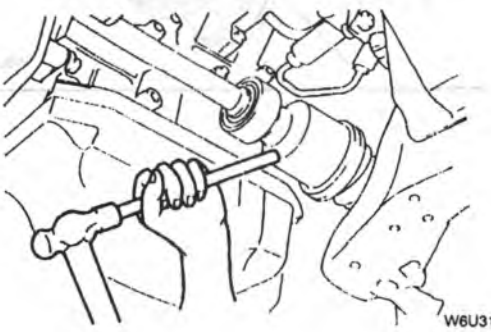
Right Drive Shaft and Axle Removal Note

1. Remove the clinch bolt and nut.
2. Wrap a rag around the ball joint dust boot.
3. Pry the lower arm out of the knuckle.



W6U313WA2

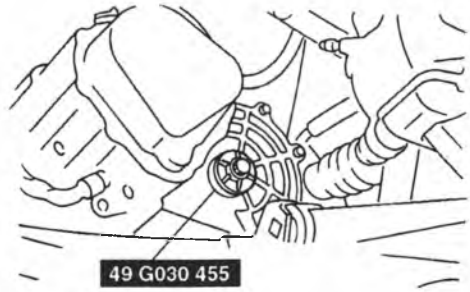
4. Separate the right side drive shaft from the joint shaft by hammering on a bar inserted between them.



W6U313WA3

Joint Shaft Removal Note

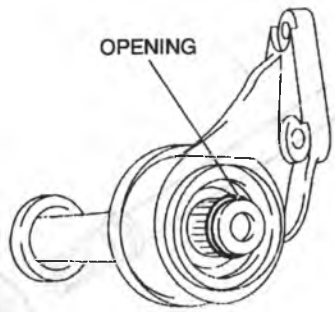
- Install the **SST** into the transaxle to hold the side gears after the joint shaft is removed.



Z6U0313W101

Clip Installation Note

- Install the new clip with the opening facing upward.



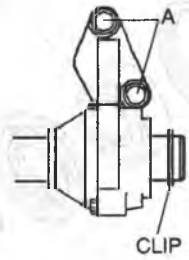
W6U313WA5

Joint Shaft Installation Note

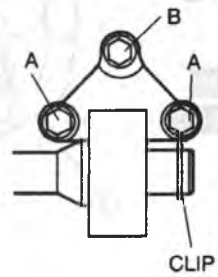
1. Install the joint shaft with the end-gap of a new clip facing upward.
2. Hand tighten the A bolts.
3. Tighten the A, B bolts to the specified torque.

Tightening torque
43—61 N·m {4.3—6.3 kgf·m, 32—45 ft·lbf}

KL ENGINE



FS ENGINE



Z6U0313W108

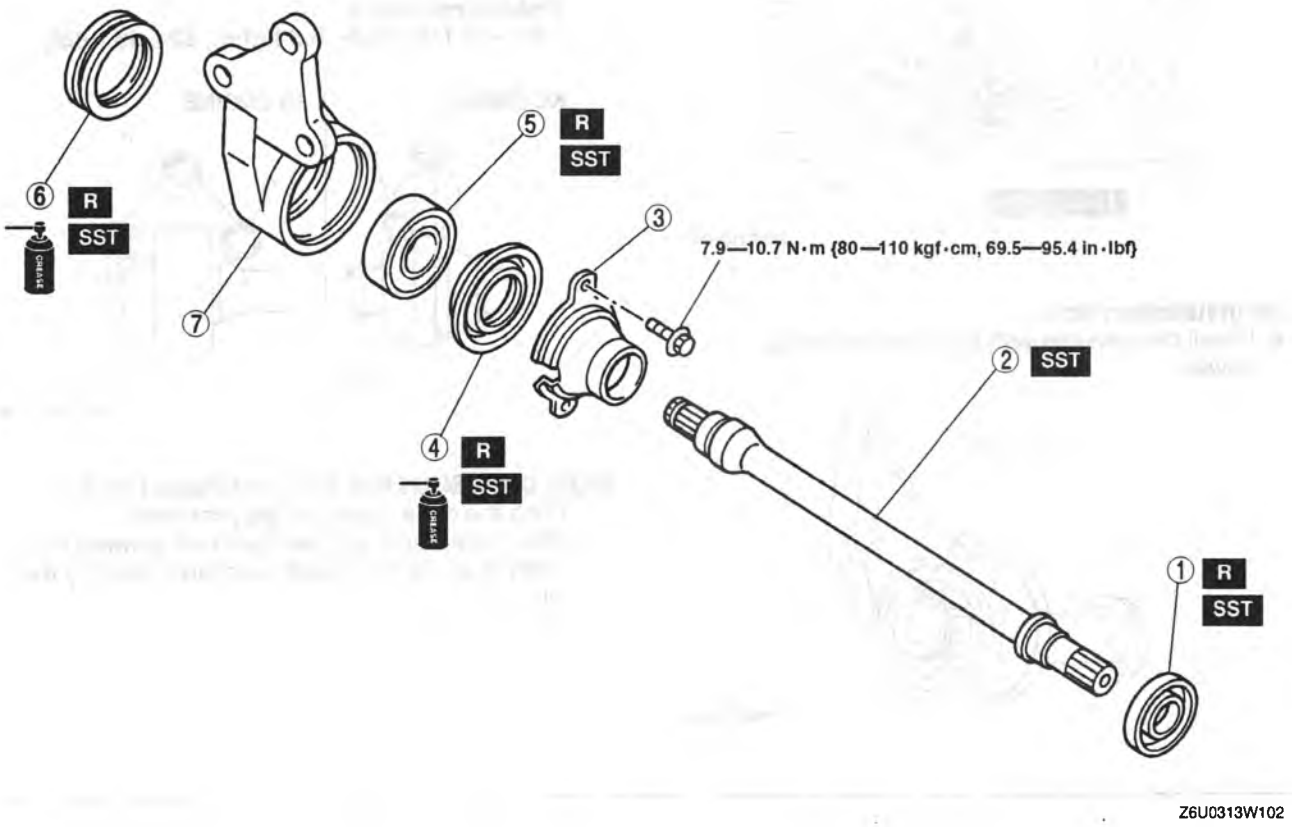
Right Drive Shaft and Axle Installation Note

1. Push the drive shaft into the joint shaft.
2. After installation, pull the front hub outward to verify that the drive shaft is securely held by the clip.

JOINT SHAFT DISASSEMBLY/ASSEMBLY

Z6U031325700W03

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

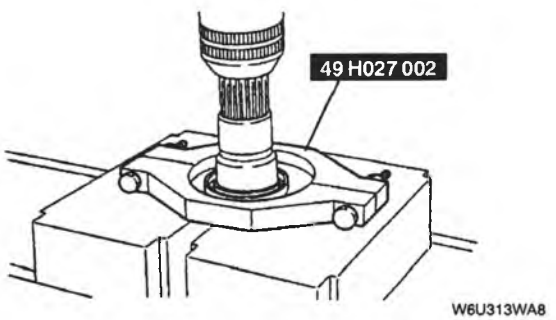


Z6U0313W102

1	Dust cover (See 03-13-4 Dust Cover Disassembly Note) (See 03-13-5 Dust Cover Assembly Note)
2	Joint shaft (See 03-13-4 Joint Shaft Disassembly Note) (See 03-13-5 Joint Shaft Assembly Note)
3	Dust cover (KL engine)
4	Dust seal (left) (See 03-13-5 Dust Seal (Left) Disassembly Note) (See 03-13-5 Dust Seal (Left) Assembly Note)
5	Bearing (See 03-13-5 Bearing Assembly Note)
6	Dust seal (right) (See 03-13-5 Dust Seal (Right) Assembly Note)
7	Bracket

Dust Cover Disassembly Note

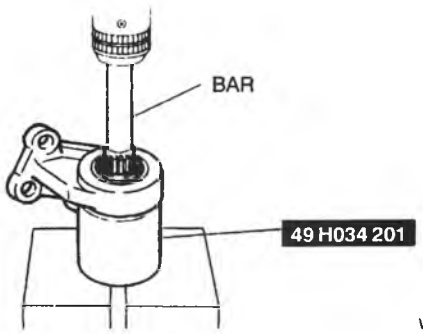
- While holding the joint shaft, press out the dust cover by using the **SST**.



W6U313WA8

Joint Shaft Disassembly Note

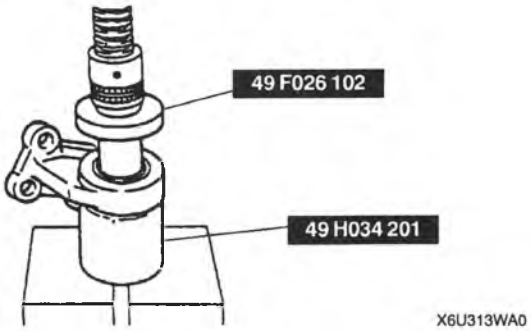
- Disassemble the joint shaft by using the **SST**.



W6U313WA9

Dust Seal (Left) Disassembly Note

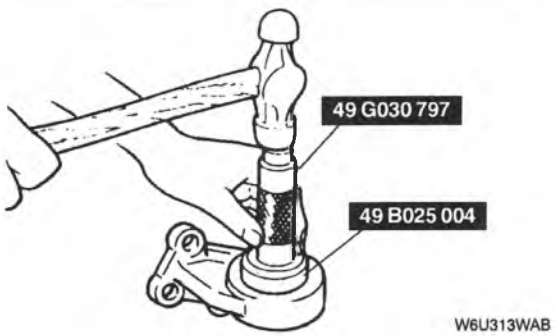
1. Remove the left side dust seal and bearing by using the **SSTs**.



X6U313WA0

Dust Seal (Right) Assembly Note

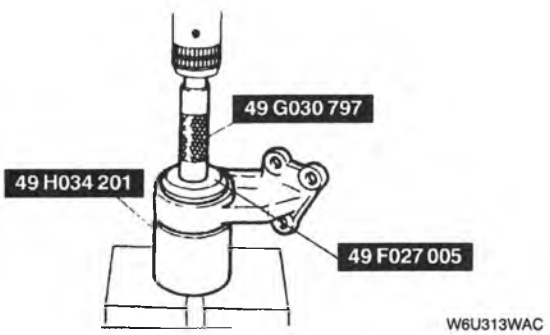
- Install the new right side dust seal by using the **SSTs**.



W6U313WAB

Bearing Assembly Note

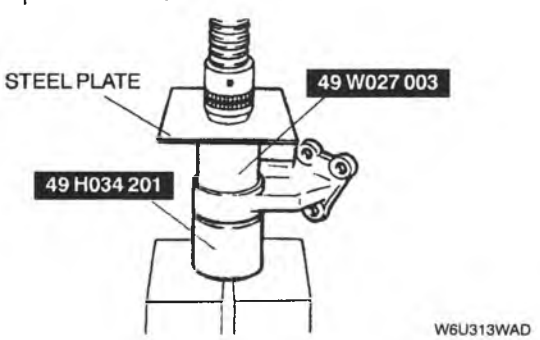
- Install the new bearing by using the **SSTs**.



W6U313WAC

Dust Seal (Left) Assembly Note

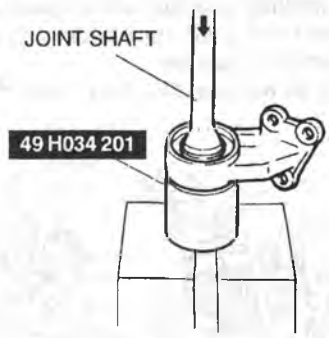
- Assemble the new left side dust seal by using a steel plate and the **SSTs**.



W6U313WAD

Joint Shaft Assembly Note

- Assemble the joint shaft by using a press and the **SST**.

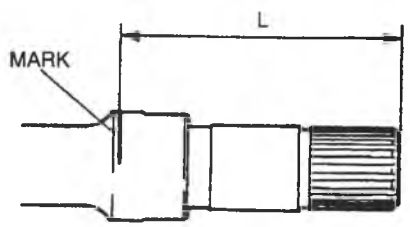


W6U313WAE

Dust Cover Assembly Note

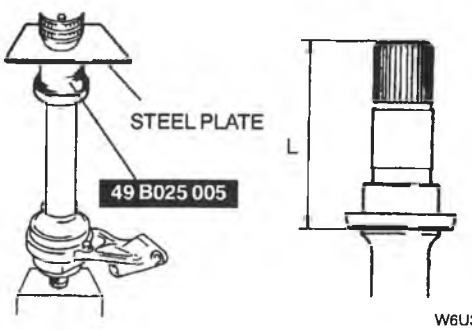
1. Mark the shaft as shown in the figure.

Length L
88.5—89.5 mm {3.49—3.52 in}



W6U313WAF

2. Press in the dust cover to the marked position by using a steel plate and the **SST**.
3. Verify that length L is within the specification.

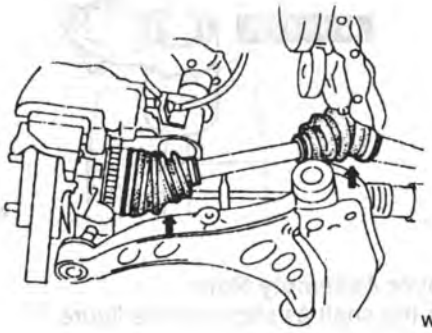


W6U313WAG

DRIVE SHAFT PRE-INSPECTION

Z6U031325500W01

1. Inspect the dust boot on the drive shaft for cracks, damage, leaking grease, and a loose boot band.
2. Inspect the drive shaft for bending, cracks, and wear of joints or splines.
   - Repair or replace the drive shaft if necessary.

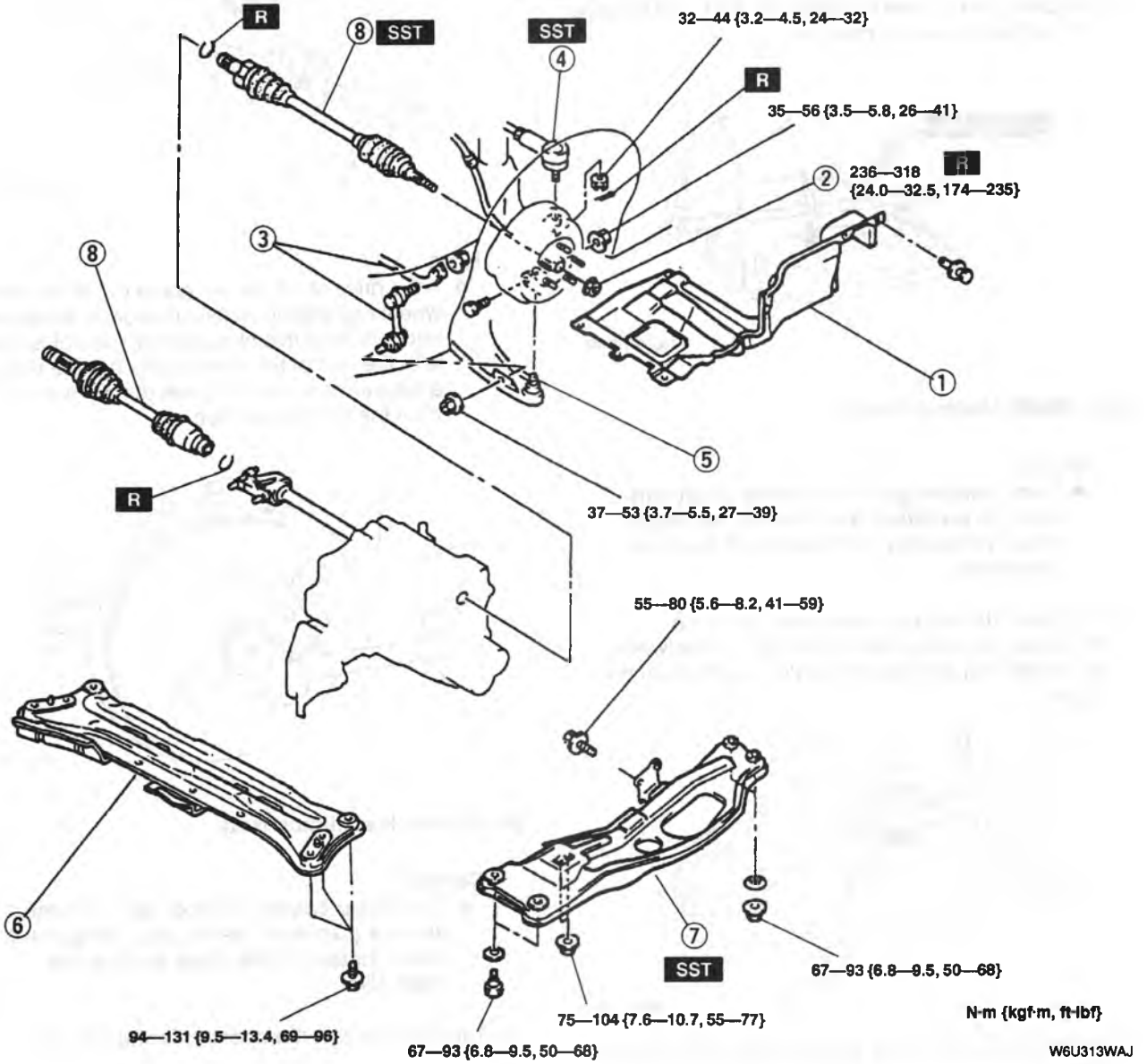


W6U313WAH

DRIVE SHAFT REMOVAL/INSTALLATION

Z6U031325500W02

1. Drain the transaxle oil. (See 05-15-1 TRANSAXLE OIL REPLACEMENT.) (See 05-17A-23 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [LA4A-EL].) (See 05-17B-21 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [GF4A-EL].)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



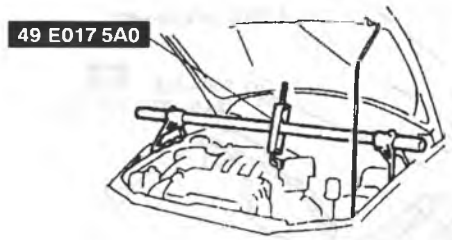
1	Splash shield
2	Locknut (See 03-11-3 Locknut Removal Note) (See 03-11-4 Locknut Installation Note)
3	Stabilizer and control link
4	Tie-rod end ball joint (See 06-12-10 Tie-rod End Ball Joint Removal Note)

5	Lower arm ball joint
6	Transverse member
7	Engine mounting member (See 03-13-8 Engine Mounting Member Removal Note)
8	Drive shaft (See 03-13-8 Drive Shaft Removal Note) (See 03-13-8 Drive Shaft Installation Note)

Engine Mounting Member Removal Note

Caution
- **To prevent damage to the body, insert a rag into the gap between the fender and body, when installing the SST.**

- Suspend the engine by using the **SST** and remove the engine mounting member.

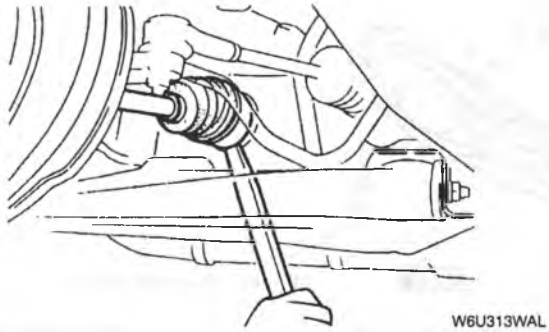


Z6U0313W107

Drive Shaft Removal Note

Caution
- **The sharp edges of the drive shaft can slice or puncture the oil seal. Be careful when removing the drive shaft from the transaxle.**

1. Separate the left side drive shaft from the transaxle by prying with a bar inserted between the outer ring and the transaxle, as shown in the figure.



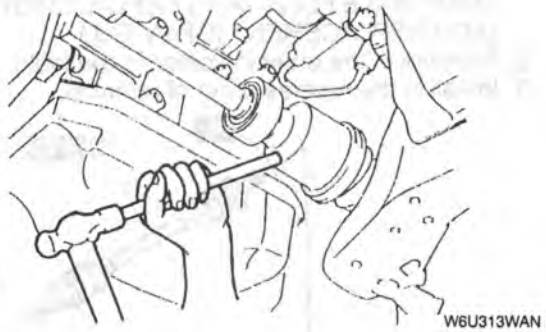
W6U313WAL

2. Install the **SST** into the transaxle to hold the side gears.



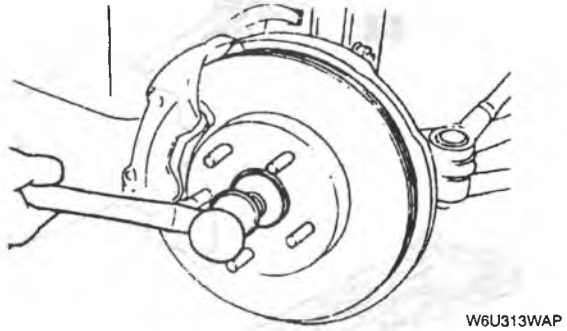
Z6U0313W101

3. Separate the right side drive shaft from the joint shaft by hammering on a bar inserted between them.



W6U313WAN

Note
- If the drive shaft will not come out of the front wheel hub easily, install an already discarded nut onto the drive shaft so that the nut is flush with the end of the drive shaft. Tap the nut with a copper hammer to loosen the drive shaft from the front wheel hub.

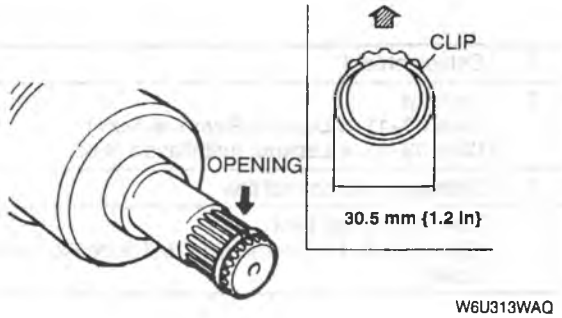


W6U313WAP

Drive Shaft Installation Note

Caution
- **The sharp edges of the drive shaft can slice or puncture the oil seal. Be careful when installing the drive shaft to the transaxle.**

1. Turn the clip with the opening facing upward.



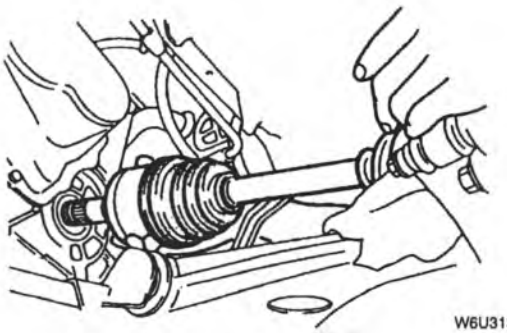
W6U313WAQ

2. Apply grease to the ends of the drive shafts.

Caution

- **The oil seals are damaged easily if this procedure is not done correctly.**

3. Push the drive shaft into the transaxle (left side) or joint shaft (right side).



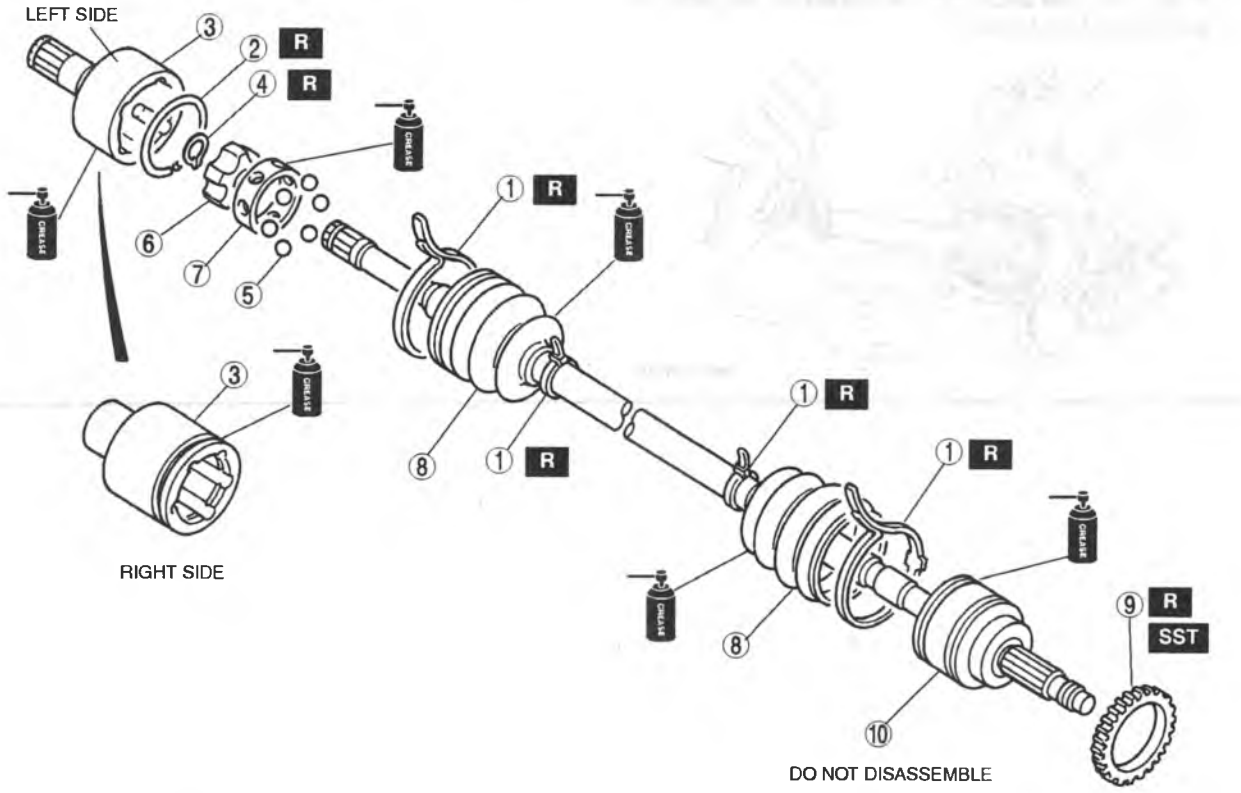
W6U313WAR

4. After installation, pull the front hub outward to confirm that the drive shaft is securely held by the clip.

DRIVE SHAFT (MTX, DOUBLE OFFSET TYPE) DISASSEMBLY/ASSEMBLY

Z6U031325500W03

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

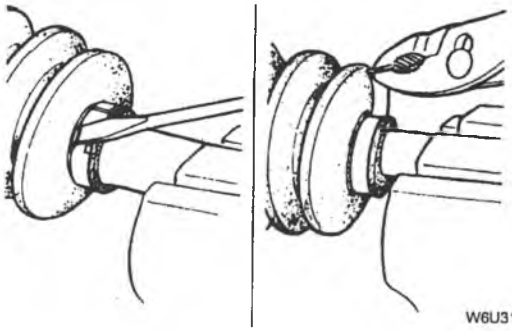


Z6U0313W103

1	Boot band (See 03-13-10 Boot Band Disassembly Note) (See 03-13-13 Boot Band Assembly Note)
2	Clip (See 03-13-10 Clip Disassembly Note)
3	Outer ring (See 03-13-12 Outer Ring Assembly Note)
4	Snap ring (See 03-13-11 Snap Ring Disassembly Note)
5	Balls (See 03-13-11 Balls Disassembly Note)
6	Inner ring
7	Cage (See 03-13-12 Cage Assembly Note)
8	Boot (See 03-13-11 Boot Disassembly Note) (See 03-13-12 Boot Assembly Note)
9	ABS sensor rotor (with ABS) (See 03-13-11 ABS Sensor Rotor (With ABS) Disassembly Note) (See 03-13-11 ABS Sensor Rotor (With ABS) Assembly Note)
10	Shaft and ball joint component

Boot Band Disassembly Note

1. Pry up the locking clips by using a screwdriver.
2. Pull back the end of the band.



W6U313WAT

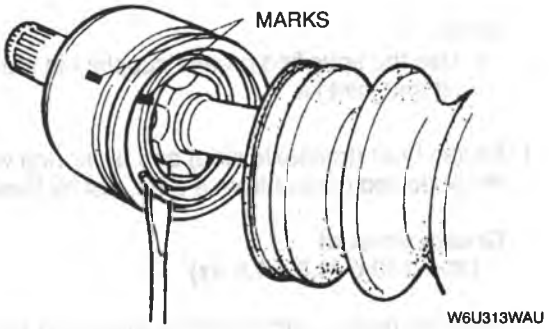
Clip Disassembly Note

Caution

- **Mark with paint; do not use a punch. The component will be damaged.**

1. Mark the drive shaft and outer ring for proper assembly.

2. Remove the clip.

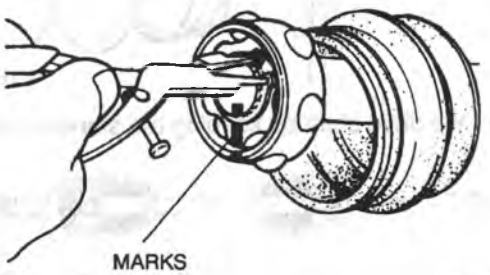


W6U313WAU

Snap Ring Disassembly Note

Caution
- **Mark with paint; do not use a punch. The component will be damaged.**

1. Mark the drive shaft and inner ring for proper assembly.
2. Remove the snap ring by using snap-ring pliers.

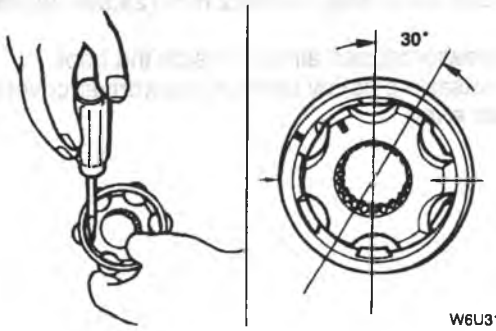


W6U313WAV

Balls Disassembly Note

Caution
- **Mark with paint; do not use a punch. The component will be damaged.**

1. Mark the inner ring and cage.
2. Turn the cage **approximately 30 degrees** and pull the cage and balls away from the inner ring.

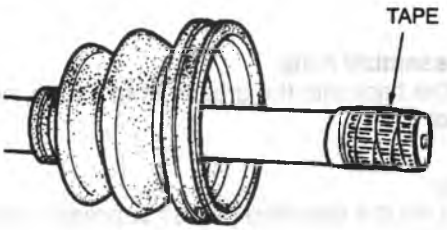


W6U313WAW

Boot Disassembly Note

Note
- The wheel side boot does not need to be removed unless it or the bell joint and shaft assembly are being replaced.
- Do not strip the tape until the boot is assembled.

1. Wrap the shaft splines with tape.
2. Remove the boot.

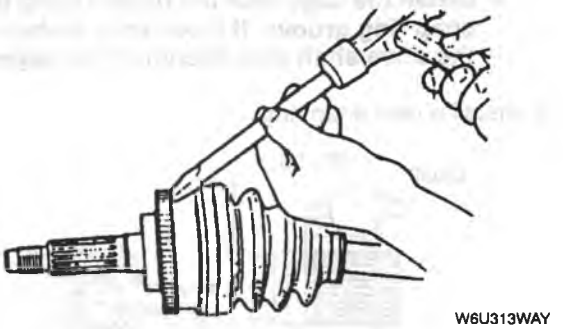


W6U313WAX

ABS Sensor Rotor (With ABS) Disassembly Note

Note
- The sensor rotor does not need to be removed unless replacing it.

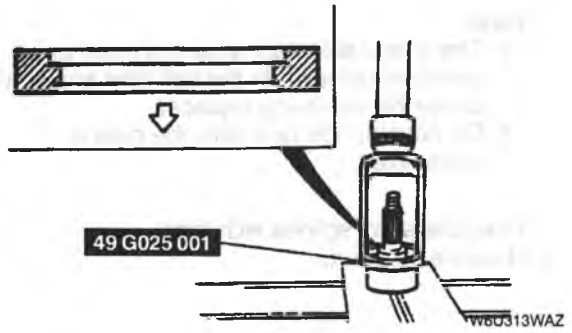
- Tap the ABS sensor rotor off the bell joint outer race by using a chisel.


W6U313WAY

ABS Sensor Rotor (With ABS) Assembly Note

Caution
- **Verify the direction of the sensor rotor.**

- Set a new ABS sensor rotor on the drive shaft and press it on with the **SST**.



Boot Assembly Note

1. Fill the boot with the grease from a tube, not by hand.

   Note
   - Use the specified grease supplied in the boot kit.

   Grease amount
   90—110 g {3.18—3.88 oz}

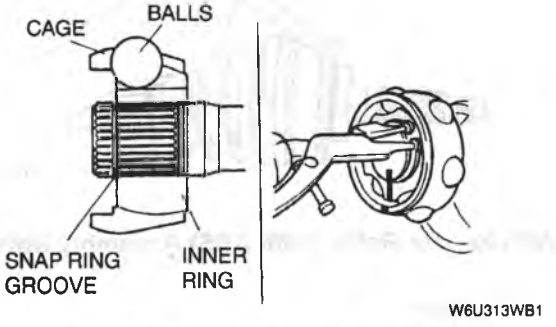
2. Slide the boot onto the shaft.

Cage Assembly Note

1. Align the marks, and install the balls and cage to the inner ring in the direction shown in the figure.

   Caution
   - **Install the cage with the offset facing the snap ring groove. If incorrectly installed, the drive shaft may become disengaged.**

2. Install a new snap ring.



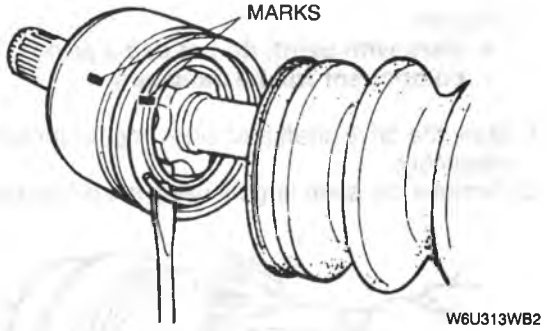
Outer Ring Assembly Note

Note
- Use the specified grease supplied in the boot kit and joint kit.

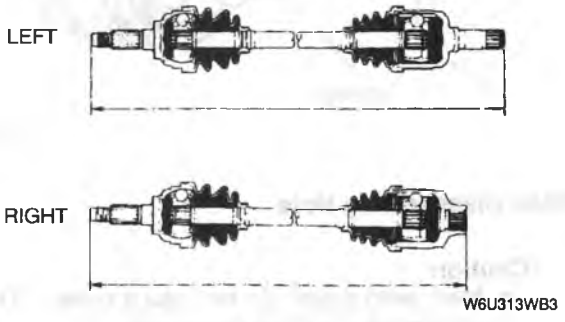
1. Fill the boot (transaxle side) and outer ring with the specified grease from a tube, not by hand.

   Grease amount
   120—140 g {4.3—4.9 oz}

2. Align the marks, and install the outer ring onto the shaft.
3. Install a new clip.
4. Install the boot.



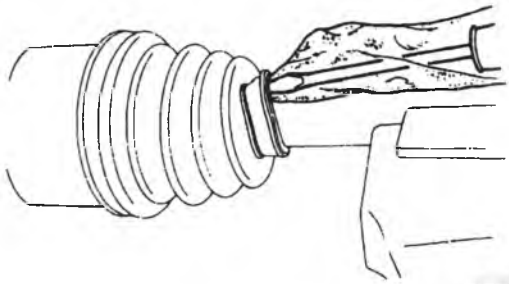
5. Set the drive shaft by keeping the standard length.



Standard length
Right side: 600.2—610.2 mm {23.63—24.02 in}
Left side: 649.2—659.2 mm {25.56—25.95 in}

6. Release trapped air from inside the boot (transaxle side) by using a screwdriver covered with a rag.

7. Verify the drive shaft length is within the standard.



W6U313WB4

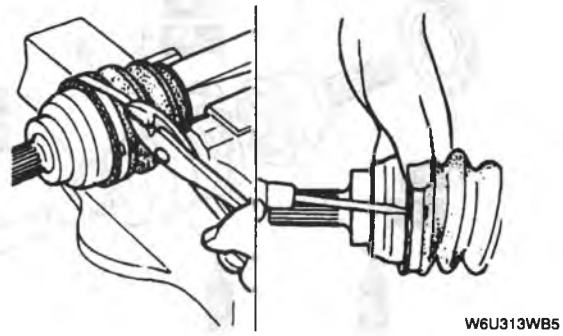
Caution
- **Verify that the boot is in the groove of the drive shaft.**

Boot Band Assembly Note

Note
- Always use new bands.

- The band should be folded in the direction opposite to the forward revolving direction of the drive shaft.

1. Fold the band back and use pliers to pull it tight.
2. Lock the end of the band by bending the locking clips.

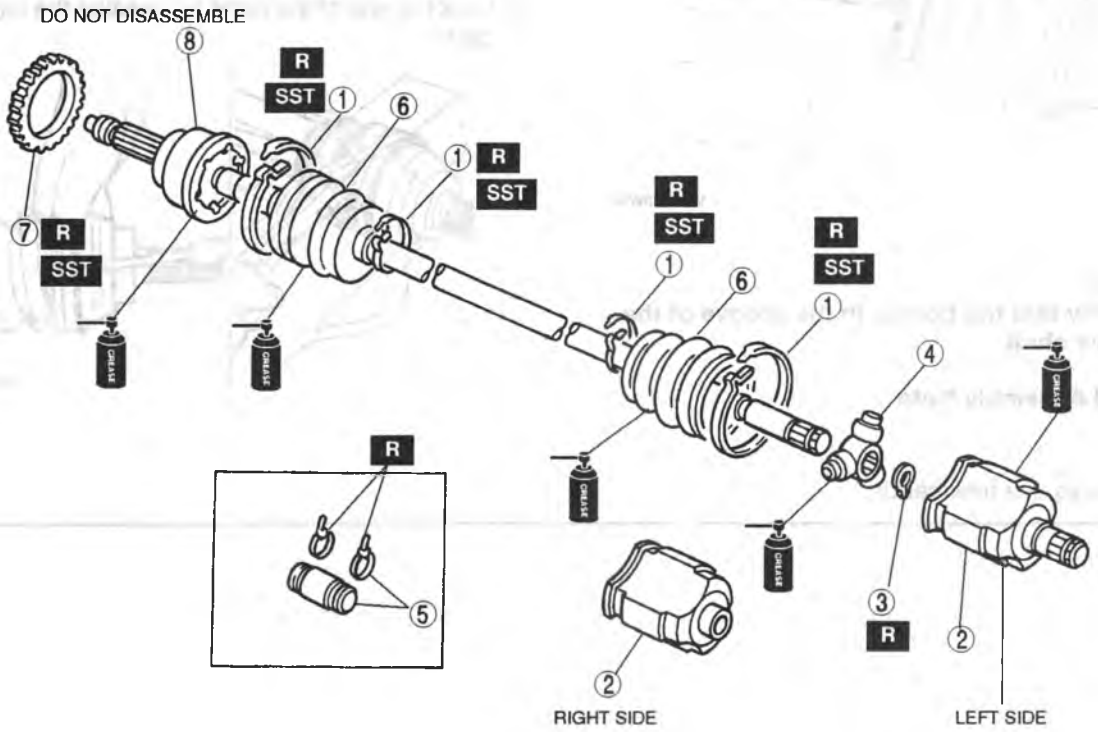


W6U313WB5

DRIVE SHAFT (ATX, TRIPOD TYPE) DISASSEMBLY/ASSEMBLY

Z6U031325500W04

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



Z6U0313W104

1	Boot band (See 03-13-14 Boot Band Disassembly Note) (See 03-13-16 Boot Band Assembly Note)
2	Outer ring (See 03-13-15 Outer Ring Disassembly Note) (See 03-13-16 Outer Ring Assembly Note)
3	Snap ring (See 03-13-15 Snap Ring Disassembly Note)
4	Tripod joint (See 03-13-16 Tripod Joint Assembly Note)
5	Dynamic damper (FS engine) (See 03-13-16 Dynamic Damper (FS engine) Assembly Note)

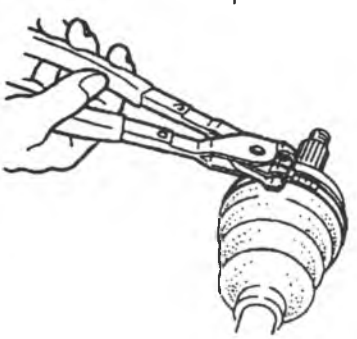
6	Boot (See 03-13-15 Boot Disassembly Note) (See 03-13-15 Boot Assembly Note)
7	ABS sensor rotor (with ABS) (See 03-13-15 ABS Sensor Rotor (With ABS) Disassembly Note) (See 03-13-15 ABS Sensor Rotor (With ABS) Assembly Note)
8	Shaft and ball joint component

Boot Band Disassembly Note

Note

- The boot band does not need to be removed unless it is being replaced.

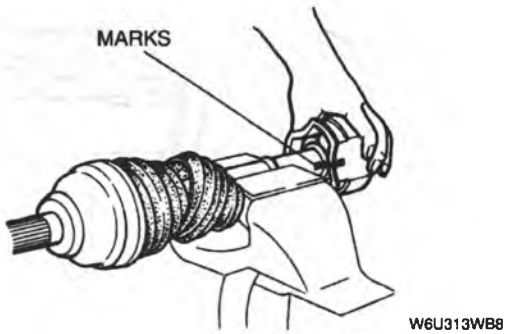
- Remove the boot clamp with end clamp pliers as shown and discard the clamp.



W6U313WB7

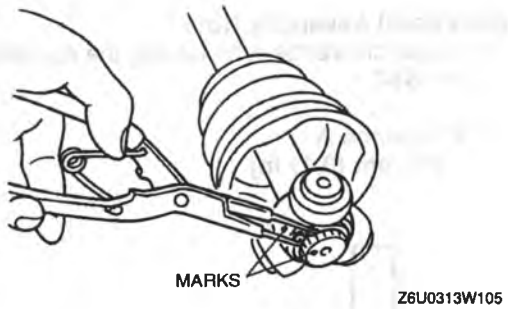
Outer Ring Disassembly Note

1. Mark the outer ring and the shaft for proper assembly.
2. Remove the outer ring.



Snap Ring Disassembly Note

1. Mark the shaft and tripod joint for proper assembly.
2. Remove the snap ring by using snap-ring pliers.
3. Remove the tripod joint from the shaft.

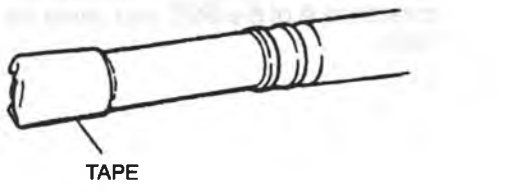


Boot Disassembly Note

Note

- The bell joint side boot does not need to be removed unless it or the bell joint and shaft component are being replaced.
- Do not strip the tape until the boot is assembled.

1. Wrap the shaft splines with tape.
2. Remove the boot.

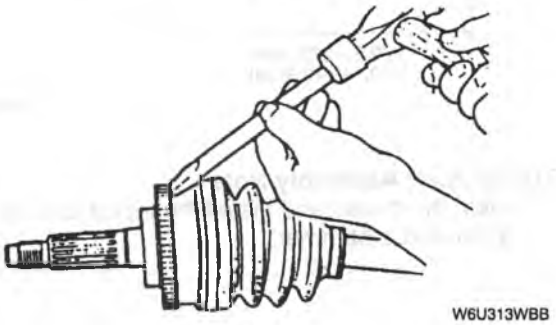


ABS Sensor Rotor (With ABS) Disassembly Note

Caution

- **Do not remove the sensor rotor unless it is necessary.**
- **Do not reuse the sensor rotor if removed.**

- Tap the ABS sensor rotor off the drive shaft by using a chisel.

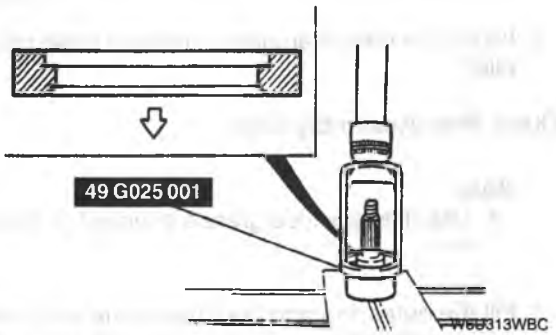


ABS Sensor Rotor (With ABS) Assembly Note

Caution

- **Verify the direction of the sensor rotor.**

- Set a new ABS sensor rotor on the drive shaft and press it on by using the **SST**.



Boot Assembly Note

Note

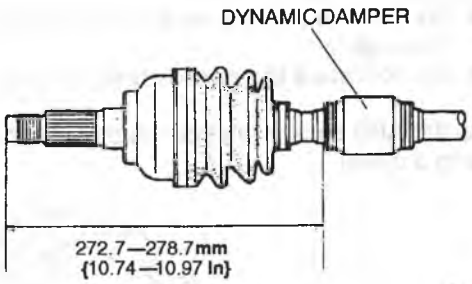
- The wheel side and transaxle side boots are different.
- Use the specified grease supplied in the boot kit.

1. Fill the boot (wheel side) with the specified grease from a tube, not by hand.

Grease amount
80—100 g {2.9—3.5 oz}

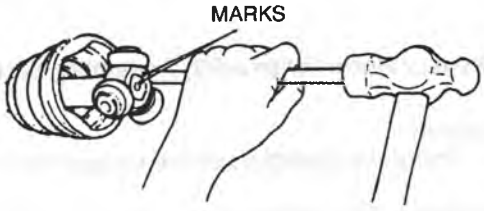
2. With the splines of the shaft still wrapped in tape from disassembly, install the boot.
3. Remove the tape.

Dynamic Damper (FS engine) Assembly Note
- Install the dynamic damper as shown in the figure.



X6U313WC1

Tripod Joint Assembly Note
1. Align the marks and install the tripod joint by using a bar and a hammer.



W6U313WBE

2. Install the new snap ring by using a snap-ring pliers.

Outer Ring Assembly Note

Note
- Use the specified grease supplied in the boot kit.

1. Fill the outer ring and boot (transaxle side) with the specified grease from a tube, not by hand.

Grease amount
185—215 g {5.6—7.5 oz}

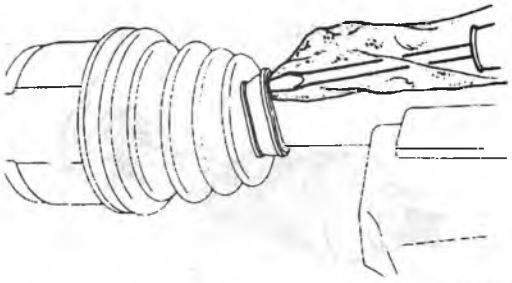
2. Install the outer ring.
3. Set the drive shaft to the standard length.

Standard length

mm {in}

Engine	Left side	Right side
FS	694.3—704.3 {27.34—27.72}	600.4—610.4 {23.64—24.03}
KL	647.4—657.4 {25.49—25.88}	600.4—610.4 {23.64—24.03}

4. Release any trapped air from the boots by carefully lifting up the small end of each boot with a cloth-wrapped screwdriver.



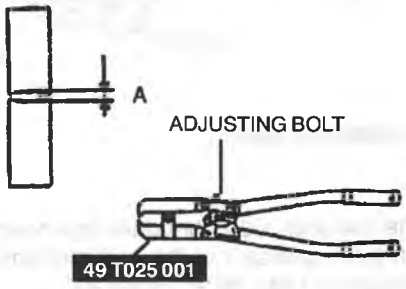
W6U313WBG

Caution
- **Verify that the boot is in the groove of the drive shaft.**

5. Verify that the drive shaft length is within the standard.

Boot Band Assembly Note
1. Adjust clearance A by turning the adjusting bolt of the **SST**.

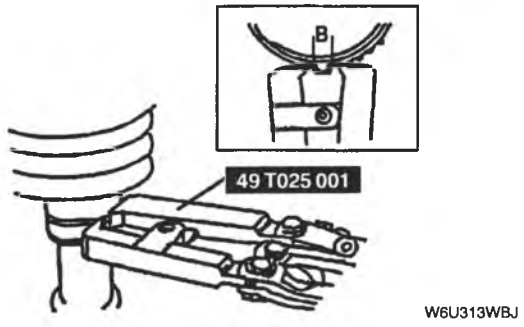
Clearance A
2.9 mm {0.11 in}



W6U313WBH

2. Crimp the wheel side small boot band by using the **SST**. Verify that clearance B is within the specification.
- If clearance B is more than the specification, reduce clearance A of the **SST** and crimp the boot again. If clearance B is less than the specification, replace the boot band, increase clearance A of the **SST**, and crimp the new boot.

Clearance B
2.4—2.8 mm {0.095—0.110 in}



W6U313WBJ

3. Verify that the boot band does not protrude from the boot band installation area. If it does, replace the boot band and repeat step 2.
4. Fill the boot with the repair kit grease.
5. Adjust clearance A by turning the adjusting bolt of the **SST**.

Clearance A
3.2 mm {0.13 in}

6. Crimp the wheel side big boot band by using the **SST**. Verify that clearance B is within the specification.

Clearance B
2.4—2.8 mm {0.095—0.110 in}

- If clearance B is more than the specification, reduce clearance A of the **SST** and crimp the boot again. If clearance B is less than the specification, replace the boot band, increase clearance A of the **SST** and crimp the new boot.

7. Verify that the boot band does not protrude from the boot band installation area. If it does, replace the boot band and repeat step 6.

03-50 TECHNICAL DATA

DRIVELINE/AXLE TECHNICAL DATA 03-50-1
DRIVELINE/AXLE TIGHTENING TORQUE 03-50-1

DRIVELINE/AXLE TECHNICAL DATA

Z6U035001018W01

Item			FS		KL	
			MTX	ATX	MTX	ATX
FRONT AXLE						
Maximum wheel bearing play	(mm {in})	(mm {in})	0.1 {0.004}			
REAR AXLE						
Maximum wheel bearing play	(mm {in})	(mm {in})	0.1 {0.004}			
DRIVE SHAFT						
Shaft length (Air in boot at atmospheric pressure)	(mm {in})	Right side	600.2—610.2 {23.63—24.02}	600.4—610.4 {23.64—24.03}	600.2—610.2 {23.63—24.02}	600.4—610.4 {23.64—24.03}
		Left side	649.2—659.2 {25.56—25.95}	694.3—704.3 {27.34—27.72}	649.2—659.2 {25.56—25.95}	647.4—657.4 {25.49—25.88}

DRIVELINE/AXLE TIGHTENING TORQUE

Z6U035001018W02

Item	Tightening torque (N·m {kgf·m, ft·lbf})
GENERAL PROCEDURES	
Wheel nut	89—117 {9.0—12.0, 65.1—86.7}
FRONT AXLE	
ABS wheel-speed sensor	19—25 {1.9—2.6, 14—18}
Stabilizer contol link	37—53 {3.7—5.5, 27—39}
Shock absorber bottom	74—83 {7.5—8.3, 55—61}
Tie-rod end ball joint	31—44 {3.2—4.5, 23—32}
Lower arm ball joint	35—56 {3.5—5.8, 26—41}
Brake caliper	79—101 {8.0—10.0, 58—75}
Locknut	236—318 {24.0—32.5, 174—235}
REAR AXLE	
Shock absorber	74—83 {7.5—8.3, 55—61}
Front lateral link	79—116 {8.0—11.9, 57.8—86.0}
Rear lateral link	79—116 { 8.0—11.9, 57.8—86.0}
ABS wheel-speed sensor	19—25 {1.9—2.6, 14—18}
Rear brake drum	9.9—14.7 N·m {100—150 kgf·cm, 87—130 in·lbf}
Rear brake back plate	50—68 5.0—7.0, 37—50}
Rear brake caliper	46—66 {4.6—6.8, 34—49}
Dust cover	19—25 {1.9—2.6,14—18}
Locknut	177—235 {18.0—24.0, 131—173}
DRIVESHAFT	
Joint shaft	43—61 {4.3—6.3, 32—445}
Joint shaft dust cover	7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}

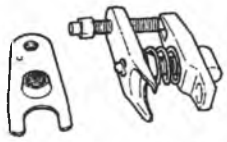
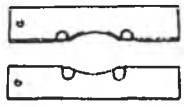
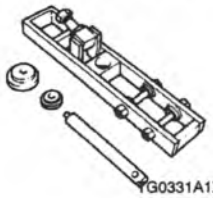
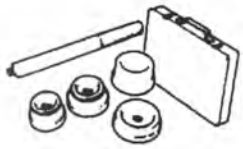
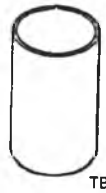
Item		Tightening torque (N·m {kgf·m, ft·lbf})
Engine mount member	front	67—93 {6.8—9.5, 49—68}
	center	75—104 {7.6—10.7, 55.0—77.3}
	rear	67—93 {6.8—9.5, 49—68}
	side	55—80 {5.6—8.2, 41—59}
Transverse member		94—131 {9.5—13.4, 68.8—96.9}
Stabilizer contol link		37—53 {3.7—5.5, 27—39}
Tie-rod end ball joint		31—44 {3.2—4.5, 23—33}
Lower arm ball joint		35—56 {3.5—5.8, 26—41}
Locknut		236—318 {24.0—32.5, 174—235}

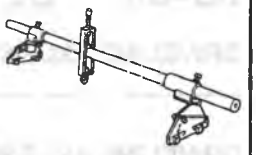
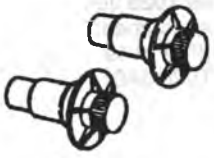
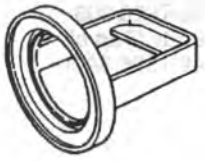
03-60 SERVICE TOOLS

DRIVELINE/AXLE SST 03-60-1

DRIVELINE/AXLE SST

Z6U036001018W01

49 T028 3A0 Ball joint puller set  TT0283A0X	49 T028 303 Body (Part of 49 T028 3A0)  TT028303X	49 T028 304 Attachment (Part of 49 T028 3A0)  TT028304X
49 F026 103 Wheel hub puller  TF026103X	49 G033 107A Dust cover installer  TG033107A	49 V001 795 Oil seal installer  TV001795X
49 G033 1A1 Wheel hub puller  TG0331A1X	49 G033 102 Handle (Part of 49 G033 1A1)  TG033102X	49 G033 105 Attachment (Part of 49 G033 1A1)  TG033105X
49 G033 106 Attachment (Part of 49 G033 1A1)  TG033106X	49 F027 0A1 Bearing installer set  TF0270A1X	49 F027 004 Attachment ø80 (Part of 49 F027 0A1)  TF027004X
49 F027 009 Attachment ø68 & ø77 (Part of 49 F027 0A1)  TF027009X	49 G030 795 Oil seal installer  TG030795X	49 G030 797 Handle (Part of 49 G030 795)  TG030797X
49 H028 204 Attachment  TH028204X	49 H034 201 Support block (Part of 49 H034 2A0)  TH034201X	49 F026 102 Bearing installer  TF026102X
49 H034 2A0 Lower arm bushing puller & installer  TH0342A0X	49 G030 796 Body (Part of 49 G030 795)  TG030796X	49 B025 005 Dust cover installer  TB025005X

49 W027 003 Oil seal installer  TW027003X	49 H027 002 Bearing installer  TH027002X	49 E017 5A0 Engine support  TE0175A0X
49 G030 455 Differential side gear holder  TG030455X	49 G025 001 Sensor rotor installer  TG025001X	—

BRAKES

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04

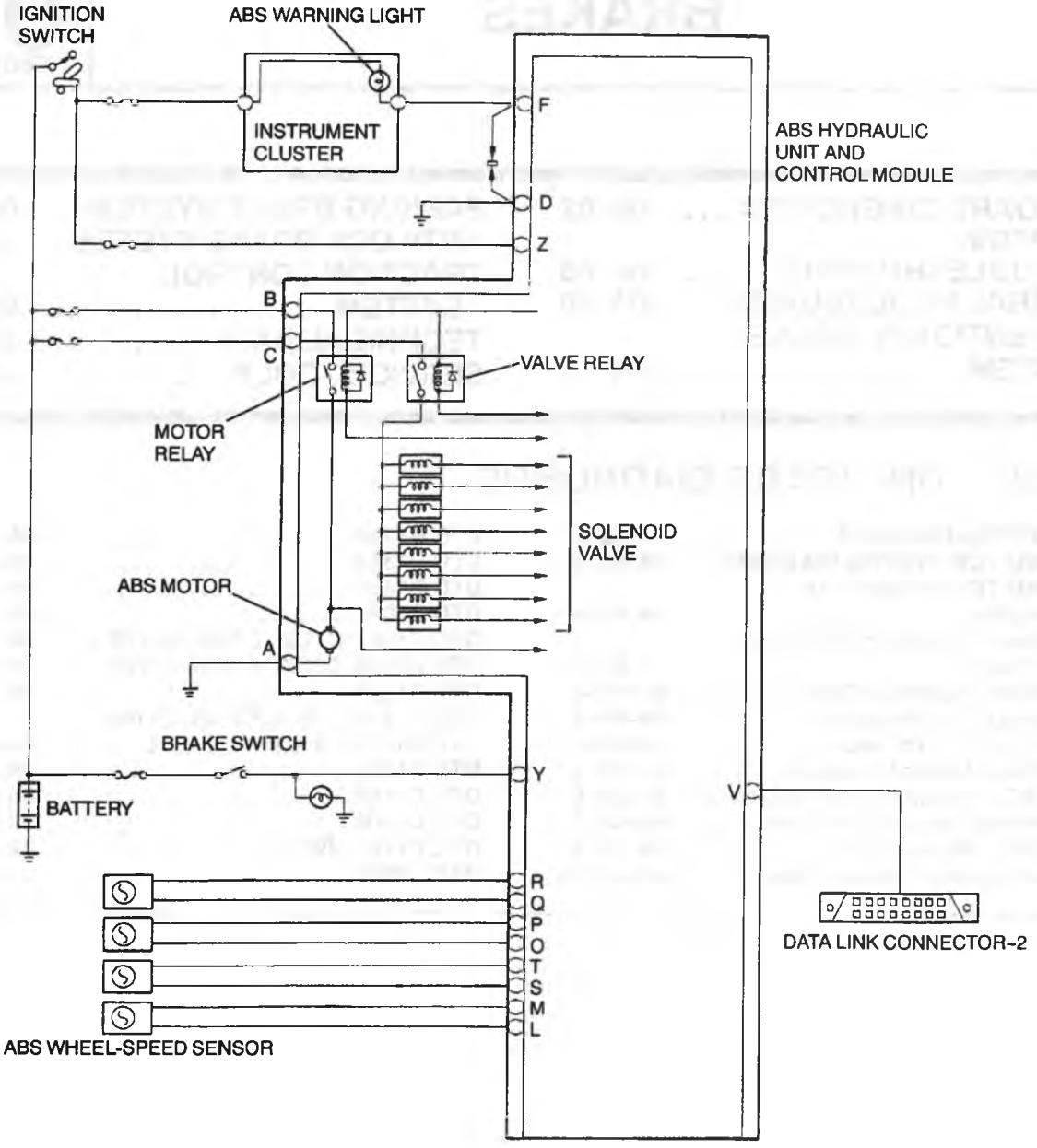
04-02 ON-BOARD DIAGNOSTIC

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DTC C1266 04-02-15
DTC C1117 04-02-16
DTC C1118 04-02-17
DTC C1119, U2012 04-02-17
DTC U2021 04-02-18

ABS SYSTEM DIAGRAM

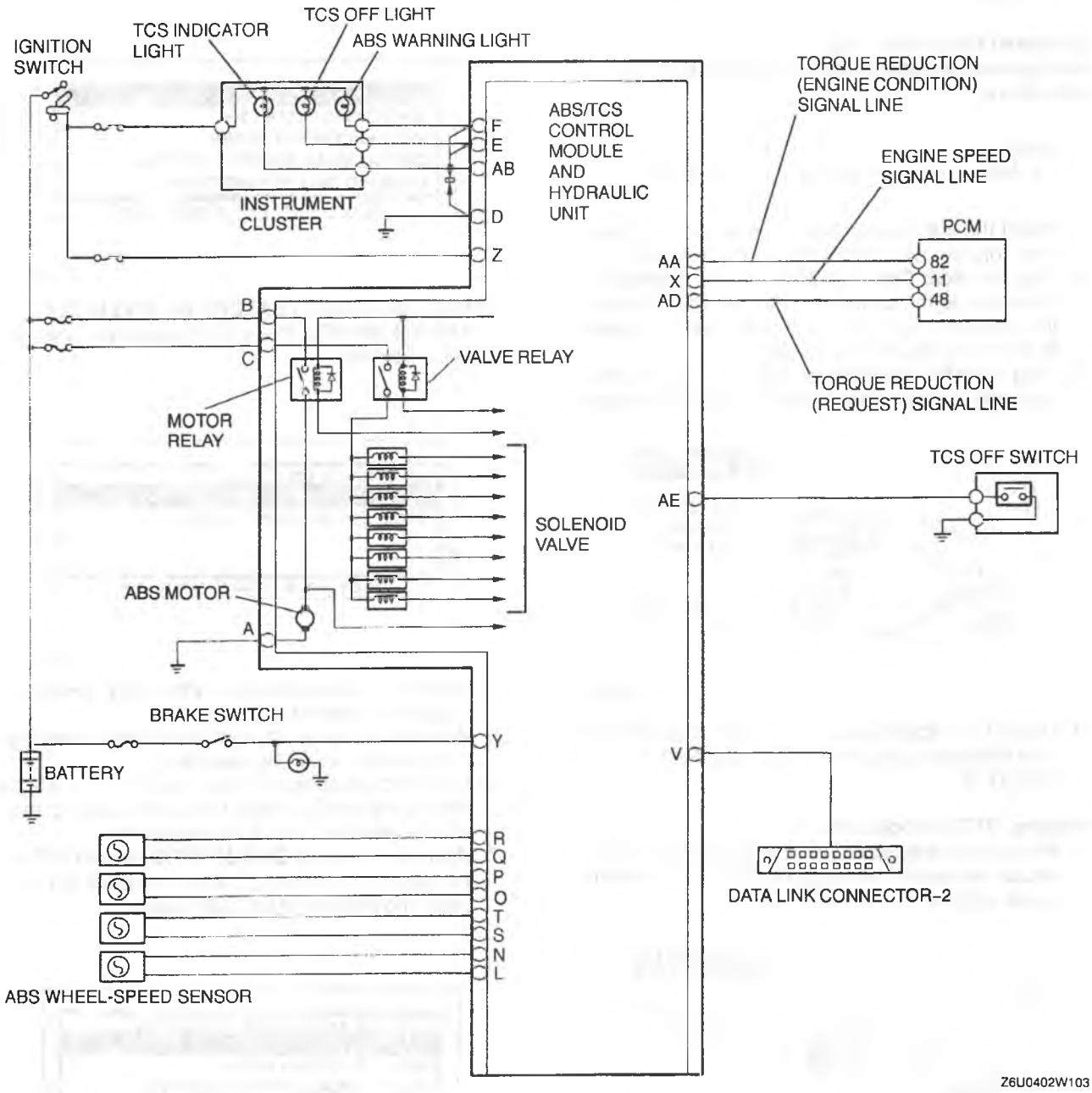
Z6U040243000W01



Z6U0402W102

ABS AND TCS SYSTEM DIAGRAM

Z6U040243000W02



Z6U0402W103

ABS AND TCS ON-BOARD DIAGNOSIS

Z6U040243000W03

On-Board Diagnostic (OBD) Test Description

- The OBD test checks the integrity and function of the ABS/TCS and outputs the test results when requested by the NGS tester. It also provides a quick end check of the ABS/TCS. It is usually performed at the start of each diagnostic procedure with all accessories off. It is also performed at the end of most troubleshooting tests for verification of repair and to make sure no other faults were incurred while servicing a previous fault.
- The OBD test is divided into three tests: Read/clear diagnostic results, PID monitor and record and active command modes.

Read/clear diagnostic results

- This function allows you to read or clear DTCs in the ABS/TCS control module memory.

PID monitor and record

- This function allows you to access certain data values, input signals, calculated values, and system status information.

Active command modes

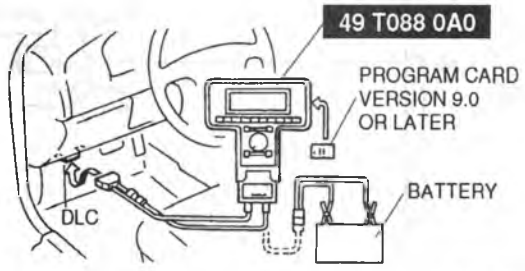
- This function allows you to control devices through the NGS.

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

Note

- Make sure that ignition switch is at OFF.

1. Insert the vehicle interface module and program card into the **SST** (NGS tester) control unit.
2. Plug the NGS OBDII adapter into the interface module and the connector into the vehicle data link connector-2 (DLC-2) located under the dash to the left of the steering shaft.
3. Plug the **SST** (NGS tester) power cable into the cigarette lighter or use a battery hook-up adapter.

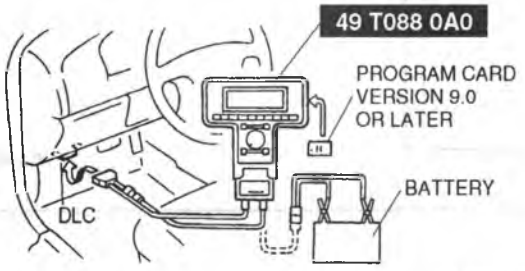


Z6U0402W101

4. Listen for a double beep. The **SST** (NGS tester) is now initialized. Begin the functional test of ABS/TCS.

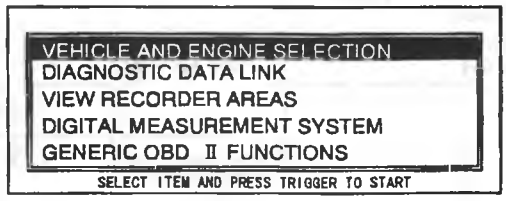
Reading DTCs Procedure

1. Perform the necessary vehicle preparation and visual inspection. Hook-up the **SST** (NGS tester) to the vehicle.



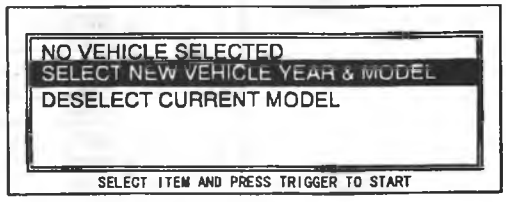
Z6U0402W101

2. Move the cursor to **VEHICLE AND ENGINE SELECTION**.



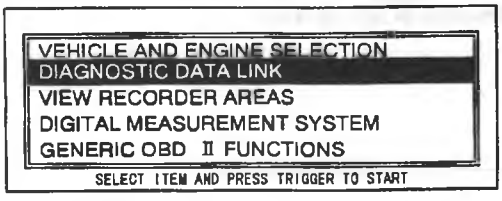
W6U401WA3

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



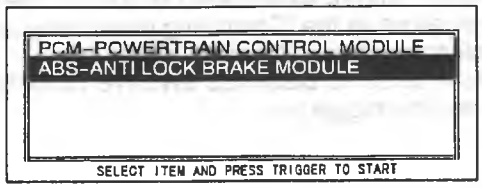
W6U401WA4

4. Move the cursor to **2001 — VIN #10:Z**. Press the trigger key to enter this selection.
5. Move the cursor to appropriate model. Press the trigger key to enter this selection.
6. The 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** in the main menu screen. Press the trigger key to enter into menu system diagnostics.



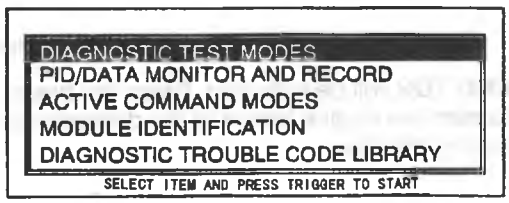
W6U401WA6

8. Move the cursor to **ABS-ANTI LOCK BRAKE MODULE**. Press the trigger.



W6U401WA7

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

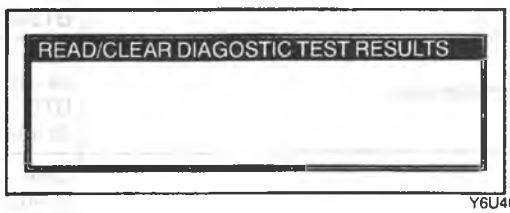


W6U401WA8

10. Move the cursor to **READ/CLEAR DIAGNOSTIC TEST RESULTS**. Press the trigger key to enter this selection.
11. Press START.
12. If the system is normal, **SYSTEM PASSED. (NO DTCS AVAILABLE)** will be indicated. If any DTC is indicated, follow the appropriate DTC troubleshooting chart.
13. After completion of repairs, clear DTCs.

Clearing DTCs Procedure

1. Connect the **SST** (NGS tester) to the data link connector and select **READ/CLEAR DIAGNOSTIC TEST RESULTS** in the same procedure as the reading DTCs procedure. Press the trigger key to enter this selection.



Y6U402WC3

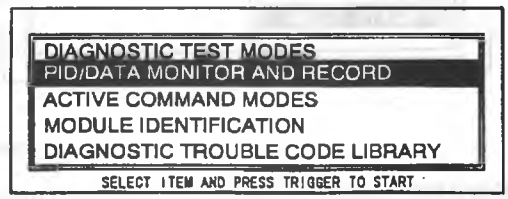
2. Press CLEAR.
3. Press the trigger key.

Note

- After repairing the ABS wheel-speed sensor or pump motor, the ABS warning light may not go off when ignition is switched to ON. In this case, drive the vehicle at a speed of more than **10 km/h {6.2 mph}**. After the ABS warning light goes off, reset the memory.

PID/Data Monitor Procedure

1. Select **ABS-ANTILOCK BRAKE SYSTEM** in the same procedure as the reading DTCs procedure.
2. Move the cursor to **PID/DATA MONITOR AND RECORD**. Press the trigger key to enter this selection.

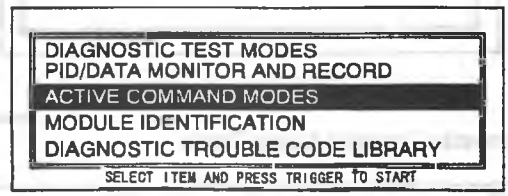


W6U401WB0

3. Move the cursor to PID values to view. Press the trigger key.
4. Press START.

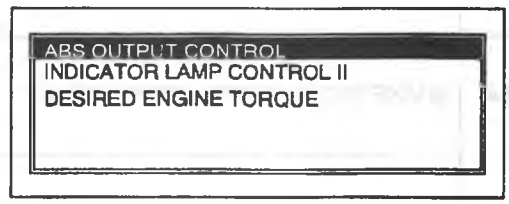
Active Command Modes Procedure
Controlling motor relay and solenoid valves

1. Select **ABS-ANTILOCK BRAKE SYSTEM** in the same procedure as the reading DTCs procedure.
2. Move the cursor to **ACTIVE COMMAND MODES**. Press trigger key to enter this selection.



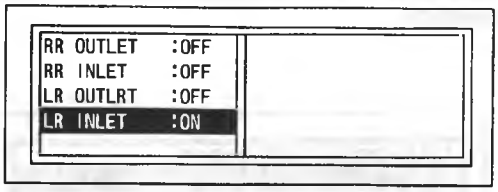
W6U401WB1

3. Press the trigger key to enter **ABS OUTPUT CONTROL**.



W6U401WB2

4. Move the cursor to **LR INLET: OFF**. Press the trigger key to make LR INLET ON.

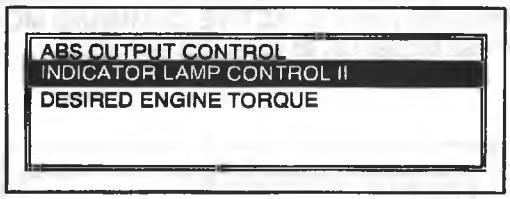


Y6U402WA2

5. Move the cursor to appropriate item and press the trigger key to make it ON.

Controlling indicator lights

1. Select **ACTIVE COMMAND MODES** in the same procedure as the "Controlling motor relay and solenoid valves." Press the trigger key.
2. Move the cursor to **INDICATOR LAMP CONTROL II** and press the trigger key.

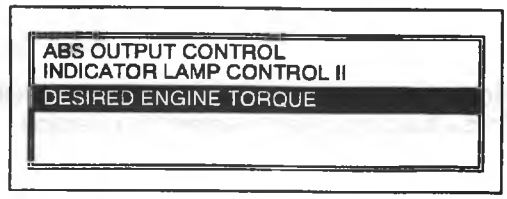


W6U401WB3

3. Move the cursor to appropriate item and press the trigger key to make it ON.

Controlling engine torque

1. Select **ACTIVE COMMAND MODES** in the same procedure as the "Controlling motor relay and solenoid valves." Press the trigger key.
2. Move cursor to **DESIRED ENGINE TORQUE** and press the trigger key.



W6U401WB4

3. **ENG TQR** will be indicated. Press the trigger key.
4. Control the engine torque to the desired value by turning the dial.

Diagnostic Trouble Code Table

DTC	Display on the NGS	Diagnosis component	Page
B1318	BATTERY VOLTAGE-LOW	Battery voltage	(See 04-02-11 DTC B1318)
B1342	ECU-DEFECTIVE	ABS control module	(See 04-02-12 DTC B1342)
B1484	BRAKE PEDAL INPUT-OPEN CIRCUIT	Brake switch harness	(See 04-02-12 DTC B1484)
C1145	RF SPEED SENSOR-INPUT CKT FAILURE	Right front ABS wheel-speed sensor	(See 04-02-13 DTC C1145, C1155, C1165, C1175)
C1155	LF SPEED SENSOR-INPUT CKT FAILURE	Left front ABS wheel-speed sensor	(See 04-02-13 DTC C1145, C1155, C1165, C1175)

DTC	Display on the NGS	Diagnosis component	Page
C1165	RR SPEED SENSOR-INPUT CKT FAILURE	Right rear ABS wheel-speed sensor	(See 04-02-13 DTC C1145, C1155, C1165, C1175)
C1175	LR SPEED SENSOR-INPUT CKT FAILURE	Left rear ABS wheel-speed sensor	(See 04-02-13 DTC C1145, C1155, C1165, C1175)
C1222	WHEEL SPEED-MISMATCH	ABS wheel-speed sensor	(See 04-02-14 DTC C1222)
C1210	RF DUMP VALVE COIL-CKT FAILURE	Solenoid valve (RF AV)	(See 04-02-15 DTC C1210, C1214, C1194, C1198, C1246, C1254, C1242, C1250)
C1214	RF ISOL VALVE COIL-CKT FAILURE	Solenoid valve (RF EV)	(See 04-02-15 DTC C1210, C1214, C1194, C1198, C1246, C1254, C1242, C1250)
C1194	LF DUMP VALVE COIL-CKT FAILURE	Solenoid valve (LF AV)	(See 04-02-15 DTC C1210, C1214, C1194, C1198, C1246, C1254, C1242, C1250)
C1198	LF ISOL VALVE COIL-CKT FAILURE	Solenoid valve (LF EV)	(See 04-02-15 DTC C1210, C1214, C1194, C1198, C1246, C1254, C1242, C1250)

DTC	Display on the NGS	Diagnosis component	Page
C1246	RR DUMP VALVE COIL-CKT FAILURE	Solenoid valve (RR AV)	(See 04-02-15 DTC C1210, C1214, C1194, C1198, C1246, C1254, C1242, C1250)
C1254	RR ISOL VALVE COIL-CKT FAILURE	Solenoid valve (RR EV)	(See 04-02-15 DTC C1210, C1214, C1194, C1198, C1246, C1254, C1242, C1250)
C1242	LR DUMP VALVE COIL-CKT FAILURE	Solenoid valve (LR AV)	(See 04-02-15 DTC C1210, C1214, C1194, C1198, C1246, C1254, C1242, C1250)
C1250	LR ISOL VALVE COIL-CKT FAILURE	Solenoid valve (LR EV)	(See 04-02-15 DTC C1210, C1214, C1194, C1198, C1246, C1254, C1242, C1250)
C1148	RF SPEED SENSOR-COHERENCY FAULT	Right front ABS wheel-speed sensor/sensor rotor	(See 04-02-14 DTC C1148, C1158, C1168, C1178)
C1158	LF SPEED SENSOR-COHERENCY FAULT	Left front ABS wheel-speed sensor/sensor rotor	(See 04-02-14 DTC C1148, C1158, C1168, C1178)
C1168	RR SPEED SENSOR-COHERENCY FAULT	Right rear ABS wheel-speed sensor/sensor rotor	(See 04-02-14 DTC C1148, C1158, C1168, C1178)

DTC	Display on the NGS	Diagnosis component	Page
C1178	LR SPEED SENSOR-COHERENCY FAULT	Left rear ABS wheel-speed sensor/sensor rotor	(See 04-02-14 DTC C1148, C1158, C1168, C1178)
C1266	ABS POWER RELAY VALVE-CKT FAILURE	Solenoid valve power supply	(See 04-02-15 DTC C1266)
C1095	HYDRAULIC PUMP MOTOR-CKT FAILURE	Pump motor relay	(See 04-02-12 DTC C1095)
C1117*	RPM INPUT CIRCUIT FAILURE	Engine speed signal line	(See 04-02-16 DTC C1117)
C1118*	TRAC CONTROL IND TORQ REDUC CKT FAIL	Torque reduction (request) signal line	(See 04-02-17 DTC C1118)
C1119*	TRAC CONTROL ACT TORQ REDUC CKT FAIL	Torque reduction (engine condition) signal line	(See 04-02-17 DTC C1119, U2012)
U2012*	COMMUNICATION BUS ERROR	Torque reduction (engine condition) signal line	(See 04-02-17 DTC C1119, U2012)
U2021*	INVALID/FAULTED DATA RECEIVED	Engine control system	(See 04-02-18 DTC U2021)

* : For TCS

PID/DATA Monitor Table

PID name	Definition	Unit	Operation
ABSLF I	LF ABS pressure retention valve output status	—	ON/OFF
ABSLF O	LF ABS pressure reduction valve output status	—	ON/OFF
ABSLR I	LR ABS pressure retention valve output status	—	ON/OFF
ABSLR O	LR ABS pressure reduction valve output status	—	ON/OFF
ABSRF I	RF ABS pressure retention valve output status	—	ON/OFF
ABSRF O	RF ABS pressure reduction valve output status	—	ON/OFF
ABSRR I	RR ABS pressure retention valve output status	—	ON/OFF
ABSRR O	RR ABS pressure reduction valve output status	—	ON/OFF
BOO_ABS	Brake light switch status	—	ON/OFF
B+	System battery voltage value	V	—
CCNT ABS	Number of continuous DTC	—	—
ENG TQ*	Engine torque actual value	Nm	—
ENG TQR*	Engine torque reduction	Nm	—
LF_WSPD	Front left wheel speed sensor input	MPH	—
LR_WSPD	Rear left wheel speed sensor input	MPH	—
MMI SIG*	Torque reduction (engine condition) signal	%	—
PMP_MTR	Pump motor relay output status	—	ON/OFF
RF_WSPD	Front right wheel speed sensor input	MPH	—
RPM*	Engine speed	RPM	—

PID name	Definition	Unit	Operation
RR_WSPD	Rear right wheel speed sensor input	MPH	—
TCS OFF	Voltage at TCS OFF switch	V	—
VLV_CTR	Valve relay status	—	ON/OFF

* : For TCS

Active Command Modes Table

Description 1	Command name	Description 2	Unit	Operation
ABS OUTPUT CONTROL	PMP MOTR	Hydraulic pump motor	—	ON/OFF
	LF INLET	LF pressure retention valve	—	ON/OFF
	LF OUTLET	LF pressure reduction valve	—	ON/OFF
	RF INLET	RF pressure retention valve	—	ON/OFF
	RF OUTLET	RF pressure reduction valve	—	ON/OFF
	LR INLET	LR pressure retention valve	—	ON/OFF
	LR OUTLET	LR pressure reduction valve	—	ON/OFF
	RR INLET	RR pressure retention valve	—	ON/OFF
	RR OUTLET	RR pressure reduction valve	—	ON/OFF
	VPWR RLY	Valve power relay	—	ON/OFF
INDICATOR LAMP CONTROL II	CHK TRAC*	Check traction control indicator	—	ON/OFF
	ABS LMP	ABS warning light	—	ON/OFF
	TRAC OFF*	Traction control off indicator	—	ON/OFF
DESIRED ENGINE TORQUE	ENG TQR*	Engine torque reduction signal output	N·m	—

* : For TCS

Note

- When operating each valve forcibly, turn VPWR RLY on, and then each command on. VPWR RLY regulates the power supply for the eight valves.

DTC B1318

Z6U040243000W04

Caution
- **When attaching the tester lead to the PCM, the SST must be used. (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL].)**

DTC B1318 (63)	ABS CM power supply
DETECTION CONDITION	• Voltage sensor detects low voltage
POSSIBLE CAUSE	• Malfunction of generator • Malfunction of related wiring harness • Depleted battery

ABS CM HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



Z5U0402W104

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• With engine idling, is battery terminal voltage okay?	Yes	Make sure that battery terminal connection is okay. Go to next step.
		No	Charge or replace battery.
2	• Are generator and drive belt tension okay? (See 01-17-3 GENERATOR INSPECTION)	Yes	Go to next step.
		No	Adjust drive belt tension as necessary. Replace generator and/or drive belt as necessary.
3	• Is DTC for engine control system obtained? (See 01-02B-8 FOREWORD [KL])	Yes	Follow inspection procedures for engine control system.
		No	Go to next step.
4	• Inspect connection of Z (power supply) and D (ground) connector pins for ABS CM. Is it okay?	Yes	Go to next step.
		No	Repair ABS CM connector.
5	• Is voltage of ABS CM harness between Z and D **above 10 V** when engine is idling?	Yes	Go to next step.
		No	Go to step 7.
6	• With IG SW OFF, is resistance between D of ABS CM harness and secure ground **less than 5 Ω**?	Yes	Go to next step.
		No	Repair harness between D and ground point for open circuit.
7	• Remove ABS, A/B fuse (10 A). Is resistance between Z of ABS CM harness and secure ground **less than 10 kΩ**?	Yes	Repair harness between Z and J/B fuse box for short to ground.
		No	Go to next step.
8	• Is resistance between Z of ABS CM harness and ABS, A/B fuse (10 A) **less than 5 Ω**?	Yes	Go to next step.
		No	Repair harness between Z and fuse for open circuit.
9	• Erase DTC and recheck for DTC with engine idling. • Is DTC B1318 obtained?	Yes	Replace ABS CM.
		No	There was a temporarily low battery voltage.

DTC B1342

Z6U040243000W05

DTC B1342	ABS CM
DETECTION CONDITION	• The on-board diagnostic program detects computer malfunction
POSSIBLE CAUSE	• Malfunction of ABS CM

Diagnostic procedure

STEP	INSPECTION		ACTION
—	—	—	Replace ABS CM.

DTC B1484

Z6U040243000W06

DTC B1484	Brake switch harness
DETECTION CONDITION	• When open circuit is detected in the following — Harness between brake switch and ABS CM — ABS CM
POSSIBLE CAUSE	• Malfunction of related wiring harness

Diagnostic procedure

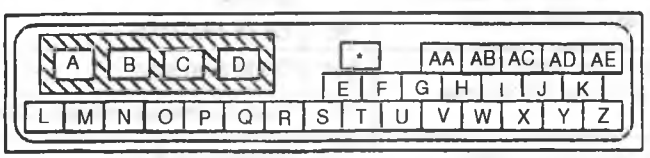
STEP	INSPECTION		ACTION
1	• Inspect harness between brake light and ABS CM. — Open circuit • Is harness normal?	Yes	Go to next step.
		No	Repair harness.
2	• Erase DTC, and recheck for DTC. • Is DTC B1484 obtained?	Yes	Replace ABS CM.
		No	There was temporary poor contact in wiring harness or connector.

DTC C1095

Z6U040243000W07

DTC C1095	ABS motor, motor relay
DETECTION CONDITION	• Motor monitor signal does not track in response to motor relay at ON/OFF command
POSSIBLE CAUSE	• Malfunction of ABS motor or motor relay • Malfunction of related wiring harness

ABS CM HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



Z5U0402W104

Diagnostic procedure

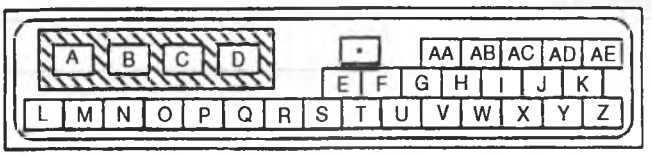
STEP	INSPECTION		ACTION
1	• Is voltage at B of ABS CM connector 10 V or more?	Yes	Go to next step.
		No	Go to step 6.
2	• Is ABS (60 A) fuse okay?	Yes	Go to next step.
		No	Replace fuse.
3	• Is resistance between B of ABS CM harness connector and secure ground **less than 10 kΩ**?	Yes	Repair harness between B and fuse for short to ground.
		No	Go to next step.
4	• Is resistance between B of ABS CM harness connector and ABS (60 A) fuse **5 Ω or less**?	Yes	Go to next step.
		No	Repair harness between B and fuse for open circuit.
5	• Is resistance between A of ABS CM harness connector and secure ground **less than 5 Ω**?	Yes	Go to next step.
		No	Repair harness between A and joint box (ground) for open circuit.
6	• Connect the **SST** (NGS tester). • Select ACTIVE COMMAND MODES. • Select PID PMP MTR. • Activate PID ON. • Does pump motor function when commanded to ON?	Yes	System is normal. Erase DTC and observe symptom.
		No	Replace ABS HU/CM component.

DTC C1145, C1155, C1165, C1175

Z6U040243000W08

DTC	**C1145** **C1155** **C1165** **C1175**	**RF ABS wheel-speed sensor** **LF ABS wheel-speed sensor** **RR ABS wheel-speed sensor** **LR ABS wheel-speed sensor**
DETECTION CONDITION	• When open circuit is detected	
POSSIBLE CAUSE	• Open circuit of ABS wheel-speed sensor	

ABS CM HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



Z5U0402W104

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• With ABS CM disconnected, inspect resistance between following sensor terminals of harness connector. — RF: P—O, LF: Q—R, RR: M (N)*—L, LR: T—S • Is resistance **1.28—1.92 kΩ**?	Yes	Go to step 2 of DTC C1222 chart.
		No	Go to next step.
2	• Remove sensor connector and inspect resistance between sensor terminals. • Is resistance **1.28—1.92 kΩ**?	Yes	Repair harness between ABS CM connector and ABS wheel-speed sensor connector.
		No	Replace ABS wheel-speed sensor.

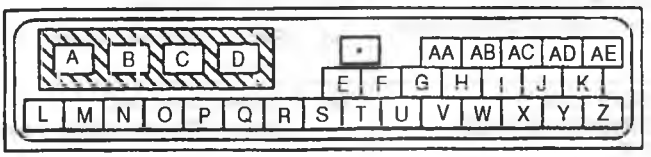
* : Models with TCS

DTC C1148, C1158, C1168, C1178

Z6U040243000W09

DTC	C1148 C1158 C1168 C1178	**RF ABS wheel-speed sensor/sensor rotor** **LF ABS wheel-speed sensor/sensor rotor** **RR ABS wheel-speed sensor/sensor rotor** **LR ABS wheel-speed sensor/sensor rotor**
DETECTION CONDITION	• Wheel speed signal is out of specification when vehicle is stopped or starting	
POSSIBLE CAUSE	• Open or short circuit of ABS wheel-speed sensor • Damaged ABS sensor rotor	

ABS CM HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



Z5U0402W104

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Inspect clearance between sensor and rotor, and output voltage. (See 04-13-14 FRONT ABS WHEEL-SPEED SENSOR INSPECTION) • Is sensor okay?	Yes	Go to next step.
		No	Replace ABS wheel-speed sensor.
2	• With ABS CM disconnected, inspect resistance between following sensor terminals of harness connector. — RF: P—O, LF: Q—R, RR: M (N)*—L, LR: T—C • Is resistance **1.28—1.92 kΩ**?	Yes	Go to next step.
		No	Repair harness between sensor and ABS CM.
3	• With ABS CM disconnected, inspect resistance between sensor terminals and ground. — RF: P—O, LF: Q—R, RR: M (N)*—L, LR: T—C • Is resistance **less than 5 Ω**?	Yes	Go to step 2 of DTC 1222 chart.
		No	There is a short to ground. Inspect short point and repair it as necessary.

* : Models with TCS

DTC C1222

Z6U040243000W10

DTC	C1222	**ABS wheel-speed sensor**
DETECTION CONDITION	• Wheel speed signal is out of specification	
POSSIBLE CAUSE	• Malfunction of ABS wheel-speed sensor • Damaged ABS sensor rotor	

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Inspect clearance between sensor and rotor, and output voltage. (See 04-13-14 FRONT ABS WHEEL-SPEED SENSOR INSPECTION) • Is sensor okay?	Yes	Go to next step.
		No	Replace ABS wheel-speed sensor.

STEP	INSPECTION		ACTION
2	• Inspect wheel bearing play. (See 03-11-1 WHEEL HUB, STEERING KNUCKLE PRE-INSPECTION) • Is wheel bearing play within specification? — **Wheel bearing play 0.1 mm {0.004in} max.**	Yes	Go to next step.
		No	Repair or replace damaged part.
3	• Visually inspect sensor rotor for loss, deformation and obstruction of teeth. Is there looseness or damage?	Yes	Replace ABS sensor rotor.
		No	Go to next step.
4	• Connect the **SST** (NGS) • Select PID WSPD of appropriate wheel • Drive vehicle and note PID • Is PID active?	Yes	System is normal.
		No	Inspect in ABS CM connector for poor connection and ABS CM wheel-speed sensor terminals for poor contact. Repair or replace terminal as necessary.

DTC C1210, C1214, C1194, C1198, C1246, C1254, C1242, C1250

Z6U040243000W11

DTC	**C 1210**	**RF pressure reduction valve**
	C 1214	**RF pressure retention valve**
	C 1194	**LF pressure reduction valve**
	C 1198	**LF pressure retention valve**
	C 1246	**RR pressure reduction valve**
	C 1254	**RR pressure retention valve**
	C 1242	**LR pressure reduction valve**
	C 1250	**LR pressure retention valve**
DETECTION CONDITION	• Solenoid monitor signal does not track in response to solenoid ON/OFF command	
POSSIBLE CAUSE	• Malfunction of solenoid valve	

Diagnostic procedure

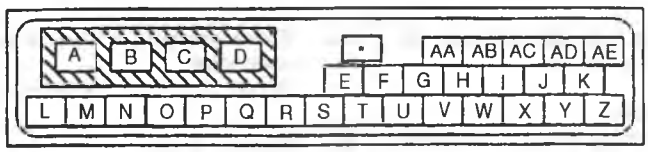
STEP	INSPECTION		ACTION
—	—	—	Replace ABS HU/CM component.

DTC C1266

Z6U040243000W12

DTC C1266	Valve relay power supply
DETECTION CONDITION	• Three or more valve systems are detected to be faulty among eight systems
POSSIBLE CAUSE	• Malfunction of valve relay • Malfunction of related wiring harness

ABS CM HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



Z5U0402W104

Diagnostic procedure

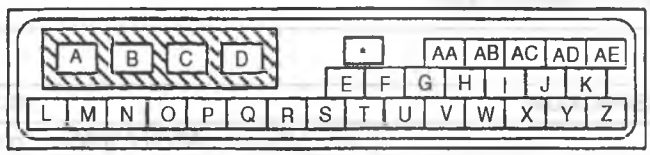
STEP	INSPECTION		ACTION
1	• Is ABS fuse (20 A) okay?	Yes	Go to next step.
		No	Replace ABS fuse (20 A).
2	• Is resistance between D and secure ground **less than 5 Ω**?	Yes	Go to next step.
		No	Repair harness between D and ground point for open circuit.
3	• Is resistance between C of ABS CM harness connector and secure ground **less than 10 kΩ**?	Yes	Repair harness between C and ABS fuse (20 A) for short to ground.
		No	Go to next step.
4	• Is resistance between C of ABS CM harness connector and ABS fuse (20 A) **less than 5 Ω**?	Yes	Replace ABS CM.
		No	Repair harness between C and ABS fuse (20 A) for open circuit.

DTC C1117

Z6U040243000W13

DTC C1117	Engine speed signal line
DETECTION CONDITION	• Torque reduction (engine condition) signal is normal and engine speed is less than specification
POSSIBLE CAUSE	• Malfunction of engine control system • Malfunction of related wiring harness

ABS CM HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



Z5U0402W104

Diagnostic procedure

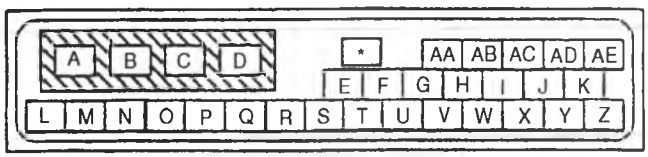
STEP	INSPECTION		ACTION
1	• Connect **SST** (NGS). • Select PID/DATA MONITOR. • Select ENG RPM. • With engine idling, is engine speed **400—1500 rpm**?	Yes	Go to step 4.
		No	Go to next step.
2	• With ABS/TCS CM connector disconnected and engine idling, is duty ratio between AD (+) and D (–) within specification? — **Duty ratio: 20—80%** — **Dwell meter reading: 18—72° (4-cycle, 4-cylinder)**	Yes	Go to step 4.
		No	Go to next step.
3	• With engine idling, is duty ratio between 48 (+) and 91 (–) of PCM within specification? — **Duty ratio: 20—80%** — **Dwell meter reading: 18—72° (4-cycle, 4-cylinder)**	Yes	There was temporary poor contact in wiring harness or connector. Repair or replace as necessary.
		No	Replace PCM.
4	• Does DTC indicate failure?	Yes	Replace ABS/TCS CM.
		No	There was temporary poor contact in wiring harness or connector. Repair or replace as necessary.

DTC C1118

Z6U040243000W14

DTC C1118	Torque reduction (request) signal line
DETECTION CONDITION	• Received the torque reduction (engine condition) signal that indicates PCM detects malfunction of torque reduction (request) signal line
POSSIBLE CAUSE	• Malfunction of ABS/TCS CM • Malfunction of related wiring harness

ABS CM HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



Z5U0402W104

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Connect **SST** (NGS). • Select PID/DATA MONITOR. • Select MMI SIG. • With engine idling, is duty ratio **93—97%**?	Yes	Go to next step.
		No	Go to step 4.
2	• With ABS/TCS CM connector disconnected and IG SW at ON, is voltage between X (+) and D (–) of connector **5 V or more**?	Yes	Go to next step.
		No	Inspect wiring harness between X of ABS/TCS CM and 11 of PCM for open or short. Repair or replace as necessary.
3	• With engine idling, is duty ratio between 11 (+) and 91 (–) of PCM within specification? — **Duty ratio: 70—99%** — **Dwell meter reading: 0.9—27° (4-cycle, 4-cylinder)**	Yes	Replace PCM.
		No	Replace ABS/TCS CM.
4	• Does DTC indicate failure?	Yes	Replace ABS/TCS CM.
		No	There was temporary poor contact in wiring harness or connector. Repair or replace as necessary.

DTC C1119, U2012

Z6U040243000W15

DTC C1119 U2012	Torque reduction (engine condition) signal line
DETECTION CONDITION	• Torque reduction (engine condition) signal is out of specification
POSSIBLE CAUSE	• Malfunction of PCM • Malfunction of related wiring harness

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Connect **SST** (NGS). • Select PID/DATA MONITOR. • Select MMI SIG. • With engine idling, is duty ratio **15—70%**?	Yes	Go to step 4.
		No	Go to next step.
2	• With PCM connector disconnected and IG SW at ON, is voltage between 82 (+) and 91 (–) of PCM **5 V or more**?	Yes	Go to next step.
		No	Inspect wiring harness between 82 of PCM and AA of ABS/TCS CM. Repair or replace as necessary.

STEP	INSPECTION		ACTION
3	• With PCM connector connected and engine idling, is duty ratio between 82 (+) and 91 (–) of PCM within specification? — **Duty ratio: 15—70%** — **Dwell meter reading: 27—76.5° (4-cycle, 4-cylinder)**	Yes	Go to step 4.
		No	Replace PCM.
4	• Is DTC present failure?	Yes	Replace ABS/TCS CM.
		No	There was temporarily poor contact in wiring harness or connector. Repair or replace as necessary.

DTC U2021

Z6U040243000W16

DTC U2021	Engine control system
DETECTION CONDITION	• Torque reduction (engine condition) signal is normal, and received that signal indicates that PCM cannot execute torque reduction
POSSIBLE CAUSE	• Malfunction of engine control system

Diagnostic procedure

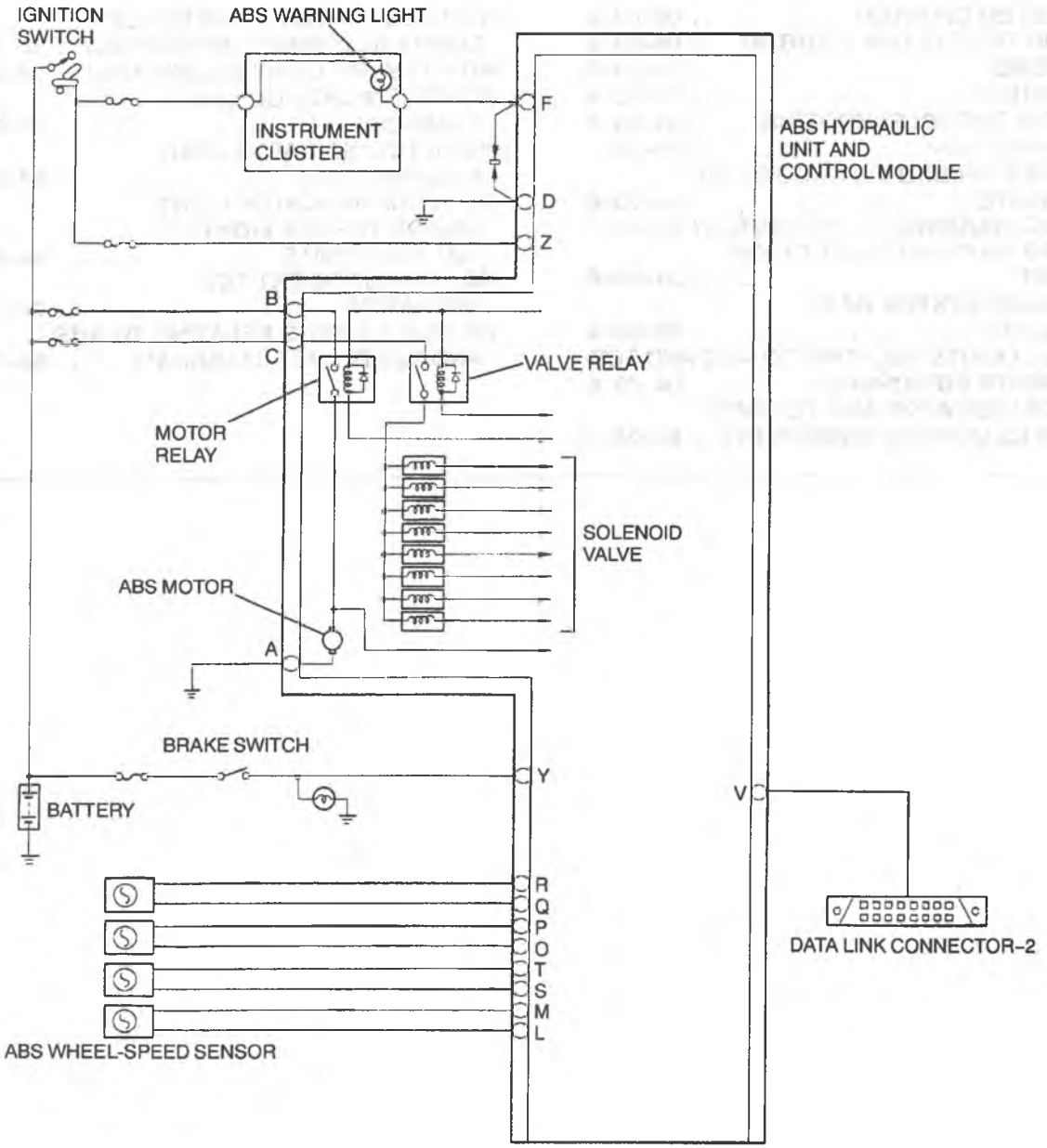
STEP	INSPECTION		ACTION
—	—	—	Perform engine on-board diagnostic inspection. (See 01-02B-8 FOREWORD [KL])

04-03 SYMPTOM TROUBLESHOOTING

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ABS SYSTEM DIAGRAM

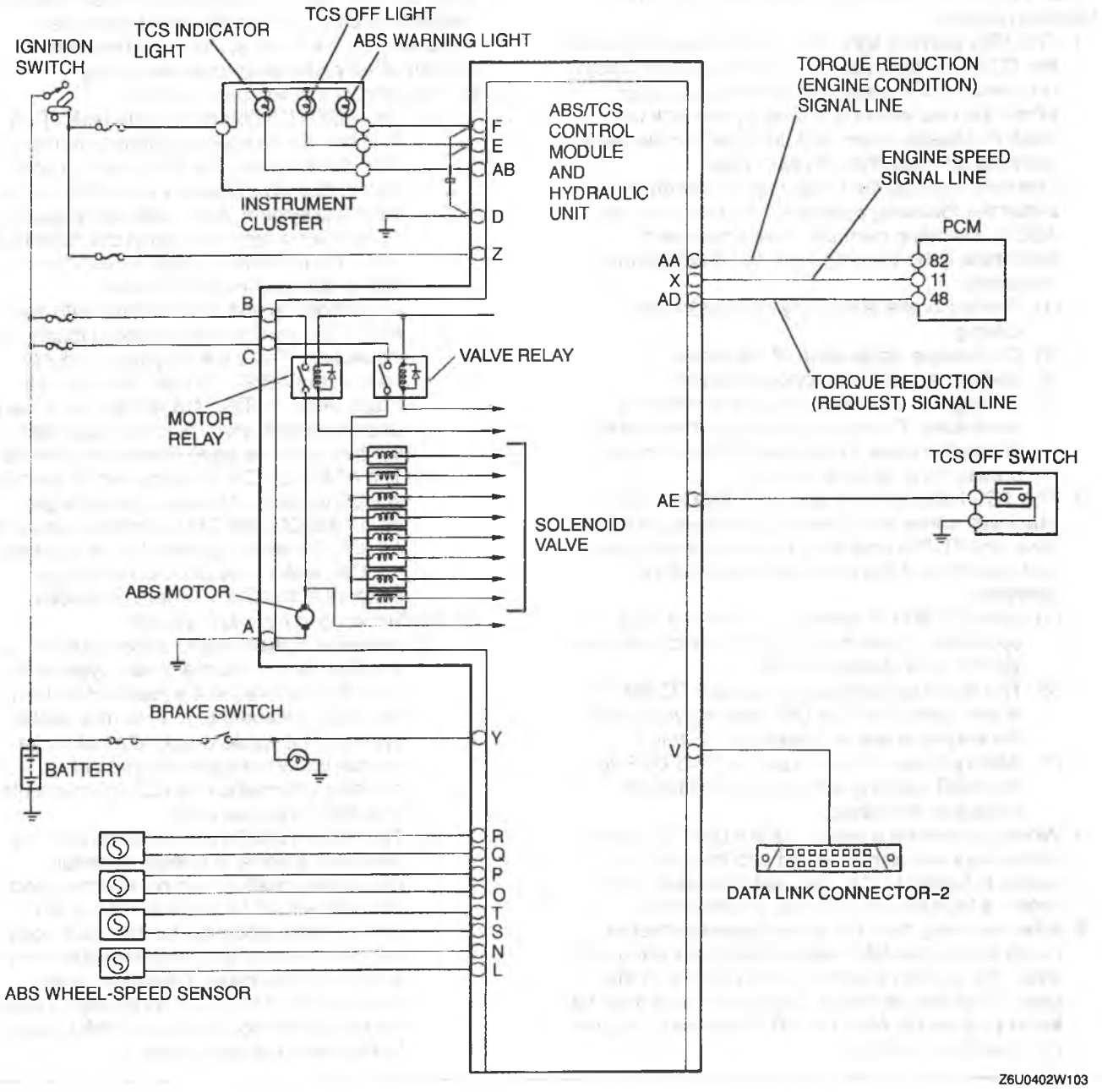
Z6U040343000W01



Z6U0402W102

ABS AND TCS SYSTEM DIAGRAM

Z6U040343000W02



Z6U0402W103

FOREWORD

Z6U040343000W03

- Before performing the steps in Symptom Troubleshooting, perform the On-board Diagnostic Test. To check the DTC, follow the OBD TEST steps.

PRECAUTION

Z6U040343000W04

When inspecting or servicing the ABS/TCS, note the following points:

1. The ABS warning light, the TCS indicator light and the TCS OFF light stay on until the ignition switch is turned to OFF under the following condition. When the rear wheel is locked by the jack up, stack or chassis roller, and only the front wheel is spinning for more than **60 seconds**.
2. The ABS warning light may flash when driving under the following conditions. In this case, the ABS is operating normally. Investigate and determine if the warning light illuminates before operation.
   (1) Parking brake is not fully released while driving.
   (2) Continuous application of the brake.
   (3) Sudden acceleration or deceleration.
   (4) Left/right or front/rear tires are in different conditions. Tire sizes other than those listed on the tire label, or tires with different radii, pressures or wear are used.
3. The TCS indicator light and the TSC OFF light illuminate under the following conditions. In this case, the TCS is operating normally. Investigate and determine if the lights illuminate before operation.
   (1) Using TCS OFF switch to cancel the TCS operation. Press the TCS OFF switch and the system is in standby mode.
   (2) The water temperature is below **0 °C {32 °F}**. In this case, the TCS OFF light stays lit until the engine is warm. (maximum 15 min.)
   (3) Battery is low. In this case, the TCS OFF light and ABS warning light stay lit until battery voltage is increased.
4. When performing a repair, if the ABS/TCS related connectors are disconnected and the ignition switch is turned to ON, the control module will detect a fault and record it as a malfunction.
5. After repairing the ABS wheel-speed sensor or pump motor, the ABS warning light may not go off when the ignition switch is turned to ON. In this case, drive the vehicle at a speed of more than **10 km/h {6.2 mph}**. After the ABS warning light goes off, reset the memory.
6. The ABS and TCS are composed of electrical and mechanical parts. It is necessary to treat them separately as electrical system and hydraulic system when performing troubleshooting.
   (1) Malfunctions in electrical system
      ① The ABS/TCS control module (ABS/TCS CM) has an on-board diagnostic function. With this function, the ABS warning light illuminates when there is a problem in the electrical system. Also, past and present malfunctions are recorded in the ABS/TCS CM. This function can find malfunctions that do not occur during periodic inspection. To find malfunctions with the ABS/TCS, perform the on-board diagnostic inspection. Erase the diagnostic trouble code in the ABS/TCS CM memory after repair. Also, if ABS/TCS related parts have been replaced, verify that the diagnostic trouble code has been erased afterwards.
      ② The ABS/TCS CM is composed of delicate electronic parts. If foreign materials get inside the CM, the CM will malfunction and ABS/TCS cannot operate. When replacing the CM, make sure there is no foreign material in the CM's system connector.
   (2) Malfunctions in hydraulic system
      ① Hydraulic system malfunction is similar to a malfunction in normal brake system. It must be determined if a malfunction is in the ABS components or in normal brake system. This guide omits information for normal brake components and only contains information for ABS components (the ABS hydraulic unit).
      ② The ABS hydraulic unit contains delicate mechanical parts. If foreign material penetrates, malfunction could occur, and the ABS will fail to operate. Also, if the normal brake operates but the ABS does not, the cause of the problem will be very difficult to determine. Therefore, when servicing the ABS, such as changing brake fluid or detaching pipes, be careful that no foreign material gets inside.

SYMPTOM TROUBLESHOOTING

Z6U040343000W05

Diagnostic Index

Use the following table to determine the problem, and go to the appropriate "Symptom Troubleshooting."

(For ABS)

No.	TROUBLESHOOTING ITEM	DESCRIPTION	PAGE
1	ABS warning light does not illuminate	When IG switch is turned to ON, ABS warning light does not illuminate **within 2—4 seconds**.	(See 04-03-6 NO.1 ABS WARNING LIGHT DOES NOT ILLUMINATE)
2	ABS warning light stays on	When IG switch is turned to ON, ABS warning light illuminates after **more than 4 seconds**.	(See 04-03-7 NO.2 ABS WARNING LIGHT STAYS ON)
3	ABS warning light go on and off	When IG switch is turned to ON, ABS warning light goes on and off intermittently.	(See 04-03-8 NO.3 ABS WARNING LIGHT GO ON AND OFF
4	Brake system has problems	ABS warning light illuminates normally, but system has problems: • Spongy brake feeling • Poor braking • Brakes pull to one side	(See 04-03-9 NO.4 BRAKE SYSTEM HAS PROBLEMS)

(For ABS/TCS)

No.	TROUBLESHOOTING ITEM	DESCRIPTION	PAGE
5	All lights relating to ABS and TCS illuminate improperly	When IG switch is turned to ON, all of the following lights illuminate improperly: • ABS warning light • TCS indicator light • TCS OFF light	(See 04-03-9 NO.5 ALL LIGHTS RELATING TO ABS AND TCS ILLUMINATE IMPROPERLY)
6	TCS indicator and TCS OFF lights illuminate improperly	When IG switch is turned to ON, both of the following lights illuminate improperly: • TCS indicator light • TCS OFF light	(See 04-03-10 NO.6 TCS INDICATOR AND TCS OFF LIGHTS ILLUMINATE IMPROPERLY)
7	ABS warning and TCS OFF lights illuminate improperly	When IG switch is turned to ON, both of the following lights illuminate improperly: • ABS warning light • TCS OFF light	(See 04-03-11 NO.7 ABS WARNING AND TCS OFF LIGHTS ILLUMINATE IMPROPERLY)
8	TCS OFF light illuminates	When IG switch is turned to ON, only TCS OFF light illuminates.	(See 04-03-12 NO.8 TCS OFF LIGHT ILLUMINATES)
9	TCS indicator light flashes	TCS indicator light flashes when TCS is not activated during driving.	(See 04-03-13 NO.9 TCS INDICATOR LIGHT FLASHES)
10	TCS indicator light illuminates	When IG switch is turned to ON, only TCS indicator light illuminates.	(See 04-03-14 NO.10 TCS INDICATOR LIGHT ILLUMINATES)
11	TCS indicator light and/or TCS OFF light do not illuminate	TCS indicator light and /or TCS OFF light had illuminated in the past and they do not any more.	(See 04-03-14 NO.11 TCS INDICATOR LIGHT AND/OR TCS OFF LIGHT DO NOT ILLUMINATE)
12	Insufficient TCS operation	Insufficient TCS operation.	(See 04-03-15 NO.12 INSUFFICIENT TCS OPERATION)
13	All lights relating to ABS and TCS do not illuminate	When IG switch is turned to ON, all of the following lights do not illuminate: • ABS warning light • TCS indicator light • TCS OFF light	(See 04-03-16 NO.13 ALL LIGHTS RELATING TO ABS AND TCS DO NOT ILLUMINATE)

NO.1 ABS WARNING LIGHT DOES NOT ILLUMINATE

Z6U040343000W06

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors. Terminals and wiring harness are connected correctly and undamaged.

1	ABS warning light does not illuminate
DESCRIPTION	• When IG switch is turned to ON, ABS warning light does not illuminate **within 2—4 seconds**.
POSSIBLE CAUSE	• Burnt out bulb, or short/open circuit in harness. • Malfunction in instrument cluster (print plate). • Malfunction in ABS CM.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CHECK TO SEE WHETHER MALFUNCTION IS IN WARNING LIGHTS' COMMON POWER SUPPLY OR OTHER WARNING LIGHTS AND INDICATOR LIGHTS** • Will other indicator lights illuminate when IG switch is turned to ON?	Yes	Verify that diagnostic trouble code is in memory. If any diagnostic trouble code is retrieved, go to ABS/TCS On-Board Diagnosis. If no DTC is retrieved, go to next step.
		No	Inspect meter fuse. If fuse is melted, inspect for short to ground between ignition switch and fuse panel, or fuse panel and warning light.
2*	**INSPECT WIRING HARNESS BETWEEN FUSE PANEL AND WARNING LIGHT AND ABS CM FOR CONTINUITY** • Inspect harnesses of ABS warning light: meter fuse and warning light, warning light and ABS CM. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness.
3	**INSPECT ABS WARNING LIGHT BULB** • Inspect ABS warning light bulb. • Is it okay?	Yes	Go to next step.
		No	Replace bulb.
4	**INSPECT CIRCUIT BOARD IN INSTRUMENT CLUSTER** • Inspect the instrument cluster (print plate). • Is it okay?	Yes	Go to next step.
		No	Replace instrument cluster (print plate).
5*	**INSPECT WIRING HARNESS BETWEEN ABS CM AND GROUND FOR CONTINUITY** • Inspect continuity between ABS CM on D terminal and ground. • Is there continuity?	Yes	Go to next step.
		No	Repair harness.
6*	**CHECK TO SEE WHETHER MALFUNCTION IS IN ABS CM OR WIRING HARNESS (LACK OF CONTINUITY OR SHORT TO GROUND BETWEEN FUSE PANEL AND ABS CM)** • Turn the ignition switch to ON. • Inspect voltage of ABS CM on Z terminal. • Is voltage **more than 10 V**?	Yes	Replace ABS CM.
		No	Repair or replace harness.

Caution

- **Recheck the diagnostic trouble code after repair completion.**

Note

- The ABS warning light normally illuminates for **2—4 seconds** after ignition switch is turned to ON.
- If any symptoms have occurred in the past but are now okay, malfunction of related harness could be the possible cause and thus ABS CM is normal.

NO.2 ABS WARNING LIGHT STAYS ON

Z6U040343000W07

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

2	ABS warning light stays on
DESCRIPTION	• When IG switch is turned to ON, ABS warning light illuminates after **more than 4 seconds**.
POSSIBLE CAUSE	• Malfunction in ABS system • Low battery voltage • Ignition switch malfunction • Generator malfunction • Improper drive belt tension • Poor connection in ABS CM harness • Malfunction of ABS warning light harness • Malfunction of instrument cluster (print plate) • ABS CM inoperative

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY THAT ABS CM STORED AN ABS WHEEL-SPEED SENSOR MALFUNCTION DTC** • Drive the vehicle at more than **10 km/h {6.2 mph}** for **5 seconds**. • Did the light go off?	Yes	System is okay. Delete memory.
		No	If any other electrical component is inoperative while ABS warning light stays on, inspect ignition switch. Go to next step.
2	**CHECK FOR DTCS IN ABS CM** • Perform on-board diagnostic inspection using NGS tester. • Is the diagnostic trouble code displayed?	Yes	Go to ABS/TCS On-Board Diagnosis.
		No	Go to next step.
3	**VERIFY THAT ABS CM CONNECTOR IS CONNECTED TO ABS CM** • Is ABS CM harness connector securely connected to ABS CM?	Yes	Go to next step.
		No	Connect it securely.
4*	**INSPECT WIRING HARNESS BETWEEN WARNING LIGHT AND ABS CM FOR SHORT TO GROUND** • Is there any short circuit between ABS CM and ABS warning light?	Yes	Repair or replace the harness, between warning light and ABS CM.
		No	Go to next step.
5	**CHECK TO SEE WHETHER MALFUNCTION IS IN CIRCUIT BOARD IN INSTRUMENT CLUSTER OR ABS CM** • Inspect print plate in instrument cluster.	Yes	Replace ABS CM.
		No	Replace instrument cluster (print plate).

Caution

- **Recheck the diagnostic trouble code after repair completion.**

Note

- The ABS warning light normally illuminates for **2—4 seconds** after ignition switch is turned to ON.
- If any symptoms have occurred in the past but are now okay, malfunction of related harness could be the possible cause and thus ABS CM is normal.

NO.3 ABS WARNING LIGHT GO ON AND OFF

Z6U040343000W08

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

3	ABS warning light go on and off
DESCRIPTION	• When IG switch is turned to ON, ABS warning light goes on and off intermittently.
POSSIBLE CAUSE	• Low battery voltage • Poor ABS CM ground • Malfunction of ABS warning light harness • Malfunction of instrument cluster (print plate) • Improper bulb installation • Poor connection in ABS harness connector • Malfunction in ABS CM

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY THAT ABS CM IS CONNECTED** • Is ABS CM harness connector securely connected to ABS CM?	Yes	Go to next step.
		No	Connect it securely.
2*	**INSPECT WIRING HARNESS BETWEEN WARNING LIGHT AND ABS CM FOR SHORT TO GROUND** • Is harness between ABS CM and ABS warning light okay? (Inspect for short to ground)	Yes	Go to next step.
		No	Repair or replace the defective harness (short to GND) between warning light and ABS CM.
3*	**INSPECT WIRING HARNESS BETWEEN ABS CM (TERMINALS A AND D) AND GROUND FOR CONTINUITY** • Disconnect the ABS CM connector. • Is there continuity between ABS CM (A)terminal or (D) terminal and body ground?	Yes	Go to next step.
		No	Repair or replace harness.
4	**INSPECT ABS WARNING LIGHT BULB INSTALLATION** • Is the bulb securely installed?	Yes	Go to next step.
		No	Install it securely.
5	**CHECK TO SEE WHETHER MALFUNCTION IS IN CIRCUIT BOARD IN INSTRUMENT CLUSTER OR ABS CM** • Inspect instrument cluster (print plate) • Is it okay?	Yes	Replace ABS CM.
		No	Replace instrument cluster (print plate).

Caution

- **Recheck the diagnostic trouble code after repair completion.**

Note

- The ABS warning light normally illuminates for **2—4 seconds** after ignition switch is turned to ON.
- If any symptoms have occurred in the past but are now okay, malfunction of related harness could be the possible cause and thus ABS CM is normal.

NO.4 BRAKE SYSTEM HAS PROBLEMS

Z6U040343000W09

4	Brake system has problems
DESCRIPTION	• ABS warning light illuminates normally, but system has problem: — Spongy brake feeling — Poor braking — Brakes pull to one side
POSSIBLE CAUSE	• Brake pedal and brake master cylinder attachment incorrect • Air in brake system • Malfunction of master cylinder • Malfunction of proportioning valve • Leakage of brake fluid

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT BRAKE PEDAL AND MASTER CYLINDER ATTACHMENT INSTALLATION** • Are pedal and master cylinder attachment properly installed?	Yes	Go to next step.
		No	Install properly.
2	**VERIFY THAT THERE IS AIR IN THE BRAKE SYSTEM** • Is there air in the brake system?	Yes	Bleed the air.
		No	Go to next step.
3	**CHECK TO SEE WHETHER MALFUNCTION IS IN BRAKE PIPING OF ABS HYDRAULIC UNIT OR ELSEWHERE** • Is brake piping of ABS hydraulic unit okay?	Yes	Inspect the following conventional brake parts: • Master cylinder • Power brake unit • Proportioning valve, etc.
		No	Install the piping properly.

Caution
- **Recheck the diagnostic trouble code after repair completion.**

Note
- The ABS warning light normally illuminates for **2—4 seconds** after ignition switch is turned to ON.
- If any symptoms have occurred in the past but are now okay, malfunction of related harness could be the possible cause and thus ABS CM is normal.

NO.5 ALL LIGHTS RELATING TO ABS AND TCS ILLUMINATE IMPROPERLY

Z6U040343000W10

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

5	All lights relating to ABS and TCS illuminate improperly
DESCRIPTION	• When IG switch is turned to ON, all of the following lights illuminate improperly: — ABS warning light — TCS indicator light — TCS OFF light
POSSIBLE CAUSE	• Malfunction in ABS wiring system • Malfunction of ABS/TCS CM

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT ABS HYDRAULIC UNIT** • Perform ABS hydraulic unit on-vehicle inspection. • Is ABS hydraulic unit okay?	Yes	Go to next step.
		No	Service as necessary.

STEP	INSPECTION		ACTION
2*	**CHECK TO SEE WHETHER MALFUNCTION (SHORT TO GROUND) IS IN WIRING HARNESS (BETWEEN ABS/TCS CM AND EACH LIGHT) OR INSTRUMENT CLUSTER** • Are the harness between ABS/TCS CM and each light okay (No short to GND)?	Yes	Inspect instrument cluster.
		No	Repair or replace harness.

Caution
- **Recheck the diagnostic trouble code after repair completion.**

Note
- The ABS warning light normally illuminates for **2—4 seconds** after ignition switch is turned to ON.
- If any symptoms have occurred in the past but are now okay, malfunction of related harness could be the possible cause and thus ABS CM is normal.

NO.6 TCS INDICATOR AND TCS OFF LIGHTS ILLUMINATE IMPROPERLY

Z6U040343000W11

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

6	TCS indicator and TCS OFF lights illuminate improperly
DESCRIPTION	• When IG switch is turned to ON, both of the following lights illuminate improperly: — TCS indicator light — TCS OFF light
POSSIBLE CAUSE	• Malfunction of ABS/TCS CM or PCM • Malfunction of harness on TCS indicator light or TCS OFF light • Communication error, between ABS/TCS CM and PCM • Malfunction of engine control system

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CHECK FOR DTCS IN PCM** • Perform PCM on-board diagnostic inspection. • Is DTC displayed?	Yes	Go to Engine On-board Diagnosis.
		No	Go to next step.
2	**CHECK FOR DTCS IN ABS/TCS CM** • Perform ABS/TCS on-board diagnostic inspection. • Is DTC displayed?	Yes	Repair problem found during DTC inspection.
		No	Go to next step.
3*	**CHECK TO SEE WHETHER MALFUNCTION (SHORT TO GROUND) IS IN WIRING HARNESS (BETWEEN ABS/TCS CM AND INSTRUMENT CLUSTER) OR ABS/TCS CM** • Inspect harness between ABS/TCS CM and instrument cluster (ABS/TCS warning light) for short circuit and connector pins for looseness. • Is the harness okay?	Yes	Replace ABS/TCS CM.
		No	Repair or replace harness.

Caution
- **Recheck the diagnostic trouble code after repair completion.**

Note
- The ABS warning light normally illuminates for **2—4 seconds** after ignition switch is turned to ON.
- If any symptoms have occurred in the past but are now okay, malfunction of related harness could be the possible cause and thus ABS CM is normal.

NO.7 ABS WARNING AND TCS OFF LIGHTS ILLUMINATE IMPROPERLY

Z6U040343000W12

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

7	ABS warning and TCS OFF lights illuminate improperly
DESCRIPTION	• When IG switch is turned to ON, both of the following lights illuminate improperly: — ABS warning light — TCS OFF light
POSSIBLE CAUSE	• Low battery voltage • Poor connection or disconnection of ABS/TCS CM connection • Poor GND of ABS/TCS CM • Malfunction of ABS/TCS CM

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT ABS 10A FUSE** • Inspect ABS fuse (10 A). • Is the fuse blown?	Yes	Replace fuse.
		No	Go to next step.
2	**VERIFY THAT ABS/TCS CM STORED AN ABS WHEEL-SPEED SENSOR MALFUNCTION DTC** • Drive the vehicle at **10 km/h {6.2 mph}** for **5 seconds**, then inspect the ABS/TCS warning lights. • Do both lights go off after driving?	Yes	System is okay. (Erase memory)
		No	Go to next step.
3	**CHECK FOR DTCS IN ABS/TCS CM** • Perform ABS/TCS on-board diagnostic inspection. • Is DTC displayed?	Yes	Repair problem detected by DTC inspection.
		No	Go to next step.
4	**VERIFY THAT ABS/TCS CM CONNECTOR TERMINAL Z IS CONNECTED** • Inspect connection on Z terminal of ABS/TCS CM. • Is it securely connected?	Yes	Go to next step.
		No	Repair or replace harness.
5*	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY, BETWEEN ABS/TCS CM AND GROUND) OR ABS/TCS CM** • Disconnect ABS/TCS CM connector and inspect resistance from D terminal to body ground. • Is resistance less than **5 Ω**?	Yes	Replace ABS/TCS CM.
		No	Repair or replace harness.

Caution

- **Recheck the diagnostic trouble code after repair completion.**

Note

- The ABS warning light normally illuminates for **2—4 seconds** after ignition switch is turned to ON.
- If any symptoms have occurred in the past but are now okay, malfunction of related harness could be the possible cause and thus ABS CM is normal.

NO.8 TCS OFF LIGHT ILLUMINATES

Z6U040343000W13

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

8	TCS OFF light illuminates
DESCRIPTION	• When IG switch is turned to ON, only TCS OFF light illuminates.
POSSIBLE CAUSE	• Malfunction of TCS OFF switch • Short to GND in TCS OFF light harness • Malfunction of ABS/TCS CM • Malfunction of instrument cluster

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CHECK TO SEE WHETHER TROUBLE OCCURS WHEN THE WATER TEMPERATURE IS BELOW 0 °C {32 °F}** • Does the light only illuminate when the water temperature is below **0 °C {32 °F}**? • Warm up the engine to the normal operating temperature (**max. 15 min.**). • Does the light go off after warming up?	Yes	System is okay.
		No	Go to next step.
2	**CHECK TO SEE WHETHER MALFUNCTION IS IN TCS OFF SWITCH SYSTEM OR ELSEWHERE** • Connect NGS tester and switch TCS OFF of active command mode to OFF. • Will TCS OFF light go off?	Yes	Go to next step.
		No	Go to Step 7.
3	**CHECK TO SEE WHETHER MALFUNCTION IS IN TCS OFF SWITCH OR ELSEWHERE** • Using NGS tester, start the engine and check MMI SIG. • Is the value between **4—6%**?	Yes	Go to Step 5.
		No	Go to next step.
4	**INSPECT TCS OFF PID** • Connect NGS tester and select TCS OFF PID. • Does status of TCS OFF PID change when TCS OFF switch is operated?	Yes	Go to next step.
		No	Repair or replace harness or TCS OFF switch.
5	**CHECK FOR DTCS IN PCM** • Perform PCM on-board diagnostic inspection. • Is DTC displayed?	Yes	Repair problem detected by PCM on-board diagnostic inspection.
		No	Go to next step.
6	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (SHORT TO GROUND, BETWEEN TCS OFF LIGHT AND ABS/TCS CM) OR ELSEWHERE** • Disconnect ABS/TCS CM harness connector and turn IG switch to ON. • Does the TCS OFF light illuminate?	Yes	Go to next step.
		No	Go to Step 8.
7*	**INSPECT WIRING HARNESS BETWEEN TCS OFF LIGHT AND ABS/TCS CM FOR SHORT TO GROUND** • Is harness between ABS/TCS CM and TCS OFF light okay? (Check for short to GND.)	Yes	Go to next step.
		No	Repair or replace harness.
8	**CHECK TO SEE WHETHER MALFUNCTION IS IN ABS/TCS CM OR POOR CONNECTION OF ABS/TCS CM CONNECTOR** • Connect ABS/TCS CM harness connector and turn IG switch to ON. • Does TCS OFF light illuminate?	Yes	Replace ABS/TCS CM.
		No	Poor connection of harness and connector.

Caution
- **Recheck the diagnostic trouble code after repair completion.**

Note
- When the engine coolant temperature is below **0 °C {32 °F}**, the TCS OFF light stays on until the engine warms up to the normal operating temperature (**max. approx. 15 min.**). If the light goes off after warming up, the system is normal.
- The TCS OFF light illuminates at key on engine off. Start engine and inspect again.
- If any symptoms have occurred in the past but are now okay, malfunction of related harness could be the possible cause and thus ABS CM is normal.

NO.9 TCS INDICATOR LIGHT FLASHES

Z6U040343000W14

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

9	TCS indicator light flashes
DESCRIPTION	• TCS indicator light flashes when TCS is not activated during driving.
POSSIBLE CAUSE	• Improper tire size or pressure • Malfunction of ABS wheel-speed sensor, and/or sensor rotor • Short to GND in TCS indicator light harness intermittently

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT TIRE SIZE AND TIRE AIR PRESSURE** • Are tire size and pressure as specified?	Yes	Go to next step.
		No	Replace the tire with specified one, or adjust the pressure.
2*	**INSPECT WIRING HARNESS BETWEEN TCS INDICATOR LIGHT AND ABS/TCS CM FOR CONTINUITY AND SHORTS** • Is the harness between the ABS/TCS CM and the TCS indicator light okay? — There should be no open or short circuit	Yes	Go to next step.
		No	Repair or replace wiring harness.
3	**CHECK TO SEE WHETHER MALFUNCTION IS IN ABS WHEEL-SPEED SENSOR AND SENSOR ROTOR OR ABS/TCS CM** • Inspect the ABS wheel-speed sensor/sensor rotor. (See 04-13-14 FRONT ABS WHEEL-SPEED SENSOR INSPECTION) • Is the result okay?	Yes	Replace ABS/TCS CM.
		No	Replace ABS wheel-speed sensor/sensor rotor.

Caution
- **Recheck the diagnostic trouble code after repair completion.**

Note
- When tires of different sizes are used or tire air pressure is insufficient, the TCS may activate. While the TCS is operating, TCS OFF switch cannot be selected until the operation has been completed.
- When wheel spinning occurs, the TCS indicator light flashes. It indicates that the TCS system is operating normally. If flashing is observed too often, however, inspect the above items.
- If any symptoms have occurred in the past but are now okay, malfunction of related harness could be the possible cause and thus ABS CM is normal.

NO.10 TCS INDICATOR LIGHT ILLUMINATES

Z6U040343000W15

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

10	TCS indicator light illuminates
DESCRIPTION	• When IG switch is turned to ON, only TCS indicator light illuminates.
POSSIBLE CAUSE	• Malfunction of instrument cluster • Malfunction of ABS/TCS CM • Short to GND in TCS indicator light harness

Diagnostic procedure

STEP	INSPECTION		ACTION
1*	**INSPECT WIRING HARNESS BETWEEN TCS INDICATOR LIGHT AND ABS/TCS CM FOR SHORT TO GROUND** • Is the harness between the ABS/TCS CM and the TCS indicator light okay? — No shorted GND	Yes	Go to next step.
		No	Repair or replace wiring harness.
2	**CHECK TO SEE WHETHER MALFUNCTION IS IN ABS/TCS CM OR TCS INDICATOR LIGHT BULB** • Is the bulb in the instrument cluster okay?	Yes	Replace ABS/TCS CM.
		No	Replace the bulb in the instrument cluster.

Caution

- **Recheck the diagnostic trouble code after repair completion.**

Note

- The ABS warning light normally illuminates for **2—4 seconds** after ignition switch is turned to ON.
- If any symptoms have occurred in the past but are now okay, malfunction of related harness could be the possible cause and thus ABS CM is normal.

NO.11 TCS INDICATOR LIGHT AND/OR TCS OFF LIGHT DO NOT ILLUMINATE

Z6U040343000W16

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

11	TCS indicator light and/or TCS OFF light do not illuminate
DESCRIPTION	• TCS indicator light and/or TCS OFF light had illuminated in the past and they do not any more.
POSSIBLE CAUSE	• Poor harness of TCS indicator light, TCS OFF light, or TCS OFF switch • Communication error between TCS CM and PCM, or past malfunction of engine control system

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CHECK FOR DTCS IN PCM** • Perform PCM on-board diagnostic inspection. • Is DTC displayed?	Yes	Repair as specified by the applicable DTC.
		No	Go to next step.
2	**CHECK FOR DTCS IN ABS/TCS CM** • Perform ABS/TCS on-board diagnostic inspection. • Are any diagnostic trouble codes displayed?	Yes	Repair as specified by the applicable DTC.
		No	Go to next step.

STEP	INSPECTION		ACTION
3*	**INSPECT TCS OFF SWITCH AND WIRING HARNESS (SHORT TO GROUND BETWEEN INSTRUMENT CLUSTER AND ABS/TCS CM)** • Inspect TCS OFF switch and the related harnesses in the following area: • From ABS/TCS CM to TCS OFF light and from ABS/TCS CM to TCS indicator light (No shorted GND.)	Yes	System is normal. Recheck customer's complaint.
		No	Repair or replace harness.

Caution
- **Recheck the diagnostic trouble code after repair completion.**

Note
- When the engine coolant temperature is below **0 °C {32 °F}**, the TCS OFF light stays on until the engine warms up to the normal operating temperature (**max. approx. 15 min.**). If the light goes off after warming up, the system is normal.
- The TCS OFF light illuminates at key on engine off. Start engine and inspect again.
- If any symptoms have occurred in the past but are now okay, malfunction of related harness could be the possible cause and thus ABS CM is normal.

NO.12 INSUFFICIENT TCS OPERATION

Z6U040343000W17

12	Insufficient TCS operation
DESCRIPTION	• Insufficient TCS operation
POSSIBLE CAUSE	• Improper tire size and tire air pressure • Malfunction of PCM • Malfunction of ABS/TCS system

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT TIRE SIZE AND TIRE AIR PRESSURE** • Are tire size and pressure as specified?	Yes	Go to next step.
		No	Replace the tire with specified one, or adjust the pressure.
2	**CHECK FOR DTCS IN PCM** • Perform on-board diagnostic inspection for the PCM. • Are DTCs indicated?	Yes	Repair as specified by the applicable DTC for the PCM.
		No	Go to next step.
3	**VERIFY THAT ABS/TCS CM IS OKAY** • Connect the NGS tester to the connector, select ACTIVE COMMAND MODES and input **0 N·m** ENG TQR. • Increase the engine speed between **2,000 and 3,000 rpm**. • Does engine speed decrease?	Yes	System is normal. Recheck customer's complaint.
		No	Replace ABS/TCS CM.

Caution
- **Recheck the diagnostic trouble code after repair completion.**

Note
- When there is a possibility of engine stalling, TCS may allow spinning and restrain the torque reduction amount in order to prevent the engine from stalling.
- If any symptoms have occurred in the past but are now okay, malfunction of related harness could be the possible cause and thus ABS CM is normal.

NO.13 ALL LIGHTS RELATING TO ABS AND TCS DO NOT ILLUMINATE

Z6U040343000W18

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

13	All lights relating to ABS and TCS do not illuminate
DESCRIPTION	• When IG switch is turned to ON, all of following lights do not illuminate: — ABS warning light — TCS indicator light — TCS OFF light
POSSIBLE CAUSE	• Burnt out bulb or short in related harness • Poor ABS CM ground • Malfunction of power supply circuit of ABS CM • Malfunction of ABS CM

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CHECK TO SEE WHETHER MALFUNCTION IS IN WARNING LIGHT AND INDICATOR LIGHTS' COMMON POWER SUPPLY OR IN OTHER WARNING LIGHTS AND INDICATOR LIGHTS** • Inspect the instrument cluster. — Do other lights illuminate when the ignition switch is turned to ON?	Yes	Verify that diagnostic trouble code is in memory. Repair as necessary. If no DTC is displayed, go to next step.
		No	Inspect meter fuse. If fuse is melted, check to see if there is short to ground circuit between the ignition switch and fuse panel, and the ground between the fuse panel and the warning light.
2*	**CHECK TO SEE WHETHER THE CONNECTOR TERMINALS BETWEEN THE IGNITION SWITCH AND ABS/TCS CM ARE LOOSENED OR DEFORMED** • Inspect the terminals for any looseness or deformations between: — ABS/TCS CM and instrument cluster — Instrument cluster and fuse — Fuse and ignition switch • for the following lights: — ABS warning light — TCS indicator light — TCS OFF light • Is everything okay?	Yes	Go to next step.
		No	Repair or replace harness.
3	**INSPECT WARNING LIGHT BULB AND INDICATOR LIGHT BULBS** • Inspect the bulbs for the following lights: — ABS warning light — TCS indicator light — TCS OFF light • Is everything okay?	Yes	Go to next step.
		No	Replace the valves.
4	**CHECK TO SEE WHETHER ABS/TCS CM CONNECTOR TERMINALS D AND Z ARE LOOSENED OR DEFORMED** • Inspect terminal Z and D of the ABS/TCS CM connector for connecting and fitting condition. • Verify that there are no deformations or looseness. Are they okay?	Yes	Go to next step.
		No	Repair the deformed or loosened terminals.
5*	**INSPECT WIRING HARNESS BETWEEN FUSE PANEL AND ABS/TCS CM FOR CONTINUITY** • When the engine is idle, inspect the voltage at terminal Z of ABS/TCS CM. • Is the voltage **10 V or more**?	Yes	Go to next step.
		No	Repair or replace harnesses.

STEP	INSPECTION		ACTION
6*	**INSPECT WIRING HARNESS BETWEEN ABS/TCS CM AND GROUND FOR CONTINUITY** • Inspect the continuity between the body ground and the ground terminal on the ABS/TCS CM. • Is there continuity?	Yes	Replace the ABS/TCS CM.
		No	Repair or replace harnesses.

Caution
- **Recheck the diagnostic trouble code after repair completion.**

Note
- If any symptoms have occurred in the past but are now okay, malfunction related harness could be the possible cause and thus ABS CM is normal.

04-10 GENERAL PROCEDURES

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Brake Lines Disconnection/Connection **04-10-1**
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PRECAUTION (BRAKES)

Z6U041001020W01

Wheels and Tires Removal/Installation

- The removal and installation procedures for the wheels and tires are not mentioned in this section. When a wheel is removed, retighten it to **89—117 N·m {9—12 kgf·m, 66—86 ft·lbf}**.

Brake Lines Disconnection/Connection

Caution
- **Brake fluid will damage painted surfaces. If brake fluid gets on a painted surface, wipe it off immediately.**

- Tighten the brake pipe flare nut by using the **SST** (49 0259 770B). Be sure to modify the brake pipe flare nut tightening torque to allow for use of a torque wrench-**SST** combination. (See 00-00-15 Torque Formulas.)
- If any brake line has been disconnected anytime during the procedure, add brake fluid, bleed the brakes, and inspect for leakage after the procedure has been completed.

Connectors Disconnection

- Disconnect the negative battery cable before doing any work that requires handling of connectors. Connect the negative battery cable only after the work is completed.

ABS/TCS Components Operations

- Make sure that there are no diagnostic trouble codes in the ABS/TCS memory after working on ABS/TCS components. If there are any codes in the memory, erase them.

04-11 CONVENTIONAL BRAKE SYSTEM

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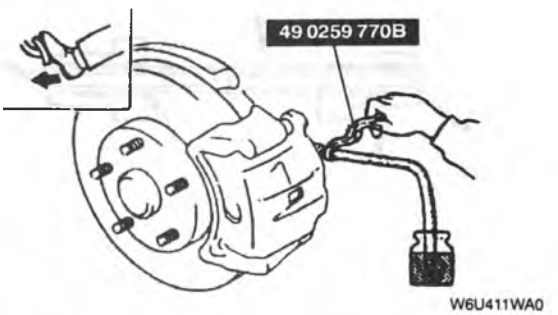
AIR BLEEDING

Z6U041143001W01

Note

- The brakes should be bled whenever a brake line is disconnected. If a hydraulic line is disconnected at the master cylinder, start at the brake caliper or wheel cylinder farthest from the brake master cylinder, and move to the next farthest brake caliper or wheel cylinder until all four have been bled. If the disconnection point is anywhere except the master cylinder, start at the point closest to the disconnection, and move to the next closest brake caliper or wheel cylinder until all four have been bled.

1. On level ground, jack up the vehicle and support it evenly on safety stands.
2. Remove the bleeder cap and attach a vinyl tube to the bleeder screw.
3. Place the other end of the vinyl tube in a clear container filled with brake fluid.
4. Depress the brake pedal several times, and then hold it in the depressed position.
5. Have an assistant loosen the bleeder screw, drain out the fluid and close the screw by using the **SST**.



W6U411WA0

6. Repeat step 4 and 5 until no air bubbles are seen. The reservoir should be kept about 3/4 full during bleeding to prevent air from reentering the lines.

Tightening torque
5.9—8.8 N·m {60—90 kgf·cm, 53—78 in·lbf}

7. Inspect for correct brake operation.
8. Verify that there is no fluid leakage. Wipe off any spilled fluid immediately.
9. After bleeding the brakes, add brake fluid to the maximum level.

BRAKE FLUID

Z6U041143001W02

Brake Fluid Inspection

1. Depress the brake pedal several times, and inspect for leakage of the brake line system.
2. Verify that the fluid level in the reservoir is between the MAX and MIN lines on the reservoir.
   - If the fluid level is extremely low, inspect the brake system for leakage.

Fluid specification
SAE J1703 or FMVSS116 DOT-3

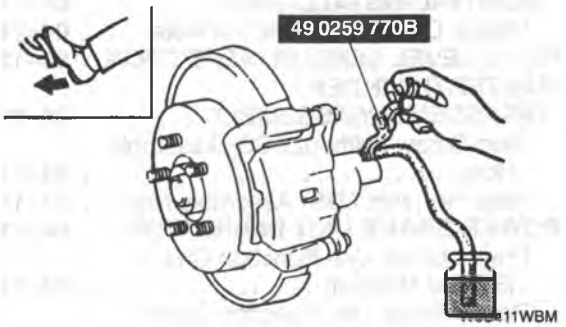


W6U411WBL

Brake Fluid Replacement

Caution
- **Brake fluid will damage painted surfaces. If brake fluid gets on a painted surface, wipe it off immediately.**

1. Remove the brake fluid from the reservoir by using a suction pump.
2. Fill the reservoir with clean brake fluid.
3. Attach a vinyl tube to the farthest bleeder screw and place the other end of the tube in a clear container.
4. Remove all old brake fluid from the brake lines by loosening the bleeder screw and pumping the brake pedal until only clean fluid is seen. The reservoir should be kept about 3/4 full during bleeding to prevent air from reentering the lines.



11WBM

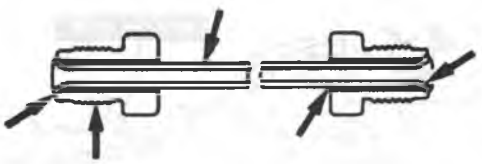
5. Perform the above for all bleeder screws.
6. Fill the reservoir to the specified levels.

BRAKE PIPE INSPECTION

Z6U041143002W01

Brake Pipe Inspection

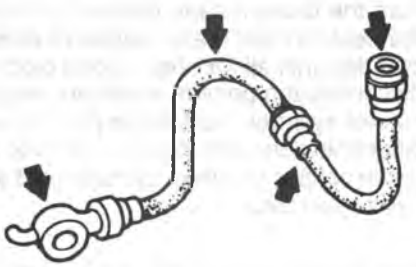
1. Inspect for cracks, damage, and corrosion of the brake pipe.
   - Replace the pipe or flare nut(s) as necessary.



W6U411WBN

Flexible Hose Inspection

1. Inspect for scars, cracks, and swelling of the flexible hose.
   - Replace the hose as necessary.



W6U411WBP

BRAKE PIPE REMOVAL/INSTALLATION

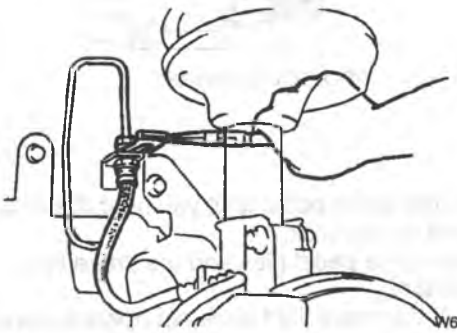
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1. Remove the brake pipe by using the **SST**.
2. Disconnect the clip and remove the flexible hose from the bracket.



W6U411WBQ

3. Secure the flexible hose in the bracket and connect the clip to it.



W6U411WBR

4. Connect the flexible hose to the brake pipe. Verify that the hose is not twisted.
5. Tighten the flare nut by using the **SST**. Verify that the hose can not come in contact with any other parts of vehicle.

Tightening torque
12.9—21.5 N·m {130—220 kgf·cm, 113—190 in·lbf}

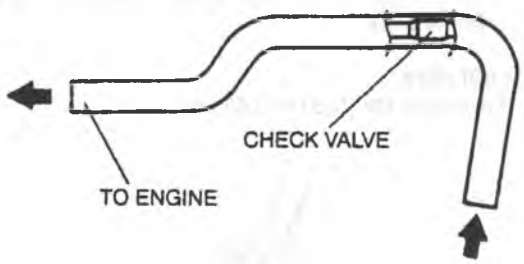


W6U411WBS

VACUUM LINE INSPECTION

Z6U041143980W01

1. Remove the clamps and vacuum hose.
2. Apply both suction and pressure to the engine-side hose, and verify that air blows only toward that side. If air flows in both directions or not at all, replace the vacuum hose.



W6U411WA1

BRAKE PEDAL INSPECTION

Z6U041143300W01

Brake Pedal Height Inspection

1. Verify that the distance from the center of the upper surface of the pedal pad to the carpet is as specified.
   - If not as specified, adjust the brake pedal height.

Pedal height (reference value)
186 mm {7.32 in}

Brake Pedal Height Adjustment

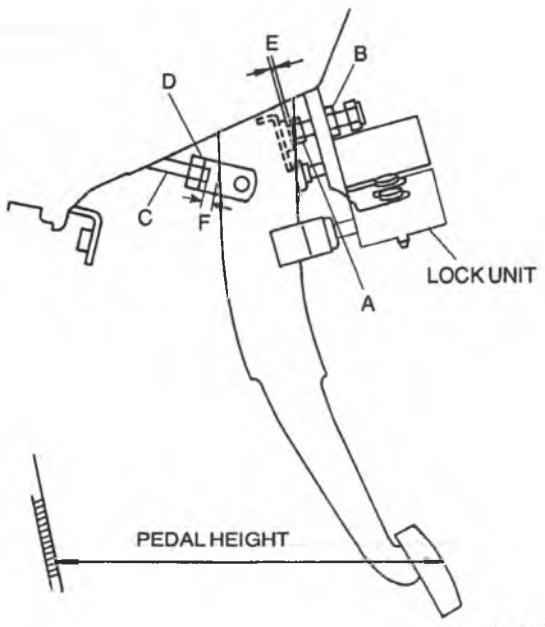
1. Loosen locknut B and turn adjusting bolt A until it does not contact the pedal.
2. Loosen locknut D and turn rod C to adjust the height.
3. Tighten locknut D.

Tightening torque
24—34 N·m {2.4—3.5 kgf·m, 18—25 ft·lbf}

4. Turn adjusting bolt A so that clearance E between adjusting bolt A and the pedal is **0.1—1.0 mm {0.004—0.039 in}**.
5. Tighten locknut B.

Tightening torque
14—17 N·m {140—180 kgf·cm, 122—156 in·lbf}

6. Verify that clearance F is obtained at any position of the pedal full stroke.
7. Verify that the lock unit operates correctly.



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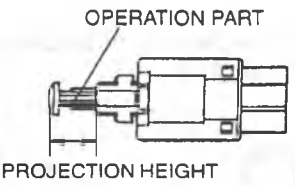
Caution

- **When the brake pedal height is adjusted, a new brake switch must be used.**
- **The new switch can be adjusted only once.**
- **Pulling or pushing the tip of the new brake switch can damage the inner parts.**

8. Install a new brake switch.

Note

- The new brake switch projection height is adjusted automatically in step 7.



W6U411WC0

9. Pull the brake pedal until you hear the tip of the brake switch click.
10. Inspect the pedal play and the brake light operation.
    - If the brake light does not operate, replace the brake switch and repeat steps 6—8.

Brake Pedal Play Inspection

1. Depress the pedal several times to eliminate the vacuum in the system.
2. Remove the snap pin, verify that the holes in the fork and in the pedal are aligned, and reinstall the pin.
3. Gently depress the pedal by hand until resistance is felt, and inspect for the play.
   - If not within the specification, adjust the brake pedal play.

Pedal play
7.8—12 mm {0.31—0.47 in}

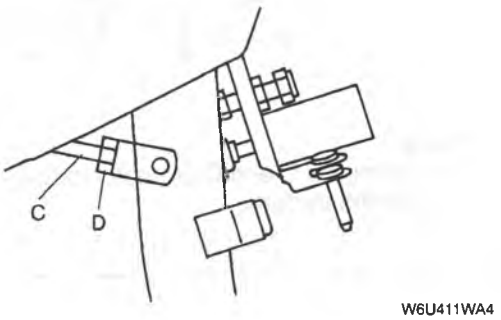


W6U411WA3

Brake Pedal Play Adjustment

1. Remove the snap pin and clevis pin.
2. Loosen locknut D and turn rod C to align the holes in the fork and in the pedal.
3. Install the clevis pin and the snap pin.
4. Tighten locknut D.

Tightening torque
24—34 N·m {2.4—3.5 kgf·m, 18—25 ft·lbf}



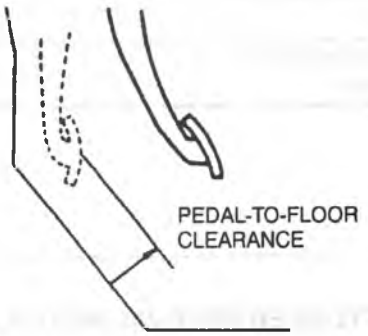
W6U411WA4

5. Perform step 6 through step 11 from the "Brake Pedal Height Adjustment".

Pedal-to-floor Clearance Inspection

1. Start the engine and verify that the distance from the floor panel to the pedal pad center is as specified when the pedal is depressed with a force of **589 N {60 kgf, 132 lbf}**.
   - If the distance is less than specified, inspect for the air in brake system.

Specification
53 mm {2.1 in} min.

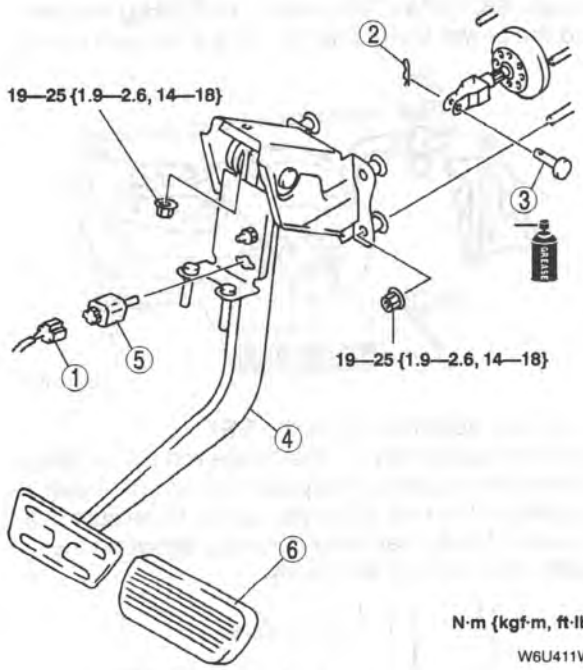


W6U411WA5

BRAKE PEDAL REMOVAL/INSTALLATION

Z6U041143300W02

1. Remove the lock unit (ATX).
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



W6U411WA6

1	Brake switch connector
2	Spring pin
3	Clevis pin
4	Brake pedal
5	Brake switch
6	Pedal pad

BRAKE SWITCH INSPECTION

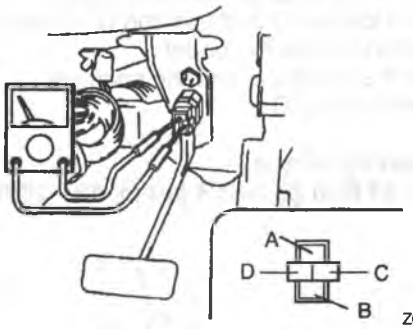
1. Disconnect the brake switch connector.
2. Inspect for continuity between the terminals of the brake switch connector by using the circuit tester.
   - If not as specified, replace the brake switch.

O—O : Continuity

Condition	Terminal			
	A	B	C	D
When the brake pedal is depressed	O	O		
When the brake pedal is not depressed			O	O

W6U411WA7

Z6U041166490W01

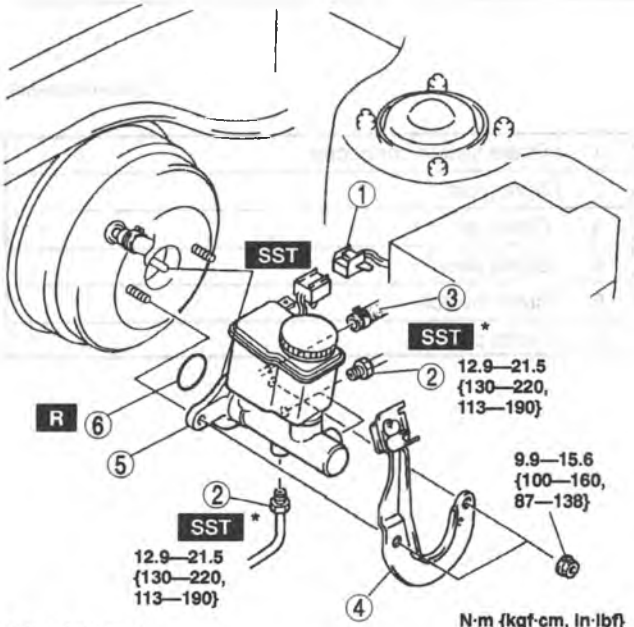


Z6U0411W101

Note
- Terminals C and D are used for the cruise control system.

MASTER CYLINDER REMOVAL/INSTALLATION

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



* 49 0259 770B

X6U411WA1

1	Brake fluid level sensor connector
2	Brake pipe
3	Hose (MTX)
4	Bracket
5	Master cylinder (See 04-11-6 Master Cylinder Installation Note)
6	O-ring

Z6U041143400W01

Master Cylinder Installation Note

1. Loosen the adjusting nut of the **SST**.
2. Place the **SST** on the power brake unit and tighten the nut and washer.

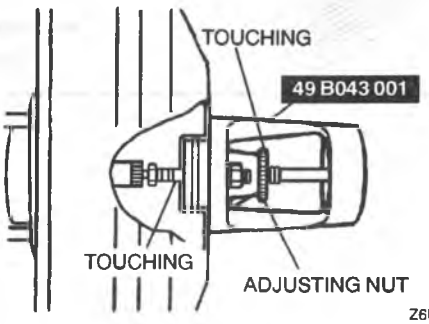
   Tightening torque
   9.9—15.6 N·m {100—160 kgf·cm, 87—138 in·lbf}

3. Apply **66.7 kPa {500 mmHg, 19.7 inHg}** vacuum to the power brake unit by using a vacuum pump.



W6U411WAC

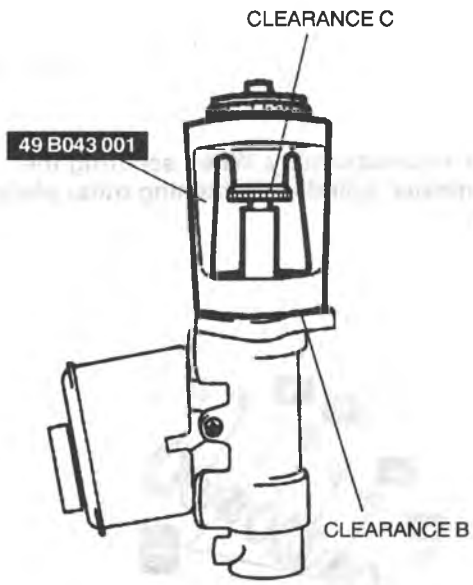
4. Turn the adjusting nut of the **SST** counterclockwise until the gauge rod just contacts the push rod end of the power brake unit. Push lightly on the end of the gauge rod to be sure it is seated. Verify that there is no gap between the adjusting nut and **SST** body.



Z6U0411W102

5. Remove the **SST** from the power brake unit without disturbing the adjusting nut. Set the **SST** onto the master cylinder as shown in the figure.
6. Push lightly on the end of the **SST** gauge rod to be sure that it is contacting the bottom of the master cylinder piston, but do not push so hard that the piston moves. Note any clearance between the **SST** body and the adjusting nut: clearance B, or between the body and the master cylinder: clearance C. Adjust the push rod as necessary as outlined in "Adjustment" below.

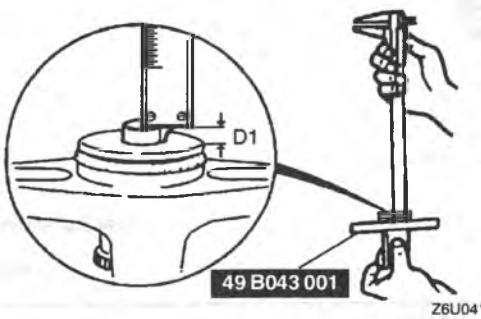
Measurement	Push rod
Clearance at B	Too long
Clearance at C	Too short
No clearance at B and C	Okay



Z6U0411W103

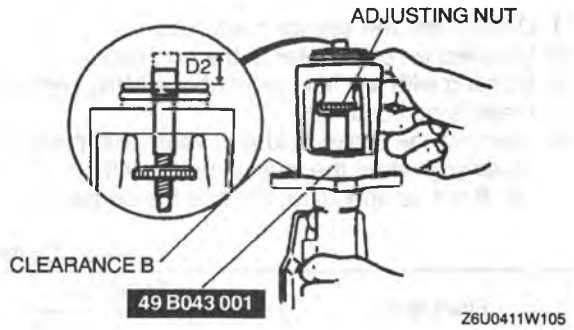
Adjustment
Clearance at B

1. Measure and record the height D1 of the gauge rod.



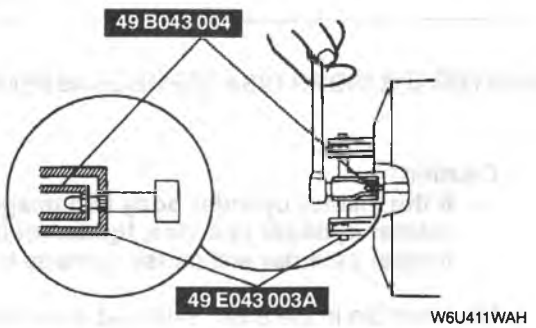
Z6U0411W104

2. Turn the adjusting nut until the **SST** body sets closely on the master cylinder. Turn only enough for the body to touch.
3. Measure and record height D2 of the gauge rod.



Z6U0411W105

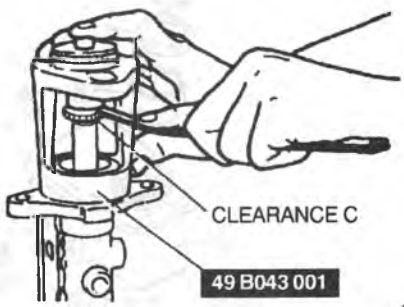
4. Subtract D1 from D2. By using the **SST**, turn the nut to shorten the power brake unit push rod an amount equal to the difference.



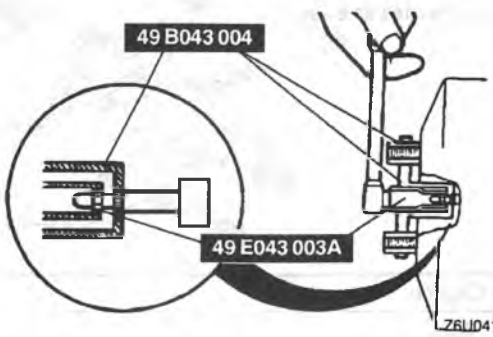
W6U411WAH

Clearance at C

1. Push lightly on the end of the **SST** gauge rod, and measure the clearance between the adjusting nut and the **SST** body.



Z6U0411W106



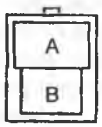
Z6U0411W107

2. Using the **SSTs**, turn the nut to lengthen the power brake unit push rod an amount equal to the clearance measured at B.

FLUID LEVEL SENSOR INSPECTION

Z6U041143400W02

1. Disconnect the sensor connector.
2. Connect an ohmmeter to the connector.
3. Starting with the fluid level above MIN, verify that there is no continuity.
4. Remove the brake fluid and verify that there is continuity when the level is below MIN.
   - If not as specified, replace the sensor.



VIEW FROM TERMINAL SIDE

Y6U411WBB

○—○ : Continuity

Fluid level	Terminal	
	A	B
Below MIN	○	○
Above MIN		

W6U411WAL

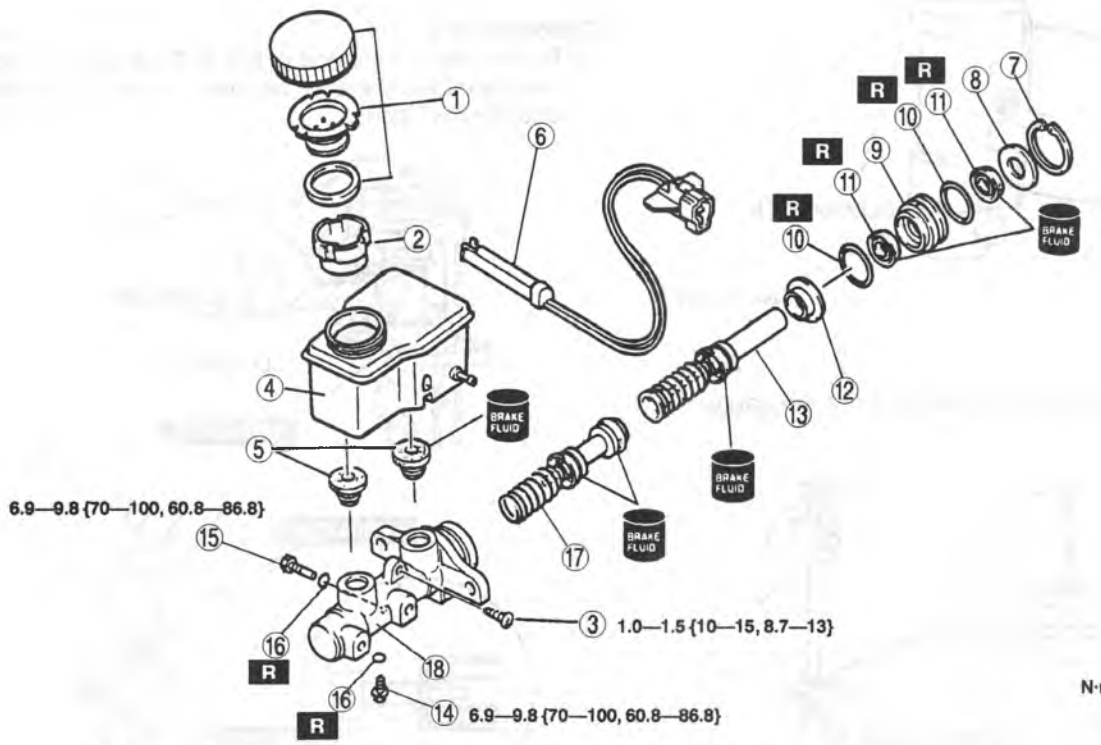
MASTER CYLINDER DISASSEMBLY/ASSEMBLY

Z6U041143400W03

Caution

- **If the master cylinder body is damaged, replace the unit as an assembly. When securing the master cylinder in a vise, tighten only the flange of the master cylinder. Tightening other places on master cylinder will cause damage to the cylinder body.**

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



N·m {kgf·cm, in·lbf}

W6U411WAN

1	Cap set
2	Float
3	Screw
4	Reservoir
5	Joint bushing
6	Fluid level sensor
7	Snap ring

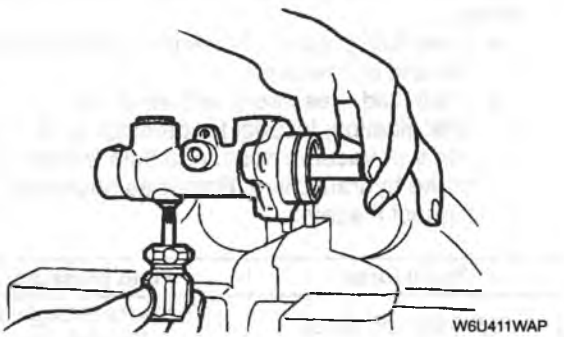
8	Spacer
9	Piston guide
10	O-ring
11	Cup
12	Primary piston stopper
13	Primary piston

14	Stop screw (without ABS) (See 04-11-9 Stop Screw (without ABS) Assembly Note)
15	Stop pin (with ABS) (See 04-11-9 Stop Pin (with ABS) Assembly Note)
16	O-ring
17	Secondary piston
18	Master cylinder body

Stop Screw (without ABS) Assembly Note

1. Install the new O-ring onto the stop screw.
2. Push the primary piston assembly in completely.
3. Install and tighten the stop screw.

Tightening torque
6.9—9.8 N·m {70—100 kgf·cm, 60.8—86.8 in·lbf}

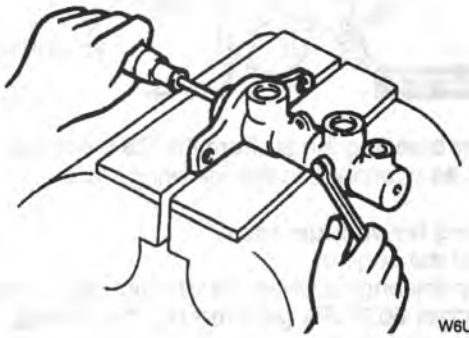

W6U411WAP

Stop Pin (with ABS) Assembly Note

1. Install the secondary piston with the piston hole facing the stop pin.
2. Install the new O-ring onto the stop pin.
3. Install the stop pin.

Tightening torque
6.9—9.8 N·m {70—100 kgf·cm, 60.8—86.8 in·lbf}

4. Push and release the secondary piston assembly to verify that it is held by the stop pin.


W6U411WAQ

POWER BRAKE UNIT INSPECTION

Z6U041143800W01

Power Brake Unit Function Check (Simple Method)

Note
- Replace power brake unit assembly as necessary.

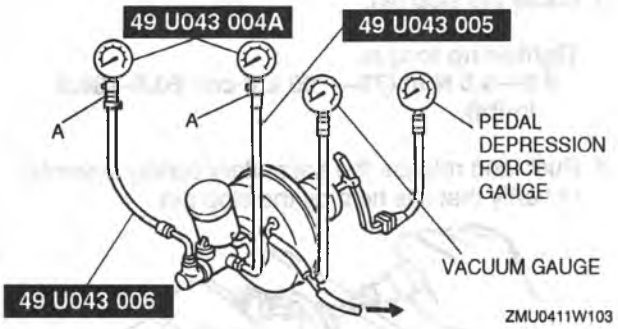
Step 1
1. With the engine stopped, depress the pedal several times.
2. With the pedal depressed, start the engine.
   - If the pedal moves down slightly, immediately after the engine starts, the unit is operating.
   - If a problem is found, inspect for damage on the check valve or vacuum hose, and examine the installation. Repair as necessary, and inspect it again.

Step 2
1. Start the engine.
2. Stop the engine after idling for **1 or 2 minutes**.
3. Depress the pedal with the usual force.
   - If the first pedal stroke is long and becomes shorter with subsequent strokes, the unit is operating.
   - If a problem is found, inspect for damage on the check valve or vacuum hose, and examine the installation. Repair as necessary, and inspect it again.

Step 3
1. Start the engine.
2. Depress the pedal with the usual force.
3. Stop the engine with the pedal held depressed.
4. Hold the pedal down for **about 30 seconds**.
   - If the pedal height does not change, the unit is operating.
   - If a problem is found, inspect for damage on the check valve or vacuum hose, and examine the installation. Repair as necessary, and inspect it again.

Power Brake Unit Function Check (Inspection Using the Testers)
1. Connect the **SSTs**, vacuum gauge, and pedal depression force gauge as shown in the figure.

Note
- Use commercially available gauges and pedal depression force gauge.
- Bleed the air from the **SST** at gauge A.



2. After bleeding the air from the **SST**, conduct the test as described in the following steps.

Checking for vacuum loss
1. Start the engine.
2. Stop the engine when the vacuum gauge reading reaches **66.7 kPa {500 mmHg, 19.7 inHg}**.
3. Observe the vacuum gauge for **15 seconds**.
   - If the gauge shows **63.3—66.7 kPa {475—500 mmHg, 18.7—19.7 inHg}**, the unit is operating.
   - If a problem is found, inspect for damage on the check valve or vacuum hose, and examine the installation. Repair as necessary, and inspect it again.
4. Start the engine.
5. Depress the brake pedal with a force of **196 N {20 kgf, 44 lbf}**.
6. With the brake pedal depressed, stop the engine when the vacuum gauge reading reaches **66.7 kPa {500 mmHg, 19.7 inHg}**.
7. Observe the vacuum gauge for **15 seconds**.
   - If the gauge shows **66.3—66.7 kPa {475—500 mmHg, 18.7—19.7 inHg}**, the unit is operating.
   - If a problem is found, inspect for damages on the check valve or vacuum hose, and examine the installation. Repair as necessary, and inspect it again.

Checking for hydraulic pressure
1. When the engine is stopped (vacuum **0 kPa {0 mmHg, 0 inHg}**) and the fluid pressure is within the specification, the unit is operating.

Pedal force	Fluid pressure
196 N {20 kgf, 44 lbf}	880 kPa {9 kgf/cm^2, 130 psi} min

2. Start the engine. Depress the brake pedal when the vacuum reaches **66.7 kPa {500 mmHg, 19.7 inHg}**.
   - If the fluid pressure is within the specification, the unit is operating.
   - If the fluid pressure is not within the specification, inspect for damage on the check valve or vacuum hose, and fluid leakage of the brake hydraulic line. Repair as necessary, and inspect it again.

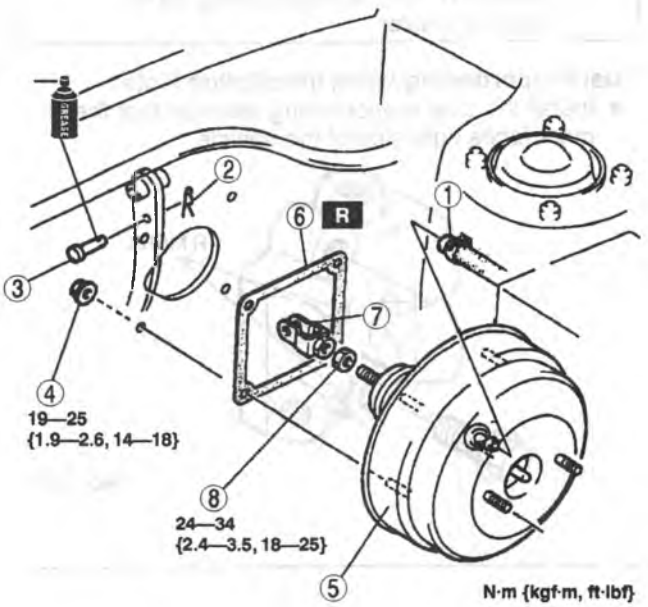
Pedal force	Fluid pressure
196 N {20 kgf, 44 lbf}	8,830 kPa {90 kgf/cm^2, 1,280 psi} min

POWER BRAKE UNIT REMOVAL/INSTALLATION

Z6U041143800W02

1. Remove the master cylinder. (See 04-11-6 MASTER CYLINDER REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

1	Vacuum hose
2	Snap pin
3	Clevis pin
4	Nut
5	Power brake unit
6	Gasket
7	Fork
8	Nut

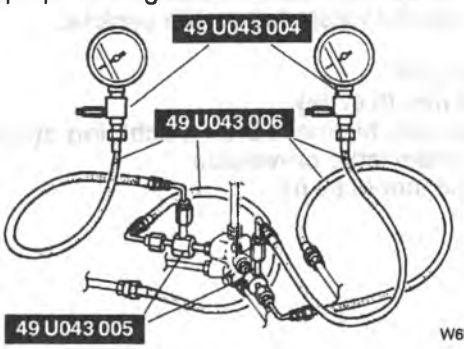


W6U411WAS

DUAL PROPORTIONING VALVE INSPECTION

Z6U041143900W01

1. Connect the **SSTs** to the brake pipes as shown in the figure.
2. Bleed the air from the brake system.
3. Measure the fluid pressure of the master cylinder and the rear brake.
   - If not within the specification, replace the dual proportioning valve.

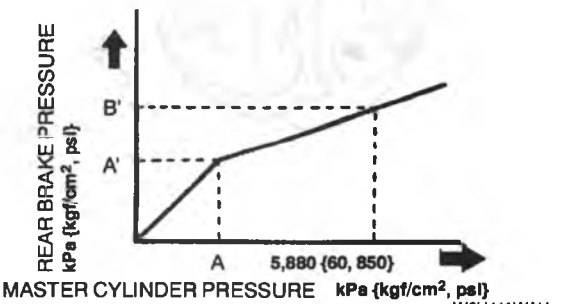


W6U411WAT

Fluid pressure

kPa {kgf/cm², psi}

	A	A'	B	B'
Without ABS	3400 {35, 500}	3400 {35, 500} ±295 {3, 43}	5880 {60, 850}	4170 {42.5, 604} ±390 {4, 60}
With ABS	3400 {35, 500}	3400 {35, 500} ±295 {3, 43}	5880 {60, 850}	4410 {45.0, 640} ±390 {4, 60}

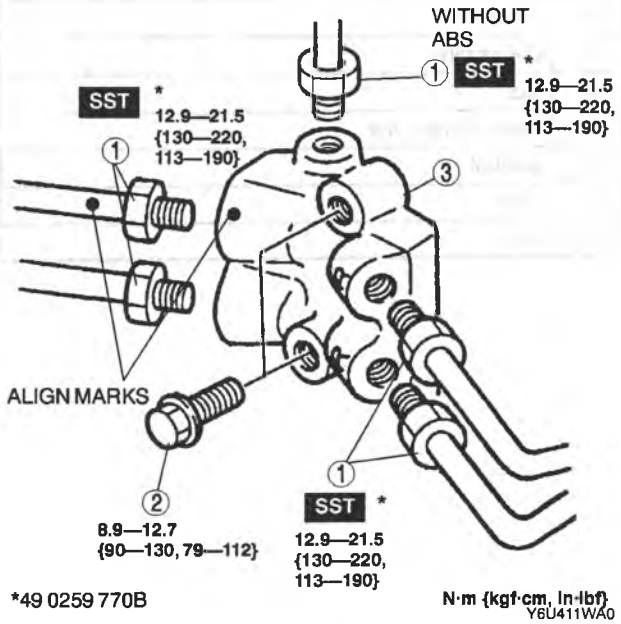


W6U411WAU

DUAL PROPORTIONING VALVE REPLACEMENT

Z6U041143900W02

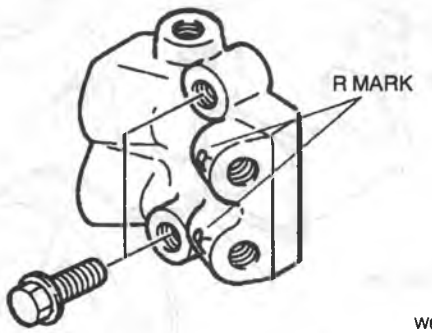
1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



1	Brake pipe
2	Bolt
3	Dual proportioning valve (See 04-11-12 Dual Proportioning Valve Installation Note)

Dual Proportioning Valve Installation Note

- Install the dual proportioning valve so that the R mark faces right side of the vehicle.



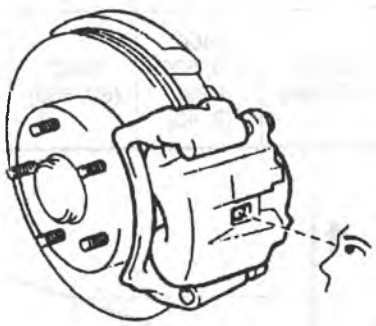
FRONT BRAKE (DISC) INSPECTION

Z6U041133980W01

Disc Pad Thickness Inspection

1. Jack up the front of the vehicle and support it with safety stands.
2. Remove the wheels.
3. Verify the remaining thickness of the pads.
   - Replace the pads as a set: right and left wheels, if either one is at or less than the minimum thickness.

Thickness
2.0 mm {0.08 in} min.



Disc Plate Thickness Inspection

- Measure the thickness of the disc plate.
- If the thickness is not within the specification, replace the disc plate.

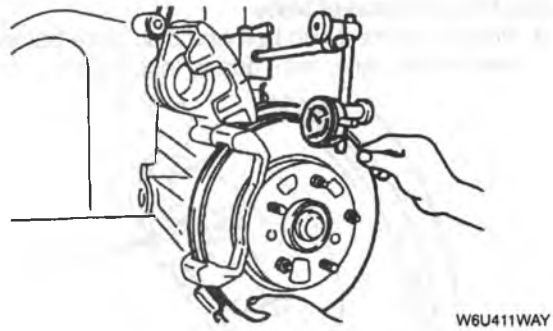
Caution
- **When it is necessary to machine the disc plate, and the disc plate is removed from the vehicle then machined, excessive runout may result. Machine the disc plate which is installed on the vehicle.**

Minimum
22 mm {0.87 in}
Minimum thickness after machining by using a brake lathe on-vehicle
22.8 mm {0.90 in}

Disc Plate Runout Inspection

1. Verify that there is no looseness in wheel bearing. (See 03-11-1 Wheel Bearing Play Inspection.)
2. Measure the runout at the outer edge of the contact surface of the disc pad.
   - If the runout is not within the specification, repair or replace the disc plate.

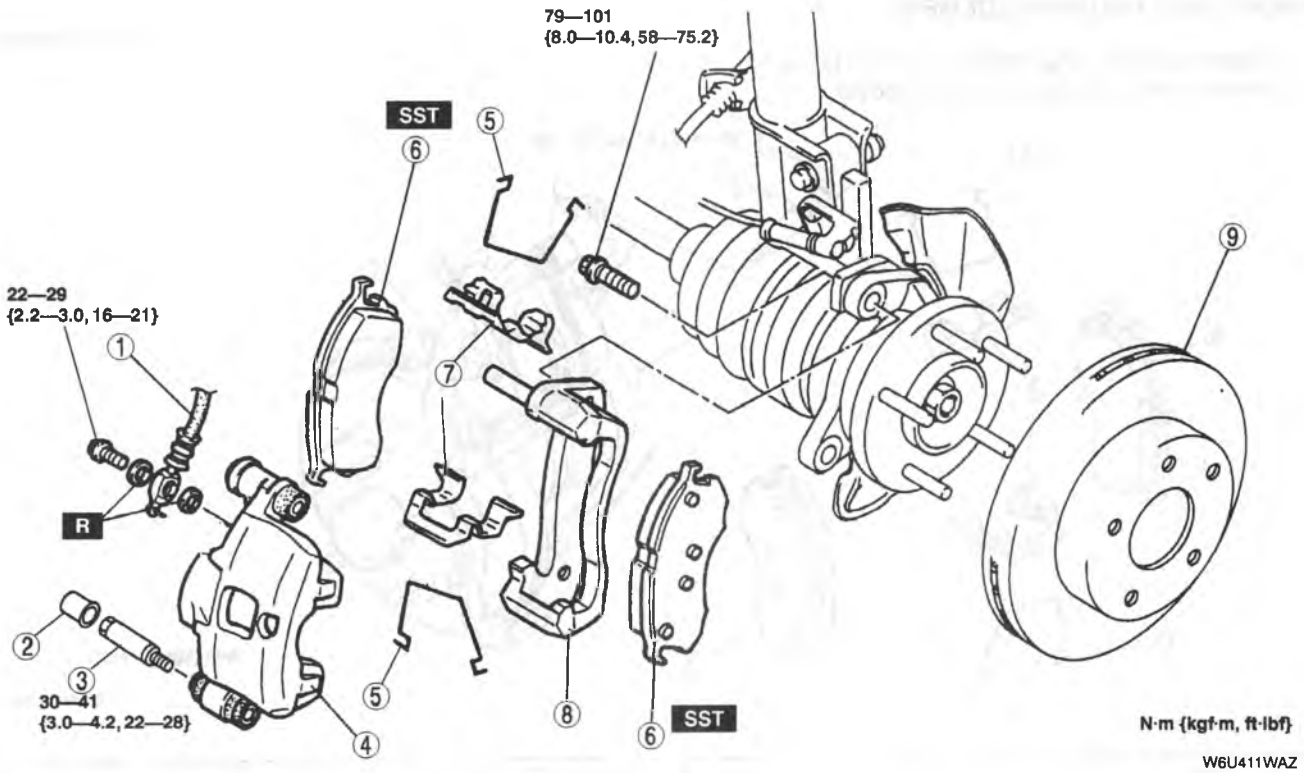
Runout
0.05 mm {0.002 in} max.


W6U411WAY

FRONT BRAKE (DISC) REMOVAL/INSTALLATION

Z6U041133980W02

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. After installation, depress the pedal several times, rotate the wheel by hand, and verify that the brake does not drag.



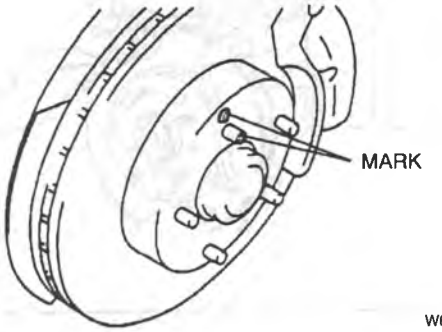
W6U411WAZ

1	Flexible hose
2	Cap
3	Lock bolt
4	Caliper
5	M-spring
6	Disc pad (See 04-11-14 Disc Pad Installation Note)

7	Guide plate
8	Mounting support
9	Disc plate (See 04-11-14 Disc Plate Removal Note) (See 04-11-14 Disc Plate Installation Note)

Disc Plate Removal Note

- Mark the wheel hub bolt and disc plate before removal for reference during installation.



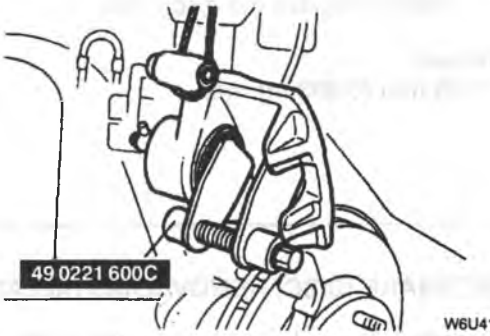
W6U411WB0

Disc Plate Installation Note

1. Remove any rust or grime on the contact face of the disc plate and wheel hub.
2. Install the disc plate and align the marks made before removal.

Disc Pad Installation Note

1. Push the piston fully inward by using the **SST**.
2. Install the disc pad.

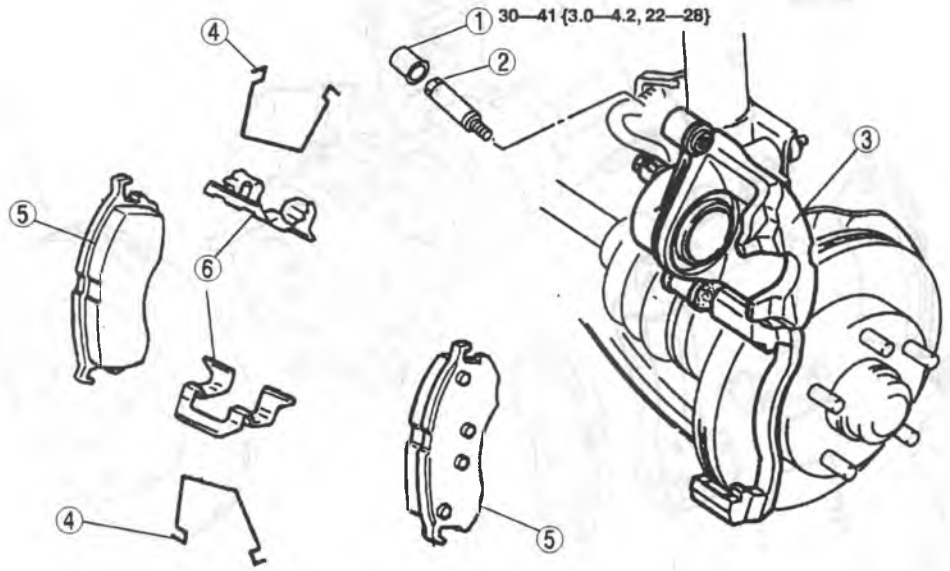


W6U411WB1

FRONT DISC PAD REPLACEMENT

Z6U041133630W01

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



N·m {kgf·m, ft·lbf}

W6U411WB2

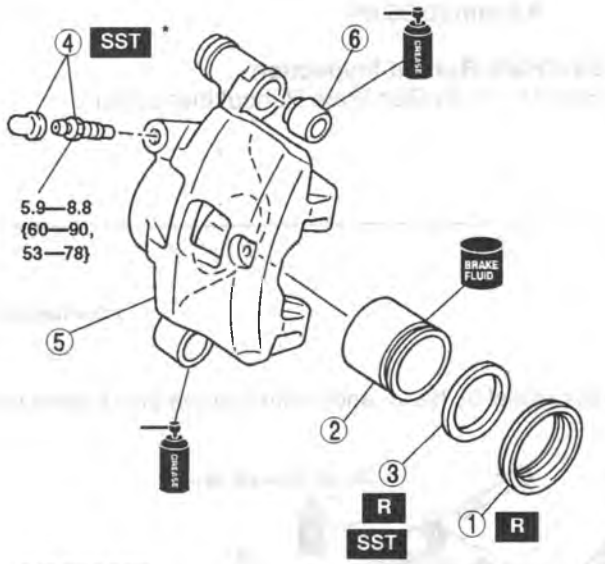
1	Cap
2	Lock bolt
3	Caliper
4	M-spring

5	Disc pad (See 04-11-14 Disc Pad Installation Note)
6	Guide plate

FRONT CALIPER DISASSEMBLY/ASSEMBLY

Z6U041133990W01

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



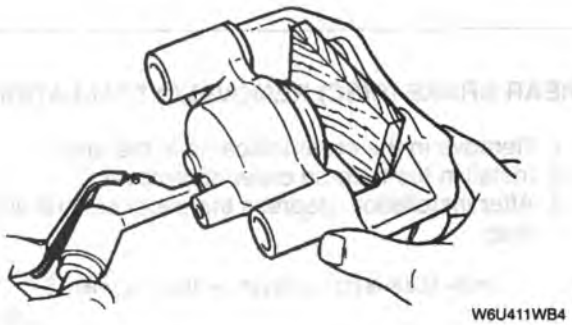
Z6U0411W108

1	Dust seal
2	Piston (See 04-11-15 Piston Disassembly Note)
3	Piston seal (See 04-11-15 Piston Seal Disassembly Note)
4	Bleeder cap, bleeder screw
5	Caliper body
6	Boot

Piston Disassembly Note

Caution
- **Blow the compressed air slowly to prevent the piston from suddenly popping out.**

- Place a piece of wood in the caliper, then blow compressed air through the hole to force the piston out of the caliper.



W6U411WB4

Piston Seal Disassembly Note

- Remove the piston seal from the brake caliper by using the **SST**.



W6U411WB5

REAR BRAKE (DISC) ON-VEHICLE INSPECTION

Z6U041126980W01

Disc Pad Thickness Inspection

1. Jack up the rear of the vehicle and support it on safety stands.
2. Remove the wheel and tires.
3. Look through the caliper inspection hole and inspect the remaining thickness of the pads.
   - Replace the pads as a set (right and left wheels) if either is less than the minimum thickness.

Thickness
1.0 mm {0.04 in}



W6U411WB7

Disc Plate Thickness Inspection

1. Measure the thickness of the disc plate.
   - If the thickness is not within the specifications, replace the disc plate.

Caution

- **When it is necessary to machine the disc plate, and the disc plate is removed from the vehicle then machined, excessive runout may result. Machine the disc plate which is installed on the vehicle.**

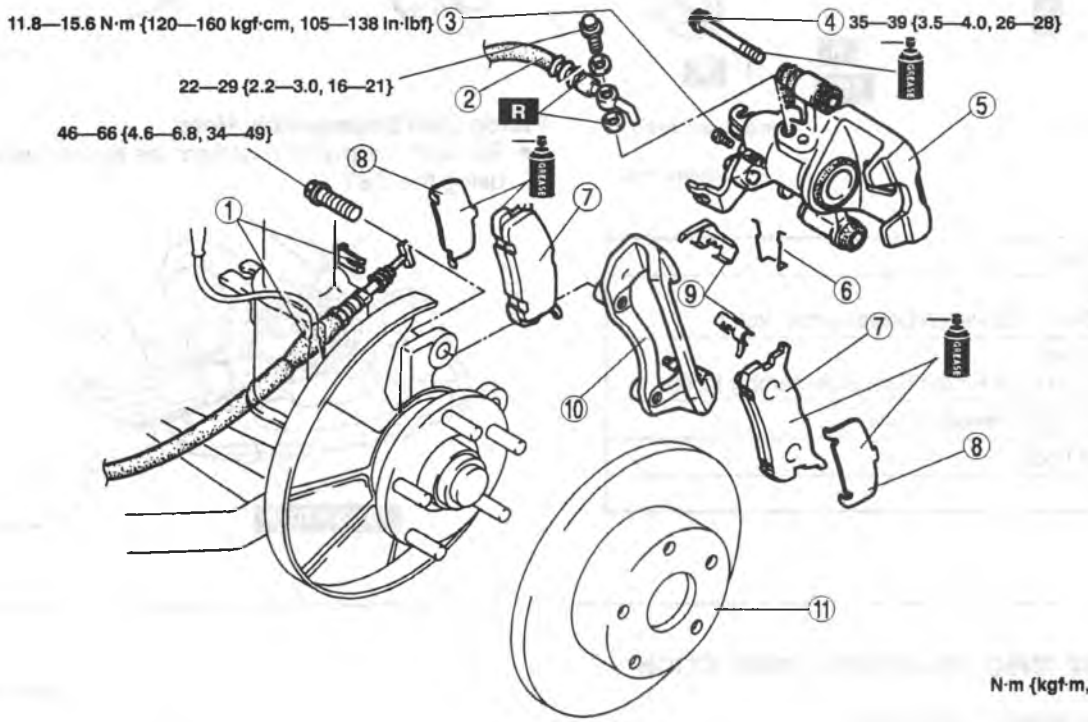
Minimum
8 mm {0.31 in}
Minimum thickness after machining by using a brake lathe on-vehicle
8.8 mm {0.35 in}

Disc Plate Runout Inspection
(See 04-11-13 Disc Plate Runout Inspection.)

REAR BRAKE (DISC) REMOVAL/INSTALLATION

Z6U041126980W02

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. After installation, depress the pedal several times, rotate the wheel by hand, and verify that the brake does not drag.



W6U411WB8

1	Parking brake cable, clip
2	Flexible hose
3	Screw plug
4	Lock bolt
5	Caliper
6	Spring
7	Disc pad (See 04-11-17 Disc Pad Installation Note)

8	Shim
9	Guide plate
10	Mounting support
11	Disc plate (See 04-11-14 Disc Plate Removal Note) (See 04-11-14 Disc Plate Installation Note)

Disc Pad Installation Note

1. Turn the manual adjustment gear counterclockwise with an Allen wrench to pull the brake caliper piston inward. (Turn until it stops.)
2. Install the disc pads.
3. Turn the manual adjustment gear clockwise until the brake pads just touch the disc plate. Turn the manual adjustment gear back 1/3-turn.

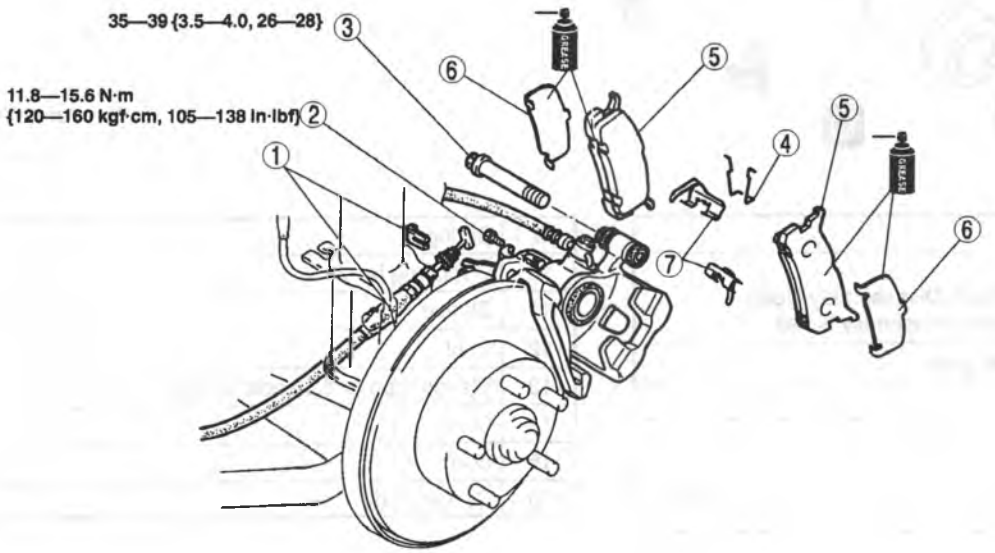


W6U411WB9

REAR DISC PAD REPLACEMENT

Z6U041126630W01

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



N·m {kgf·m, ft·lbf}

W6U411WBA

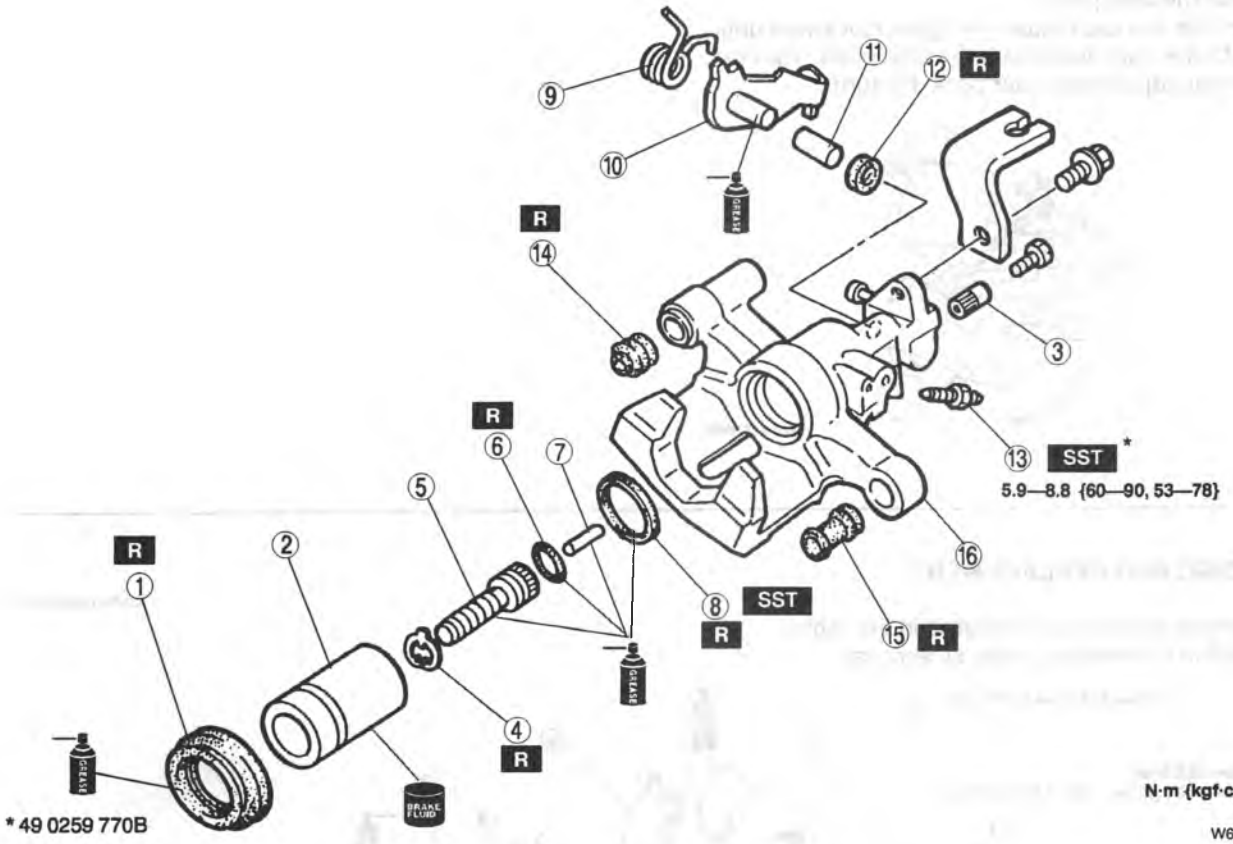
1	Parking brake cable, clip
2	Screw plug
3	Lock bolt
4	Spring

5	Disc pad (See 04-11-17 Disc Pad Installation Note)
6	Shim
7	Guide plate

REAR CALIPER DISASSEMBLY/ASSEMBLY

Z6U041126990W01

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

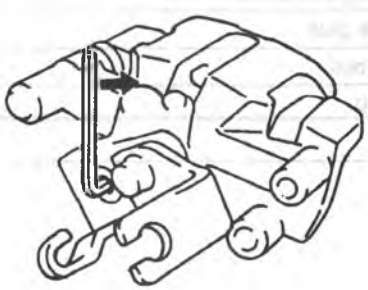


1	Dust seal
2	Piston (See 04-11-18 Piston Disassembly Note) (See 04-11-19 Piston Assembly Note)
3	Manual adjustment gear
4	Snap ring
5	Adjusting bolt
6	O-ring
7	Connecting link
8	Piston seal (See 04-11-15 Piston Seal Disassembly Note)

9	Spring
10	Operating lever
11	Sleeve
12	Boot
13	Bleeder cap and bleeder screw
14	Boot
15	Boot
16	Caliper body

Piston Disassembly Note

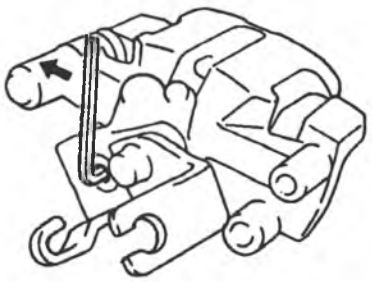
- Turn the adjustment gear clockwise with an Allen wrench to remove the piston from the adjustment gear. (Turn the adjustment gear until it becomes easy to turn.)



W6U411WBC

Piston Assembly Note

- Insert the piston into the caliper and turn the adjustment gear counterclockwise with an Allen wrench to pull the piston inward. (Turn until it stops.)



W6U411WBD

REAR BRAKE (DRUM) INSPECTION

Z6U041126250W01

Brake Lining Thickness Inspection

1. Remove the brake drum.
2. Inspect the remaining thickness of the lining.
   - Replace both left and right brake shoes if either is at or less than the minimum thickness.

Thickness
1.0 mm {0.04 in} min.

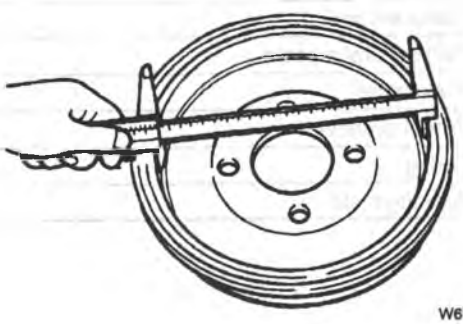


W6U411WBE

Brake Drum Inspection

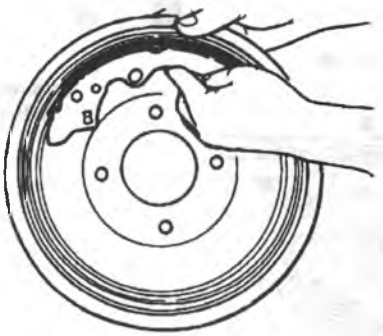
1. Measure the inner diameter of the drum.

Maximum diameter
230.1 mm {9.059 in}



W6U411WBF

2. Inspect for scratches, uneven or abnormal wear inside the drum.
   - Repair or replace the drum as necessary.
3. When repairing or replacing the drum, inspect for the contact with the shoes.

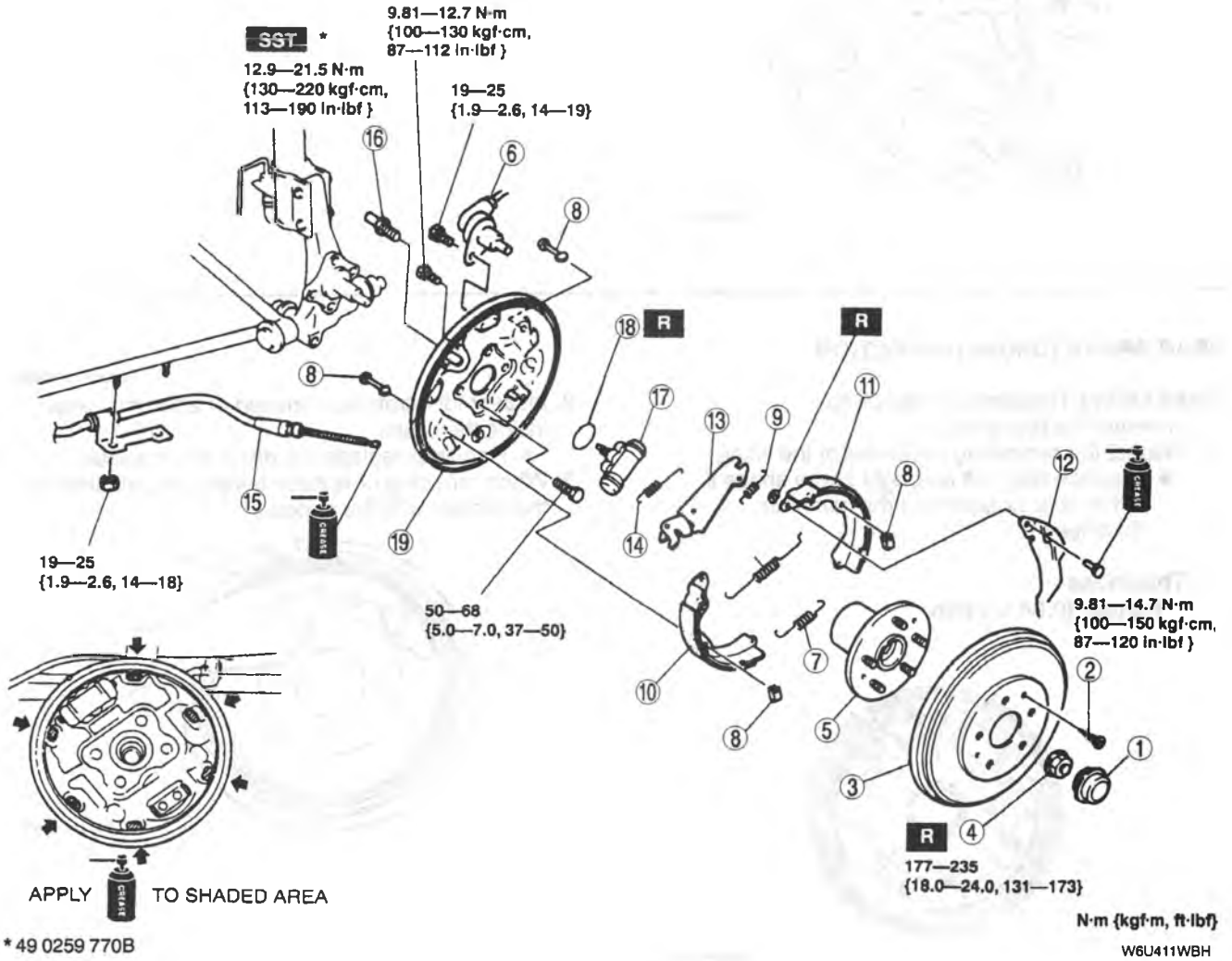


W6U411WBG

REAR BRAKE (DRUM) REMOVAL/INSTALLATION

Z6U041126250W02

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. After installation,
   (1) Depress the brake pedal several times. Then verify that the brakes do not drag.
   (2) Inspect for the pedal-to-floor clearance.
   (3) Inspect for the parking brake lever stroke.

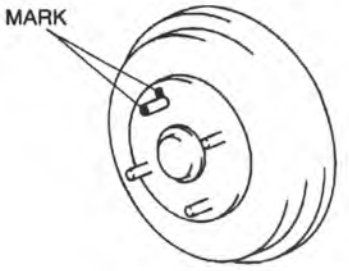


1	Hub cap
2	Screw
3	Brake drum (See 04-11-21 Brake Drum Removal Note) (See 04-11-21 Brake Drum Installation Note)
4	Locknut (See 03-11-3 Locknut Removal Note) (See 03-11-4 Locknut Installation Note)
5	Wheel hub
6	ABS wheel-speed sensor (if equipped)
7	Return spring
8	Hold pin and hold spring

9	Anti-rattle spring
10	Leading shoe
11	Trailing shoe
12	Operating lever
13	Quadrant
14	Quadrant spring
15	Parking brake cable
16	Brake pipe
17	Wheel cylinder
18	O-ring
19	Backing plate

Brake Drum Removal Note

- Mark the wheel hub bolt and brake drum before removal for reference during installation.



W6U411WBJ

Brake Drum Installation Note

1. Before brake drum installation, inspect the auto adjuster by depressing the brake pedal.
2. Remove any rust or grime on the contact face of the drum brake.
3. Install the brake drum and align the marks made before removal.

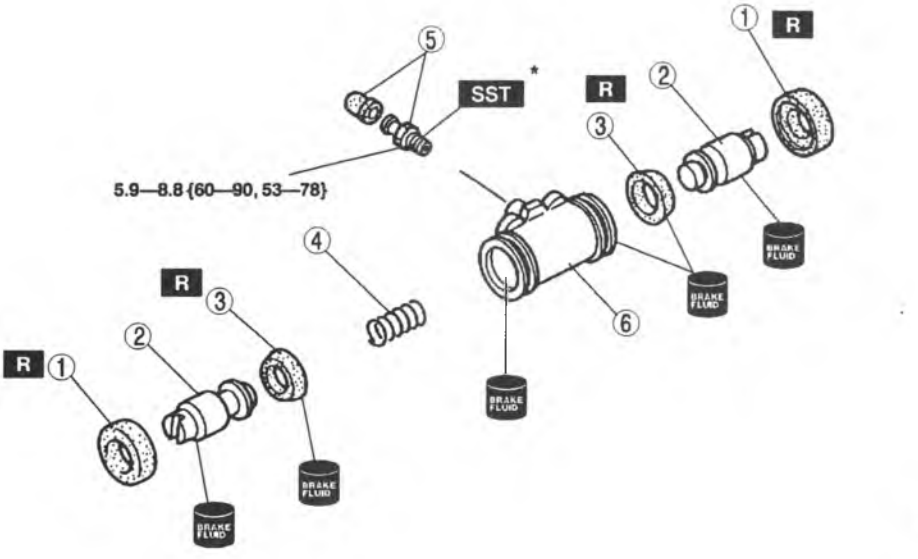
WHEEL CYLINDER DISASSEMBLY/ASSEMBLY

Z6U041126610W01

Caution

- **Replace the wheel cylinder assembly if a problem is found.**

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



N·m {kgf·cm, in·lbf}

* 49 0259 770B

W6U411WBK

1	Boot
2	Wheel cylinder piston
3	Piston cup

4	Wheel cylinder spring and cap
5	Rubber cap and bleeder screw
6	Wheel cylinder body

04-12 PARKING BRAKE SYSTEM

PARKING BRAKE INSPECTION 04-12-1
PARKING BRAKE ADJUSTMENT 04-12-1
PARKING BRAKE REMOVAL/INSTALLATION 04-12-2

PARKING BRAKE INSPECTION

Z6U041244000W01

1. Pull the parking brake lever a few times.
2. Depress the brake pedal a few times.
3. Inspect the parking brake stroke by pulling the parking brake lever with a force of **98 N {10 kgf, 22 lbf}**.

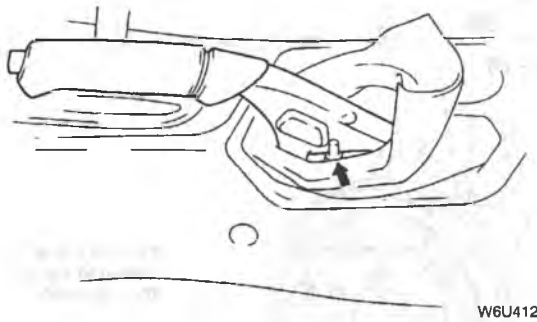
- If not within the specification, adjust the stroke.

Stroke
6—8 notches

PARKING BRAKE ADJUSTMENT

Z6U041244000W02

1. Start the engine and depress the brake pedal several times.
2. Stop the engine.
3. Turn the adjusting nut at the front of the parking cable.



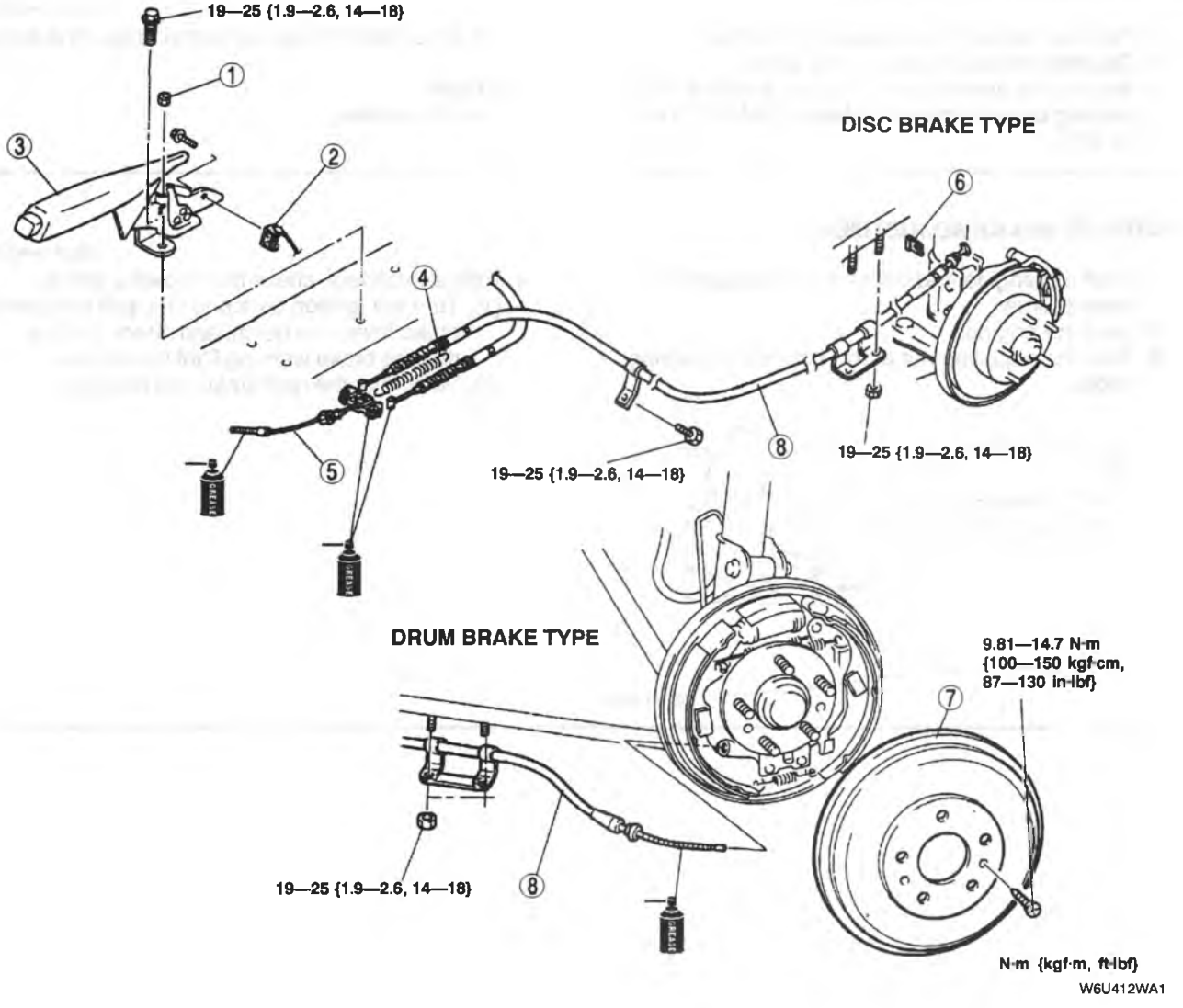
W6U412WA0

4. After adjustment, check the following points:
   (1) Turn the ignition switch to ON, pull the parking brake lever one notch, and check that the parking brake warning light illuminates.
   (2) Verify that the rear brakes do not drag.

PARKING BRAKE REMOVAL/INSTALLATION

Z6U041244000W03

1. Remove the rear console.
2. Remove the exhaust pipe insulator bolts.
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.
5. Adjust the parking brake stroke.



1	Adjusting nut
2	Parking brake switch
3	Parking brake lever
4	Return spring

5	Front cable and equalizer
6	Clip
7	Brake drum
8	Parking brake cable

04-13 ANTILOCK BRAKE SYSTEM

ANTILOCK BRAKE SYSTEM 04-13-1
Outline 04-13-1
Structural View 04-13-2
Wiring Diagram 04-13-3
ABS Hydraulic Unit Description 04-13-4
ABS Control Module Description 04-13-6
ABS HYDRAULIC UNIT INSPECTION . 04-13-9
System Operation Check 04-13-9
ABS HYDRAULIC UNIT AND CONTROL MODULE REMOVAL/INSTALLATION . 04-13-10
ABS Hydraulic Unit and ABS Control Module Removal/Installation Note ... 04-13-10
ABS Control Module Removal Note .. 04-13-10
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FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION 04-13-15
REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION 04-13-16
REAR ABS WHEEL-SPEED SENSOR INSPECTION 04-13-16

ANTILOCK BRAKE SYSTEM

Z6U041343780W01

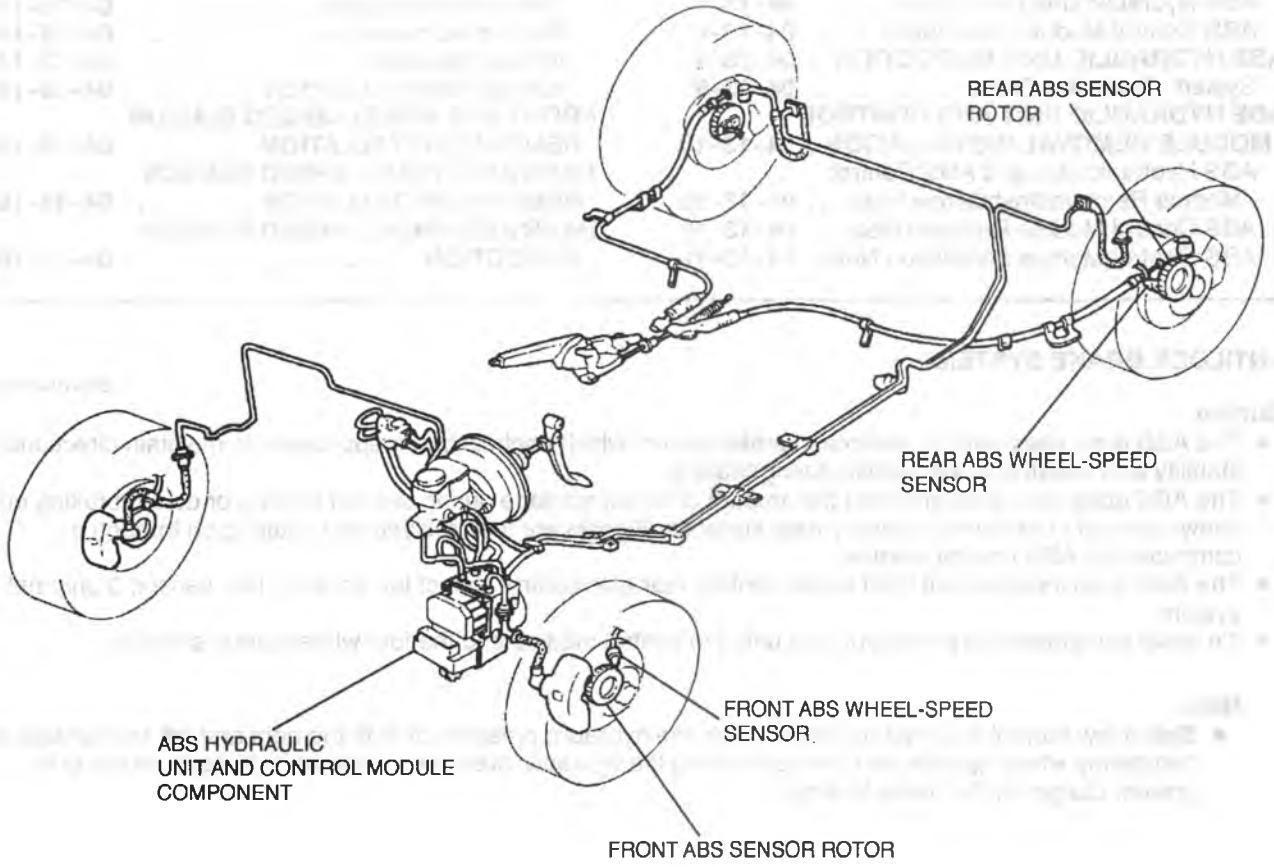
Outline

- The ABS is an electronically controlled brake system which controls brake application to maintain directional stability and steering of the vehicle during braking.
- The ABS does this by determining the amount of wheel slippage during sudden braking or during braking on snow-covered or otherwise slippery road surfaces. Signals are then relayed and acted upon through a computerized ABS control module.
- The ABS is an independent front wheel control, rear axle control (select low control), four sensor, 3-channel system.
- It's basic components are the hydraulic unit, the control module and the four wheel-speed sensors.

Note

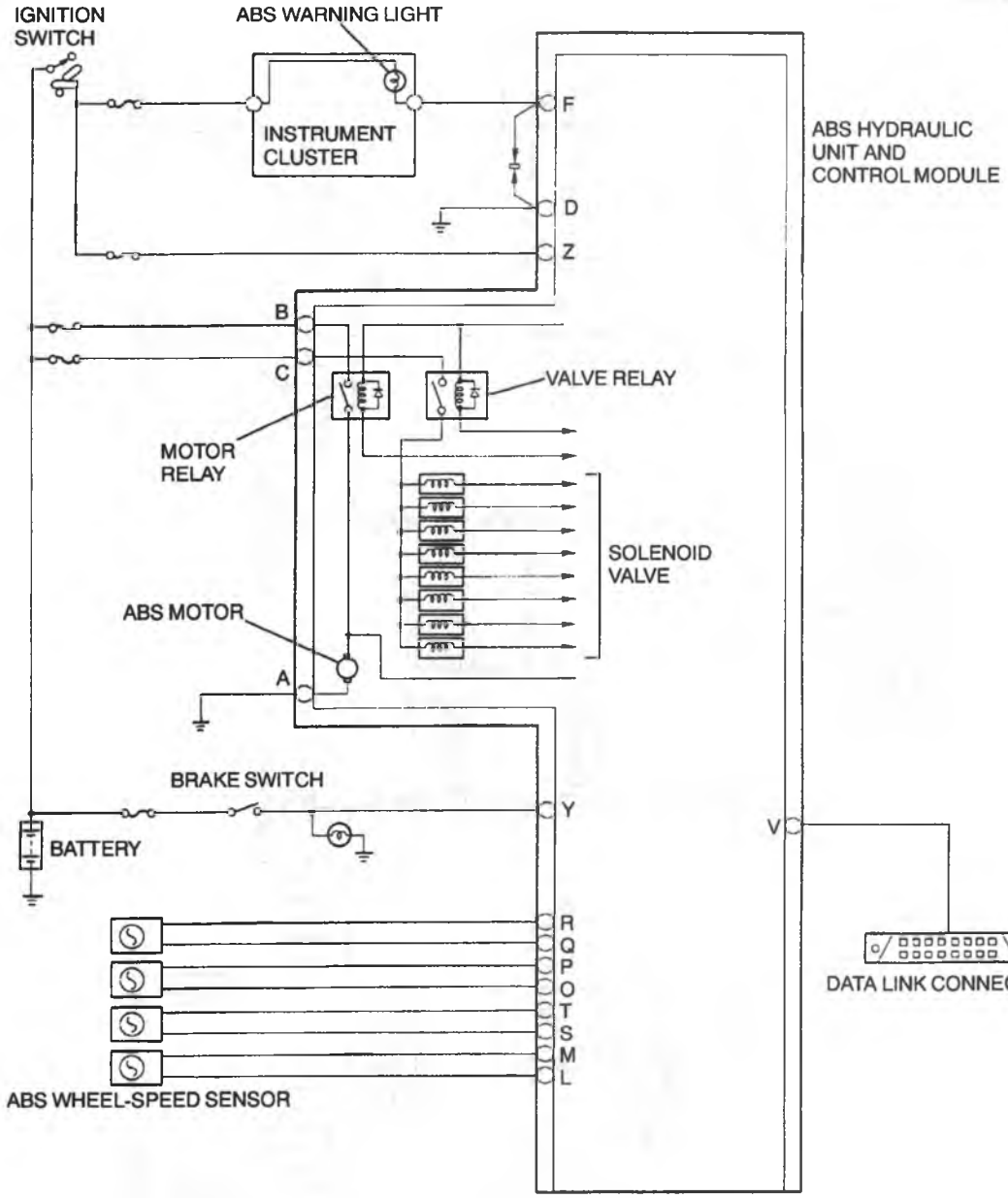
- Select low control is a method that controls the hydraulic pressure of both the right and left rear wheels by comparing wheel speeds and then controlling the hydraulic pressure in relation to the side which is in greater danger of the brake locking.

Structural View



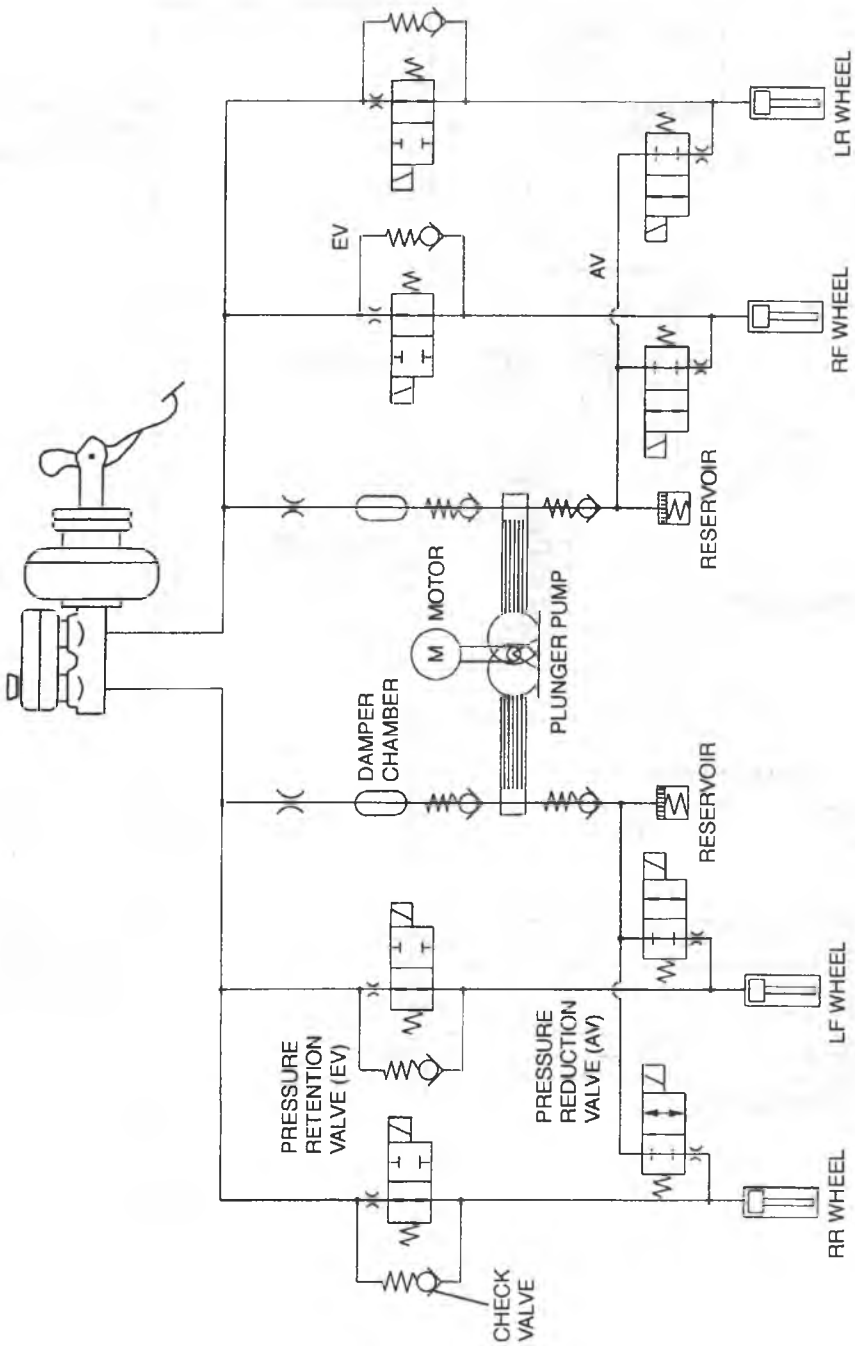
W6U413SA0

Wiring Diagram



Z6U0402W102

ABS Hydraulic Unit Description
Function diagram



W6U413SA3

- The hydraulic unit uses signals from the ABS control module to control pressure of the brake fluid acting on the wheels.
- The main components of the hydraulic unit are: solenoid valves, reservoir, pump, pump motor and damper.

Main component description
Solenoid valve

- The solenoid valves control the fluid pressure at individual brake calipers (wheel cylinders) in accordance with the signal received from the ABS control module.
- There are eight solenoid valves in total. Two solenoid valves in each wheel(one for holding pressure and one for reducing pressure) are used.

Reservoir

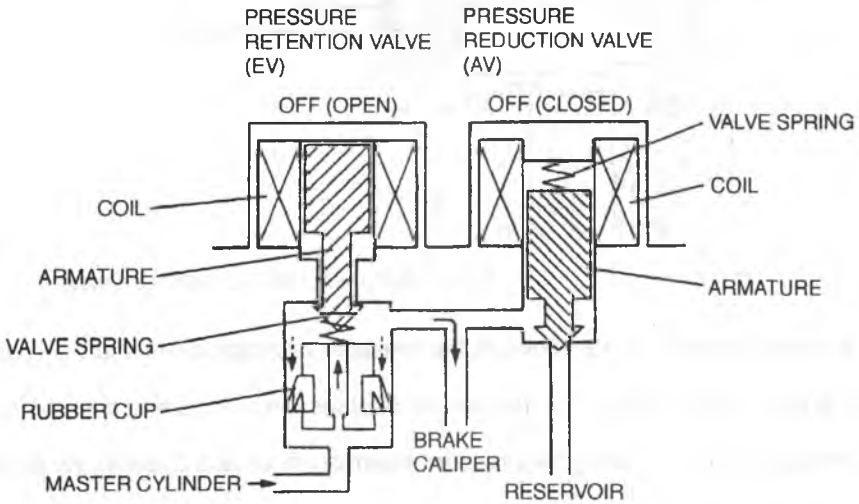
- The reservoirs temporarily store the hydraulic pressure which flows from the brake caliper through the solenoid valve during pressure reduction.

Pump
- The pump returns brake fluid from the reservoir to the master cylinder via the damper chamber.

Damper chamber
- The damper chamber is located between the pump and the master cylinder. It reduces fluctuation in the brake fluid pressure generated by the pump. This reduces brake pedal kickback.

Return check valve
- The check valve returns brake fluid from the brake calipers to the master cylinder when the brake pedal is released.

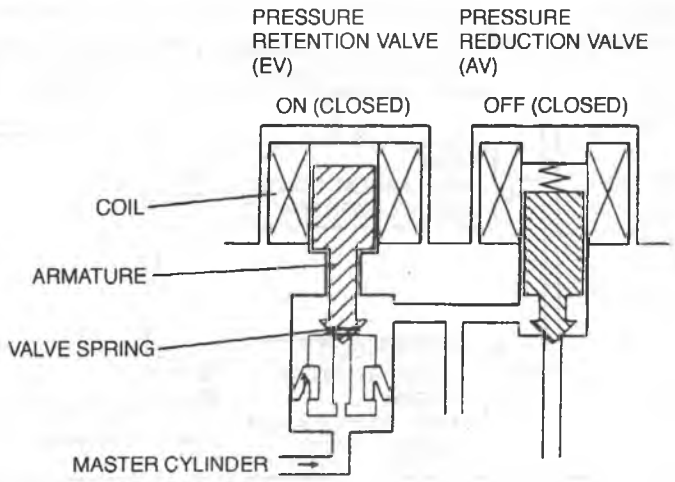
Normal braking and pressure increase



W6U413SA4

- During normal braking and increase in pressure, current does not flow to the coils. The valve spring presses on the armature, causing the pressure retention valve to open and the pressure reduction valve to close.
- The passage to the reservoir is blocked because the pressure reduction valve is closed. As a result, the brake fluid passes through the pressure retention valve and acts on the calipers.
- A rubber cup is fitted to the pressure retention valve. The function of this cup enables the brake fluid to return smoothly from the calipers to the master cylinder side when the brake pedal is released.

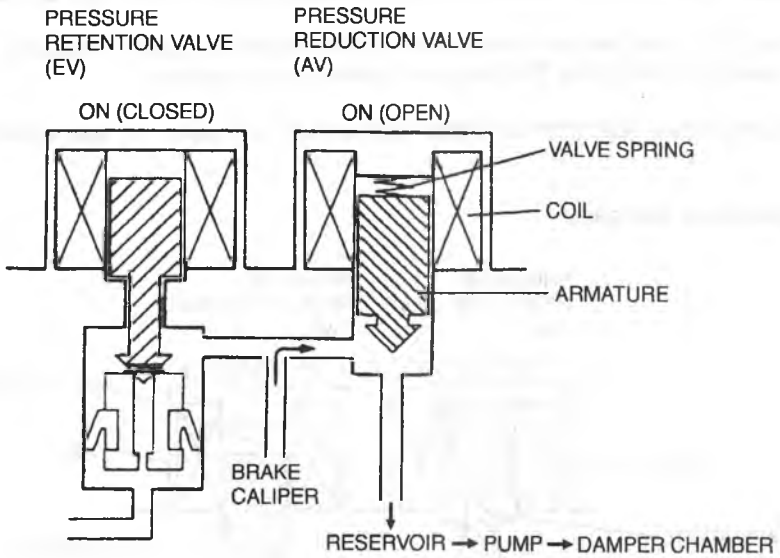
Pressure retention



W6U413SA5

- When pressure is being retained, current flows to the pressure retention valve coil. The magnetic force generated in the coil by the current enables the armature to overcome the force of the valve spring.
- As a result, the armature moves and closes the pressure retention valve.
- When the pressure retention valve closes, the passage between the master cylinder and the brake caliper is blocked. This maintains the pressure of the brake fluid acting on the brake calipers.

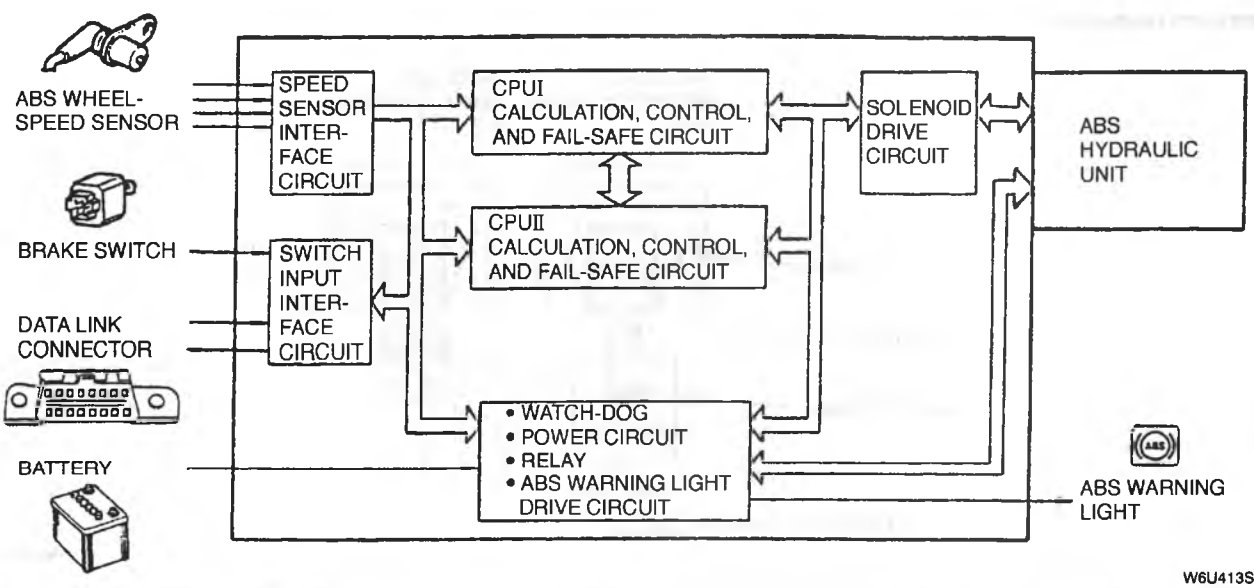
Pressure reduction



W6U413SA6

- When pressure is being reduced, current flows to the pressure retention valve and the pressure reduction valve.
- The magnetic force generated in the coil by the current enables the armature to overcome the force of the valve spring.
- As a result, the armature moves, closing the pressure retention valve and opening the pressure reduction valve.
- When the pressure reduction valve opens, the passage between the reservoir and the brake caliper opens. This makes the pressure of the brake fluid on the caliper pass in to the reservoir. As a result, pressure is reduced.
- The pressure reduction signal also causes the pump to operate, transferring the hydraulic fluid within the reservoir to the damper.

ABS Control Module Description
System control



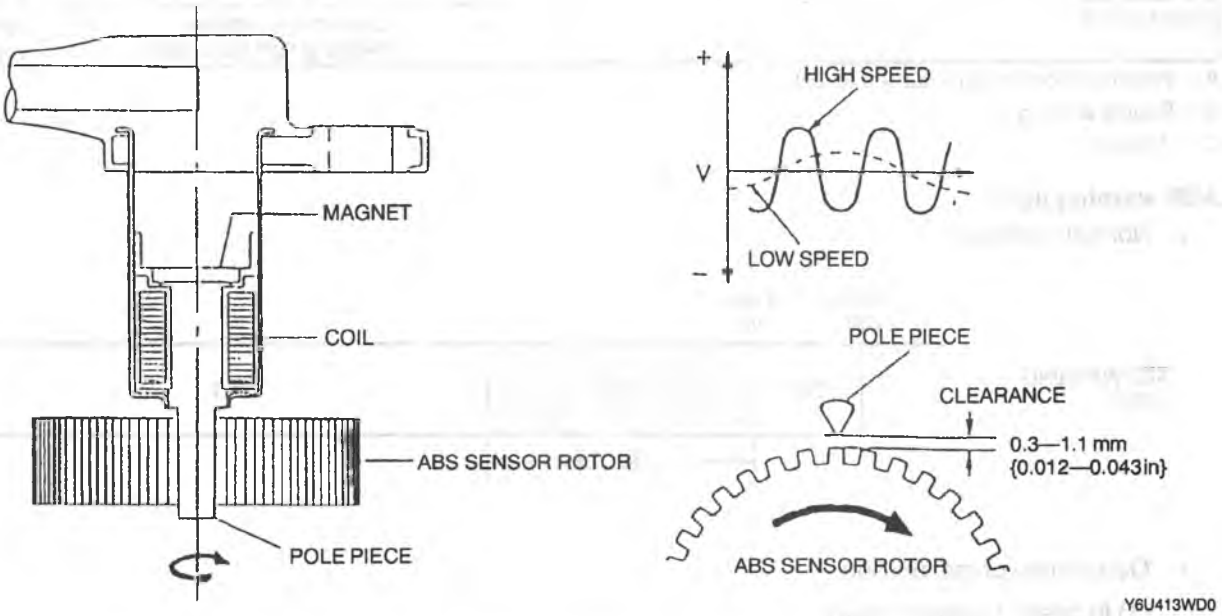
W6U413SA7

- The ABS control module detects wheel speeds and evaluates the situation of the wheels based on the signals from the speed sensors.
- Based on the program within the control module, the control module then relays signals to the solenoid valves and the pump motor within the hydraulic unit to control wheel lock-up.

Main component description

ABS wheel-speed sensor

ABS WHEEL-SPEED SENSOR



- The ABS wheel-speed sensors work in conjunction with the rotors to detect wheel revolutions. Each consists of a permanent magnet, coil, and pole piece, and is installed on the knuckle. These produce electrical pulses by monitoring the rotation of the sensor rotors installed on the drive shafts and the wheel hubs.

Operation

- As it rotates, the sensor rotor interrupts the magnetic field of the wheel-speed permanent magnet, generating ac voltage in the coil by electromagnetic induction.
- The AC voltage cycle changes in proportion to the wheel speed. Wheel speed is detected by the ABS control module by this cycle.
- The sensor is mounted so that there is a small clearance between the speed sensor pickup (pole piece) and the sensor rotor.

Fail-safe function

- The ABS control module has a fail-safe function. When this function senses a malfunction in the ABS, the valve relay cuts the power supply to the hydraulic unit solenoid valves, and the system returns to normal braking.
- The ABS warning light illuminates.

On-board Diagnostics

- The ABS control module includes an on-board diagnostic function which checks for normal operation of the ABS.

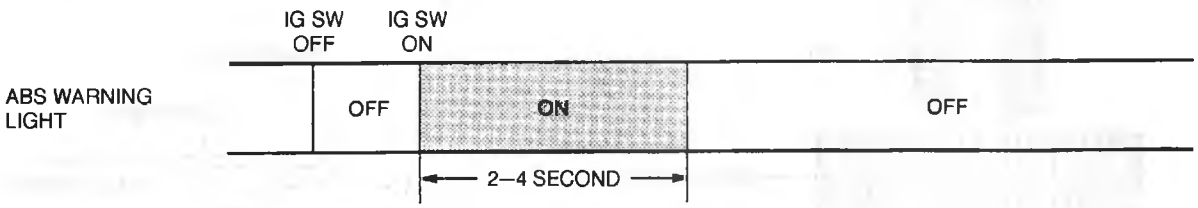
Main self-diagnosis	Diagnosis period			Reaction to malfunction	Result
	A	B	C		
ABS control module	×		×	System shut-down Warning light illuminated	Normal braking
Solenoid valves		×	×	System shut-down Warning light illuminated	Normal braking
Pump motor X		×	×	System shut-down Warning light illuminated	Normal braking
Valve relay	×		×	System shut-down Warning light illuminated	Normal braking
Wheel-speed sensors	×	×	×	System shut-down Warning light illuminated	Normal braking

Main self-diagnosis	Diagnosis period			Reaction to malfunction	Result
	A	B	C		
Battery (power supply)	×	×	×	System shut-down Warning light illuminated	Normal braking
Brake switch	×		×	System shut-down Warning light illuminated	Normal braking

A : When ignition switch is turned to ON.
B : Engine starting.
C : Driving

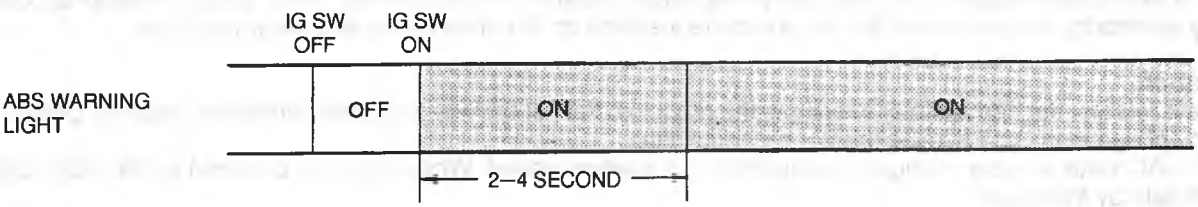
ABS warning light

- Normal condition

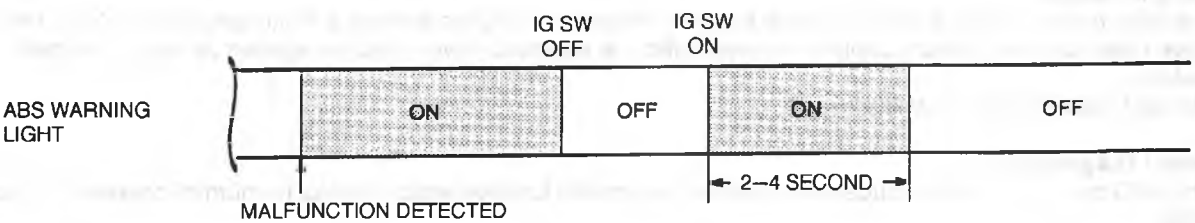


- Occurrence of malfunction

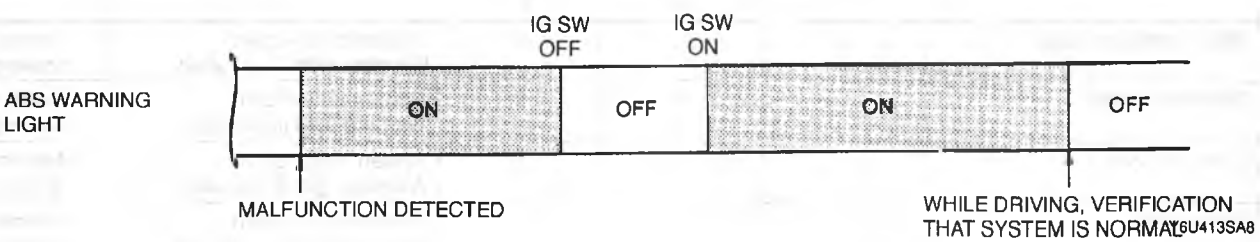
(1) in case of present failure
(includes failures that reapear during operation only, such as in the ABS sensor rotor malfunction)



(2) In case of past failure



(Malfunction detected in wheel-speed sensor or pump motor circuit)



- The ABS warning light is located within the instrument cluster. If the warning light illuminates during driving, it indicates a malfunction in the ABS system.
- The following conditions indicate a malfunction in the system.
  1. The warning light does not illuminate when the ignition switch is turned to ON.
  2. The warning light remains illuminated after the ignition switch is turned to ON.

3. The warning light illuminates or flashes while driving the vehicle.

- In the case with past failures, the next time the engine is started, if the control module verifies that the system is normal, the ABS warning light goes out.
- However, with the malfunctions in the ABS wheel-speed sensor or pump motor circuit, verification cannot be done without driving the vehicle.
- Drive the vehicle **over 10 km/h {6.2 mph}**, and if the system is verified to be normal, the warning light goes out.

ABS HYDRAULIC UNIT INSPECTION

Z6U041343780W02

System Operation Check

1. Verify that the battery is fully charged. With the ignition switch at ON, verify that the ABS warning light goes off after **4 seconds**.
   - If the light stays at ON after **4 seconds** the control module detects a failure and will not activate the hydraulic unit. Follow the troubleshooting procedures.
2. Turn the ignition switch to OFF.
3. On level ground, jack up the vehicle and support it evenly on safety stands. Shift the transaxle to neutral (MTX) or N range (ATX).
4. Release the parking brake.
5. Rotate the wheels by hand, and inspect for brake drag.
6. Connect the **SST** (NGS set) to the data link connector. (See 04-02-3 ABS AND TCS ON-BOARD DIAGNOSIS.)
7. Select ACTIVE COMMAND MODES.

Caution

- **To prevent damage to the solenoid valve, do not keep the valve ON for more than 5 seconds.**

8. Input LF AV ON command.
9. Depress the brake pedal, and have an assistant verify that the left front wheel can be turned by hands.
10. If the wheel can not be turned, replace the ABS hydraulic unit component.
11. Depress the brake pedal.

Caution

- **To prevent damage to the solenoid valve, do not keep the valve ON for more than 5 seconds.**

12. Select ACTIVE COMMAND MODES and input the following commands.
    a. LF AV ON
    b. LF EV ON
    c. PMP RLY ON
13. With the brake pedal still depressed, have an assistant verify that the brake is released and that the left front wheel can be turned by hands.
    - If the wheel can not be turned, replace the ABS hydraulic unit component.
14. Inspect operation of the remaining wheels in the same manner as steps 8—15 by using appropriate commands.

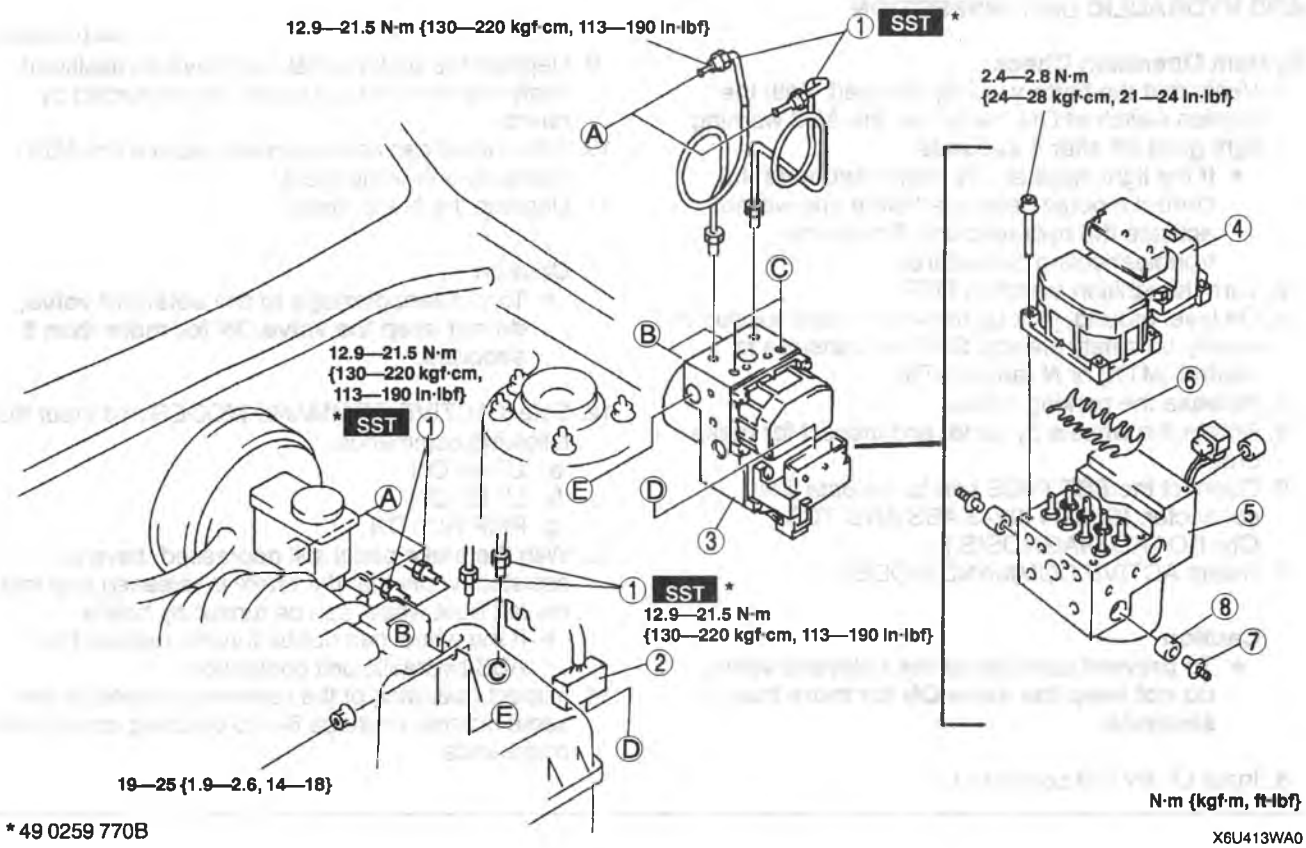
ABS HYDRAULIC UNIT AND CONTROL MODULE REMOVAL/INSTALLATION

Z6U041343780W03

1. Remove the charcoal canister.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

Note

- The ABS hydraulic unit is not purchased as one part. Replace the ABS hydraulic unit and control module component as one assembly part if the ABS hydraulic unit is malfunctioning.



1	Brake pipe
2	Connector
3	ABS hydraulic unit and ABS control module (See 04-13-10 ABS Hydraulic Unit and ABS Control Module Removal/Installation Note)
4	ABS control module (See 04-13-10 ABS Control Module Removal Note) (See 04-13-11 ABS Control Module Installation Note)
5	ABS hydraulic unit
6	Spring plate
7	Stud
8	Soft mount

ABS Hydraulic Unit and ABS Control Module Removal/Installation Note

- When removing/installing the ABS hydraulic unit and ABS control module from/to the vehicle, attach protective tape on the HU connector to prevent brake fluid from entering.

ABS Control Module Removal Note

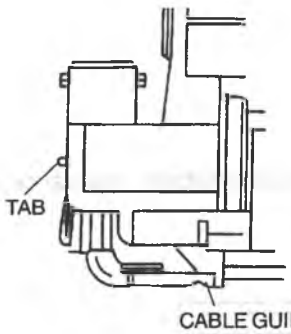
1. Install the screw plugs (supplied in the service part kit) onto the brake pipe holes of the HU.
2. Disconnect the motor connector as follows.

Caution

- **Do not apply force on the locking tab when disconnecting the connector.**

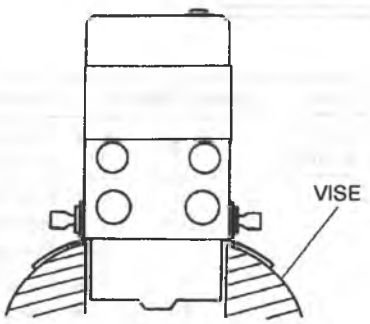
(1) Lift up the tab to unlock the connector by hand.
(2) Pull the connector from the ABS CM by grasping the side of the motor connector.

3. Carefully pull the wiring of the pump motor out of the cable guides.



W6U413WA2

4. Secure the HU as shown.
5. Remove the bolts.

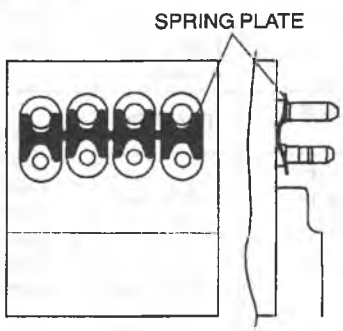


W6U413WA3

6. Protect the HU from damage to the valve body and keep the sealing surface free from foreign materials.

ABS Control Module Installation Note

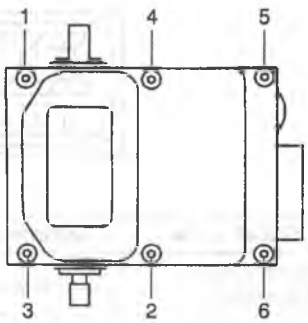
1. Verify that the sealing surface of the HU is clean. If there are scratches, grooves or dirt, do not mechanically rework. Carefully remove any dirt or seal residue with plastic tools only. The use of chemical solvents is not permitted.
2. Install the spring plate properly. When re-installing, insert the spring plate over the valve bodies in the correct position to preload the spring and to center the solenoid coils.



W6U413WA4

3. Carefully fit the coils of the ABS CM over the valve bodies.
4. Locate the ABS CM by placing the new bolts evenly against the housing and tightening them slightly by hands. To aid alignment, the housing may be pressed onto the contact surface by hand while tightening the bolts.
5. Tighten the bolts to the specified torque in the order shown.

Tightening torque
2.4—2.8 N·m {24—28 kgf·cm, 21—24 in·lbf}



W6U413WA5

6. Visually inspect for all bolts mode contact. The ABS CM must be flush against the housing with no gap in the area of the bolts.
7. Connect the 2-pin connector of the pump motor to the ABS CM. Verify that the spring clip is engaged securely.
8. Clip the wiring back in the cable guide.
9. Reinsert the soft mount if it has fallen out.
10. Inspect flats of two side retaining bolts and position flats vertically by turning bolts as necessary.

ABS HARNESS AND INPUT SIGNAL INSPECTION

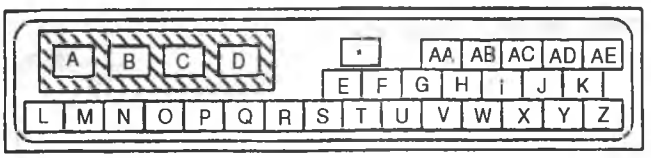
Z6U041367650W01

1. Disconnect the ABS CM connector with the ignition switch at OFF.

Caution
- **Be careful not to damage the terminals during inspection.**

2. Insert a thin isolation plate to the short bar of the connector.
3. Attach a wire to the tester lead to avoid damaging the terminals then inspect voltage, resistance or continuity, referring to the table below.

ABS CM HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)



Z5U0402W104

Terminal	Signal name	Connected to	Item	Condition	Specification	Possible cause
A	System ground (ABS motor)	Ground point	Continuity	A—ground point (IG SW is at OFF)	Yes	• Harness to ground point
B	Power supply (ABS motor)	Fuse (60 A)	Voltage	B—A	B+	• Fuse (60 A) • Harness (B—fuse (60 A))
C	Power supply (solenoid valve)	Fuse (20 A)	Voltage	C—D	B+	• Fuse (20 A) • Harness (C—fuse (20 A))
D	System ground (signal)	Ground point	Continuity	D—ground point (IG SW is at OFF)	Yes	• Harness to ground point
E*3	TCS OFF light	TCS OFF light	Voltage	E—D (IG SW is at ON)	B+*1	• Harness (E—meter—IG SW)
F	ABS warning light	ABS warning light	Voltage	F—D (IG SW is at ON)	B+*1	• Harness (F—meter—IG SW)
L M (N)*2	RR wheel speed	RR wheel-speed sensor	Voltage	M (N)*2—L vehicle is stopped	0 V (AC)	• Harness (Sensor—ABS CM harness connector) • Sensor, Installation condition
				M (N)*2—L when RR wheel turned 1 revolution per second	0.23 V min. (AC)	
			Resistance	M (N)*2—L	1.28—1.92 kΩ	
O P	RF wheel speed	RF wheel-speed sensor	Voltage	P—O vehicle is stopped	0 V (AC)	• Harness (Sensor—ABS CM harness connector) • Sensor, Installation condition
				P—O when RF wheel turned 1 revolution per second	0.23 V min. (AC)	
			Resistance	P—O	1.28—1.92 kΩ	
Q R	LF wheel speed	LF wheel-speed sensor	Voltage	R—Q vehicle is stopped	0 V (AC)	• Harness (Sensor—ABS CM harness connector) • Sensor, Installation condition
				R—Q when LF wheel turned 1 revolution per second	0.23 V min. (AC)	
			Resistance	R—Q	1.28—1.92 kΩ	

Terminal	Signal name	Connected to	Item	Condition	Specification	Possible cause
S T	LR wheel speed	LR wheel-speed sensor	Voltage	T—S vehicle is stopped	0 V (AC)	• Harness (Sensor—ABS CM harness connector) • Sensor, Installation condition
				T—S when LR wheel turned 1 revolution per second	0.23 V min. (AC)	
			Resistance	T—S	1.28—1.92 kΩ	
V	On-board diagnosis	Data link connector	Continuity	V—Z	No	• Harness (V—D at DLC)
				V—D	No	
				V—D at DLC	Yes	
X*3	TCS (request)	PCM	Voltage	X—D	B+	• Harness (X—PCM)
Y	Brake switch	Brake switch	Voltage	Y—D When brake pedal depressed (IG SW is at ON)	B+	• Harness (AY—brake sw) (when brake light normal) • Brake switch
				Y—D When brake pedal released (IG SW is at ON)	0 V	
Z	Power supply (system)	Ignition switch	Voltage	Z—D (IG SW is at ON)	B+	• Harness, fuse (Z—IG SW)
				Z—D (IG SW is at OFF)	0 V	
AA*3	TCS (engine condition)	PCM	Continuity	AA—PCM	Yes	• Harness (AA—PCM)
AB*3	TCS indicator light	TCS indicator light	Voltage	AB—D (IG SW is at ON)	B+	• Harness (AB—meter)
AD*3	TCS (engine speed)	PCM	Voltage	AD—D (engine is stopped)	0 V or B+	• Harness (AD—PCM)
				AD—D (engine is idling)	0 V—B+	
AE*3	TCS OFF switch	TCS OFF switch	Continuity	AE—D (SW is depressed)	Yes	• Harness (AE—TCS OFF SW) • TCS OFF SW
				AE—D (SW is released)	No	

*1 : When an isolation plate is not inserted to the short bar, voltage is 0 V.

*2 : Models with TCS

*3 : For TCS

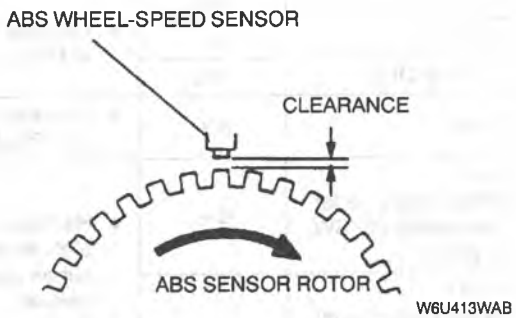
FRONT ABS WHEEL-SPEED SENSOR INSPECTION

Z6U041343720W01

Clearance Inspection

1. Inspect for clearance between the wheel-speed sensor and the sensor rotor.
   - If not as specified, correct installation condition or replace the ABS wheel-speed sensor.

Clearance
1.3—2.0 mm {0.0512—0.0787 in}



W6U413WAB

Resistance Inspection

1. Disconnect the ABS wheel-speed sensor connector.
2. Inspect for resistance at the ABS wheel-speed sensor.
   - If not as specified, replace the ABS wheel-speed sensor.

Resistance
1.28—1.92 kΩ

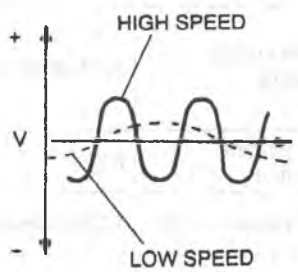
Voltage Inspection

1. On level ground, jack up the vehicle and support it evenly on safety stands.
2. Disconnect the ABS wheel-speed sensor connector.
3. Inspect each wheel by rotating it at one revolution per second.
   - If not as specified, replace the ABS wheel-speed sensor.

Voltage
0.23 V min. (AC)

Voltage Pattern Inspection

1. On level ground, jack up the vehicle and support it evenly on safety stands.
2. Disconnect the ABS wheel-speed sensor connector and connect an oscilloscope to the sensor connector.
3. Inspect for voltage pattern by rotating it at one revolution per second.

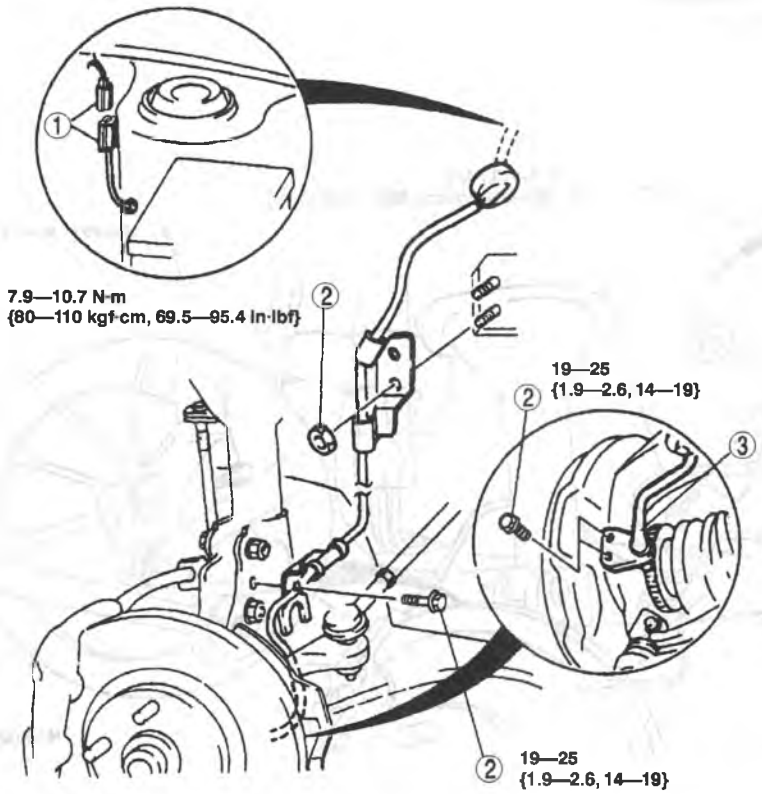


W6U413WAD

FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION

Z6U041343720W02

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



Z6U0413W101

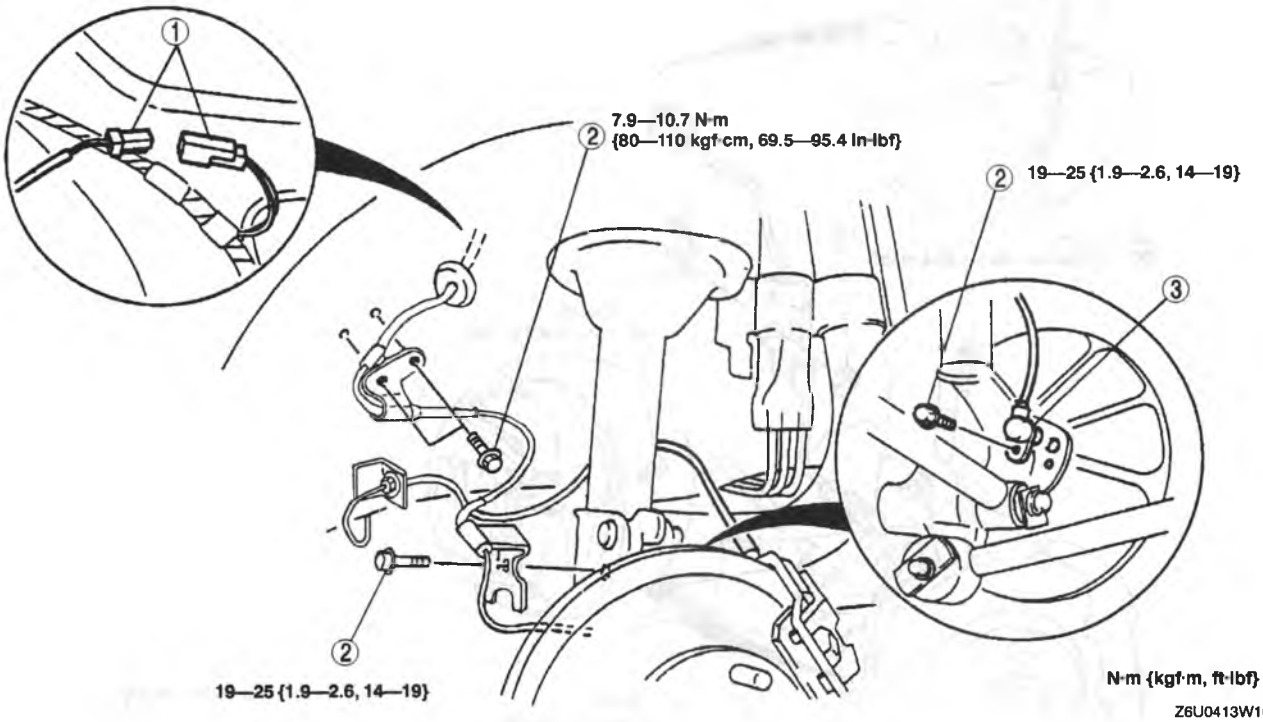
1	Connector
2	Bolt and nut

3	Front ABS wheel-speed sensor

REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION

Z6U041343710W01

1. Remove the trunk compartment covering. (See 09-17-14 TRUNK COMPARTMENT COVERING REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



Z6U0413W102

1	Connector
2	Bolt
3	Rear ABS wheel-speed sensor

REAR ABS WHEEL-SPEED SENSOR INSPECTION

Z6U041343710W02

- Inspect the rear ABS wheel-speed sensor in the same procedure as the front sensor. (See 04-13-14 FRONT ABS WHEEL-SPEED SENSOR INSPECTION.)

04-14 TRACTION CONTROL SYSTEM

TRACTION CONTROL SYSTEM 04-14-1
Outline 04-14-1
Wiring Diagram 04-14-2
ABS / TCS Control Module Description 04-14-3
TCS OPERATION INSPECTION 04-14-5
ABS/TCS CONTROL MODULE REMOVAL/INSTALLATION 04-14-5
ABS/TCS HARNESS AND INPUT SIGNAL INSPECTION 04-14-5
TCS OFF SWITCH REMOVAL/INSTALLATION 04-14-5
TCS OFF SWITCH INSPECTION 04-14-6

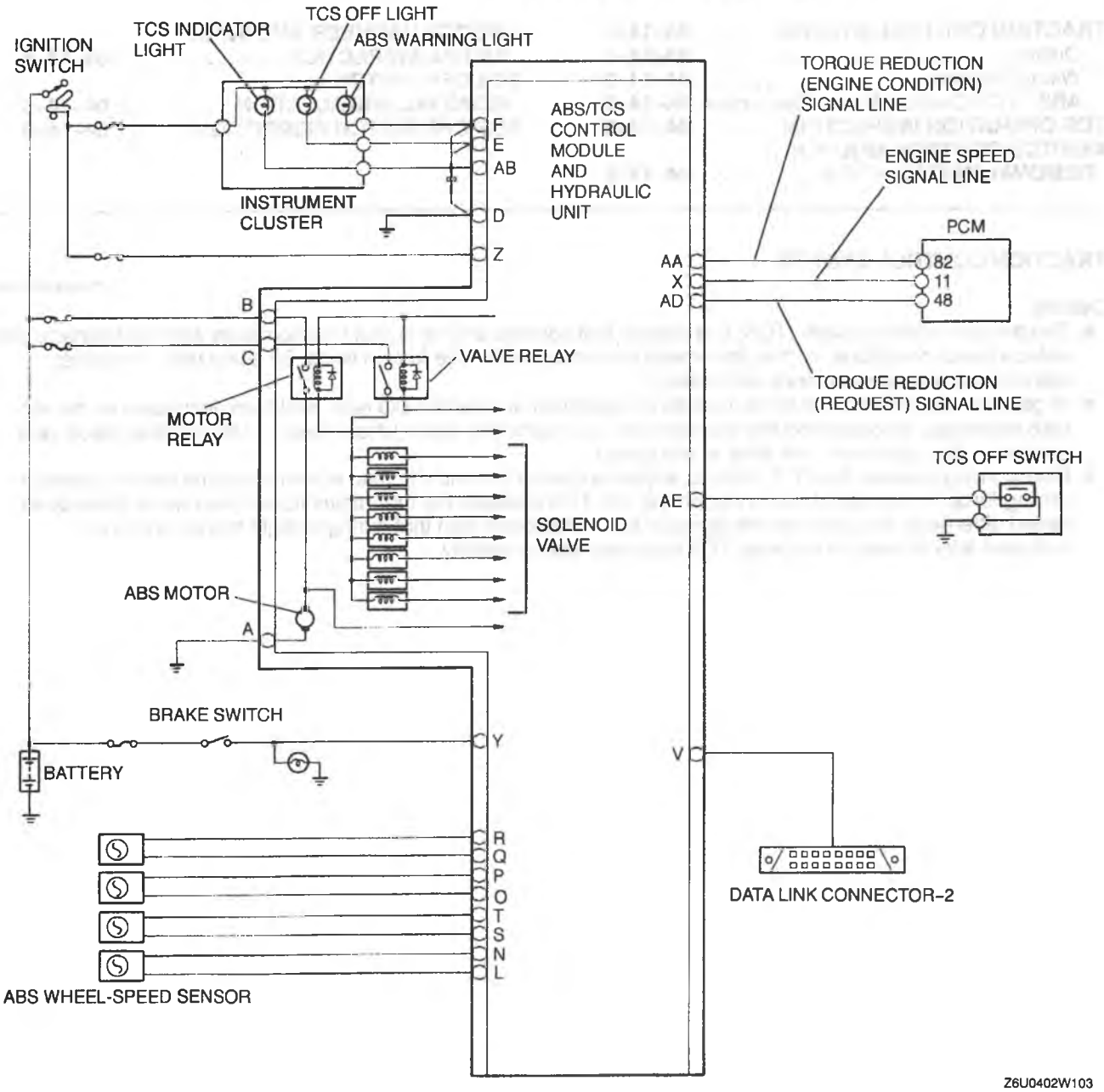
TRACTION CONTROL SYSTEM

Z6U041401023W01

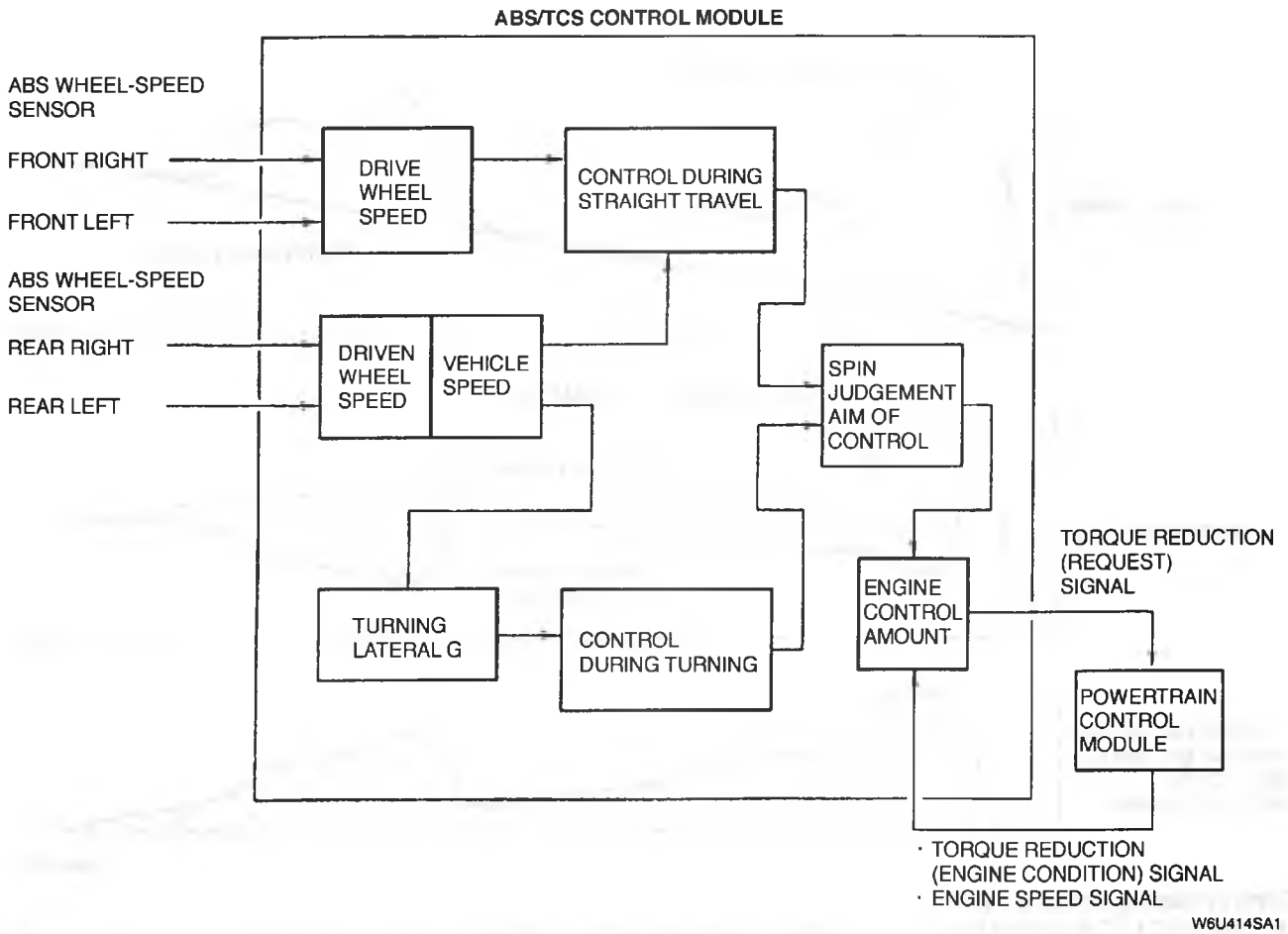
Outline

- The traction control system (TCS) is a system that controls engine output in accordance with road surface and vehicle travel conditions, so that the driving force stays within the friction limits. By doing this, it improves start/acceleration performance and safety.
- In general, the tire's driving force reaches its maximum at a certain slip ratio, and then decreases as the slip ratio increases. To determine the slip ratio, the TCS takes the driven wheel speed as the vehicle speed, and compares this speed with the drive wheel speed.
- During straight travel, the TCS controls engine output so that the slip ratio is near the value where maximum driving force is obtained. And during turning, the TCS deduces the turn radius from driven wheel inner/outer speed difference, and controls the slip ratio to a value lower than that during straight travel, to provide sufficient lateral force. In this way, TCS improves driving stability.

Wiring Diagram



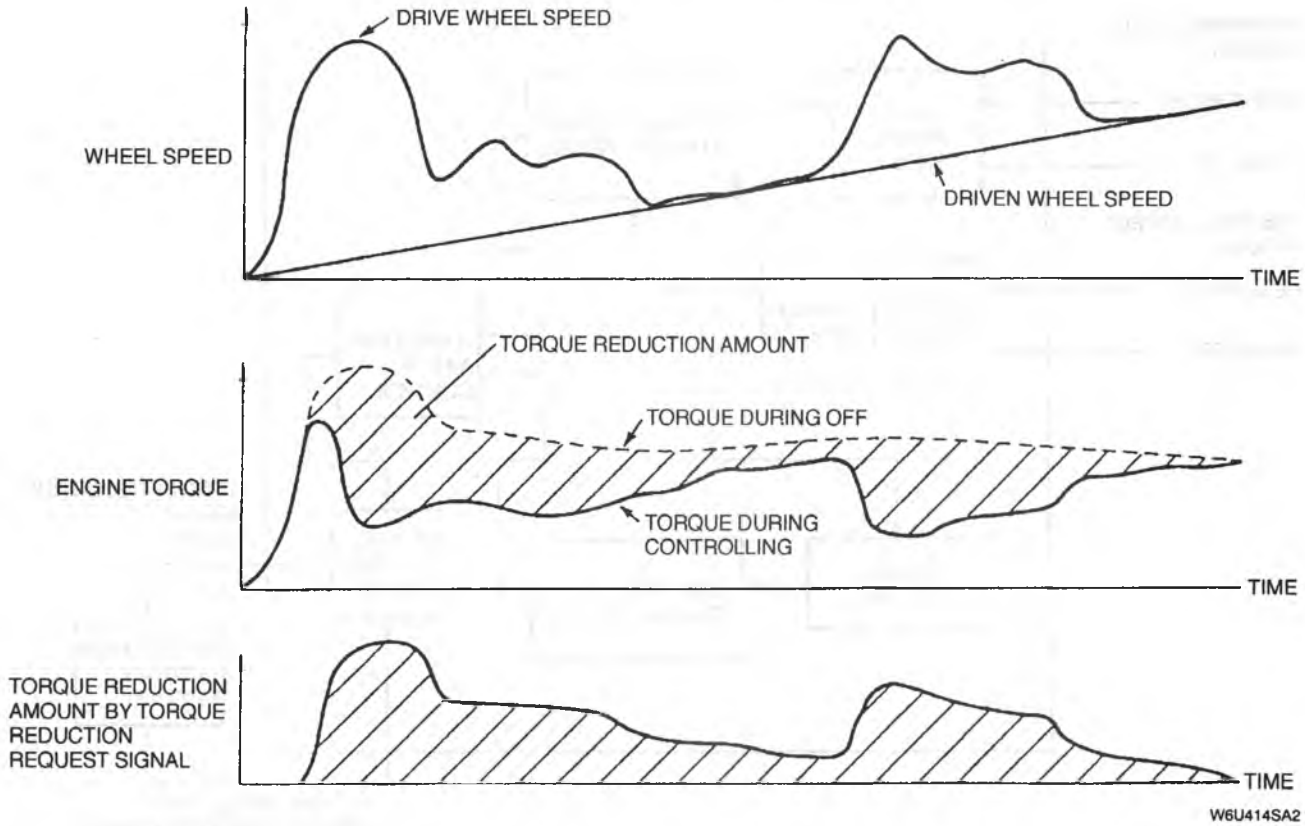
ABS / TCS Control Module Description
Outline



- The TCS control module is integrated with the ABS, and the integrated module is installed on the lower part of the ABS hydraulic unit.
- Each wheel's speed signal, and various types of switch inputs for judging the vehicle's condition are input to the ABS/TCS control module. If the ABS/TSC control module detects from these signals that the drive wheels are spinning, it sends a torque reduction request signal appropriate to the traveling conditions to the PCM. The PCM restrains engine output in accordance with the torque reduction request signal.
- The ABS/TCS control module has fail-safe and on-board diagnosis functions. When it detects a malfunction inside the system, it stops TCS operation and illuminates the TCS OFF light and TCS indicator light to inform the driver that there is a malfunction. The malfunction is stored by the TCS/ABS control module. In the diagnosis mode, the ABS/TCS control module outputs the diagnostic trouble code for the malfunction via the data link connector.

System control

EXAMPLE OF CONTROL



Control during straight travel

- The ABS / TCS control module computes the speeds of the 4 wheels.
- If the drive wheel speed exceeds the driven wheel speed by more than the regulation amount, the ABS / TCS control module judges that slipping has occurred, and starts control.
- When control starts, the ABS / TCS control module decides the optimum amount of engine torque reduction for the amount of slippage, and sends signals communicating this torque reduction amount to the PCM.
- In accordance with these signals, the PCM executes torque reduction by fuel cuts and retarding ignition timing.

Control during turning

- The ABS / TCS control module uses the steering angle from the wheel speed to calculate the lateral G in the vehicle. The larger this lateral G is, the more traction is controlled and lateral force is increased.
- That is, the larger the lateral G is, the lower the target slip ratio is made, and traction is controlled so that it is on the driving stability side of the range.

Other control

- This system is automatically ready for operation as soon as the engine is started, but a TCS OFF switch is installed that enables the driver to deactivate TCS control if desired.
- However, when this switch is used, if the ABS / TCS control module detects that the vehicle is travelling on a slippery road surface, the TCS system will be deactivated only after it has completed its operation. And in order to protect the engine, if engine coolant temperature is extremely low, TCS control is temporarily interrupted until the engine coolant temperature rises. In such cases, the TCS OFF light will be illuminated.

Fail-safe function

- The ABS / TCS control module has a fail-safe function. When this function senses a malfunction in the ABS, the ABS returns to normal braking and the ABS warning light illuminates. At this time, the TCS OFF light and the TCS indicator light also illuminate and TCS operation is inhibited until the ignition switch has been turned off.
- When a malfunction is detected in the TCS, the torque reduction request signals are fixed at 0, and the TCS OFF and TCS indicator light are illuminated simultaneously.

TCS OPERATION INSPECTION

Z6U041401023W02

1. Place the front wheels on a chassis roller or jack up the front of the vehicle on level ground and support it on safety stands.
2. Start the engine, and verify that the TCS OFF light is out.
   - If the light stays on after the engine is started and reaches normal operating temperature, the ABS/TCS control module detects a failure. In that case, turn off the engine and follow the troubleshooting procedures.

Note

- In order to protect the engine, if engine coolant temperature is extremely low, TCS control is temporarily interrupted until the engine coolant temperature rises. In such cases, the TCS OFF light illuminates.

3. Shift the transaxle to second (MTX) or D range (ATX).
4. Depress the accelerator pedal for 5 seconds, and verify that the engine speed is held low and the TCS indicator light is flashing.
   - If not as described, follow the troubleshooting procedures.

Note

- If the front wheels rotate for 60 seconds or more, the ABS warning light, TCS indicator light and TCS OFF lights illuminate, and the engine speed increases. In that case, turn the ignition switch to OFF and ON again, then drive the vehicle faster than **10 km/h {6.2 mph}**. Verify that those lights go out. ABS/TCS CM does not store DTC.

ABS/TCS CONTROL MODULE REMOVAL/INSTALLATION

Z6U041467650W01

(See 04-13-10 ABS HYDRAULIC UNIT AND CONTROL MODULE REMOVAL/INSTALLATION.)

ABS/TCS HARNESS AND INPUT SIGNAL INSPECTION

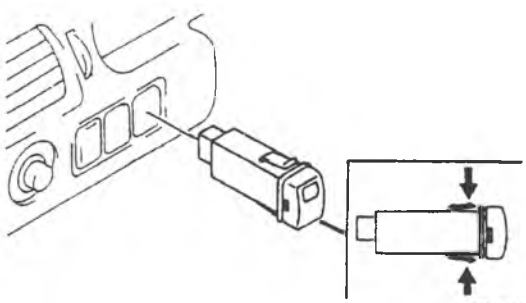
Z6U041467650W02

(See 04-13-12 ABS HARNESS AND INPUT SIGNAL INSPECTION.)

TCS OFF SWITCH REMOVAL/INSTALLATION

Z6U041446444W01

1. Remove the meter hood. (See 09-17-7 METER HOOD REMOVAL/INSTALLATION.)
2. Press the hooks of the TCS OFF switch and pull the switch out.
3. Install in the reverse order of removal.



W6U414WA0

TCS OFF SWITCH INSPECTION

Z6U041446444W02

1. Remove the TCS OFF switch.
2. Measure the resistance between B and C of the connector.
   - If not within the specification, replace the TCS OFF switch.

Resistance
When switch is pressed: 100 Ω or less
When switch is released: ∞



W6U414WA1

04-50 TECHNICAL DATA

BRAKES TECHNICAL DATA ..... 04-50-1 BRAKES TIGHTENING TORQUE 04-50-2

BRAKES TECHNICAL DATA

Z6U045001020W01

Item			Without ABS	With ABS
CONVENTIONAL BRAKE SYSTEM				
Brake pedal	Brake pedal height (mm {in})		193 {7.60}	
	Brake pedal play (mm {in})		7.8—12 {0.31—0.47}	
	Pedal-to-floor clearance (mm {in})		60 {2.4} min.	
Power brake unit	Fluid pressure (kPa {kgf/cm^2, psi})	At 0 kPa {0 mmHg, 0 inHg}	880 {9, 30} min.	
		At 66.7 kPa {500 mmHg, 19.7 inHg}	8,830 {90, 1,280} min.	
Dual proportioning valve	Bend portion (kPa {kgf/cm^2, psi})		3,400 {35, 500} ±295 {3, 43}	3,400 {35, 500} ±295 {3, 43}
	Rear wheel pressure when master cylinder pressure is 5,880 kPa {60 kgf/cm^2, 850 psi} (kPa {kgf/cm^2, psi})		4,170 {42.5, 604} ±390 {4, 60}	4,410 {45.0, 640} ±390 {4, 60}
Front disc brake	Minimum disc pad thickness (mm {in})		2.0 {0.08}	
	Minimum disc plate thickness (mm {in})		22 {0.87}	
	Disc plate runout limit (mm {in})		0.05 {0.002}	
Rear disc brake	Minimum disc pad thickness (mm {in})		1.0 {0.04}	
	Minimum disc plate thickness (mm {in})		8 {0.31}	
	Disc plate runout limit (mm {in})		0.05 {0.002}	
Rear drum brake	Maximum brake drum diameter (mm {in})		230.1 {9.059}	
	Minimum lining thickness (mm {in})		1.0 {0.04}	
	Clearance between shoe and drum		Automatic adjuster	
Brake fluid	Type		SAE J1703 or FMVSS 116 DOT3	
PARKING BRAKE SYSTEM				
Parking brake lever	Lever stroke when pulled at 98 N {10 kgf, 22 lbf} (notches)		6—8	

BRAKES TIGHTENING TORQUE

Z6U045001020W02

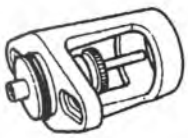
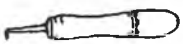
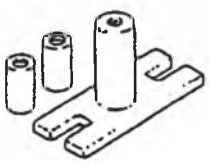
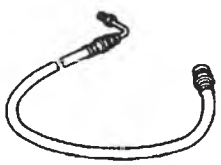
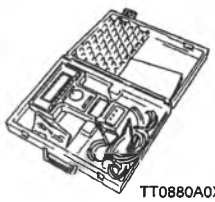
Item	Tightening torque (N·m {kgf·m, ft·lbf})
GENERAL PROCEDURES	
Wheel nut	89—117 {9—12, 66—86}
CONVENTIONAL BRAKE SYSTEM	
Bleeder screw	5.9—8.8 N·m {60—90 kgf·cm, 53—78 in·lbf}
Brake pipe	12.9—21.5 N·m {130—220 kgf·cm, 113—190 in·lbf}
Brake pedal adjusting bolt	14—17 N·m {140—180 kgf·cm, 122—156 in·lbf}
Brake pedal bracket	19—25 {1.9—2.6, 14—18}
Master cylinder	9.9—15.6 N·m {100—160 kgf·cm, 87—138 in·lbf}
Master cylinder stop screw	6.9—9.8 N·m {70—100 kgf·cm, 60.8—86.8 in·lbf}
Master cylinder stop pin	6.9—9.8 N·m {70—100 kgf·cm, 60.8—86.8 in·lbf}
Power brake unit	19—25 {1.9—2.6, 14—18}
Dual proportionig valve	8.9—12.7 N·m {90—130 kgf·cm, 79—112 in·lbf}
Front brake caliper lock bolt	30—41 {3.0—4.2, 22—28}
Front brake mounting support	79—101 {8.0—10.4, 58—75.2}
Frexible hose to brake caliper	22—29 {2.2—3.0, 22—28]
Rear brake caliper	35—39 {3.5—4.0, 26—28}
Rear brake mounting support	46—66 {4.6—6.8, 34—49}
Adjustment gear plug	11.8—15.6 N·m {120—160 kgf·cm, 105—138 in·lbf}
Rear brake drum	9.81—14.7 N·m {100—150 kgf·cm, 87—120 in·lbf}
Rear wheel hub locknut	177—235 {18.0—24.0, 131—173}
Back plate	50—68 {5.0—7.0, 37—50}
ABS wheel-speed sensor	19—25 {1.9—2.6, 14—18}
Wheel cylinder	9.81—12.7 N·m {100—130 kgf·cm, 87—112 in·lbf}
PARKING BRAKE SYSTEM	
Parking brake lever	19—25 {1.9—2.6, 14—18}
Parking brake cable	19—25 {1.9—2.6, 14—18}
ANTILOCK BRAKE SYSTEM	
Brake pipe	12.9—21.5 N·m {130—220 kgf·cm, 113—190 in·lbf}
ABS hydraulic unit and control module	19—25 {1.9—2.6, 14—18}
ABS control module	2.4—2.8 N·m {24—28 kgf·cm, 21—24 in·lbf}
ABS wheel-speed sensor	19—25 {1.9—2.6, 14—18}

04-60 SERVICE TOOLS

BRAKES SST 04-60-1

BRAKES SST

Z6U046001020W01

49 0259 770B Flare nut wrench  T0259770B	49 B043 001 Adjust gauge  TB043001X	49 U043 0A0A Oil pressure gauge set  TU0430A0X
49 0208 701A Boot air-out tool  T0208701A	49 0221 600C Disc brake expand tool  T0221600C	49 U043 005 Joint (Part of 49 U043 0A0A)  TU043005X
49 E043 003A Turning lock tool  TE043003A	49 B043 004 Socket wrench  TB043004X	49 U043 004A Oil pressure gauge(Part of 49 U043 0A0A)  TU043004X
49 U043 006 Hose (Part of 49 U043 0A0A)  TU043006X	49 T088 0A0 NGS tester set  TT0880A0X	49 T088 010K or later Program card (V.9.0)  TT088010G

TRANSMISSION/TRANSAXLE

05 SECTION

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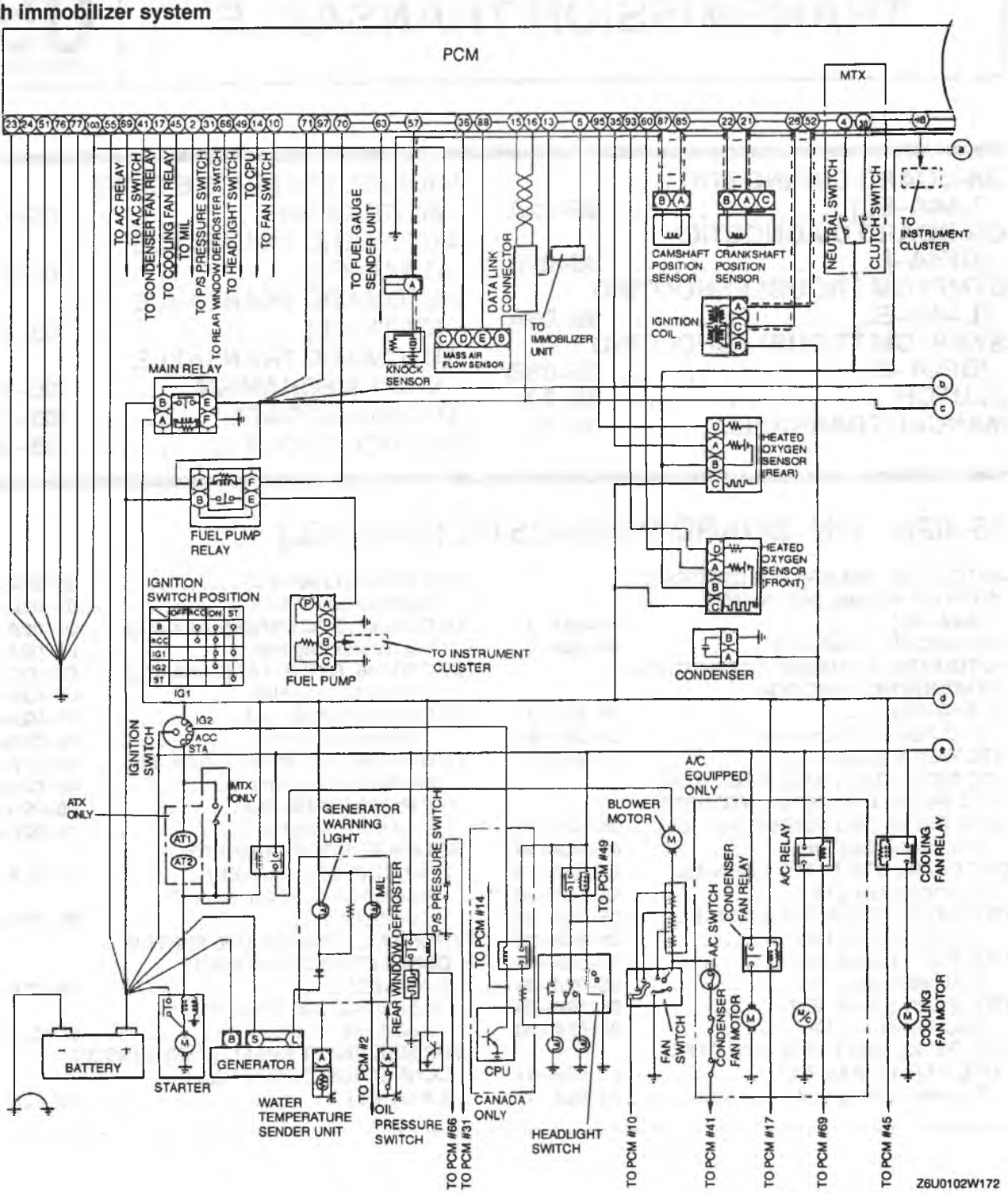
05-02A ON-BOARD DIAGNOSTIC [LA4A-EL]

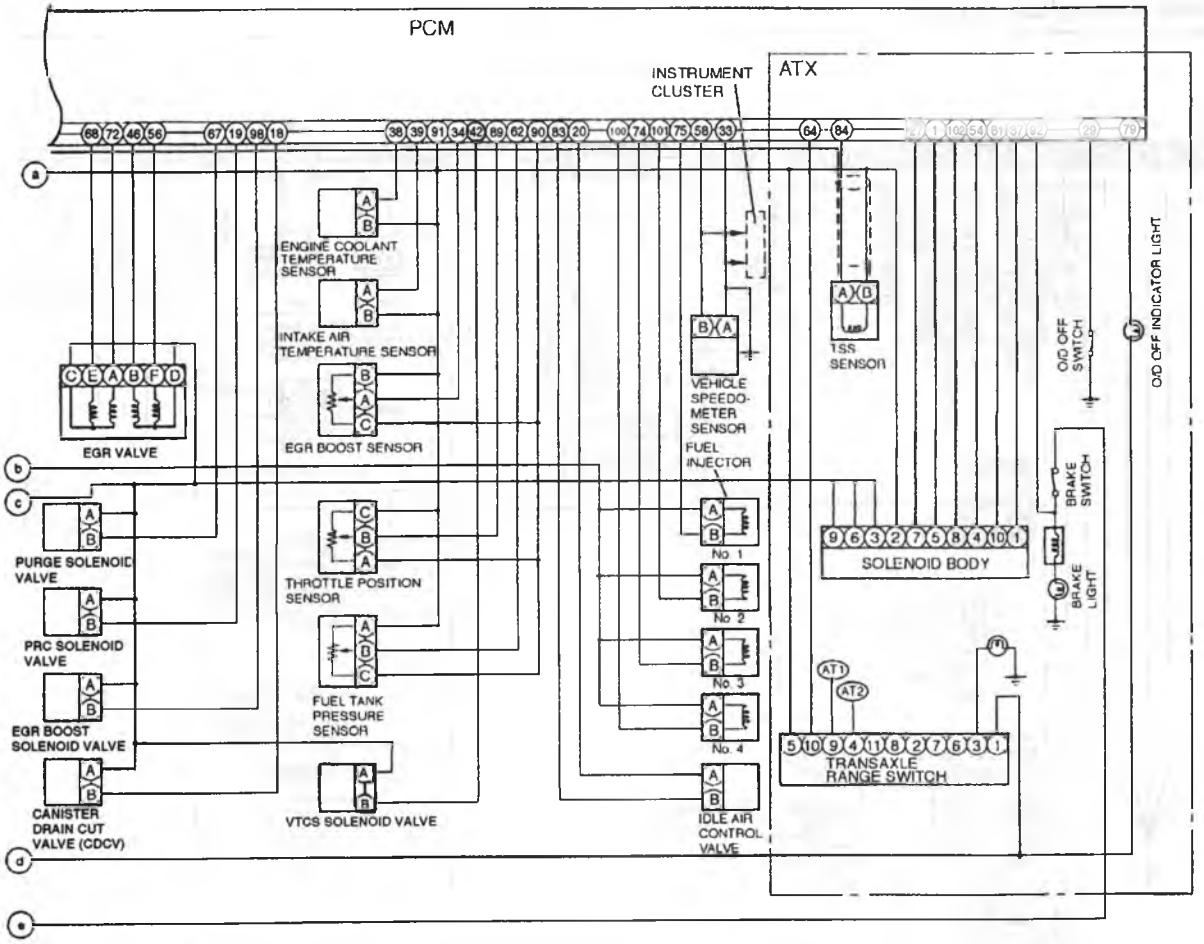
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AUTOMATIC TRANSAXLE CONTROL SYSTEM WIRING DIAGRAM [LA4A-EL]

Z6U050201030W25

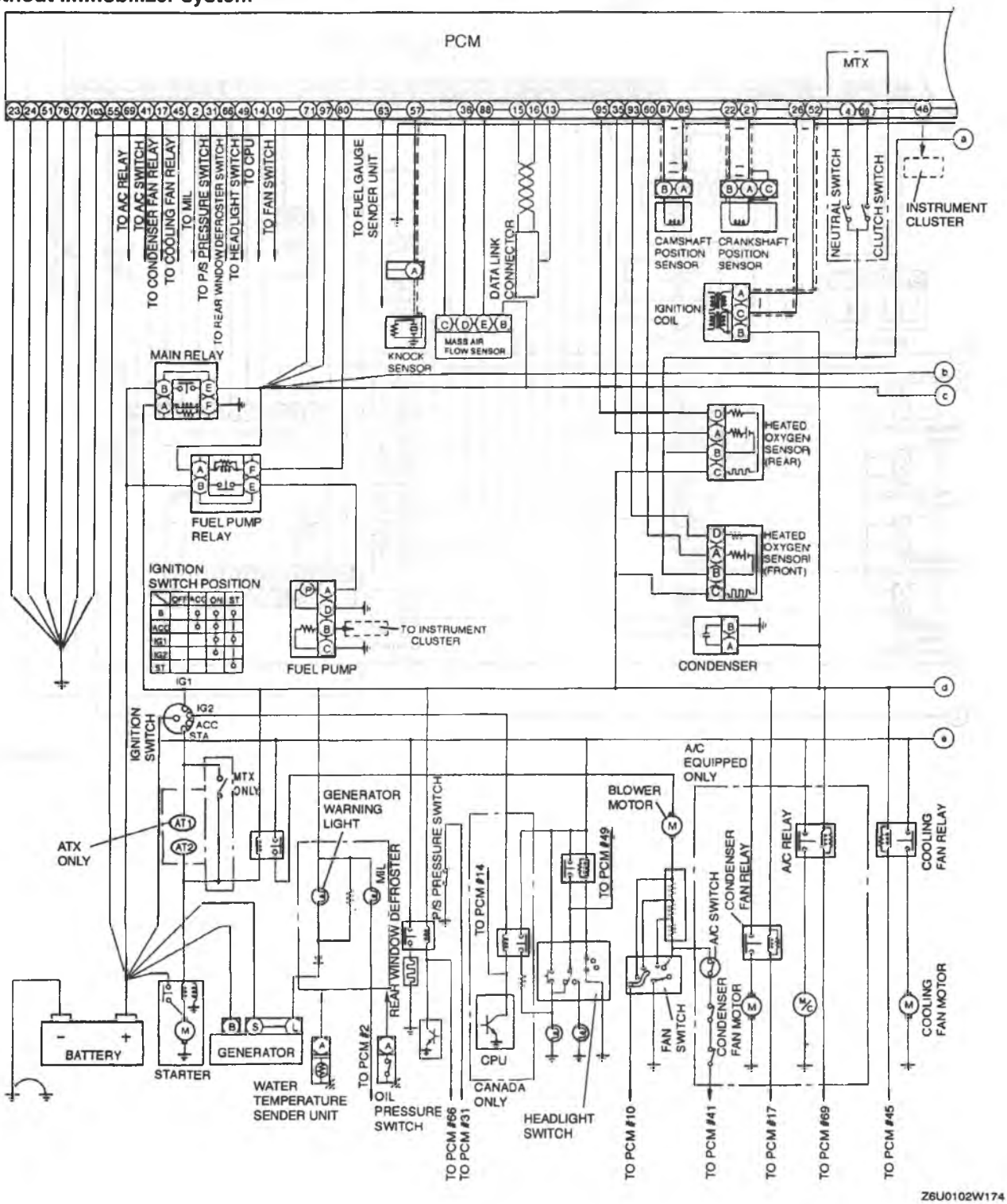
With immobilizer system

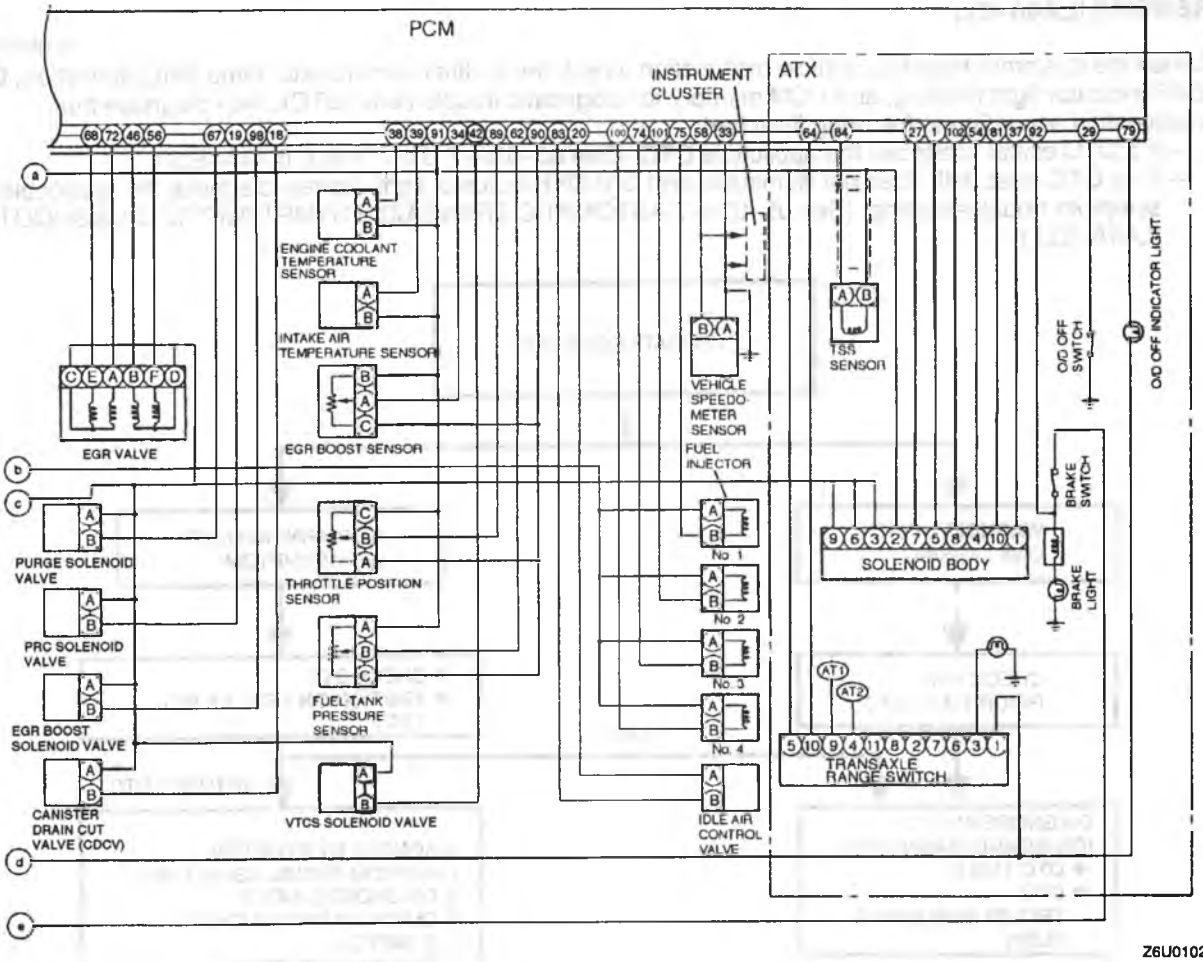




Z6U0102W173

Without immobilizer system

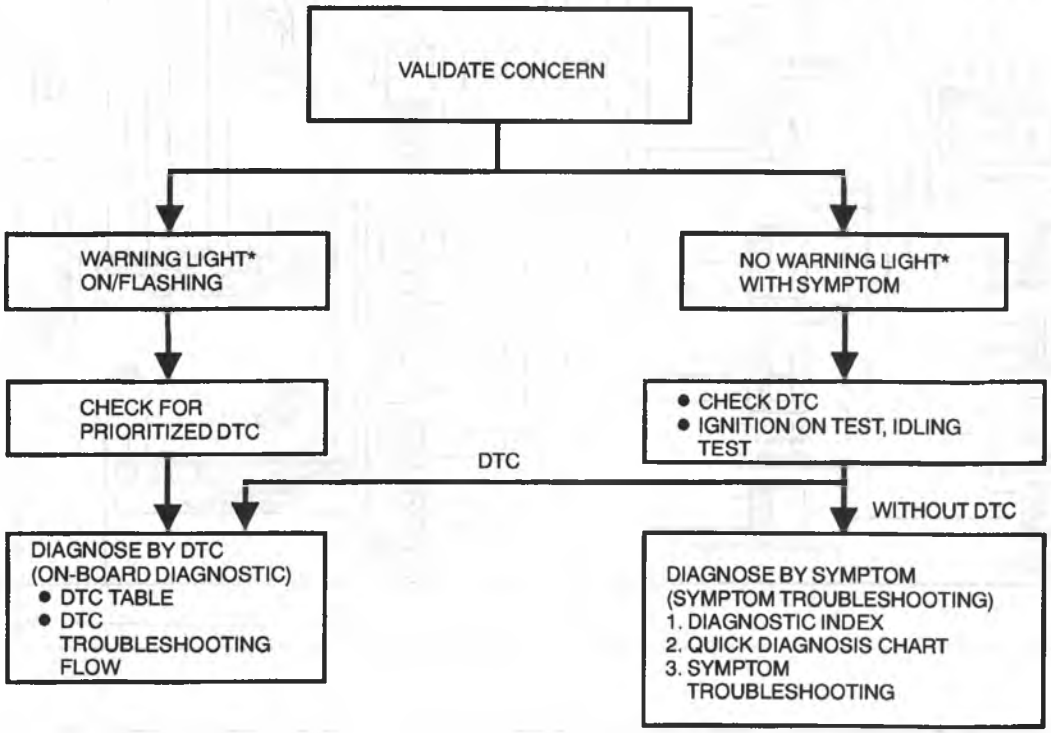



PCM
INSTRUMENT CLUSTER
ATX
ENGINE COOLANT TEMPERATURE SENSOR
INTAKE AIR TEMPERATURE SENSOR
EGR BOOST SENSOR
EGR VALVE
VEHICLE SPEEDO-METER SENSOR
TSS SENSOR
O/D OFF SWITCH
O/D OFF INDICATOR LIGHT
FUEL INJECTOR
No. 1
No. 2
No. 3
No. 4
SOLENOID BODY
BRAKE SWITCH
BRAKE LIGHT
PURGE SOLENOID VALVE
PRC SOLENOID VALVE
EGR BOOST SOLENOID VALVE
CANISTER DRAIN CUT VALVE (CDCV)
THROTTLE POSITION SENSOR
FUEL TANK PRESSURE SENSOR
VTCS SOLENOID VALVE
IDLE AIR CONTROL VALVE
TRANSAXLE RANGE SWITCH
Z6U0102W173

FOREWORD [LA4A-EL]

Z6U050201030W26

- When the customer reports a vehicle malfunction, check the malfunction indicator lamp (MIL) indication, O/D OFF indicator light flashing, and PCM memory for diagnostic trouble code (DTC), then diagnose the malfunction according to following flowchart.
  - —If a DTC exists, diagnose the applicable DTC. (See 05-02A-7 DTC TABLE [LA4A-EL].)
  - —If no DTC exist, MIL does not illuminate, and O/D OFF indicator light flashes, diagnose the applicable symptom troubleshooting. (See 05-03A-7 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [LA4A-EL].)



Z6U0102W316

* : Malfunction Indicator Lamp (MIL), O/D OFF indicator light

AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL]

Z6U050201030W27

DTC Reading Procedure

(See 01-02A-11 DTCs Reading Procedure.)

DTC TABLE [LA4A-EL]

Z6U050201030W28

DTC	Description	MIL	O/D OFF indicator light flashes	DC	*Monitor item	On demand self-test		Page
						KOEO	KOER	
P0102	MAF circuit low input	See 01-02A-31 DTC P0102 [FS]						
P0103	MAF circuit high input	See 01-02A-34 DTC P0103 [FS]						
P0106	BARO sensor circuit performance problem	See 01-02A-36 DTC P0106 [FS]						
P0107	BARO sensor circuit low input	See 01-02A-38 DTC P0107 [FS]						
P0108	BARO sensor circuit high input	See 01-02A-40 DTC P0108 [FS]						
P0112	IAT circuit low input	See 01-02A-43 DTC P0112 [FS]						
P0113	IAT circuit high input	See 01-02A-45 DTC P0113 [FS]						
P0116	ECT sensor performance problem	See 01-02A-48 DTC P0116 [FS]						
P0117	ECT circuit low input	See 01-02A-50 DTC P0117 [FS]						
P0118	ECT circuit high input	See 01-02A-52 DTC P0118 [FS]						
P0122	TP circuit low input	See 01-02A-55 DTC P0122 [FS]						
P0123	TP circuit high input	See 01-02A-58 DTC P0123 [FS]						
P0125	Insufficient ECT for CL fuel control	See 01-02A-60 DTC P0125 [FS]						
P0126	Coolant thermostat stuck open	See 01-02A-61 DTC P0126, P0128 [FS]						
P0128	Coolant thermostat stuck open	See 01-02A-61 DTC P0126, P0128 [FS]						
P0133	HO2S (Front) circuit slow response	See 01-02A-64 DTC P0133 [FS]						
P0135	HO2S heater (Front) circuit malfunction	See 01-02A-67 DTC P0135 [FS]						
P0136	HO2S (Rear) circuit malfunction	See 01-02A-69 DTC P0136, P1137, P1138 [FS]						
P0141	HO2S heater (Rear) circuit malfunction	See 01-02A-71 DTC P0141 [FS]						
P0171	Fuel trim system too lean	See 01-02A-73 DTC P0171, P0172, P1130, P1131, P1132 [FS]						
P0172	Fuel trim system too rich	See 01-02A-73 DTC P0171, P0172, P1130, P1131, P1132 [FS]						
P0230	Fuel pump primary circuit malfunction	See 01-02A-84 DTC P0230 [FS]						
P0300	Random misfire detected	See 01-02A-88 DTC P0300, P0301, P0302, P0303, P0304 [FS]						
P0301	Cylinder 1 misfire detected	See 01-02A-88 DTC P0300, P0301, P0302, P0303, P0304 [FS]						
P0302	Cylinder 2 misfire detected	See 01-02A-88 DTC P0300, P0301, P0302, P0303, P0304 [FS]						
P0303	Cylinder 3 misfire detected	See 01-02A-88 DTC P0300, P0301, P0302, P0303, P0304 [FS]						
P0304	Cylinder 4 misfire detected	See 01-02A-88 DTC P0300, P0301, P0302, P0303, P0304 [FS]						
P0320	CKP sensor circuit malfunction	See 01-02A-92 DTC P0320 [FS]						
P0325	Knock sensor circuit malfunction	See 01-02A-94 DTC P0325 [FS]						
P0340	CMP sensor circuit malfunction	See 01-02A-96 DTC P0340 [FS]						
P0400	EGR flow malfunction	See 01-02A-98 DTC P0400 [FS]						
*P0421	Warm-up catalyst system efficiency below threshold	See 01-02A-102 DTC P0421 [FS]						
P0442	EVAP control system leak detected (small leak)	See 01-02A-107 DTC P0442 [FS]						
P0443	EVAP control system purge control valve circuit malfunction	See 01-02A-110 DTC P0443 [FS]						
P0446	EVAP control system vent control malfunction	See 01-02A-111 DTC P0446 [FS]						
P0452	EVAP control system fuel tank pressure sensor low input	See 01-02A-114 DTC P0452 [FS]						
P0453	EVAP control system fuel tank pressure sensor high input	See 01-02A-117 DTC P0453 [FS]						
P0455	EVAP control system leak detected (gross leak)	See 01-02A-120 DTC P0455 [FS]						
P0460	Fuel gauge sender unit circuit malfunction	See 01-02A-125 DTC P0460 [FS]						

DTC	Description	MIL	O/D OFF Indicator light flashes	DC	*Monitor item	On demand self-test		Page
						KOEO	KOER	
P0461	Fuel gauge sender unit circuit range/performance problem	See 01-02A-128 DTC P0461 [FS]						
P0500	VSS circuit malfunction	See 01-02A-129 DTC P0500, P0503, P1501 [FS]						
P0503	VSS circuit erratic malfunction	See 01-02A-129 DTC P0500, P0503, P1501 [FS]						
P0505	IAC system malfunction	See 01-02A-131 DTC P0505 [FS]						
P0603	PCM Keep Alive Memory (KAM) test error	See 01-02A-133 DTC P0603, P0605 [FS]						
P0605	PCM Read Only Memory (ROM) test error	See 01-02A-133 DTC P0603, P0605 [FS]						
P0704	Clutch switch circuit malfunction	See 01-02A-134 DTC P0704 [FS]						
P0707	Transaxle range (TR) switch short circuit malfunction	ON	NO	2	CCM	×	—	See 05-02A-41 DTC P0707, DTC P0708 [LA4A-EL]
P0708	Transaxle range (TR) switch open circuit malfunction	ON	NO	2	CCM	×	—	See 05-02A-41 DTC P0707, DTC P0708 [LA4A-EL]
P0712	Transaxle fluid temperature (TFT) circuit low voltage malfunction	OFF	YES	2	CCM	×	×	See 05-02A-19 DTC P0712, DTC P1713 [LA4A-EL]
P0713	Transaxle fluid temperature (TFT) circuit high voltage malfunction	OFF	YES	2	CCM	×	×	See 05-02A-22 DTC P0713, DTC P1718 [LA4A-EL]
P0715	Turbine shaft speed (TSS) sensor circuit malfunction	ON	NO	2	CCM	—	×	See 05-02A-47 DTC P0715 [LA4A-EL]
P0731	Gear 1 incorrect ratio	OFF	YES	2	CCM	—	—	See 05-02A-13 DTC P0731, DTC P0732, DTC P0733, DTC P0734, DTC P0750, DTC P0751, DTC P0755, DTC P0756 [LA4A-EL]
P0732	Gear 2 incorrect ratio	OFF	YES	2	CCM	—	—	See 05-02A-13 DTC P0731, DTC P0732, DTC P0733, DTC P0734, DTC P0750, DTC P0751, DTC P0755, DTC P0756 [LA4A-EL]

DTC	Description	MIL	O/D OFF indicator light flashes	DC	*Monitor item	On demand self-test		Page
						KOEO	KOER	
P0733	Gear 3 incorrect ratio	OFF	YES	2	CCM	—	—	See 05-02A-13 DTC P0731, DTC P0732, DTC P0733, DTC P0734, DTC P0750, DTC P0751, DTC P0755, DTC P0756 [LA4A-EL]
P0734	Gear 4 incorrect ratio	OFF	YES	2	CCM	—	—	See 05-02A-13 DTC P0731, DTC P0732, DTC P0733, DTC P0734, DTC P0750, DTC P0751, DTC P0755, DTC P0756 [LA4A-EL]
P0743	Torque converter clutch (TCC) solenoid circuit malfunction	ON	NO	2	CCM	×	—	See 05-02A-31 DTC P0743, DTC P1742, DTC P1743, DTC P1744 [LA4A-EL]
P0750	Shift solenoid No.1 (SS1) circuit malfunction	ON	NO	2	CCM	×	—	See 05-02A-13 DTC P0731, DTC P0732, DTC P0733, DTC P0734, DTC P0750, DTC P0751, DTC P0755, DTC P0756 [LA4A-EL]
P0751	Shift solenoid No.1 (SS1) performance	ON	NO	2	CCM	—	—	See 05-02A-13 DTC P0731, DTC P0732, DTC P0733, DTC P0734, DTC P0750, DTC P0751, DTC P0755, DTC P0756 [LA4A-EL]
P0755	Shift solenoid No.2 (SS2) circuit malfunction	ON	NO	2	CCM	×	—	See 05-02A-13 DTC P0731, DTC P0732, DTC P0733, DTC P0734, DTC P0750, DTC P0751, DTC P0755, DTC P0756 [LA4A-EL]

DTC	Description	MIL	O/D OFF Indicator light flashes	DC	*Monitor item	On demand self-test		Page
						KOEO	KOER	
P0756	Shift solenoid No.2 (SS2) performance	ON	NO	2	CCM	—	—	See 05-02A-13 DTC P0731, DTC P0732, DTC P0733, DTC P0734, DTC P0750, DTC P0751, DTC P0755, DTC P0756 [LA4A-EL]
P1001	DLC malfunction	See 01-02A-136 DTC P1001 [FS]						
P1100	MAF sensor intermittent malfunction	See 01-02A-139 DTC P1100 [FS]						
P1101	MAF sensor out of self test range	See 01-02A-140 DTC P1101 [FS]						
P1112	IAT sensor intermittent malfunction	See 01-02A-142 DTC P1112 [FS]						
P1116	ECT sensor out of self test range	See 01-02A-144 DTC P1116 [FS]						
P1117	ECT sensor intermittent malfunction	See 01-02A-145 DTC P1117 [FS]						
P1120	TP sensor out of range low	See 01-02A-147 DTC P1120 [FS]						
P1121	TP sensor inconsistent with MAF sensor	See 01-02A-148 DTC P1121 [FS]						
P1124	MAF sensor inconsistent with RPM (greater than expected)	See 01-02A-150 DTC P1124 [FS]						
P1125	TP sensor intermittent problem	See 01-02A-152 DTC P1125 [FS]						
P1127	Exhaust not warm enough	See 01-02A-153 DTC P1127 [FS]						
P1130	Lack of HO2S (Front) switch, adapted fuel limit	See 01-02A-73 DTC P0171, P0172, P1130, P1131, P1132 [FS]						
P1131	Lack of HO2S (Front) switch, Sensor indicates lean	See 01-02A-73 DTC P0171, P0172, P1130, P1131, P1132 [FS]						
P1132	Lack of HO2S (Front) switch, Sensor indicates rich	See 01-02A-73 DTC P0171, P0172, P1130, P1131, P1132 [FS]						
P1137	Lack of HO2S (Front) switch, Sensor indicates lean	See 01-02A-69 DTC P0136, P1137, P1138 [FS]						
P1138	Lack of HO2S (Rear) switch, Sensor indicates rich	See 01-02A-69 DTC P0136, P1137, P1138 [FS]						
P1250	PRC solenoid valve circuit malfunction	See 01-02A-154 DTC P1250 [FS]						
P1409	EGR valve control circuit malfunction	See 01-02A-156 DTC P1409 [FS]						
P1410	EGR boost sensor solenoid valve stuck	See 01-02A-158 DTC P1410 [FS]						
P1450	EVAP control system malfunction (excessive vacuum)	See 01-02A-160 DTC P1450 [FS]						
P1451	CDCV circuit malfunction	See 01-02A-162 DTC P1451 [FS]						
P1460	WOT A/C control circuit malfunction	See 01-02A-165 DTC P1460, P1464 [FS]						
P1464	A/C demand out of self test range	See 01-02A-165 DTC P1460, P1464 [FS]						
P1474	Cooling fan control circuit malfunction	See 01-02A-168 DTC P1474 [FS]						
P1479	Condenser fan control primary circuit malfunction	See 01-02A-171 DTC P1479 [FS]						
P1487	EGR boost sensor solenoid valve circuit malfunction	See 01-02A-173 DTC P1487 [FS]						
P1501	VSS out of self test range	See 01-02A-129 DTC P0500, P0503, P1501 [FS]						
P1504	IAC valve circuit malfunction	See 01-02A-176 DTC P1504 [FS]						
P1506	Idle control system RPM lower than expected	See 01-02A-178 DTC P1506 [FS]						
P1507	Idle control system RPM higher than expected	See 01-02A-180 DTC P1507 [FS]						
P1512	VTCS shutter valve stuck	See 01-02A-182 DTC P1512 [FS]						

DTC	Description	MIL	O/D OFF indicator light flashes	DC	*Monitor item	On demand self-test		Page
						KOEO	KOER	
P1516	Neutral Switch input circuit malfunction	See 01-02A-184 DTC P1516 [FS]						
P1569	VTCS solenoid valve circuit malfunction	See 01-02A-187 DTC P1569 [FS]						
P1602	Immobilizer unit-PCM communication error	See 01-02A-189 DTC P1602 [FS]						
P1603	Cord word unregistered in PCM	See 01-02A-191 DTC P1603 [FS]						
P1604	Key ID number unregistered in PCM	See 01-02A-192 DTC P1604 [FS]						
P1621	Cord word mismatch after engine cranking	See 01-02A-192 DTC P1621 [FS]						
P1622	Key ID number mismatch	See 01-02A-193 DTC P1622 [FS]						
P1623	Cord word or key ID number read/write error in PCM	See 01-02A-194 DTC P1623 [FS]						
P1624	Immobilizer system communication counter = 0	See 01-02A-194 DTC P1624 [FS]						
P1633	PCM KAM voltage low	See 01-02A-195 DTC P1633 [FS]						
P1650	PSP switch sensor out of self test range	See 01-02A-197 DTC P1650 [FS]						
P1652	PSP switch failed on	See 01-02A-199 DTC P1652 [FS]						
P1703	Brake switch out of self test range	See 01-02A-201 DTC P1703 [FS]						
P1705	Park/Neutral not indicated during KOEO/KOER	OFF	NO	2	—	×	×	See 05-02A-37 DTC P1705 [LA4A-EL]
P1711	Transaxle fluid temperature (TFT) out of range during KOEO/KOER	OFF	NO	2	—	×	×	See 05-02A-25 DTC P1711 [LA4A-EL]
P1713	Transaxle fluid temperature (TFT) in-range low malfunction	OFF	YES	1	CCM	—	—	See 05-02A-19 DTC P0712, DTC P1713 [LA4A-EL]
P1718	Transaxle fluid temperature (TFT) in-range high malfunction	OFF	YES	1	CCM	—	—	See 05-02A-22 DTC P0713, DTC P1718 [LA4A-EL]
P1742	Torque converter clutch (TCC) solenoid failed on (MIL on)	ON	NO	2	CCM	—	—	See 05-02A-31 DTC P0743, DTC P1742, DTC P1743, DTC P1744 [LA4A-EL]
P1743	Torque converter clutch (TCC) solenoid failed on (O/D OFF flash)	OFF	YES	1	CCM	—	—	See 05-02A-31 DTC P0743, DTC P1742, DTC P1743, DTC P1744 [LA4A-EL]
P1744	Torque converter clutch (TCC) system malfunction	ON	NO	2	CCM	—	—	See 05-02A-31 DTC P0743, DTC P1742, DTC P1743, DTC P1744 [LA4A-EL]

DTC	Description	MIL	O/D OFF Indicator light flashes	DC	*Monitor item	On demand self-test		Page
						KOEO	KOER	
P1746	Electronic pressure control (EPC) open	OFF	YES	2	CCM	×	—	See 05-02A-44 DTC P1746, DTC P1747 [LA4A-EL]
P1747	Electronic pressure control (EPC) short	ON	NO	2	CCM	×	—	See 05-02A-44 DTC P1746, DTC P1747 [LA4A-EL]
P1780	O/D OFF switch circuit malfunction	OFF	NO	2	—	—	×	See 05-02A-53 DTC P1780 [LA4A-EL]
P1783	High temperature operation	OFF	YES	1	CCM	—	—	See 05-02A-29 DTC P1783 [LA4A-EL]
P1788	3-2 timing/coasting clutch solenoid (3-2T/CCS) open	OFF	YES	2	CCM	×	—	See 05-02A-50 DTC P1788, DTC P1789 [LA4A-EL]
P1789	3-2 timing/coasting clutch solenoid (3-2T/CCS) short	OFF	YES	2	CCM	×	—	See 05-02A-50 DTC P1788, DTC P1789 [LA4A-EL]

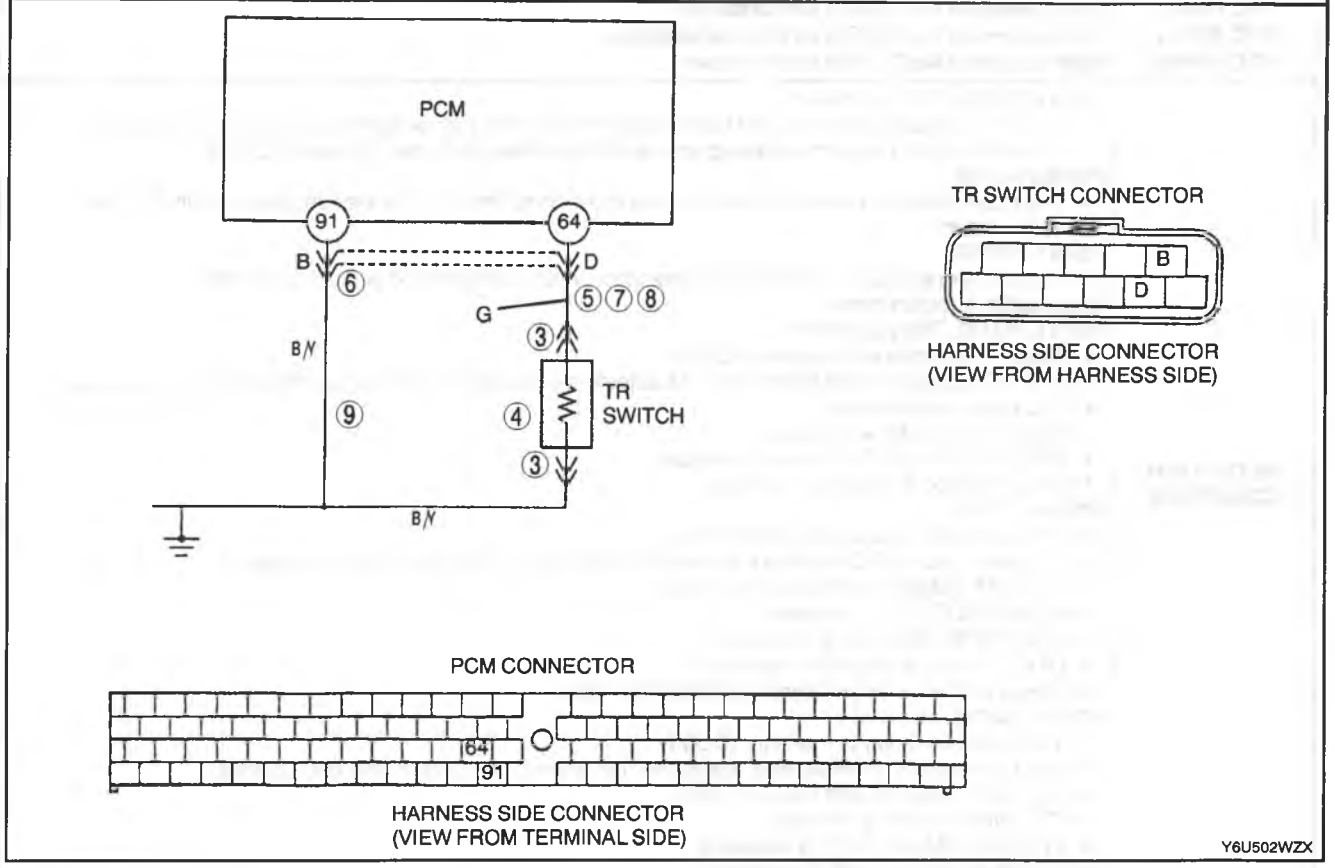
* : Indicates the applicable item in On-Board System Readiness Test defined by CARB.

DTC P0731, DTC P0732, DTC P0733, DTC P0734, DTC P0750, DTC P0751, DTC P0755, DTC P0756 [LA4A-EL]

Z6U050201030W29

DTC P0731 **DTC P0732** **DTC P0733** **DTC P0734** **DTC P0750** **DTC P0751** **DTC P0755** **DTC P0756**	**Gear 1 incorrect ratio** **Gear 2 incorrect ratio** **Gear 3 incorrect ratio** **Gear 4 incorrect ratio** **Shift solenoid No.1 (SS1) circuit malfunction** **Shift solenoid No.1 (SS1) performance** **Shift solenoid No.2 (SS2) circuit malfunction** **Shift solenoid No.2 (SS2) performance**
DETECTION CONDITION	**P0731, P0732, P0733, P0734** ● The PCM detects when the RPM difference between the turbine speed and output shaft speed exceeds or falls below the preprogrammed RPM difference in the PCM while driving. **P0750, P0755** ● The PCM detects opens or short circuit by monitoring the status of the feedback circuit from the output driver. **P0751, P0756** ● Actual obtained gear or shift pattern indicates which shift solenoid is stuck on or off. **Diagnostic support note** **P0731, P0732, P0733, P0734** ● These are continuous monitors (CCM). ● O/D OFF indicator light flashes if PCM detects the above malfunction condition in two drive cycles. ● MIL does not illuminate. ● PENDING CODE is available. ● FREEZE FRAME DATA is not available. ● DTC is stored in the PCM memory. **P0750, P0755** ● These are continuous monitors (CCM). ● MIL illuminates if PCM detects the above malfunction condition in two drive cycles. ● O/D OFF indicator light does not flash. ● PENDING CODE is available. ● FREEZE FRAME DATA is available. ● DTC is stored in the PCM memory. ● These DTCs are also detects by KOEO self-test. **P0751, P0756** ● These are continuous monitors (CCM). ● MIL illuminates if PCM detects the above malfunction condition in two drive cycles. ● O/D OFF indicator light does not flash. ● PENDING CODE is available. ● FREEZE FRAME DATA is available. ● DTC is stored in the PCM memory.
POSSIBLE CAUSE	● Engine: Performance, cooling ● Electrical: Battery, input sensors, wiring harnesses ● Transaxle: Internal transaxle components, linkages, cooling

DTC P0731	Gear 1 incorrect ratio
DTC P0732	Gear 2 incorrect ratio
DTC P0733	Gear 3 incorrect ratio
DTC P0734	Gear 4 incorrect ratio
DTC P0750	Shift solenoid No.1 (SS1) circuit malfunction
DTC P0751	Shift solenoid No.1 (SS1) performance
DTC P0755	Shift solenoid No.2 (SS2) circuit malfunction
DTC P0756	Shift solenoid No.2 (SS2) performance



Troubleshooting Hint

Fail-safe

P0750, P0751, P0755, P0756

- Malfunction gear is not commanded once CCM testing is complete.

P0731, P0732, P0733, P0734

- Electronic pressure control (EPC) minimum static pressure increased.
- Harsh shifts malfunction gear is not commanded once CCM testing is complete.

SS1 and SS2 description

- SS1 and SS2 provide gear selection of 1GR through 4GR by providing ON/OFF pressure control to the shift valves.

Solenoid valve operation chart

The following solenoid operation chart shows normal solenoid operation for given operation mode.

Transaxle range selector lever position	PCM commanded gear	SS1	SS2	3-2T/CCS	TCC
P	—	OFF	ON	—	OFF
R	—	OFF	ON	—	*
N	—	OFF	ON	—	OFF
D (O/D)					
D	1	ON	ON	—	*
D	2	OFF	ON	—	**
D	3	OFF	OFF	—	**

Transaxle range selector lever position	PCM commanded gear	SS1	SS2	3-2T/CCS	TCC
D	4	ON	OFF	ON	**
D (O/D OFF)					
D	1	ON	ON	ON	*
D	2	OFF	ON	OFF	**
D	3	OFF	OFF	OFF	**
2	2	OFF	ON	OFF	**
2***	3***	OFF	OFF	OFF	
1	1	ON	ON	OFF	**
1***	2	OFF	ON	OFF	**
1***	3	OFF	OFF	OFF	**

* : Not allowed by hydraulics

** : PCM commanded

** : When a manual select occurs above a calibrated speed, the transaxle will not downshift from the higher gear until the vehicle speed falls below this calibrated speed

SS1 and SS2 failure mode chart

Failed ON or OFF due to PCM and/or vehicle wiring concerns, and or solenoid electronically stuck off, and/or hydraulically or mechanically stuck off.

SS1 always ON	Gear selector position				SS2 always ON	Gear selector position			
	OD	D	2	1*		OD	D	2	1*
PCM gear commanded	Actual gear obtained				PCM gear commanded	Actual gear obtained			
1	1	1	—	1	1	1	1	—	4
2	1	1	1	1	2	2	2	2	3
3	4	4	4	4	3	2	2	2	3
4	4	—	—	—	4	1	1	—	—
Also no reverse									
SS1 always OFF	Gear selector position				SS2 always OFF	Gear selector position			
	OD	D	2	1*		OD	D	2	1*
PCM gear commanded	Actual gear obtained				PCM gear commanded	Actual gear obtained			
1	2	2	—	2	1	4	4	—	1
2	2	2	2	2	2	3	3	3	1
3	3	3	3	3	3	3	3	3	2
4	3	—	—	—	4	4	—	—	—

* : When a select operation occurs above a calibrated speed, the transaxle will not downshift from the higher gear until the vehicle speed drops below this calibrated speed.

SS1 and SS2 specification

Item		KOEO		KOER	
		Sol. OFF	Sol. ON	Sol. OFF	Sol. ON
SS1	SS1 PID	OFF	ON	OFF	ON
	PCM 27	B+	Below 1.0 V	B+	Below 1.0 V
SS2	SS2 PID	OFF	ON	OFF	ON
	PCM 1	B+	Below 1.0 V	B+	Below 1.0 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present during KOEO or KOER self-test? **Note** • When DTC P0731, P0732, P0733, P0734, P0751, and/or P0756 are detected, FREEZE FRAME PID DATA of these codes are recorded.	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERNS TROUBLESHOOTING procedure. (See 01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**ELECTRONIC DIAGNOSTICS** • Check that the solenoid body connector is fully seated, terminals are fully engaged in the connector and in good condition before proceeding. • Connect NGS tester to DLC. • Perform KOEO test until continuous memory DTC is displayed. • Enter output test mode. (See 01-02A-8 FOREWORD [FS]) • Select SS1 and SS2 PIDs. • Cycle SS1 OFF/ON by selecting stop/start mode in output test mode "ALL ON". • Set "ALL OFF" mode. • Cycle SS2 ON/OFF by selecting STOP/START mode in output test mode. • Does SS1 and SS2 PIDs cycle?	Yes	Go to next step.
		No	If vehicle did not enter output state (Diagnostic test mode (DTM)). (See 01-02A-8 FOREWORD [FS])
3	**CHECK ELECTRICAL SIGNAL OPERATION** **Caution** • **Removing the solenoid body connector by prying with a screwdriver will damage the connector. Remove the solenoid body connector by pushing on the wire tab and pulling on the wiring harness.** • Disconnect solenoid body connector. • Using a mirror, inspect both ends of the connector for damaged or pushed out pins, corrosion, loose wires, and missing or damaged seals. • Refer to connector schematic and table of solenoid body. (See 05-02A-56 SOLENOID BODY CONNECTOR COMPONENT [LA4A-EL]) • Connect volt-ohm meter (VOM)/digital volt-ohm meter (DVOM) positive test lead to power circuit and negative test lead to the suspected solenoid circuit of the transaxle vehicle harness connector. • VOM/DVOM on 20 Volt scale. • While observing DVOM, (follow procedures described in step 2) cycle solenoid output ON and OFF. • Does the suspected solenoid output voltage change at least 0.5 volt?	Yes	Go to Step 6.
		No	Go to next step.

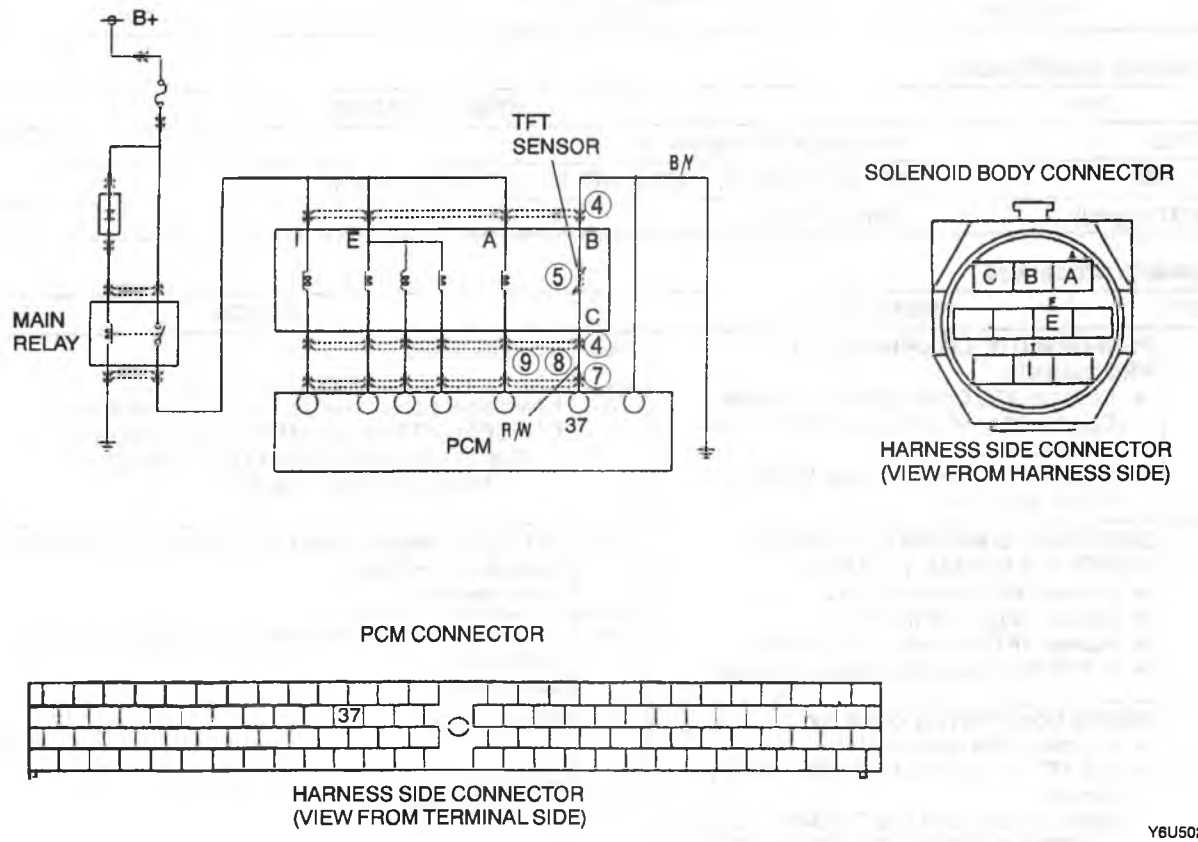
STEP	INSPECTION		ACTION
4	**CHECK CONTINUITY OF SOLENOID SIGNAL AND POWER HARNESS CIRCUITS** ● Turn ignition key to OFF. ● Solenoid body connector disconnected (Transaxle connector). ● Disconnect PCM. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as required. ● Install breakout box, and leave PCM disconnected. ● Refer to connector schematic and table of solenoid body. (See 05-02A-56 SOLENOID BODY CONNECTOR COMPONENT [LA4A-EL]) ● Measure resistance between PCM signal test pin (27 or 1) at the breakout box and signal pin at solenoid body connector. ● Measure resistance between PCM test pin (71/97) at the breakout box and power circuit pin at solenoid body connector. ● Is each resistance less than 5.0 ohms?	Yes	Go to next step.
		No	Repair or replace connectors and wiring, then go to step 10.
5	**CHECK TEST PIN 27, 1 FOR SHORTS TO POWER AND GROUND** ● Breakout box is installed, PCM is disconnected. ● Solenoid body connector is disconnected. ● Refer to connector schematic and table of solenoid body. (See 05-02A-56 SOLENOID BODY CONNECTOR COMPONENT [LA4A-EL]) Measure following voltages ● Between test pins 27 and 71 ● Between test pins 27 and 97 ● Between test pins 27 and 77 ● Between test pins 27 and 103 ● Between test pins 27 and 91 ● Between test pins 1 and 71 ● Between test pins 1 and 97 ● Between test pins 1 and 77 ● Between test pins 1 and 103 ● Between test pins 1 and 91 ● Is each resistance greater than 10,000 ohms?	Yes	Go to next step.
		No	Repair or replace connectors and wiring, then go to step 10.
6	**SOLENOID FUNCTIONAL TEST** ● Ensure that the harness is disconnected at the transaxle. ● Install transaxle tester at the solenoid body connector. ● Using tests outlined under tester instructions, perform the solenoid voltage test. **Note** ● LED will illuminate "GREEN" when solenoid is activated and illuminate "OFF" when deactivated. ● LED will illuminate "RED" if activated solenoid is shorted to BAT+. ● LED will remain "OFF" if an activated solenoid is shorted to ground or no continuity. ● Do the solenoids activate? (LED GREEN)	Yes	Go to next step.
		No	Go to step 8.

STEP	INSPECTION		ACTION
7	**TRANSAXLE DRIVE TEST** • Perform the drive test. • Does the vehicle upshift when commanded by the tester? (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Replace the PCM, then go to step 10. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS])
		No	Go to next step.
8	**CHECK SOLENOID RESISTANCE** **Note** • Refer to the transaxle tester for terminal location. • Bench/drive switch in BENCH mode. • Rotate gear selector switch to OHMS check position. • Connect ohmmeter negative lead to the SS1 jack and the positive lead to VPWR jack on tester. This is to test SS1. • Record resistance. • Connect ohmmeter negative lead to the SS2 jack and the positive lead to VPWR jack on tester. This is to test SS2. • Are all the shift solenoid resistances between 12 and 22 ohms?	Yes	Go to next step.
		No	Replace solenoid body component, then go to step 10. (See 05-17A-33 SOLENOID BODY REMOVAL/INSTALLATION [LA4A-EL])
9	**CHECK SOLENOID FOR SHORT TO GROUND** • Check for continuity between BAT- (engine ground) and appropriate jack using an ohmmeter or other low current tester (less than 200 milliamps). • Connection should show infinite resistance (no continuity). • Is there continuity?	Yes	Replace solenoid body component, then go to step 10. (See 05-17A-33 SOLENOID BODY REMOVAL/INSTALLATION [LA4A-EL])
		No	Go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P0750, DTC P0755, DTC P0731, DTC P0732, DTC P0733, DTC P0734, DTC P0751 AND DTC P0756 IS COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester. Generic OBD-II function. • Perform DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present?	Yes	Replace PCM and go to next step. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS])
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0712, DTC P1713 [LA4A-EL]

Z6U050201030W30

DTC P0712 **DTC P1713**	**Transaxle fluid temperature (TFT) circuit low voltage malfunction** **Transaxle fluid temperature (TFT) in-range low malfunction**
DETECTION CONDITION	**P0712** ● The PCM detects TFT sensor circuit input above the minimum acceptable voltage. **P1713** ● The PCM detects TFT sensor stuck at low resistance. **Diagnostic support note** **P0712** ● This is a continuous monitor (CCM). ● O/D OFF indicator light flashes if PCM detects the above malfunction condition in two drive cycles. ● MIL does not illuminate. ● PENDING CODE is available. ● FREEZE FRAME DATA is not available. ● DTC is stored in the PCM memory. ● This DTC is also detected by KOEO and KOER self-test. **P1713** ● This is a continuous monitor (CCM). ● O/D OFF indicator light flashes if PCM detects the above malfunction condition during first drive cycle. ● MIL does not illuminate. ● PENDING CODE is not available. ● FREEZE FRAME DATA is not available. ● DTC is stored in the PCM memory.
POSSIBLE CAUSE	● Fluid level not as specified ● Damaged TFT sensor ● Short to TFT sensor ground circuit in TFT signal harness circuit ● Damaged PCM



Troubleshooting Hint
Fail-safe
P0712
- ECT substituted for TFT under normal operating condition.

P1713
- Transaxle diagnostics enabled using other vehicle dynamics.

TFT sensor description
- The TFT sensor is located on the solenoid valve body. It is a temperature-sensitive device called a thermistor. The resistance value of the TFT sensor will vary with temperature.
- The PCM monitors the voltage across the TFT sensor to determine the ATF temperature. The PCM uses this signal to determine shift schedule and to control line pressure for cold and hot temperature operation. The PCM also inhibits torque converter clutch (TCC) operation at low ATF temperature and adjusts electronic pressure control (EPC) pressure for temperature.

TFT temperature chart

°C	°F	Resistance (KΩ)
-40— -20	-40— -4	1134—242
-19— -1	-3—31	242—84
0—20	32—68	84—41
21—40	69—104	41—14
41—70	105—158	14—5.9
71—90	159—194	5.9—3.1
91—110	195—230	3.1—1.7
111—130	231—266	1.7—1
131—150	267—302	1—0.6

TFT sensor specification

Item	KOEO and KOER
TFT PID	Indicates ATF temperature
TFTV PID	ATF 30 °C {86 °F} : 2.55 V, ATF 70 °C {158 °F} : 1.02 V
PCM 37 (signal)	Same as above

Diagnostic procedure

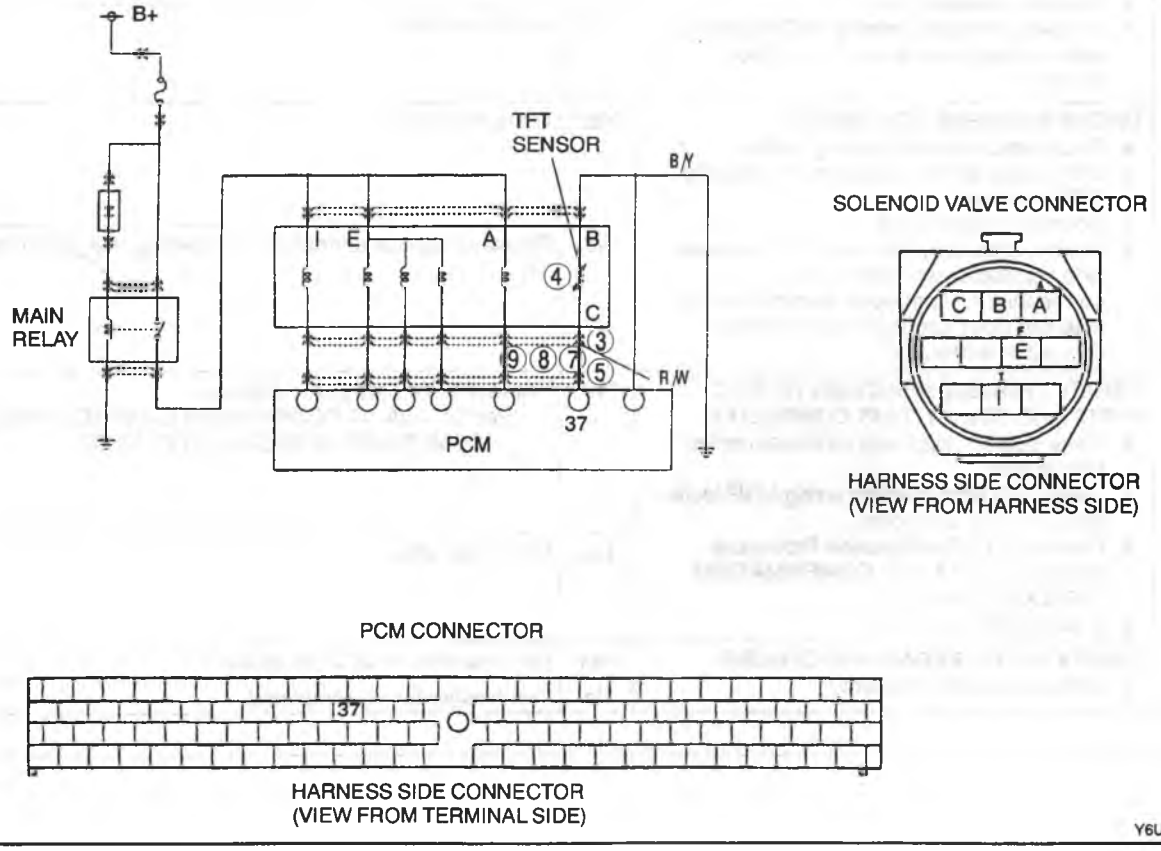
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present during KOEO or KOER self-test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERNS TROUBLESHOOTING procedure. (See 01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**CONTINUOUS MEMORY DTC P0712: VERIFY TFT SIGNAL VOLTAGE** • Connect NGS tester to DLC. • Key on, engine off (KOEO). • Access TFT PID with a NGS tester. • Is TFT PID voltage less than 0.5 volts?	Yes	TFT signal voltage is less than the acceptable minimum, but is not intermittent. Go to next step.
		No	The fault produced continuous memory DTC P0712 is intermittent. Go to step 4.
3	**CHECK NGS TESTER DISPLAY** • Connect NGS tester to DLC. • Are TFT sensor and NGS tester display correct? (See 01-40A-15 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [FS])	Yes	Go to step 10.
		No	Go to next step.
4	**CHECK SOLENOID BODY CONNECTOR** • Are solenoid body connector at the connector and connector pins okay?	Yes	Go to next step.
		No	Repair or replace connector, then go to step 10.

STEP	INSPECTION		ACTION
5	**CHECK TFT SENSOR** • Install transaxle tester to solenoid body connector. • Set bench/drive switch to BENCH mode. • Rotate gear selector switch to OHMS check position. • Connect ohmmeter negative lead to −TFT jack and positive lead to +TFT jack of tester. • Record resistance. • Resistance should be approximately in the following ranges. (See 05-17A-24 Transaxle Tester Instruction)	Yes	Go to next step.
		No	Replace solenoid body component, then go to step 10. (See 05-17A-33 SOLENOID BODY REMOVAL/INSTALLATION [LA4A-EL])
6	**CHECK VOLTAGE OF POWER SUPPLY CIRCUIT** • Disconnect solenoid body connector. • Turn ignition key to ON (engine OFF). • Is there battery positive voltage at TFT sensor harness side connector terminals A, E, and I?	Yes	Go to next step.
		No	Repair or replace connectors and wiring, then go to step 10.
7	**CHECK PCM CONNECTOR** • Are PCM at the connector and connector pins okay?	Yes	Go to next step.
		No	Repair or replace connectors, then go to step 10.
8	**CHECK CONTINUITY** • Disconnect negative battery cable. • Disconnect solenoid body connector and PCM connector. • Connect breakout box. • Is there continuity between PCM harness side connector terminal 37 and body ground?	Yes	Repair or replace connectors and wiring, then go to step 10.
		No	Go to next step.
9	**CHECK HARNESS CONTINUITY** • Disconnect negative battery cable. • Disconnect solenoid body connector and PCM connector. • Connect breakout box. • Is there continuity between PCM harness side connector terminal 37 and corresponding connector terminals at the solenoid body connector harness side connector terminal C?	Yes	Go to next step.
		No	Repair or replace connectors and wiring, then go to step 10.
10	**VERIFY TROUBLESHOOTING OF DTC P0712 AND DTC P1713 IS COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Perform DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present?	Yes	Replace PCM and go to next step. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS])
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting is completed.

DTC P0713, DTC P1718 [LA4A-EL]

Z6U050201030W31

DTC P0713 DTC P1718	**Transaxle fluid temperature (TFT) circuit high voltage malfunction** **Transaxle fluid temperature (TFT) in-range high malfunction**
DETECTION CONDITION	**P0713** ● The PCM detects TFT sensor circuit input above the maximum acceptable voltage. **P1718** ● The PCM detects TFT sensor stuck at low resistance. **Diagnostic support note** **P0713** ● This is a continuous monitor (CCM). ● O/D OFF indicator light flashes if PCM detects the above malfunction condition in two drive cycles. ● MIL does not illuminate. ● PENDING CODE is available. ● FREEZE FRAME DATA is not available. ● DTC is stored in the PCM memory. ● This DTC is also detected by KOEO and KOER self-test. **P1718** ● This is a continuous monitor (CCM). ● O/D OFF indicator light flashes if PCM detects the above malfunction condition during first drive cycle. ● MIL does not illuminate. ● PENDING CODE is not available. ● FREEZE FRAME DATA is not available. ● DTC is stored in the PCM memory.
POSSIBLE CAUSE	● Fluid level is not as specified ● Damaged TFT sensor ● Short to power circuit in TFT signal harness circuit ● Open in TFT signal or TFT sensor ground harness circuit ● Damaged PCM



Y6U502WA1

Troubleshooting Hint
Fail-safe
P0713
- ECT substituted for TFT under normal operating condition.

P1718
- Transaxle diagnostics enabled using other vehicle dynamics.

TFT sensor description
- The TFT sensor is located on the solenoid valve body. It is a temperature-sensitive device called a thermistor. The resistance value of the TFT sensor will vary with temperature.
- The PCM monitors the voltage across the TFT sensor to determine the ATF temperature. The PCM uses this signal to determine shift schedule and to control line pressure for cold and hot temperature operation. The PCM also inhibits torque converter clutch (TCC) operation at low ATF temperature and adjusts electronic pressure control (EPC) pressure for temperature.

TFT temperature chart

°C	°F	Resistance (KΩ)
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91—110	195—230	3.1—1.7
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131—150	267—302	1-0—0.6

TFT sensor specification

Item	KOEO and KOER
TFT PID	Indicates ATF temperature
TFTV PID	ATF 30 °C {86 °F} : 2.55 V, ATF 70 °C {158 °F} : 1.02 V
PCM 37 (signal)	Same as above

Diagnostic procedure

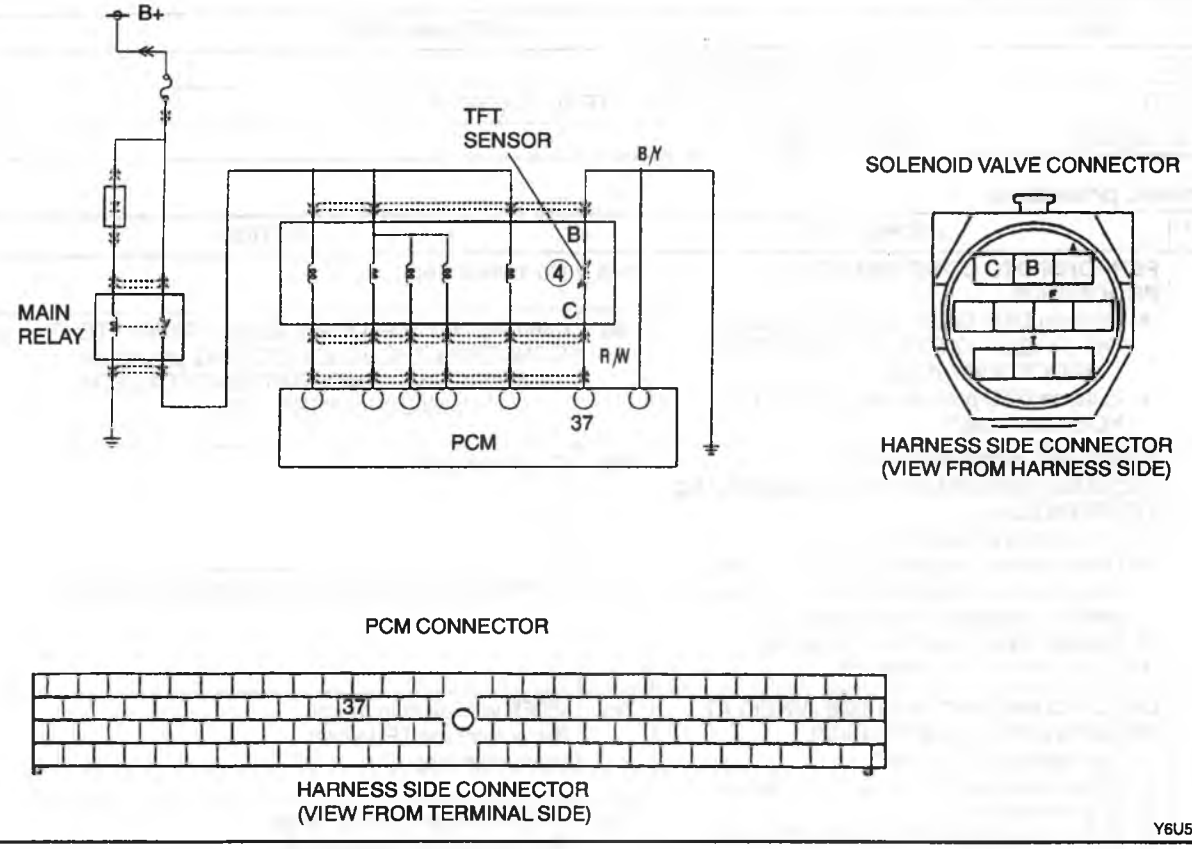
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present during KOEO or KOER self-test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERNS TROUBLESHOOTING procedure. (See 01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**CHECK NGS TESTER DISPLAY** • Connect NGS tester to DLC. • Are TFT sensor and NGS tester display correct? (See 01-40A-15 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [FS])	Yes	Go to step 10.
		No	Go to next step.
3	**CHECK SOLENOID BODY CONNECTOR** • Are solenoid body connector at the connector and connector pins okay?	Yes	Go to next step.
		No	Replace solenoid body component, then go to step 10.

STEP	INSPECTION		ACTION
4	**CHECK TFT SENSOR** ● Install transaxle tester to solenoid body connector. ● Set bench/drive switch to BENCH mode. ● Rotate gear selector switch to OHMS check position. ● Connect ohmmeter negative lead to −TFT jack and positive lead to +TFT jack of tester. ● Record resistance. ● Resistance should be approximately in the following ranges. (See 05-17A-24 Transaxle Tester Instruction)	Yes	Go to next step.
		No	Replace solenoid body component, then go to step 10. (See 05-17A-33 SOLENOID BODY REMOVAL/INSTALLATION [LA4A-EL])
5	**CHECK PCM CONNECTOR** ● Are PCM at the connector and connector pins okay?	Yes	Go to next step.
		No	Repair or replace connectors, then go to step 10.
6	**CHECK VOLTAGE OF POWER SUPPLY CIRCUIT** ● Disconnect solenoid body connector. ● Turn ignition key to ON (engine OFF). ● Is there battery positive voltage at TFT sensor harness side connector terminals A, E, and I?	Yes	Repair or replace connectors and wiring, then go to step 10.
		No	Go to next step.
7	**CHECK SHORT TO POWER CIRCUITS** ● Disconnect negative battery cable. ● Disconnect solenoid body connector and PCM connector. ● Connect breakout box. ● Is there continuity from PCM harness side connector terminals 37 to 71?	Yes	Repair or replace connectors and wiring, then go to step 10.
		No	Go to next step.
8	**CHECK CONTINUITY** ● Disconnect negative battery cable. ● Disconnect solenoid body connector and PCM connector. ● Connect breakout box. ● Is there continuity between PCM harness side connector terminal 37 and body ground?	Yes	Repair or replace connectors and wiring, then go to step 10.
		No	Go to next step.
9	**CHECK HARNESS CONTINUITY** ● Disconnect negative battery cable. ● Disconnect solenoid body connector and PCM connector. ● Connect breakout box. ● Is there continuity between PCM harness side connector terminal 37 and corresponding connector terminals at the solenoid body connector harness side connector terminal C?	Yes	Go to next step.
		No	Repair or replace connectors and wiring, then go to step 10.
10	**VERIFY TROUBLESHOOTING OF DTC P0713 AND DTC P1718 IS COMPLETED** ● Make sure to reconnect all disconnected connectors. ● Clear DTC from memory using NGS tester generic OBD-II function. ● Perform DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) ● Is same DTC present?	Yes	Replace PCM and go to next step. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS])
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** ● Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting is completed.

DTC P1711 [LA4A-EL]

Z6U050201030W32

DTC P1711	Transaxle fluid temperature (TFT) out of range during KOEO/KOER
DETECTION CONDITION	• The PCM detects the TFT sensor input that was out of range during self test. **Diagnostic support note** • This DTC is also detected by KOEO and KOER self-test. • O/D OFF indicator light does not flash. • MIL does not illuminate. • PENDING CODE is available. • FREEZE FRAME DATA is not available. • DTC is not stored in the PCM memory.
POSSIBLE CAUSE AND/OR SYMPTOM	• Fluid level is not as specified. • Fluid is not at operating temperature. • Damaged TFT sensor • Damaged powertrain control module (PCM)



Troubleshooting Hint

Fail-safe

- No fail-safe (KOEO, KOER disabled completing diagnostic routines)

TFT sensor description

- The TFT sensor is located on the solenoid valve body. It is a temperature-sensitive device called a thermistor. The resistance value of the TFT sensor will vary with temperature.
- The PCM monitors the voltage across the TFT sensor to determine the ATF temperature. The PCM uses this signal to determine shift schedule and to control line pressure for cold and hot temperature operation. The PCM also inhibits torque converter clutch (TCC) operation at low ATF temperature and adjusts electronic pressure control (EPC) pressure for temperature.

TFT temperature chart

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-19— -1	-3—31	242—84
0—20	32—68	84—41
21—40	69—104	41—14
41—70	105—158	14—5.9
71—90	159—194	5.9—3.1
91—110	195—230	3.1—1.7
111—130	231—266	1.7—1
131—150	267—302	1—0.6

TFT sensor specification

Item	KOEO and KOER
TFT PID	Indicates ATF temperature
TFTV PID	ATF 30 °C {86 °F} : 2.55 V, ATF 70 °C {158 °F} : 1.02 V
PCM 37 (signal)	Same as above

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present during KOEO or KOER self-test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERNS TROUBLESHOOTING procedure. (See 01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**KOEO AND KOER DTC P1711: INCREASE/DECREASE TRANSAXLE FLUID TEMPERATURE** • Connect NGS tester to DLC. • Drive vehicle through normal city traffic to bring the transaxle fluid temperature to at least 10 degrees C (50 degrees F). • Activate KOEO and KOER Self Tests. • Is DTC P1711 still present?	Yes	Go to next step.
		No	Transaxle fluid was not at operating temperature.
3	**CHECK CONSTANT VOLTAGE (VREF) AT THROTTLE POSITION SENSOR** • Turn ignition key to OFF. • Disconnect throttle position (TP) sensor. • Key on engine off. • Measure voltage between the TP sensor VREF and TP sensor ground circuits at the TP sensor vehicle harness connector. • Is voltage between 4.0 and 6.0 volts?	Yes	VREF voltage is in range. Reconnect the TP sensor. Go to next step.
		No	VREF voltage is out of range. Go to reference voltage test. (See 01-40A-15 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [FS])

STEP	INSPECTION		ACTION
4	**CHECK TFT SENSOR RESISTANCE AS TRANSAXLE FLUID TEMPERATURE IS VARIED** • Turn ignition key to OFF. • Disconnect PCM. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, and leave PCM disconnected. • Verify that transaxle oil pan is warm to the touch. — IF IT IS HOT: • Measure and record TFT sensor resistance between Test Pin 37 and Test Pin 91 at the breakout box. • Let transaxle cool down and repeat the measurement. (The last measurement should be greater than the first.) — IF IT IS COLD: • Measure and record TFT sensor resistance between Test Pin 37 and Test Pin 91 at the breakout box. • Reconnect the PCM and drive vehicle for short time to elevate temperature. • Disconnect the PCM and repeat the measurement at the breakout box. (The last measurement should be less than the first.) **Note** • Refer to tables and charts at the beginning of this pinpoint test. • Did resistance measurements differ as expected and was last measurement within specifications?	Yes	Replace damaged PCM, then go to step 7. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS])
		No	Go to next step.

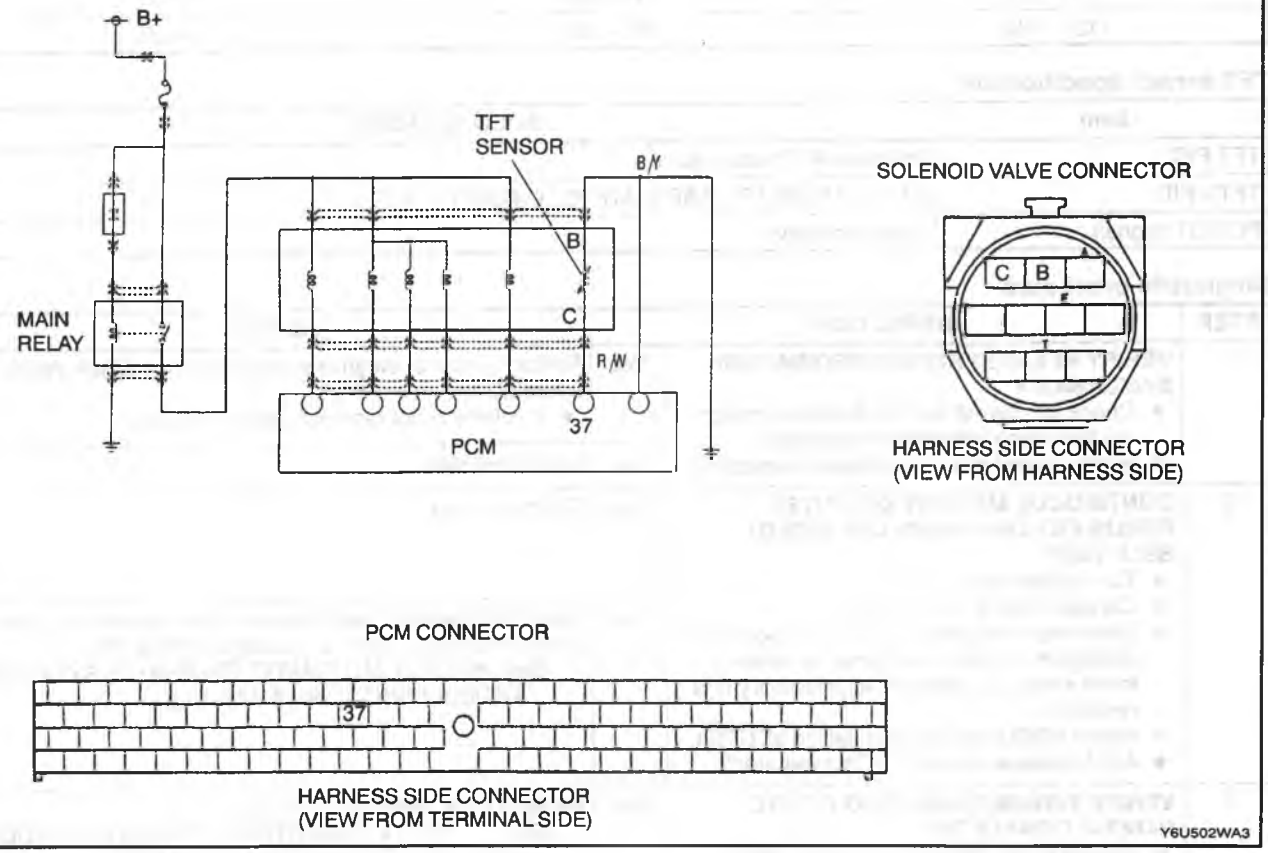
STEP	INSPECTION		ACTION
5	**CHECK RESISTANCE OF TFT SENSOR/HARNESS** **Note** • Refer to the transaxle tester for terminal location. • Ensure that the emission harness is disconnected. • Install transaxle tester to solenoid body connector. • Set bench/drive switch to BENCH mode. • Rotate gear selector switch to OHMS check position. • Connect ohmmeter negative lead to −TFT jack and positive lead to + TFT jack of tester. • Perform tests 1 and 2. **Note** • While performing tests 1 and 2, observe resistances. Code P0713 is set if resistance value exceeds 869K ohms (OPEN circuit). Code P0712 is set if resistance value falls below 597 ohms (Short circuit). **TEST 1** • Record resistance. • Resistance should be approximately in the following ranges: **Transaxle fluid temperature** (See 05-17A-24 Transaxle Tester Instruction) **TEST 2** • Check for intermittent short or open. • If resistance was between 0.8K and 100K ohms, perform the following test. If transaxle is cold, run transaxle to warm it up. If transaxle is warm, allow transaxle to cool. Check TFT sensor resistance again. Compare resistance with internal resistance. Resistance should decrease if transaxle was warmed and should increase if transaxle was allowed to cool. If correct change in resistance occurs, repeat OBD test. • Is the resistance within range?	Yes	Go to next step.
		No	Replace solenoid body component, then go to step 7. (See 05-17A-33 SOLENOID BODY REMOVAL/INSTALLATION [LA4A-EL])
6	**CHECK TFT SENSOR FOR SHORT TO GROUND** • Check for continuity between −BAT (engine ground) and appropriate jack (−TFT and + TFT) appropriate wire with ohmmeter or other low current tester (less than 200 milliamps). • Connection should show infinite resistance (no continuity). • Is there continuity?	Yes	Replace solenoid body component, then go to step 7. (See 05-17A-33 SOLENOID BODY REMOVAL/INSTALLATION [LA4A-EL])
		No	Go to next step.
7	**VERIFY TROUBLESHOOTING OF DTC P1711 IS COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Perform DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present?	Yes	Replace PCM and go to next step. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS])
		No	Go to next step.

STEP	INSPECTION		ACTION
8	**VERIFY AFTER REPAIR PROCEDURE** • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting is completed.

DTC P1783 [LA4A-EL]

Z6U050201030W33

DTC P1783	High temperature operation
DETECTION CONDITION	• Transaxle operated at high temperature **Diagnostic support note** • This is a continuous monitor (CCM). • O/D OFF indicator light flashes if PCM detects the above malfunction condition during first drive cycle. • MIL does not illuminate. • PENDING CODE is not available. • FREEZE FRAME DATA is not available. • DTC is stored in the PCM memory.
POSSIBLE CAUSE AND/OR SYMPTOM	• Damaged transaxle cooling system • Excessive loading, e.g. trailer towing • Damaged clutch • Improper transaxle fluid level • Damaged transaxle connector



Y6U502WA3

Troubleshooting Hint
Malfunction mode effects management
- Electronic pressure control (EPC) minimum static pressure increased.

TFT sensor description
- The TFT sensor is located on the solenoid valve body. It is a temperature-sensitive device called a thermistor. The resistance value of the TFT sensor will vary with temperature.
- The PCM monitors the voltage across the TFT sensor to determine the ATF temperature. The PCM uses this signal to determine shift schedule and to control line pressure for cold and hot temperate operation. The PCM also inhibits torque converter clutch (TCC) operation at low ATF temperature and adjusts electronic pressure control (EPC) pressure for temperate.

TFT temperature chart

°C	°F	Resistance (KΩ)
-40— -20	-40— -4	1134—242
-19— -1	-3—31	242—84
0—20	32—68	84—41
21—40	69—104	41—14
41—70	105—158	14—5.9
71—90	159—194	5.9—3.1
91—110	195—230	3.1—1.7
111—130	231—266	1.7—1
131—150	267—302	1—0.6

TFT sensor specification

Item	KOEO and KOER
TFT PID	Indicates ATF temperature
TFTV PID	ATF 30 °C {86 °F} : 2.55 V, ATF 70 °C {158 °F} : 1.02 V
PCM 37 (signal)	Same as above

Diagnostic procedure

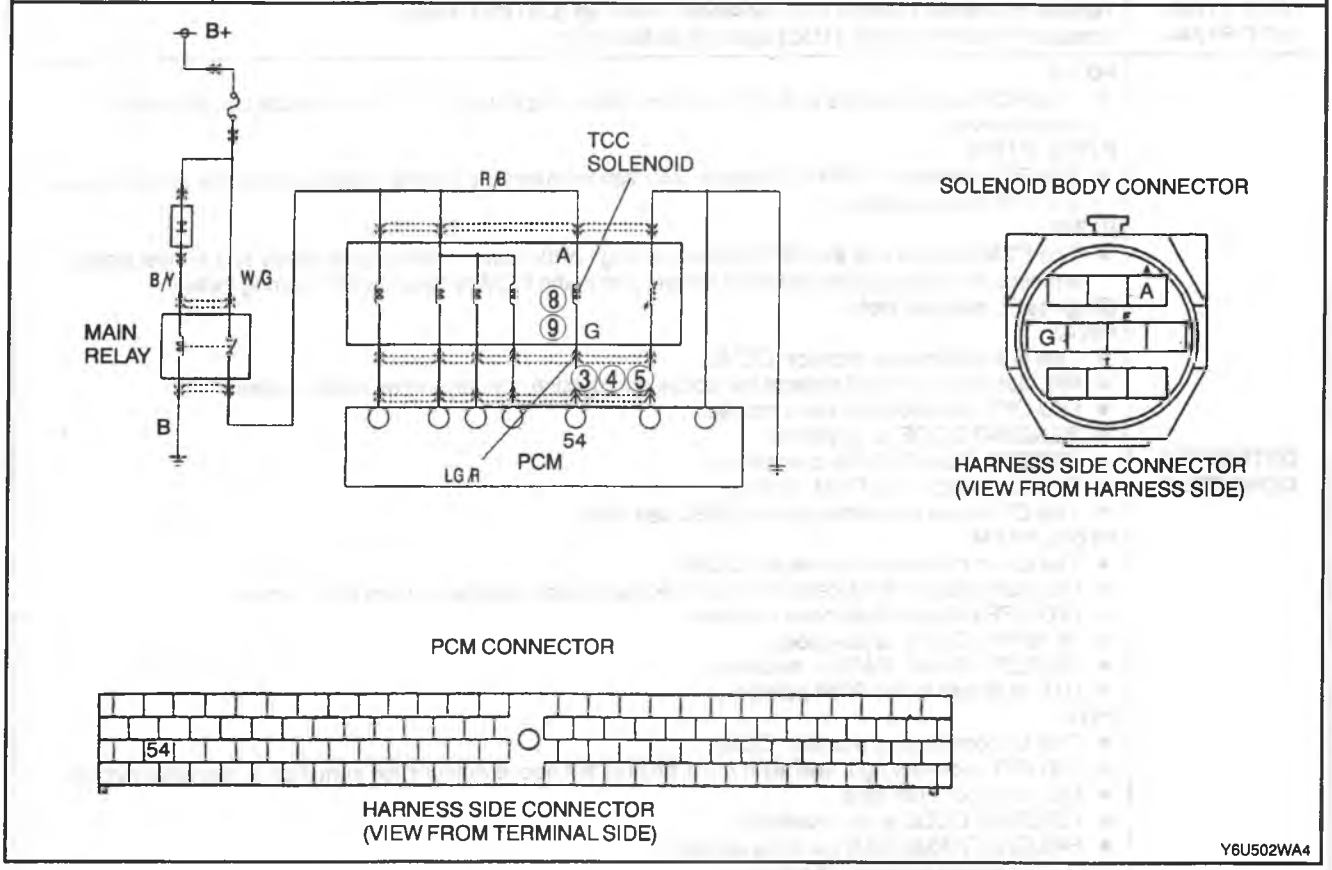
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
2	**CONTINUOUS MEMORY DTC P1783: RERUN KEY ON ENGINE OFF (KOEO) SELF-TEST** • Turn ignition key to OFF. • Connect NGS tester to DLC. • Disconnect transaxle connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary and reconnect. • Rerun KOEO self test and record all DTCs. • Any transaxle-related DTCs generated?	Yes	Go to next step.
		No	Refer to Symptom Troubleshooting for over temperature condition (check clutch, transaxle fluid level etc.). (See 05-03A-7 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [LA4A-EL])
3	**VERIFY TROUBLESHOOTING OF DTC P1783 IS COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Perform DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present?	Yes	Replace PCM, then go to next step. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS])
		No	Go to next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting is completed.

DTC P0743, DTC P1742, DTC P1743, DTC P1744 [LA4A-EL]

Z6U050201030W34

DTC P0743 **DTC P1742** **DTC P1743** **DTC P1744**	**Torque converter clutch (TCC) solenoid circuit malfunction** **Torque converter clutch (TCC) solenoid failed on (MIL on)** **Torque converter clutch (TCC) solenoid failed on (O/D OFF flash)** **Torque converter clutch (TCC) system malfunction**
DETECTION CONDITION	**P0743** ● The PCM detects opens or short circuit by monitoring the status of the feedback circuit from the output driver. **P1742, P1743** ● The PCM detects no RPM difference (low slip) between the engine speed and turbine speed across the TCC during unlock. **P1744** ● The PCM detects that the RPM difference (high slip) between the engine speed and turbine speed exceeds the preprogrammed RPM differences in the PCM across the TCC during lockup. **Diagnostic support note** **P0743** ● This is a continuous monitor (CCM). ● MIL illuminates if PCM detects the above malfunction condition in two drive cycles. ● O/D OFF indicator light does not flash. ● PENDING CODE is available. ● FREEZE FRAME DATA is available. ● DTC is stored in the PCM memory. ● This DTCs are also detected by KOEO self-test. **P1742, P1744** ● These are continuous monitors (CCM). ● MIL illuminates if PCM detects the above malfunction condition in two drive cycles. ● O/D OFF indicator light does not flash. ● PENDING CODE is available. ● FREEZE FRAME DATA is available. ● DTC is stored in the PCM memory. **P1743** ● This is a continuous monitor (CCM). ● O/D OFF indicator light flashes if PCM detects the above malfunction condition in two drive cycles. ● MIL does not illuminate. ● PENDING CODE is not available. ● FREEZE FRAME DATA is not available. ● DTC is stored in the PCM memory.
POSSIBLE CAUSE	**Possible cause** ● Engine: Performance, cooling ● Electrical: Battery, input sensors, wiring harnesses, brake switch ● Transaxle: Internal transaxle components, linkage, cooling

DTC P0743	Torque converter clutch (TCC) solenoid circuit malfunction
DTC P1742	Torque converter clutch (TCC) solenoid failed on (MIL on)
DTC P1743	Torque converter clutch (TCC) solenoid failed on (O/D OFF flash)
DTC P1744	Torque converter clutch (TCC) system malfunction



Troubleshooting Hint

Fail-safe

P0743

- No fail-safe.
- TCC will not lock due to malfunction.

P1742, P1743

- No fail-safe.
- Harsh shifts and stall possible due to malfunction.

P1744

- Unconditionally unlocks the TCC.
- Electronic pressure control (EPC) minimum static pressure increased.

TCC description

- The TCC solenoid is a pulse width modulating (PWM) style solenoid. The PWM solenoid is used to control the apply and release of the bypass clutch in the torque converter.
- By modulating the pulse width of the TCC solenoid pressure in the S4 circuit varies modulating the apply and release of the bypass clutch in the torque converter.

Solenoid valve operation chart

The following solenoid operation chart shows normal solenoid operation for given operation mode.

Transaxle range selector lever position	PCM commanded gear	SS1	SS2	3-2T/CCS	TCC
P	1	OFF	ON	—	OFF
R	—	OFF	ON	—	*
N	—	OFF	ON	—	OFF
D (O/D)					
D	1	ON	ON	—	*

Transaxle range selector lever position	PCM commanded gear	SS1	SS2	3-2T/CCS	TCC
D	2	OFF	ON	—	**
D	3	OFF	OFF	—	**
D	4	ON	OFF	ON	**
D (O/D OFF)					
D	1	ON	ON	ON	*
D	2	OFF	ON	OFF	**
D	3	OFF	OFF	OFF	**
2	2	OFF	ON	OFF	**
2***	3***	OFF	OFF	OFF	
1	1	OFF	ON	OFF	**
1***	2	OFF	ON	OFF	**
1***	3	OFF	OFF	OFF	**

* : Not allowed by hydraulics

** : PCM commanded

***: When a select operation occurs above a calibrated speed, the transaxle will not downshift from the higher gear until the vehicle speed below this calibrated speed

TCC specification

Item	KOEO (P, N)	KOER	
		TCC released	TCC engaged
TCC PID	0 %	0 %	100 %
PCM 54	Below 1.0V	Below 1.0V	B+

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present during KOEO or KOER self-test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERNS TROUBLESHOOTING procedure. (See 01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**ELECTRONIC DIAGNOSTICS** • Check the solenoid body connector is fully seated, terminals are fully engaged in the connector and in good condition before proceeding. • Connect NGS tester. • Perform key on engine off (KOEO) test until continuous memory DTC have been displayed. • Enter output test mode. (See 01-02A-8 FOREWORD [FS]) • Select TCC PID. • Cycle TCC solenoid ON/OFF by selecting ON/OFF mode. • Does TCC PID cycle?	Yes	Go to next step.
		No	If vehicle did not enter output state (Diagnostic test mode (DTM)). (See 01-02A-8 FOREWORD [FS])

STEP	INSPECTION		ACTION
3	**CHECK ELECTRICAL SIGNAL OPERATION** **Caution** • **Removing the solenoid body connector by prying with a screwdriver will damage the connector. Remove the solenoid body connector by pushing on the wire tab and pulling on the wiring harness.** • Disconnect solenoid body connector. • Using a mirror, inspect both ends of the connector for damaged or pushed out pins, corrosion, loose wires, and missing or damaged seals. • Refer to connector schematic and table of solenoid body. (See 05-02A-56 SOLENOID BODY CONNECTOR COMPONENT [LA4A-EL]) • Connect volt-ohm meter (VOM)/digital volt-ohm meter (DVOM) positive test lead to power circuit and negative test lead to TCC solenoid circuit of the solenoid body connector (vehicle harness side). • VOM/DVOM on 20 Volt scale. • While observing DVOM, cycle solenoid output ON and OFF. • Does the TCC solenoid output voltage change at least 0.5 volt?	Yes	Go to step 6.
		No	Go to next step.
4	**CHECK CONTINUITY OF SOLENOID SIGNAL AND POWER CIRCUIT HARNESS CIRCUITS** • Turn ignition key to OFF. • Disconnect solenoid body connector. • Disconnect PCM. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as required. • Install breakout box, leave PCM disconnected. • Refer to connector schematic and table of solenoid body. (See 05-02A-56 SOLENOID BODY CONNECTOR COMPONENT [LA4A-EL]) • Measure resistance between PCM signal pin 54 at the breakout box and signal test pin at solenoid body connector. • Measure resistance between PCM test pin 71/97 at the breakout box and power circuit pin at solenoid body connector. • Is each resistance less than 5.0 ohms?	Yes	Go to next step.
		No	Repair or replace connectors and wiring, then go to step 10.

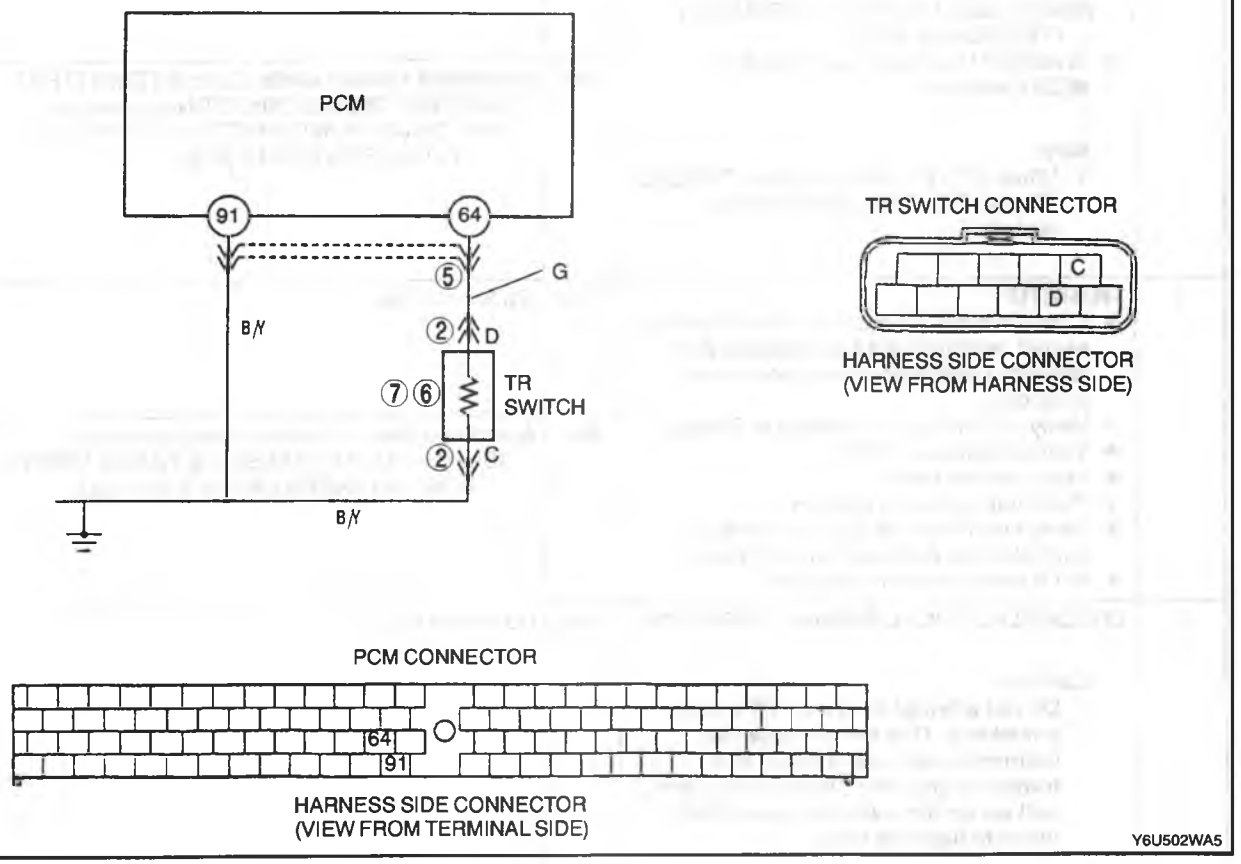
STEP	INSPECTION		ACTION
5	**CHECK SOLENOID HARNESS FOR SHORTS TO POWER AND GROUND** • Turn ignition key to OFF. • Breakout box installed, PCM disconnected. • Solenoid body connector disconnected. • Refer to connector schematic and table of solenoid body. (See 05-02A-56 SOLENOID BODY CONNECTOR COMPONENT [LA4A-EL]) • Measure resistance between PCM signal test pin 54 and test pin 71/97 at the breakout box. • Measure resistance between PCM signal test pin 54 and test pins 77/103 and 91 at breakout box and chassis ground. • Is each resistance greater than 10,000 ohms?	Yes	Go to next step.
		No	Repair or replace connectors and wiring, then go to step 10.
6	**SOLENOID FUNCTIONAL TEST** • Emission harness disconnected at transaxle. • Install transaxle tester at the solenoid body connector. • Using tests outlined under tester instructions perform the solenoid voltage test. **Note** • LED will turn "GREEN" when solenoid activated and turn "OFF" when deactivated. • LED will turn "RED" if activated solenoid is shorted to BAT+. • LED will remain "OFF" if an activated solenoid is shorted to ground or no continuity. • Does the solenoid activate? (LED GREEN)	Yes	Go to next step.
		No	Go to step 8.
7	**TRANSAXLE DRIVE TEST** • Perform the drive cycle test as outlined in transaxle tester manual. • Does the TCC active when commanded by the tester? • Does the engine RPM drop?	Yes	Replace PCM, then go to step 10. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS])
		No	Go to next step.
8	**CHECK SOLENOID RESISTANCE** **Note** • Refer to the transaxle tester for terminal location. • Set bench/drive switch to bench mode. • Rotate gear select switch to ohms check position. • Connect ohmmeter negative lead to TCC jack and positive lead to VPWR jack on tester. • Record resistance. • Is resistance between 12.5—19.0 ohms?	Yes	Go to next step.
		No	Replace solenoid body component, then go to step 10. (See 05-17A-33 SOLENOID BODY REMOVAL/INSTALLATION [LA4A-EL])

STEP	INSPECTION		ACTION
9	**CHECK SOLENOID FOR SHORT TO GROUND** • Check for continuity between BAT- (engine ground) and appropriate jack with and ohmmeter or other low current tester (less than 200 milliamps). Solenoid: TCC — Tester Jack: TCC, VPWR W6U501WA1 • Connection should show infinite resistance (no continuity). • Is there continuity?	Yes	Replace solenoid body component, then go to step 10. (See 05-17A-33 SOLENOID BODY REMOVAL/INSTALLATION [LA4A-EL])
		No	Go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P0743, DTC P1742, DTC P1743 AND DTC P1744 IS COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Perform DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present?	Yes	Replace PCM, then go to next step. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS])
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting is completed.

DTC P1705 [LA4A-EL]

Z6U050201030W35

DTC P1705	Park/Neutral not indicated during KOEO/KOER
DETECTION CONDITION	• The PCM detects improper transaxle range (TR) switch position during self test. **Diagnostic support note** • This DTC is also detected by KOEO and KOER self-test. • O/D OFF indicator light does not flash. • MIL does not illuminate. • PENDING CODE is available. • FREEZE FRAME DATA is not available. • DTC is not stored in the PCM memory.
POSSIBLE CAUSE	• Engine: Starter, starter relay • Electrical: Battery, ignition switch, wiring harness • Transaxle: Internal transaxle components, linkage



Y6U502WA5

Troubleshooting Hint

Fail-safe

Malfunction mode effects management

- No fail-safe (KOEO disabled without completing diagnostic routines)

TR switch description

- The PCM sends a voltage to the TR switch. The TR switch incorporates a series of step down resistors which act as a voltage driver. The PCM monitors this voltage which corresponds to the position of the selector lever (P, R, N, D, 2, 1) to determine desired gear and electronic pressure control (EPC) pressure.
- The TR switch is located on the top of the transaxle, and also contains the neutral/start and backup lamp circuit.

TR switch specification

Item	KOEO and KOER					
	P	R	N	D	2	1
TR PID	PARK	REV	NTRL	O/D ON: O/D O/D OFF: DRIVE	MAN2	MAN1
PCM 64	4.5 V	3.6 V	2.9 V	2.1 V	1.4 V	0.7 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present during KOEO or KOER self-test? **Note** • When DTC P1705 is detected, FREEZE FRAME PID DATA of this code is recorded.	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERNS TROUBLESHOOTING procedure. (See 01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**TR SWITCH** • Check that the TR switch connector is fully seated, terminals are fully engaged in the connector and in good condition before preceding. • Verify shift linkage adjustment in D range. • Turn ignition key to OFF. • Apply parking brake. • Place transaxle in N position. • Verify that TR switch alignment tool or equivalent fits in the appropriate slots. • Is TR switch properly adjusted?	Yes	Go to next step.
		No	Adjust or replace TR switch, then go to step 9. (See 05-17A-31 TRANSAXLE RANGE SWITCH REMOVAL/INSTALLATION [LA4A-EL])
3	**CHECK ELECTRICAL SIGNAL OPERATION** **Caution** • **Do not attempt to pry on TR switch connector. This will damage the connector and could result in a transaxle concern. Press button and pull up on the transaxle connector (vehicle harness side).** • Disconnect TR switch connector. • Using a mirror, inspect both end of the connector for damaged or pushed out pins, corrosion, loose wires and missing or damaged seals. • Refer to connector schematic of TR switch. (See 05-02A-56 TRANSAXLE RANGE (TR) SWITCH CONNECTOR COMPONENT [LA4A-EL]) • Connect a volt-ohm meter (VOM) positive test lead to TR signal circuit and negative test lead to the signal return (SIG RTN) of TR switch connector (vehicle harness side). • Place VOM on 20 volt scale. • Key on engine off. • Is voltage between 4.75 and 5.25 volts?	Yes	Go to next step.
		No	Go to ENGINE SYMPTOM TROUBLESHOOTING.

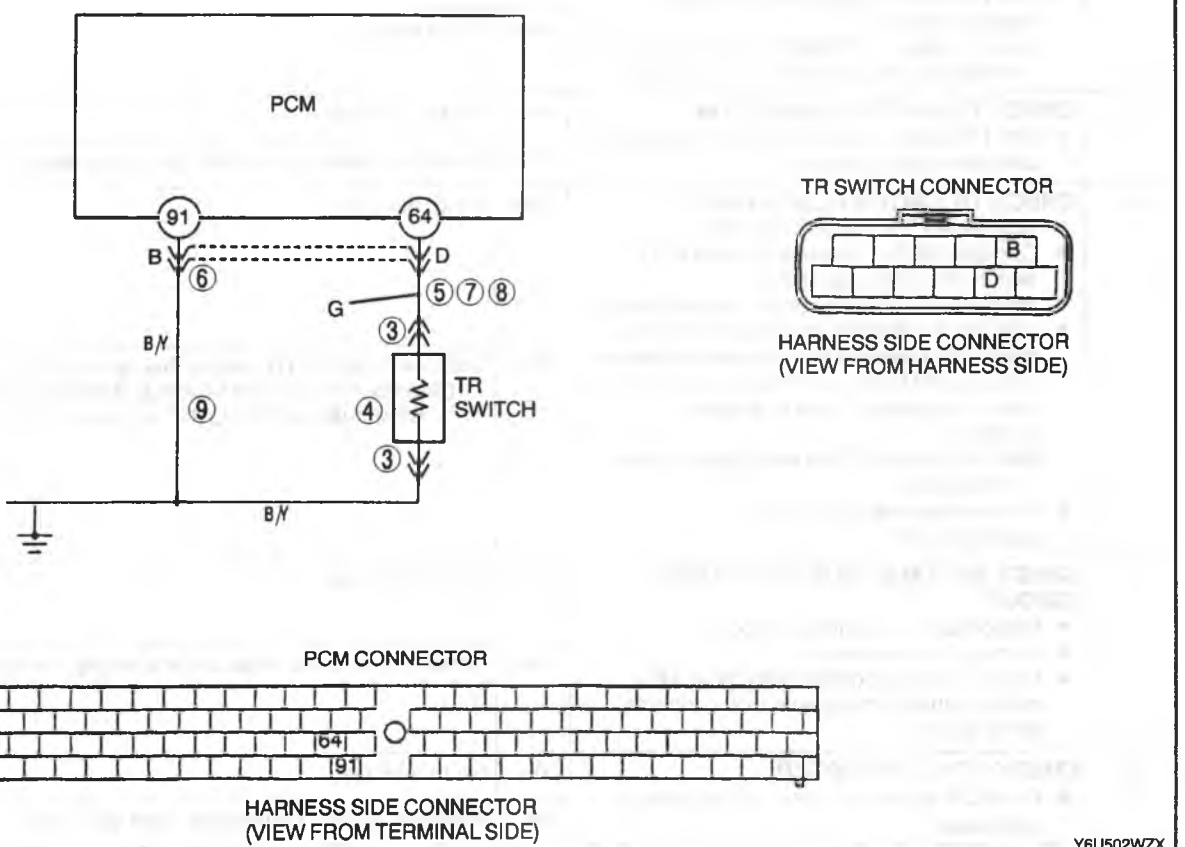
STEP	INSPECTION		ACTION
4	**CHECK CONTINUITY OF TR SWITCH HARNESS CIRCUITS** • Turn ignition key to OFF. **Caution** • **Do not attempt to pry on TR switch connector. This will damage the connector and could result in a transaxle concern. Press button and pull up on the transaxle connector (vehicle harness side).** • Disconnect TR switch connector. • Inspect for damaged or pushed out pins, corrosion, loose wires, etc. • Disconnect PCM. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. service as required. • Install breakout box, and leave PCM disconnected. • Refer to TR switch connector. (See 05-02A-56 TRANSAXLE RANGE (TR) SWITCH CONNECTOR COMPONENT [LA4A-EL]) • Measure resistance between PCM test pin 91 at the breakout box and the signal return circuits at the TR switch connector. • Measure resistance between PCM test pin 64 at the breakout box and TR signal circuit at the TR switch connector. • Is each resistance less than 5.0 ohms?	Yes	Go to next step.
		No	Repair or replace connectors and wiring, then go to step 9.
5	**CHECK TR SWITCH CIRCUIT FOR SHORTS TO POWER AND GROUND** • Breakout box installed, PCM disconnected. • TR switch connector disconnected. • Refer to TR switch connector. (See 05-02A-56 TRANSAXLE RANGE (TR) SWITCH CONNECTOR COMPONENT [LA4A-EL]) • Measure resistance between PCM test pin 64 and PCM test pins 71, 97, 24, 51, 77, 103 and 91 at the breakout box. • Measure resistance between PCM test pin 64 at the breakout box and chassis ground. • Is each resistance greater than 10,000 ohms?	Yes	Go to next step.
		No	Repair or replace connectors and wiring, then go to step 9.
6	**CHECK TR SWITCH RESISTANCE** • Disconnect TR switch connector. • Connect MLP-D harness adapter to TR switch and transaxle tester. • Install MLP-D overlay onto transaxle tester. • Use the procedures outlined in the tester manual to measure the resistance between TR and SRTN of the TR switch, verify the switch resistance values in all gear positions. (See 05-17A-29 Transaxle Range Switch Instruction) • Are the resistance values within specifications?	Yes	Go to next step.
		No	Replace TR switch and adjust, then go to step 9. (See 05-17A-31 TRANSAXLE RANGE SWITCH REMOVAL/INSTALLATION [LA4A-EL])

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>7</td><td>CHECK PARK/NEUTRAL CIRCUITS OF TR SWITCH
• Using the procedures outlined in the tester manual, check the park/neutral circuits of TR switch in all gear positions.
• Monitor the status light on the tester for proper indications.
<table><tr><th colspan="3">Park/neutral circuit</th></tr><tr><th>Terminal</th><th>Selector lever position</th><th>A good switch will indicate</th></tr><tr><td rowspan="6">64 and 91</td><td>P</td><td>Less than 5 ohms</td></tr><tr><td>R</td><td>Greater than 100K ohms</td></tr><tr><td>N</td><td>Less than 5 ohms</td></tr><tr><td>D</td><td>Greater than 100K ohms</td></tr><tr><td>2</td><td>Greater than 100K ohms</td></tr><tr><td>1</td><td>Greater than 100K ohms</td></tr></table>W6U501WA2
• Do the park/neutral circuits operate properly and only in the proper gear position?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td></td><td></td><td>No</td><td>Replace TR switch and adjust, then go to step 9.
(See 05-17A-31 TRANSAXLE RANGE SWITCH REMOVAL/INSTALLATION [LA4A-EL])</td></tr>
<tr><td>8</td><td>CHECK REVERSE/BACK-UP LIGHT CIRCUIT OF TR SWITCH
• Using the procedures outlined in the tester manual, check the reverse/back-up light circuits of TR switch in all gear positions.
• Monitor the status light on the tester for proper indications.
<table><tr><th colspan="3">Reverse/back-up light circuit</th></tr><tr><th>Terminal</th><th>Selector lever position/ range</th><th>A good switch will indicate</th></tr><tr><td rowspan="6">92 and 91</td><td>P</td><td>Greater than 100K ohms</td></tr><tr><td>R</td><td>Less than 5 ohms</td></tr><tr><td>N</td><td>Greater than 100K ohms</td></tr><tr><td>D</td><td>Greater than 100K ohms</td></tr><tr><td>2</td><td>Greater than 100K ohms</td></tr><tr><td>1</td><td>Greater than 100K ohms</td></tr></table>W6U501WA3
• Do the reverse/back-up circuits operate properly and only in the proper gear positions?</td><td>Yes</td><td>Go to next step.</td></tr>
<tr><td></td><td></td><td>No</td><td>Replace TR switch and adjust, then go to step 9.
(See 05-17A-31 TRANSAXLE RANGE SWITCH REMOVAL/INSTALLATION [LA4A-EL])</td></tr>
<tr><td>9</td><td>VERIFY TROUBLESHOOTING OF DTC P1705 IS COMPLETED
• Make sure to reconnect all disconnected connectors.
• Clear DTC from memory using NGS tester. Generic OBD-II function.
• Perform DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS])
• Is same DTC present?</td><td>Yes</td><td>Replace PCM, then go to next step.
(See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS])</td></tr>
<tr><td></td><td></td><td>No</td><td>Go to next step.</td></tr>
<tr><td>10</td><td>VERIFY AFTER REPAIR PROCEDURE
• Is there any DTC present?</td><td>Yes</td><td>Go to applicable DTC inspection.</td></tr>
<tr><td></td><td></td><td>No</td><td>Troubleshooting is completed.</td></tr>
</table>

DTC P0707, DTC P0708 [LA4A-EL]

Z6U050201030W36

DTC P0707 **DTC P0708**	**Transaxle range (TR) switch short circuit malfunction** **Transaxle range (TR) switch open circuit malfunction**
DETECTION CONDITION	**P0707** ● The PCM detects the TR switch analog input indicates short circuit. **P0708** ● The PCM detects the TR switch analog input indicates open circuit. **Diagnostic support note** ● These are continuous monitors (CCM). ● MIL illuminates if PCM detects the above malfunction condition in two drive cycles. ● O/D OFF indicator light does not flash. ● PENDING CODE is available. ● FREEZE FRAME DATA is available. ● DTC is stored in the PCM memory. ● These DTCs are also detected by KOEO self-test.
POSSIBLE CAUSE AND/OR SYMPTOM	**Possible cause** ● Damaged TR switch ● Damaged harness ● Damaged harness connector ● Damaged PCM



Y6U502WZX

Troubleshooting Hint

Fail-safe

- Harsh shifts and/or engagement.

TR switch description

- The PCM sends a voltage to the TR switch. The TR switch incorporates a series of step down resistors which act as a voltage driver. The PCM monitors this voltage which corresponds to the position of the selector lever (P, R, N, D, 2, 1) to determine desired gear and electronic pressure control (EPC) pressure.
- The TR switch is located on the top of the transaxle, and also contains the neutral/start, and backup lamp circuit.

TR switch specification

Item	KOEO and KOER					
	P	R	N	D	2	1
TR PID	PARK	REV	NTRL	O/D ON: O/D OD OFF: DRIVE	MAN2	MAN1
PCM 64	4.5 V	3.6 V	2.9 V	2.1 V	1.4 V	0.7 V

Diagnostic procedure

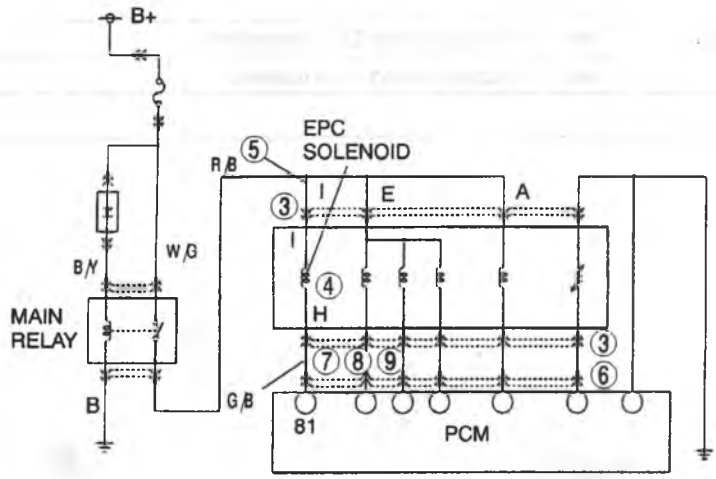
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present during KOEO or KOER self-test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERNS TROUBLESHOOTING procedure. (See 01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**CHECK NGS TESTER DISPLAY** • Connect NGS tester to DLC. • Are TR switch range and NGS tester display correct? (See 01-40A-15 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [FS])	Yes	Go to step 10.
		No	Go to next step.
3	**CHECK TR SWITCH CONNECTOR** • Are TR switch connector at the connector and connector pins okay?	Yes	Go to next step.
		No	Repair or replace connector, then go to step 10.
4	**CHECK TR SWITCH RESISTANCE** • Disconnect TR switch connector. • Connect MLP-D harness adapter to TR switch and transaxle tester. • Install MLP-D overlay onto transaxle tester. • Use the procedures outlined in the tester manual to measure the resistance between TR and SRTN of the TR switch, verify the switch resistance value in all gear positions. (See 05-17A-29 Transaxle Range Switch Instruction) • Are the resistive value within specifications?	Yes	Go to next step.
		No	Replace or adjust TR switch, then go to step 10. (See 05-17A-31 TRANSAXLE RANGE SWITCH REMOVAL/INSTALLATION [LA4A-EL])
5	**CHECK VOLTAGE OF POWER SUPPLY CIRCUIT** • Disconnect TR switch connector. • Turn ignition switch on. • Is there battery positive voltage at TR switch connector harness side connector terminal D?	Yes	Go to next step.
		No	Repair or replace connectors and wiring, then go to step 10.
6	**CHECK PCM CONNECTOR** • Are PCM at the connector and connector pins okay?	Yes	Go to next step.
		No	Repair or replace connectors, then go to step 10.
7	**CHECK CONTINUITY** • Disconnect negative battery cable. • Disconnect TR switch connector and PCM connector. • Connect breakout box. • Is there continuity between PCM harness side connector terminal 64 and body ground?	Yes	Repair or replace connectors and wiring, then go to step 10.
		No	Go to next step.
8	**CHECK CONTINUITY** • Disconnect negative battery cable. • Disconnect TR switch connector and PCM connector. • Connect breakout box. • Is there continuity between PCM harness side connector terminals 64, 71, and 97?	Yes	Repair or replace connectors and wiring, then go to step 10.
		No	Go to next step.

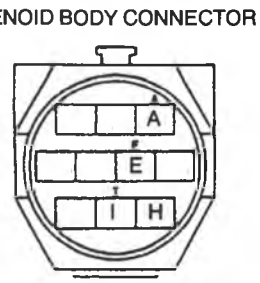
STEP	INSPECTION		ACTION
9	**CHECK CONTINUITY OF TR SWITCH HARNESS CIRCUITS** • Disconnect TR switch connector and PCM connector. • Connect breakout box, and leave PCM disconnected. • Refer to TR switch connector. (See 05-02A-56 TRANSAXLE RANGE (TR) SWITCH CONNECTOR COMPONENT [LA4A-EL]) • Measure resistance between PCM test pin 91 at the breakout box and the signal return circuit at the TR switch connector. • Measure resistance between PCM test pin 64 at the breakout box and TR signal circuit at the TR switch connector. • Is each resistance less than 5.0 ohms?	Yes	Go to next step.
		No	Repair or replace connectors and wiring, then go to step 10.
10	**VERIFY TROUBLESHOOTING OF DTC P0707 AND DTC P0708 IS COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Perform DTC Confirmation Procedure. • DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present?	Yes	Replace PCM, then go to next step. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS])
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting is completed.

DTC P1746, DTC P1747 [LA4A-EL]

Z6U050201030W37

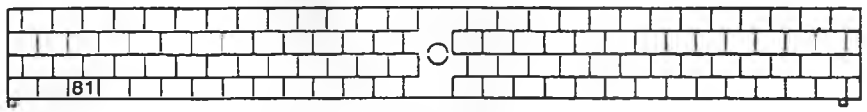
DTC P1746 DTC P1747	**Electronic pressure control (EPC) open** **Electronic pressure control (EPC) short**
DETECTION CONDITION	• The PCM detects opens or shorts by monitoring the current of the feedback circuit from the output driver. **Diagnostic support note** **P1746** • This is a continuous monitor (CCM). • O/D OFF indicator light flashes if PCM detects the above malfunction condition in two drive cycles. • MIL does not illuminate. • PENDING CODE is available. • FREEZE FRAME DATA is not available. • DTC is stored in the PCM memory. • This DTC is also detected by KOEO self-test. **P1747** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two drive cycles. • O/D OFF indicator light does not flash. • PENDING CODE is available. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC is also detected by KOEO self-test.
POSSIBLE CAUSE	**Possible cause** • Engine: Performance • Electrical: Battery, input sensors, wiring harness • Transaxle: Internal transaxle components, cooling





HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

PCM CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

Y6U502WA6

Troubleshooting Hint
Fail-safe
P1746
- Unconditionally unlock torque converter clutch (TCC)
- Maximum pressure due to malfunction

P1747
- EPC minimum static pressure increased
- Maximum pressure due to malfunction

EPC solenoid description
- The EPC solenoid is a variable force style (VFC) solenoid. The VFC type solenoid is an electro-hydraulic actuator combining a solenoid and regulator valve.
- This solenoid provides electronic pressure control (EPC) which regulates line pressure (LP) and line modulator (LM) pressure. This is controlled by producing a resisting pressure to the main regulator and line modulator circuit. The LP and LM pressures control the clutch application pressure.

EPC solenoid specification

Item	KOEO		KOER	
	Closed throttle	Wide open throttle	Closed throttle	Wide open throttle
EPC PID	0 kPa {0 psi}	0 kPa {0 psi}	P, N, R: 470—530 kPa {68—77 psi} D, 2, 1: 330—370 kPa {47—53 psi}	R: 1,790—2,020 kPa {259—294 psi} D, 2, 1: 1,158—1,269 kPa {168—184 psi}
PCM 81	9.4 V	B+	9.4 V	B+

Diagnostic procedure

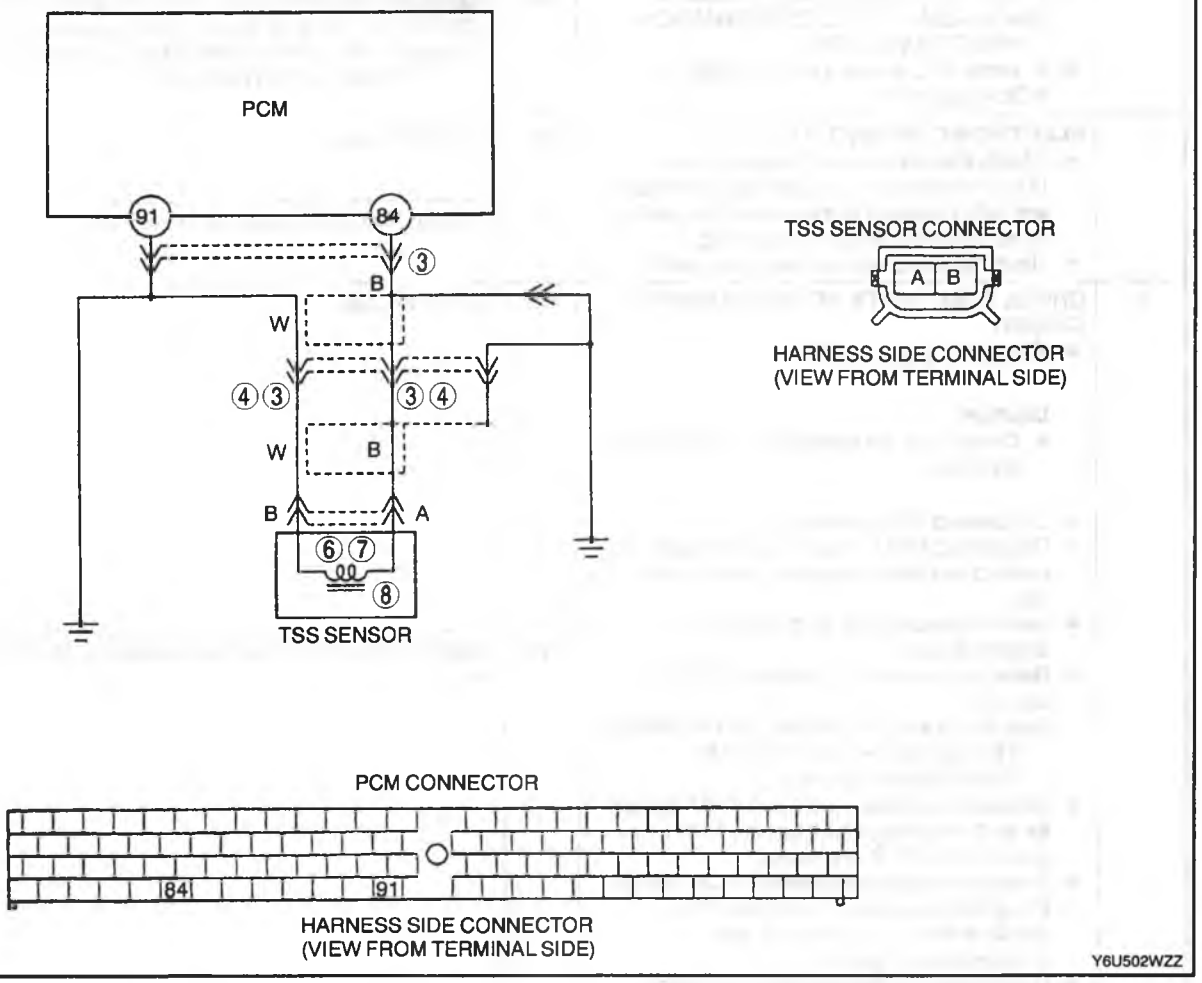
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present during KOEO or KOER self-test? **Note** • When DTC P1746 is detected, FREEZE FRAME PID DATA of this code is recorded.	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERNS TROUBLESHOOTING procedure. (See 01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**CHECK NGS TESTER DISPLAY** • Connect NGS tester to DLC. • Are EPC solenoid and NGS tester display correct? (See 01-40A-15 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [FS])	Yes	Go to step 10.
		No	Go to next step.
3	**CHECK SOLENOID BODY CONNECTOR** • Are solenoid body connector at the connector and connector pins okay?	Yes	Go to next step.
		No	Repair or replace connector, then go to step 10.
4	**CHECK EPC SOLENOID** • Install transaxle tester to solenoid body connector. • Set bench/drive switch to BENCH mode. • Rotate gear selector switch to OHMS check position. • Connect ohmmeter negative lead to VPWR jack and positive lead to EPC jack on tester. This is to test EPC solenoid. • Record resistance. • Is the resistance between 3.7—5.92 ohms? (See 05-17A-24 Transaxle Tester Instruction)	Yes	Go to next step.
		No	Replace solenoid body component, then go to step 10. (See 05-17A-33 SOLENOID BODY REMOVAL/INSTALLATION [LA4A-EL])

STEP	INSPECTION		ACTION
5	**CHECK VOLTAGE OF POWER SUPPLY CIRCUIT** ● Disconnect solenoid body connector. ● Turn ignition switch on. ● Is there battery positive voltage at solenoid body connector harness side connector terminals A, E, and I?	Yes	Go to next step.
		No	Repair or replace connectors and wiring, then go to step 10.
6	**CHECK PCM CONNECTOR** ● Are PCM at the connector and connector pins okay?	Yes	Go to next step.
		No	Repair or replace connectors, then go to step 10.
7	**CHECK CONTINUITY** ● Disconnect negative battery cable. ● Disconnect solenoid body connector and PCM connector. ● Connect breakout box. ● Is there continuity between PCM harness side connector terminal 81 and body ground?	Yes	Repair or replace connectors and wiring, then go to step 10.
		No	Go to next step.
8	**CHECK CONTINUITY** ● Disconnect negative battery cable. ● Disconnect solenoid body connector and PCM connector. ● Connect breakout box. ● Is there continuity between PCM harness side connector terminal 81, 71, and 97?	Yes	Repair or replace connectors and wiring, then go to step 10.
		No	Go to next step.
9	**CHECK HARNESS CONTINUITY** ● Disconnect negative battery cable. ● Disconnect solenoid body connector and PCM connector. ● Connect breakout box. ● Is there continuity between PCM harness side connector terminal 81 and corresponding connector terminals at the solenoid body connector harness side connector terminal H?	Yes	Go to next step.
		No	Repair or replace connectors and wiring, then go to step 10.
10	**VERIFY TROUBLESHOOTING OF DTC P1746 AND DTC P1747 IS COMPLETED** ● Make sure to reconnect all disconnected connectors. ● Clear DTC from memory using NGS tester generic OBD-II function. ● Perform DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) ● Is same DTC present?	Yes	Replace PCM, then go to next step. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS])
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** ● Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting is completed.

DTC P0715 [LA4A-EL]

Z6U050201030W38

DTC P0715	Turbine shaft speed (TSS) sensor circuit malfunction
DETECTION CONDITION	• The PCM detects no sensor signal with vehicle moving. **Diagnostic support note** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition in two drive cycles. • O/D OFF indicator light does not flash. • PENDING CODE is available. • FREEZE FRAME DATA is available. • DTC is stored in the PCM memory. • This DTC is also detected by KOER self-test.
POSSIBLE CAUSE	• Electrical: Battery, Input sensors, Wiring harness • Transaxle: Internal transaxle components



Troubleshooting Hint

Fail-safe

- Torque converter clutch (TCC) fail-safe lockup invoked.

TSS sensor description

- The TSS sensor is a magnetic pickup that sends a signal to the PCM that indicates turbine shaft input speed. The TSS sensor provides converter turbine shaft speed information for torque converter clutch (TCC) control strategy. Also, used in determining static electronic pressure control (EPC) pressure setting during shift.

TSS sensor specification

Item	KOEO	KOER			
		Idle		3000 rpm	5000 rpm
		P, N	R, D, 2, 1		
TSS/ISS PID	0 RPM	0 RPM	500–800 RPM	Approx. 3000 RPM	Approx. 5000 RPM
PCM 84	0 V (AC)	0 V (AC)	0.4–0.7 V (AC)	Approx. 2.0 V (AC)	Approx. 3.0 V (AC)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present during KOEO or KOER self-test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERNS TROUBLESHOOTING procedure. (See 01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**ELECTRONIC DIAGNOSTICS** • Check the turbine shaft speed sensor (TSS) connector is fully seated, terminals are fully engaged in the connector and in good condition before proceeding. • Have the items above been checked?	Yes	Go to next step.
		No	Perform the checks, then go to step 10.
3	**CHECK CONTINUITY OF TSS HARNESS CIRCUIT** • Turn ignition key to OFF. **Caution** • **Do not pry on connector. Pull up on harness.** • Disconnect TSS connector. • Disconnect PCM. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. • Install breakout box, and leave PCM disconnected. • Refer to connector schematic of TSS sensor. (See 05-02A-56 TURBINE SHAFT SPEED (TSS) SENSOR CONNECTOR COMPONENT [LA4A-EL]) • Measure resistance between PCM test pin 84 at the breakout box and the TSS (+) circuit at the TSS connector. • Measure resistance between PCM test pin 91 at the breakout box and the TSS (-) circuit at the TSS connector and chassis/battery ground. • Is each resistance less than 5.0 ohms?	Yes	Go to next step.
		No	Repair or replace connectors and wiring, then go to step 10.
4	**CHECK TSS CIRCUIT FOR SHORT TO POWER AND GROUND** • Turn ignition key to OFF. • Disconnect TSS connector. • Breakout box installed, PCM disconnected. • Measure resistance between PCM test pins 84, 91 and test pins 71/97 at breakout box. • Measure resistance between PCM test pins 84, 91, 71/97 and test pins 77/103 at breakout box. • Is each resistance greater than 10,000 ohms?	Yes	Go to next step.
		No	Repair or replace connectors and wiring, then go to step 10.

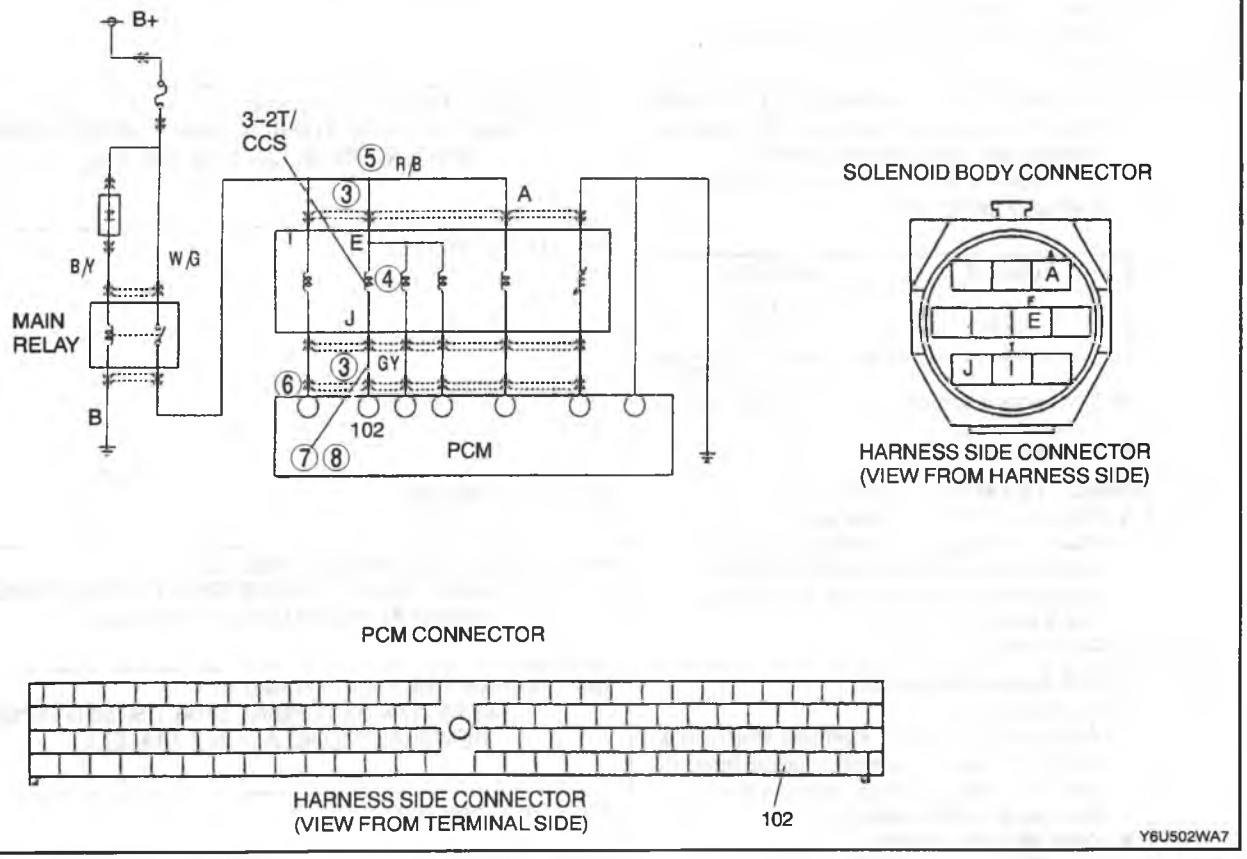
STEP	INSPECTION		ACTION
5	**TSS FUNCTIONAL TEST** **Caution** • **Do not pry on connector. Pull up on harness.** • Disconnect vehicle harness at TSS. • Install transaxle tester on to TSS. • Connect voltmeter positive lead to (+) TSS and negative lead to (-) TSS jacks. Set voltmeter to 20 volts AC. • Perform drive cycle test. Monitor voltmeter. • Does the voltage increase with an increase in vehicle speed?	Yes	Replace PCM, then go to step 10. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS])
		No	Go to next step.
6	**CHECK RESISTANCE OF TSS** **Note** • Refer to the LA4A-EL Transaxle tester for terminal locations. • Connect ohmmeter negative lead to +TSS jack and positive lead to -TSS jack on tester. This is to test TSS. • Record resistance. • Is the resistance between 12.5—19.0 ohms?	Yes	Go to next step.
		No	Replace TSS, then go to step 10. (See 05-17A-33 TURBINE SHAFT SPEED SENSOR REMOVAL/INSTALLATION [LA4A-EL])
7	**CHECK SENSOR FOR SHORT TO GROUND** • Check for continuity between BAT- (engine ground) and appropriate jack with an ohmmeter or other low current tester (less than 200 milliamps). Solenoid: TSS — Tester Jack: +TSS, -TSS W6U501WA5 • Connection should show infinite resistance (no continuity). • Is there continuity?	Yes	Replace TSS, then go to step 10. (See 05-17A-33 TURBINE SHAFT SPEED SENSOR REMOVAL/INSTALLATION [LA4A-EL])
		No	Go to next step.
8	**CHECK TSS MAGNETISM** • Remove TSS from transaxle. • Place TSS against a metal surface to which a magnet would stick. The TSS should be magnetized and stick to the metal surface. • Does the TSS stick?	Yes	Go to next step.
		No	Replace TSS, then go to step 10. (See 05-17A-33 TURBINE SHAFT SPEED SENSOR REMOVAL/INSTALLATION [LA4A-EL])
9	**CHECK EXCITER WHEEL** • Remove TSS. • With a remote starter, start and stop until a tooth of the exciter wheel is visible through the TSS hole. Continue until all 4 teeth have been visibly inspected. • Were all teeth present?	Yes	Replace TSS, then go to step 10. (See 05-17A-33 TURBINE SHAFT SPEED SENSOR REMOVAL/INSTALLATION [LA4A-EL])
		No	Go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P0715 IS COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Perform DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present?	Yes	Replace PCM, then go to next step. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS])
		No	Go to next step.

STEP	INSPECTION		ACTION
11	**VERIFY AFTER REPAIR PROCEDURE** • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting is completed.

DTC P1788, DTC P1789 [LA4A-EL]

Z6U050201030W39

DTC P1788 **DTC P1789**	**3-2 timing/coasting clutch solenoid (3-2T/CCS) open** **3-2 timing/coasting clutch solenoid (3-2T/CCS) short**
DETECTION CONDITION	• The PCM detects opens or short by monitoring the current of the feedback circuit from the output driver. **Diagnostic support note** • These are continuous monitors (CCM). • O/D OFF indicator light flashes if PCM detects the above malfunction condition in two drive cycles. • MIL does not illuminate. • PENDING CODE is available. • FREEZE FRAME DATA is not available. • DTC is stored in the PCM memory. • These DTCs are also detected by KOEO self-test.
POSSIBLE CAUSE	• Engine: Performance, cooling • Electrical: Battery, input sensors, wiring harnesses • Transaxle: Internal transaxle components



Troubleshooting Hint

Fail-safe

- No fail-safe.

3-2T/CCS description

- The 3-2T/CCS solenoid is a variable force style (VFC) solenoid. The VFC type solenoid is an electro-hydraulic actuator combining a solenoid and regulator valve.
- It supplies pressure to the S3 circuit to control the release of the direct clutch and to apply the intermediate and overdrive band during a 3-2 downshift. This solenoid also regulates the pressure in the S3 circuit to control the application and release of the coast clutch.

Solenoid valve operation chart

The following solenoid operation chart shows normal solenoid operation for given operation mode.

Transaxle range selector lever position	PCM commanded gear	SS1	SS2	3-2T/CCS	TCC
P	1	OFF	ON	—	OFF
R	—	OFF	ON	—	*
N	—	OFF	ON	—	OFF
N	—	OFF	ON	—	OFF
D (O/D)					
D	1	ON	ON	—	*
D	2	OFF	ON	—	**
D	3	OFF	OFF	—	**
D	4	ON	OFF	ON	**
D (O/D OFF)					
D	1	ON	ON	ON	*
D	2	OFF	ON	OFF	**
D	3	OFF	OFF	OFF	**
2	2	OFF	ON	OFF	**
2***	3***	OFF	OFF	OFF	
1	1	ON	ON	OFF	**
1***	2	OFF	ON	OFF	**
1***	3	OFF	OFF	OFF	**

* : Not allowed by hydraulics

** : PCM commanded

***: When a select operation occurs above a calibrated speed the transaxle will not downshift from the higher gear until the vehicle speed falls below this calibrated speed

3-2T/CCS specification

Item	KOEO	KOER	
		Solenoid OFF	Solenoid ON
CCS PID	OFF	OFF	ON
PCM 28	Below 1.0V	Approx. 9.3 V	B+

Diagnostic procedure

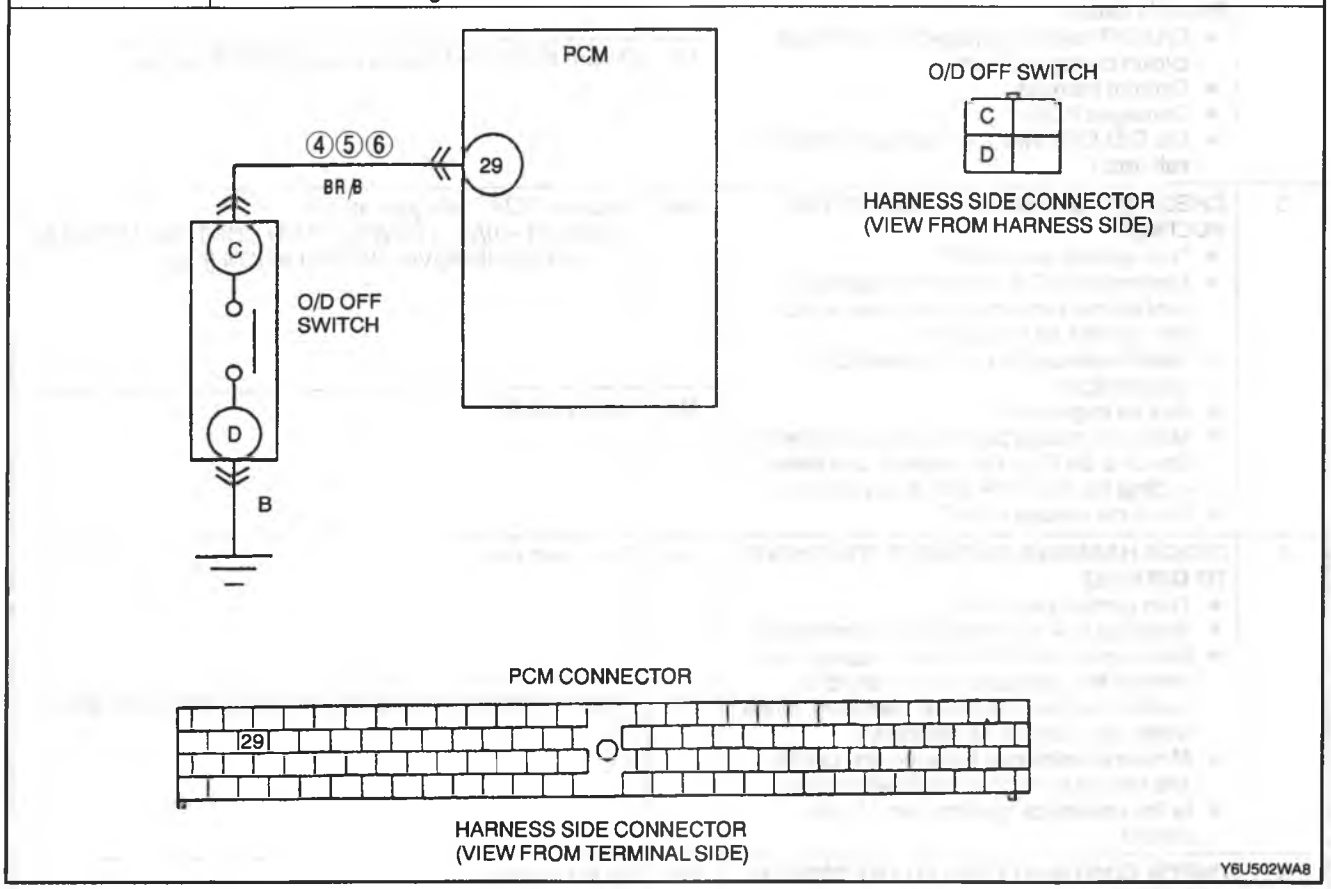
STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** ● Perform DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) ● Is same DTC present during KOEO or KOER self-test?	Yes	Go to next step.
		No	Intermittent concern exist. Go to INTERMITTENT CONCERNS TROUBLESHOOTING procedure. (See 01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**CHECK NGS TESTER DISPLAY** ● Connect NGS tester to DLC. ● Are 3-2T/CCS and NGS tester display correct? (See 01-40A-15 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [FS])	Yes	Go to step 9.
		No	Go to next step.
3	**CHECK SOLENOID BODY CONNECTOR** ● Are solenoid body connector at the connector and connector pins okay?	Yes	Go to next step.
		No	Repair or replace connector, then go to step 9.

STEP	INSPECTION		ACTION
4	**CHECK 3-2T/CCS** • Install transaxle tester to solenoid body connector. • Set bench/drive switch to BENCH mode. • Rotate gear selector switch to OHMS check position. • Connect ohmmeter negative lead to VPWR jack and positive lead to 3-2T/CCS jack on tester. This is to test 3-2T/CCS. • Record resistance. • Is the resistance between 3.7—5.92 ohms? (See 05-17A-24 Transaxle Tester Instruction)	Yes	Go to next step.
		No	Replace solenoid body component, then go to step 9. (See 05-17A-33 SOLENOID BODY REMOVAL/INSTALLATION [LA4A-EL])
5	**CHECK VOLTAGE OF POWER SUPPLY CIRCUIT** • Disconnect solenoid body connector. • Turn ignition switch on. • Is there battery positive voltage at solenoid body connector harness side connector terminals A, E, and I?	Yes	Go to next step.
		No	Repair or replace connectors and wiring, then go to step 9.
6	**CHECK PCM CONNECTOR** • Are PCM at the connector and connector pins okay?	Yes	Go to next step.
		No	Repair or replace connectors, then go to step 9.
7	**CHECK HARNESS CONTINUITY** • Disconnect negative battery cable. • Disconnect solenoid body connector and PCM connector. • Connect breakout box. • Is there continuity between PCM harness side connector terminal 102 and corresponding connector terminals at the solenoid body connector harness side connector terminal J?	Yes	Go to next step.
		No	Repair or replace connectors, then go to step 9.
8	**CHECK CONTINUITY** • Disconnect negative battery cable. • Disconnect solenoid body connector and PCM connector. • Connect breakout box. • Is there continuity between PCM harness side connector terminal 102 and body ground?	Yes	Repair or replace connectors and wiring, then go to step 9.
		No	Go to next step.
9	**VERIFY TROUBLESHOOTING OF DTC P1788 AND DTC P0789 IS COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Perform DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present?	Yes	Replace PCM, then go to next step. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS])
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting is completed.

DTC P1780 [LA4A-EL]

Z6U050201030W40

DTC P1780	O/D OFF switch circuit malfunction
DETECTION CONDITION	• The PCM detects O/D OFF switch that did not change during KOER. **Diagnostic support note** • This DTC is also detected by KOER self-test. • O/D OFF indicator light does not flash. • MIL does not illuminate. • PENDING CODE is available. • FREEZE FRAME DATA is not available. • DTC is not stored in the PCM memory.
POSSIBLE CAUSE	• Electrical: Battery, input sensors, wiring harness • Transaxle: Linkages



Troubleshooting Hint

Fail-safe

- O/D cancel malfunction.

O/D OFF switch description

- The O/D OFF switch is a momentary contact switch. When the O/D OFF switch is pressed, a signal is sent to the PCM.
- The PCM then energizes the O/D OFF indicator lamp, engages or disengages 4GR operation, and provides coast braking in 2GR and 3GR.

O/D OFF switch specification

Item	KOEO		KOER	
	Switch released	Switch depressed	Switch released	Switch depressed
TCS PID	OFF	ON	OFF	ON
PCM 29	B+	Below 1.0 V	B+	Below 1.0 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present during KOEO or KOER self-test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERNS TROUBLESHOOTING procedure. (See 01-03A-3 INTERMITTENT CONCERN TROUBLESHOOTING [FS])
2	**DTC P1780** • DTC P1780 indicates the O/D OFF switch was not cycled during key on engine running (KOER) Self-Test. Possible cause: • O/D OFF switch damaged or switch not cycled during self-test • Shorted harness • Damaged PCM • Did O/D OFF switch cycled during KOER self-test?	Yes	Go to next step.
		No	Return KOER Self-Test to cycle O/D OFF switch.
3	**CHECK O/D OFF SWITCH CIRCUIT FOR VOLTAGE** • Turn ignition key to OFF. • Disconnect PCM. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, and leave PCM disconnected. • Key on engine off. • Measure voltage between test pin 29 and test pins 24/77 at the breakout box while cycling the O/D OFF switch several times • Does the voltage cycle?	Yes	Replace PCM, then go to step 11. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS])
		No	Go to next step.
4	**CHECK HARNESS CIRCUIT(S) FOR SHORT TO GROUND** • Turn ignition key to OFF. • Breakout box installed, PCM disconnected. • Disconnect O/D OFF switch. Inspect both ends of the connector for damaged or pushed out pins, moisture, corrosion, loose wires, etc. Service as necessary. • Measure resistance between test pin 29 and test pins 24/77 at the breakout box. • Is the resistance greater than 10,000 ohms?	Yes	Go to next step.
		No	Repair or replace connectors and wiring, then go to step 11.
5	**CHECK CONTINUITY OF O/D OFF SWITCH HARNESS** • Turn ignition key to OFF. • Breakout box connected, PCM disconnected. • Measure the resistance between keypower at the fuse panel and power side of O/D OFF switch vehicle harness connector (ohmmeter negative probe). • Measure resistance between test pin 29 and signal side of O/D OFF switch vehicle harness connector. • Is resistance less than 5.0 ohms?	Yes	Go to next step.
		No	Repair or replace connectors and wiring, then go to step 11.
6	**CHECK HARNESS CIRCUIT FOR SHORT TO POWER** • Turn ignition key to OFF. • Breakout box installed, PCM disconnected. • Measure resistance between test pin 29 and test pins 71/97 at the breakout box. • Is each resistance greater than 10,000 ohms?	Yes	Go to next step.
		No	Repair or replace connectors and wiring, then go to step 11.

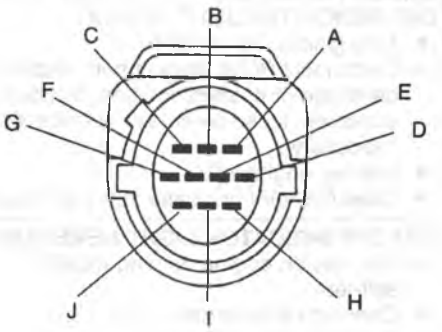
STEP	INSPECTION		ACTION
7	**O/D OFF INDICATOR LIGHT ALWAYS ON** • Key on engine off. • Cycle O/D OFF switch. • Does O/D OFF indicator light turn on and off?	Yes	Reconnect all components. Unable to duplicate or identify fault at this time. Intermittent poor connection or component malfunction (Repair or replace as necessary).
		No	Go to next step.
8	**CHECK FOR SHORT TO GROUND IN O/D OFF INDICATOR LIGHT CIRCUIT** • Turn ignition key to OFF. • Disconnect PCM. Inspect both ends for damaged or pushed out pins, moisture, corrosion, loose wires, etc. Service as necessary. • Key on, engine off. • Does O/D OFF indicator light remain on?	Yes	Repair short to ground between bulb and test pin 79. Verify O/D OFF indicator light turns on and off.
		No	O/D OFF indicator light turns off when PCM is disconnected.Replace PCM, then go to step 11.
9	**O/D OFF INDICATOR LIGHT NEVER ON** • Run key on engine running (KOER) self-test. • Connect NGS tester to DLC. • Is DTC P1780 present?	Yes	Service DTC P1780. Go to step 2.
		No	Go to next step.
10	**CHECK CONTINUITY OF O/D OFF INDICATOR LIGHT CIRCUIT** • Turn ignition key to OFF. • Breakout box installed. • Key on, engine off. • Measure the voltage between test pin 79 and test pins 24/76 at the breakout box. • Is the voltage reading greater than 2.0 volts?	Yes	Replace PCM, then go to step 11. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS])
		No	Check indicator bulb and fuse. If okay, there is open circuit in the wiring between the ignition switch and test pin (79) at the harness connector. Repair as necessary, then go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P1780 IS COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Perform DTC Confirmation Procedure. (See 01-02A-17 DTC CONFIRMATION PROCEDURE [FS]) • Is same DTC present?	Yes	Replace PCM, then go to next step. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS])
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting is completed.

SOLENOID BODY CONNECTOR COMPONENT [LA4A-EL]

Z6U050201030W41

Vehicle Harness Connector Pin Locations

Pin	Description	PCM Test Pin
C	Transaxle fluid temperature (TFT) signal	37
B	Sensor ground circuit	91
A	TCC power circuit	71, 97
G	TCC signal circuit	54
F	Shift solenoid No.2 (SS2) signal circuit	1
E	Solenoid power circuit	71, 97
D	Shift solenoid No.1 (SS1) signal circuit	27
J	3-2 timing/coasting clutch solenoid (3-2T/CCS) signal circuit	102
I	Electrical pressure control (EPC) power circuit	71, 97
H	Electrical pressure control (ECP) signal circuit	81



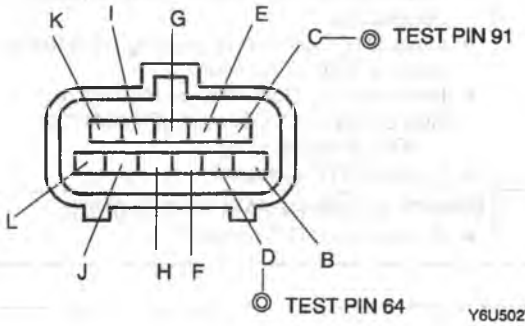
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TRANSAXLE RANGE (TR) SWITCH CONNECTOR COMPONENT [LA4A-EL]

Z6U050201030W42

Vehicle Harness Connector Pin Locations

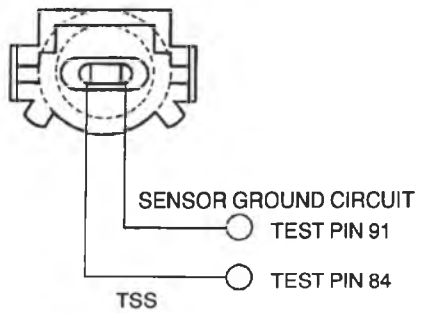
Pin	Circuit Function
K	Main relay
I	Not used
G	Backup lamp output
E	Starter
C	Sensor ground circuit
L	Not used
J	Not used
H	Not used
F	Ignition switch
D	Transaxle range switch
B	Not used



Y6U502WQ1

TURBINE SHAFT SPEED (TSS) SENSOR CONNECTOR COMPONENT [LA4A-EL]

Z6U050201030W43



W6U501WA9

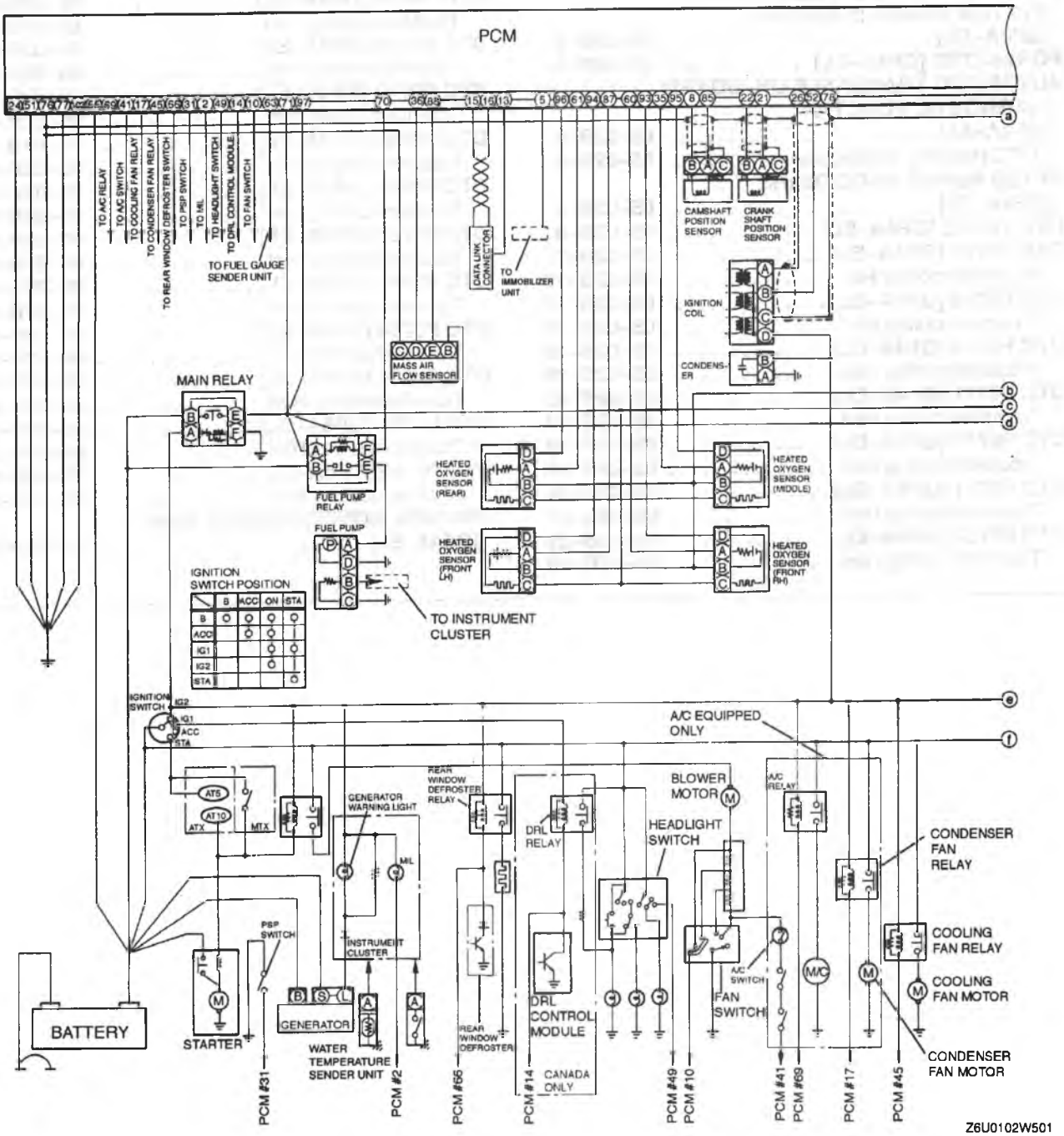
05-02B ON-BOARD DIAGNOSTIC [GF4A-EL]

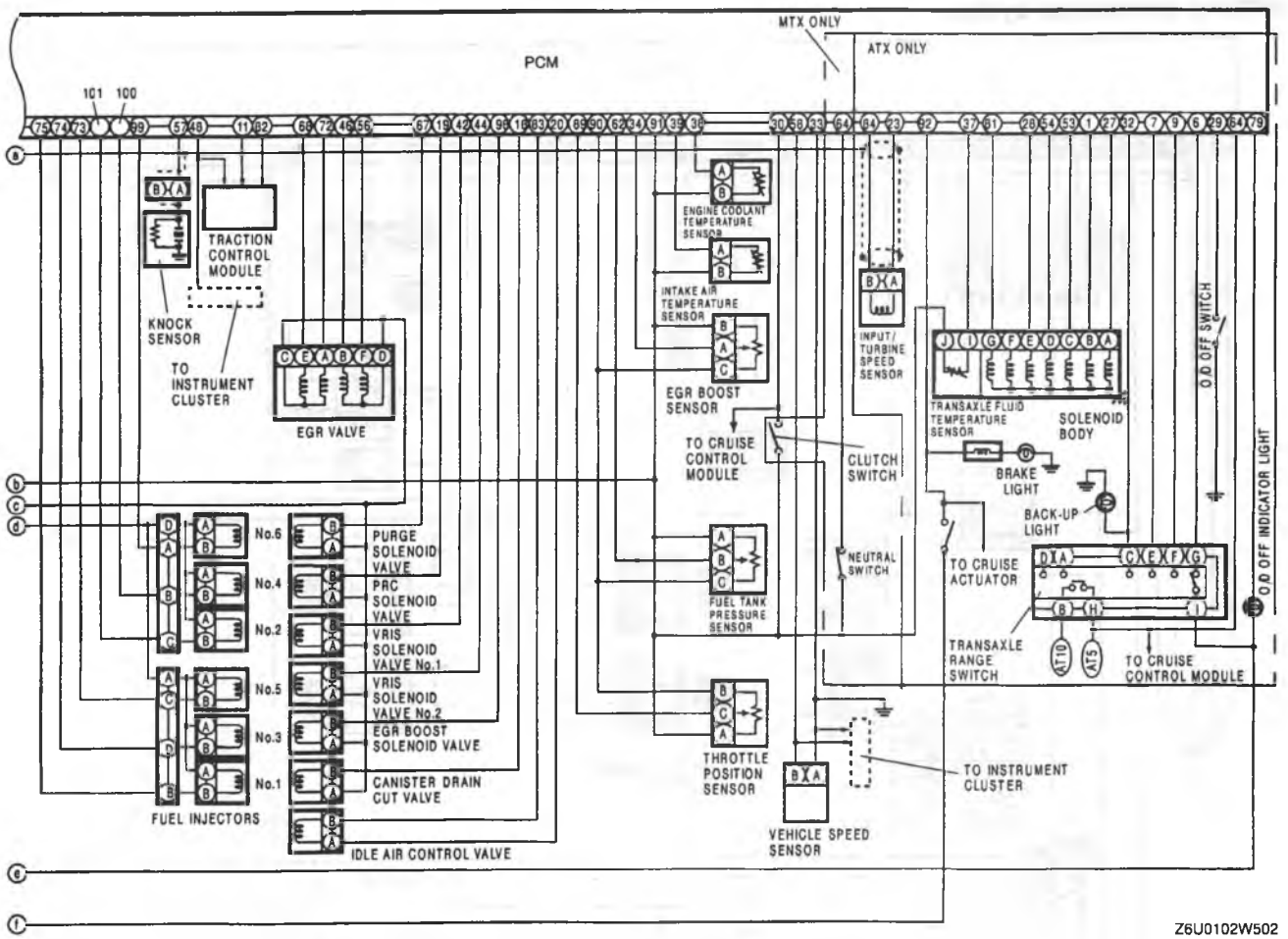
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AUTOMATIC TRANSAXLE CONTROL SYSTEM WIRING DIAGRAM [GF4A-EL]

Z6U050201030W01

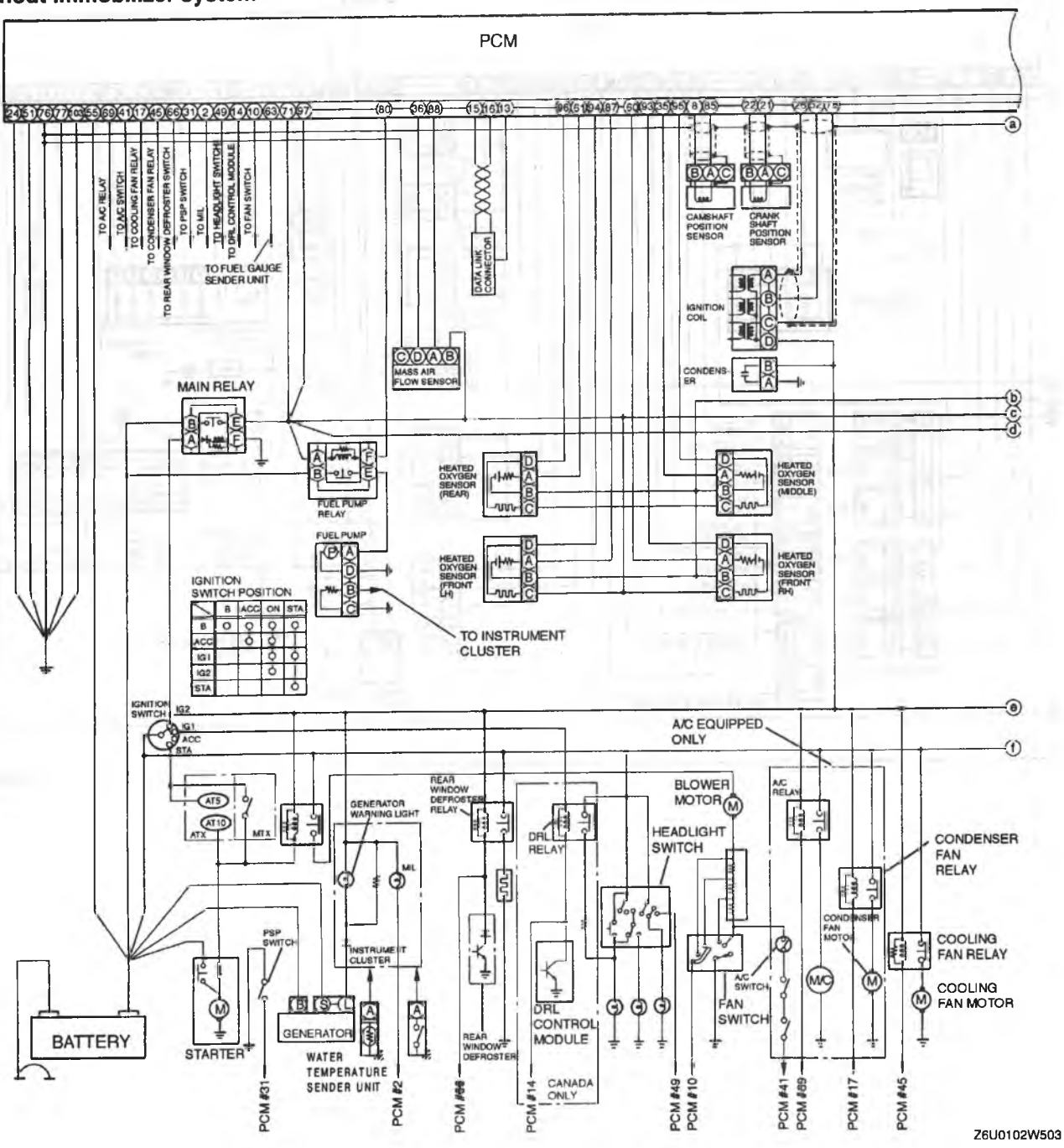
With immobilizer system

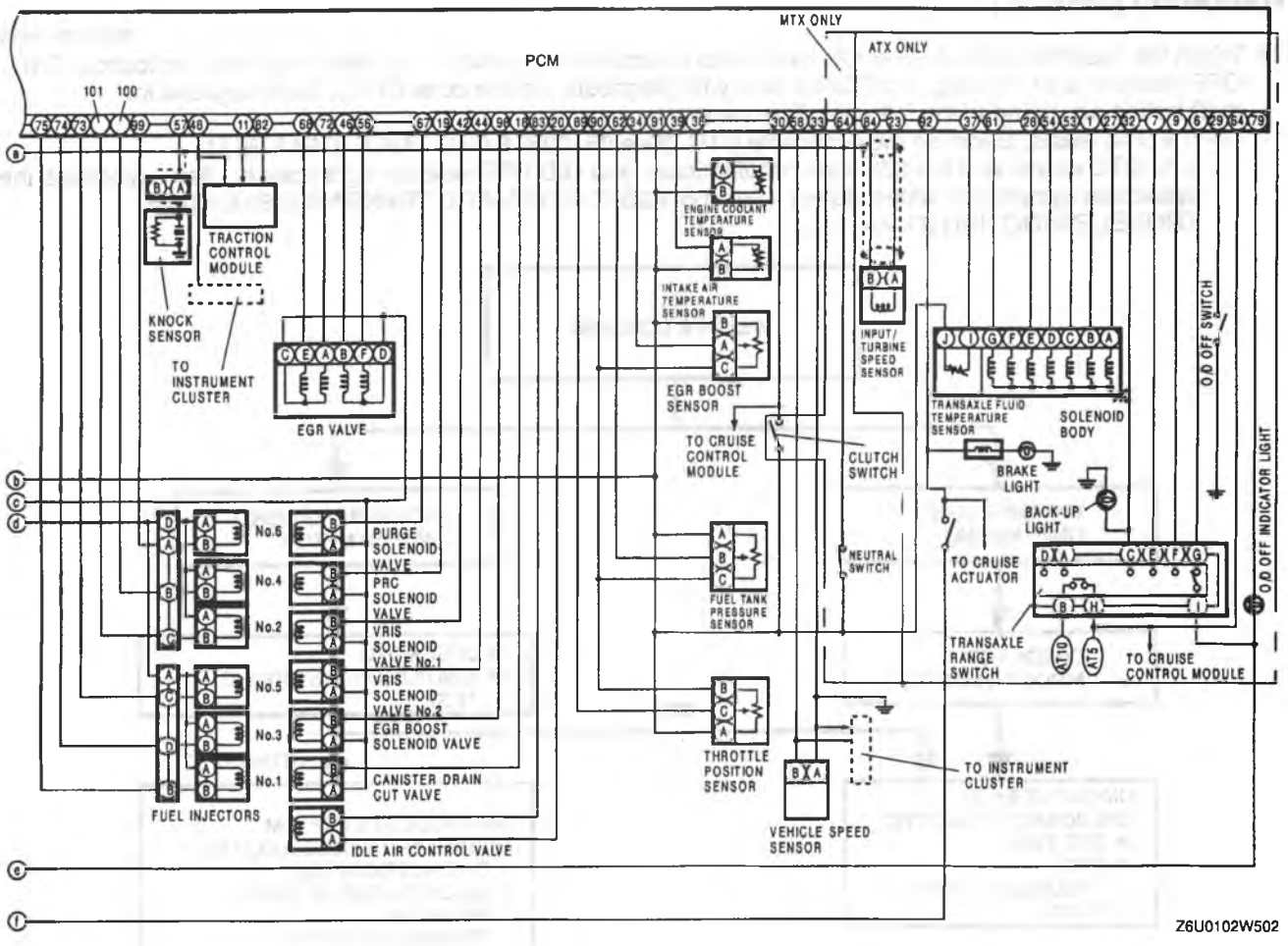




Z6U0102W502

Without Immobilizer system

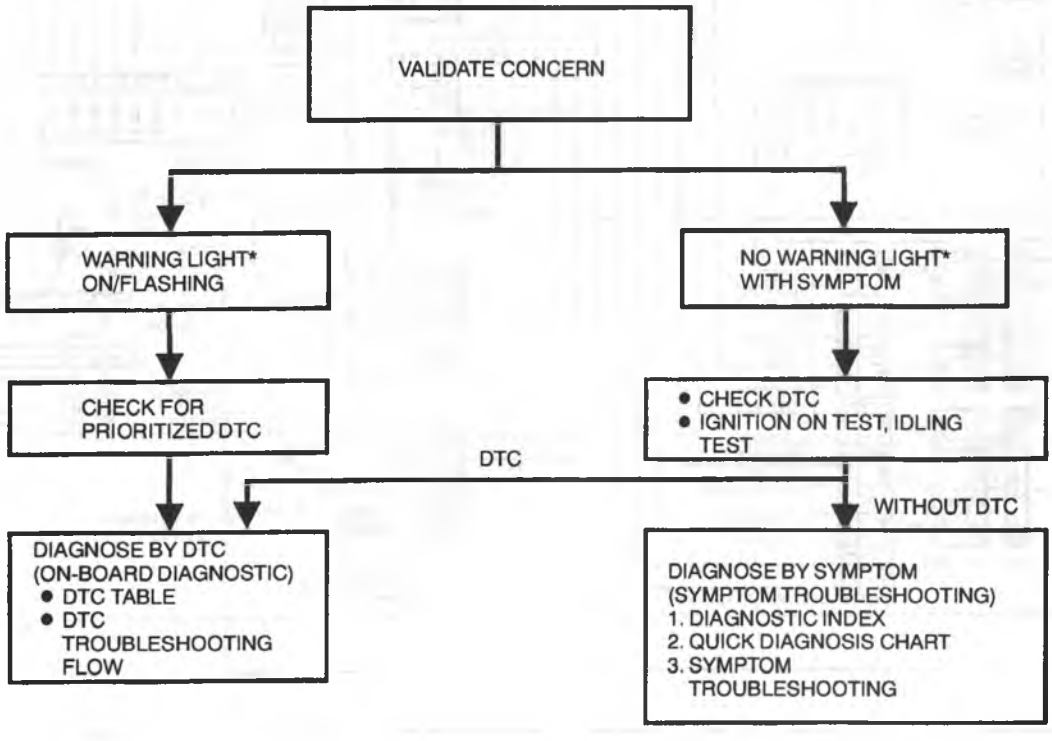



MTX ONLY
ATX ONLY
PCM
101 100
TRACTION CONTROL MODULE
KNOCK SENSOR
TO INSTRUMENT CLUSTER
EGR VALVE
ENGINE COOLANT TEMPERATURE SENSOR
INTAKE AIR TEMPERATURE SENSOR
EGR BOOST SENSOR
TO CRUISE CONTROL MODULE
FUEL TANK PRESSURE SENSOR
THROTTLE POSITION SENSOR
VEHICLE SPEED SENSOR
INPUT/ TURBINE SPEED SENSOR
CLUTCH SWITCH
NEUTRAL SWITCH
TRANSAXLE FLUID TEMPERATURE SENSOR
SOLENOID BODY
O/D OFF SWITCH
BRAKE LIGHT
BACK-UP LIGHT
TO CRUISE ACTUATOR
TRANSAXLE RANGE SWITCH
TO CRUISE CONTROL MODULE
O/D OFF INDICATOR LIGHT
TO INSTRUMENT CLUSTER
No.6
No.4
No.2
No.5
No.3
No.1
FUEL INJECTORS
PURGE SOLENOID VALVE
PRC SOLENOID VALVE
VRIS SOLENOID VALVE No.1
VRIS SOLENOID VALVE No.2
EGR BOOST SOLENOID VALVE
CANISTER DRAIN CUT VALVE
IDLE AIR CONTROL VALVE
Z6U0102W502

FOREWORD [GF4A-EL]

Z6U050201030W02

- When the customer reports a vehicle malfunction, check the malfunction indicator lamp (MIL) indication, O/D OFF indicator light flashing, and PCM memory for diagnostic trouble code (DTC), then diagnose the malfunction according to the following flowchart.
  - —If a DTC exists, diagnose the applicable DTC. (See 05-02B-8 DTC TABLE [GF4A-EL].)
  - —If no DTC exists, and the MIL does not illuminate, and O/D OFF indicator light does not flash, diagnose the applicable symptom troubleshooting. (See 05-03B-7 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [GF4A-EL].)



Z6U0102W316

* : Malfunction Indicator Lamp (MIL), O/D OFF indicator light

AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [GF4A-EL]

Z6U050201030W03

DTC Reading Procedure
(See 01-02B-11 DTCs Reading Procedure.)

AFTER REPAIR PROCEDURE [GF4A-EL]

Z6U050201030W04

Caution
- **After repairing a malfunction, perform this procedure to verify that the malfunction has been corrected.**
- **When this procedure is carried out, be sure to drive the vehicle at lawful speed and pay attention to the other vehicles.**

1. Connect the **SSTs** (NGS tester) to the DLC.
2. Turn the ignition key to ON (engine OFF).
3. Select the clear code function and clear the DTC.
4. Perform the following DTC inspections to ensure that the DTC has been resolved:
   - For P0705
     - i. Start the engine.
     - ii. Access RPM and TR PIDs using the **SSTs** (NGS tester).
     - iii. Drive the vehicle in each range (P, R, N, D, 2, and 1) for **100 seconds or more** under the following condition.

— RPM PID: **650 rpm or above**

iv. Go to Step 5.

- For P0706
  i. Start the engine.
  ii. Access RPM, VSS, TR PIDs using the **SSTs** (NGS tester).
  iii. Drive the vehicle in each range (D, 2, and 1) under the following conditions for **100 seconds** while monitoring PIDs.
  — RPM PID: **650 rpm or above**
  — VSS PID: **20 km/h {12 mph}** or above
  iv. Go to Step 5.
- For P0710
  i. Start the engine.
  ii. Access VSS PID using the **SSTs** (NGS tester).
  iii. Drive the vehicle under the following condition for **100 seconds or more** while monitoring PID.
  — VSS PID: **20 km/h {12 mph}**
  iv. Go to Step 5.
- For P0711
  i. Decrease ATF temperature to **20 °C {68 °F} or below**.
  ii. Start the engine.
  iii. Access VSS PID using the **SSTs** (NGS tester).
  iv. Drive the vehicle under the following condition for **430 seconds or more** while monitoring PIDs.
  — VSS PID: **60 km/h {37 mph}**
  v. Go to Step 5.
- For P0715
  i. Start the engine.
  ii. Access VSS PID using the **SSTs** (NGS tester).
  iii. Drive the vehicle under the following condition for **1 second or more** while monitoring PID.
  — VSS PID: **41 km/h {25 mph} or above**
  iv. Go to Step 5.
- For P0731
  i. Start the engine.
  ii. Warm up the engine and ATX.
  iii. Access VSS, TP V, and TR PIDs using the **SSTs** (NGS tester).
  iv. Drive the vehicle under the following condition for **15 seconds or more** while monitoring PIDs.
  — VSS PID: **Within 8 km/h {5 mph}—48 km/h {30 mph}**
  — 1 GR
  — TR PID: O/D
  — TP V PID: **1.1 V or above**
  v. Repeat Step iii five times.
  vi. Go to Step 5.
- For P0732
  i. Start the engine.
  ii. Warm up the engine and ATX.
  iii. Access VSS, TR, TSS, and TP V PIDs using the **SSTs** (NGS tester).
  iv. Drive the vehicle while monitoring PIDs.
  — VSS PID: **Within 10 km/h {6 mph}—87 km/h {54 mph}**
  — TR PID: O/D
  — 2 GR
  v. Repeat Step iii four times.
  vi. Go to Step 5.
- For P0733
  i. Start the engine.
  ii. Warm up the engine and ATX.
  iii. Access VSS and TR PIDs using the **SSTs** (NGS tester).
  iv. Drive the vehicle under the following conditions for **5 seconds or more** while monitoring PIDs.
  — VSS PID: **Within 27 km/h {17 mph}—48 km/h {30 mph}**
  — 3GR
  — TR PID: O/D
  v. Go to Step 5.
- For P0734
  i. Start the engine.
  ii. Warm up the engine and ATX.
  iii. Access VSS and TR PIDs using the **SSTs** (NGS tester).
  iv. Drive the vehicle under the following conditions for **15 seconds or more** while monitoring PIDs.
  — VSS PID: **Within 77 km/h {48 mph}—104 km/h {64 mph}**

— 4GR
— TR PID: O/D

v. Go to Step 5.

- For P0740
  i. Start the engine.
  ii. Warm up the engine and ATX.
  iii. Access VSS, TR, and TCC PIDs using the **SSTs** (NGS tester).
  iv. Drive the vehicle under the following conditions for **15 seconds or more** while monitoring PIDs.
  — VSS PID: **Within 76 km/h {47 mph}—104 km/h {64 mph}**
  — 4GR
  — TR PID: O/D
  — TCC PID: **100 %**
  v. Go to Step 5.
- For P0743
  i. Start the engine.
  ii. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 4GR and TCC is operated. (See 05-17B-16 ROAD TEST [GF4A-EL].)
  iii. Go to Step 5.
- For P0745
  i. Start the engine.
  ii. Drive the vehicle in D range 1GR.
  iii. Go to Step 5.
- For P0750, P0755, P0760, P1765
  i. Start the engine.
  ii. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 4GR. (See 05-17B-16 ROAD TEST [GF4A-EL].)
  iii. Go to Step 5.

5. Gradually slow down and stop the vehicle.
6. Make sure that the repaired DTC does not recur.

DTC TABLE [GF4A-EL]

Z6U050201030W05

DTC	Description	MIL	O/D OFF indicator light flashes	DC	*Monitor item	On-Demand Self-Test		Page
						KOEO	KOER	
P0102	MAF circuit low input	(See 01-02B-32 DTC P0102 [KL])						
P0103	MAF circuit high input	(See 01-02B-35 DTC P0103 [KL])						
P0106	BARO sensor circuit performance problem	(See 01-02B-37 DTC P0106 [KL])						
P0107	BARO sensor circuit low input	(See 01-02B-39 DTC P0107 [KL])						
P0108	BARO sensor circuit high input	(See 01-02B-41 DTC P0108 [KL])						
P0112	IAT circuit low input	(See 01-02B-44 DTC P0112 [KL])						
P0113	IAT circuit high input	(See 01-02B-46 DTC P0113 [KL])						
P0116	ECT sensor performance problem	(See 01-02B-48 DTC P0116 [KL])						
P0117	ECT circuit low input	(See 01-02B-51 DTC P0117 [KL])						
P0118	ECT circuit high input	(See 01-02B-53 DTC P0118 [KL])						
P0122	TP circuit low input	(See 01-02B-56 DTC P0122 [KL])						
P0123	TP circuit high input	(See 01-02B-59 DTC P0123 [KL])						
P0125	Insufficient ECT for CL fuel control	(See 01-02B-61 DTC P0125 [KL])						
P0133	HO2S (Front:RH) circuit slow response	(See 01-02B-62 DTC P0133, P0153 [KL])						
P0135	HO2S heater (Front:RH) circuit malfunction	(See 01-02B-65 DTC P0135 [KL])						
P0136	HO2S (Rear:RH) circuit malfunction	(See 01-02B-67 DTC P0136, P1137, P1138 [KL])						
P0141	HO2S (Rear:RH) circuit malfunction	(See 01-02B-69 DTC P0141 [KL])						
P0142	HO2S (Rear:LH) circuit malfunction	(See 01-02B-71 DTC P0142, P1143, P1144 [KL])						
P0147	HO2S heater (Rear) circuit malfunction	(See 01-02B-73 DTC P0147 [KL])						
P0153	HO2S (Front:LH) circuit slow response	(See 01-02B-62 DTC P0133, P0153 [KL])						
P0155	HO2S heater (Front:LH) circuit malfunction	(See 01-02B-75 DTC P0155 [KL])						

DTC	Description	MIL	O/D OFF indicator light flashes	DC	*Monitor item	On-Demand Self-Test		Page
						KOEO	KOER	
P0161	HO2S heater (Rear:LH) circuit malfunction	(See 01-02B-77 DTC P0161 [KL])						
P0171	Fuel trim system too lean (RH)	(See 01-02B-79 DTC P0171, P0172, P0174, P0175, P1130, P1131, P1132, P1150, P1151, P1152 [KL])						
P0172	Fuel trim system too rich (RH)							
P0174	Fuel trim system too lean (LH)							
P0175	Fuel trim system too rich (LH)							
P0230	Fuel pump primary circuit malfunction	(See 01-02B-90 DTC P0230 [KL])						
P0300	Random misfire detected	(See 01-02B-94 DTC P0300, P0301, P0302, P0303, P0304, P0305, P0306 [KL])						
P0301	Cylinder 1 misfire detected							
P0302	Cylinder 2 misfire detected							
P0303	Cylinder 3 misfire detected							
P0304	Cylinder 4 misfire detected							
P0305	Cylinder 5 misfire detected							
P0306	Cylinder 6 misfire detected							
P0320	CKP sensor circuit malfunction	(See 01-02B-98 DTC P0320 [KL])						
P0325	Knock sensor circuit malfunction	(See 01-02B-101 DTC P0325 [KL])						
P0340	CMP sensor circuit malfunction	(See 01-02B-103 DTC P0340 [KL])						
P0400	EGR flow malfunction	(See 01-02B-105 DTC P0400 [KL])						
P0420	Catalyst system efficiency below threshold	(See 01-02B-108 DTC P0420 [KL])						
P0421	Warm-up catalyst system efficiency below threshold (RH)	(See 01-02B-113 DTC P0421, P0431 [KL])						
P0431	Warm-up catalyst system efficiency below threshold (LH)							
P0442	EVAP control system leak detected (Small leak)	(See 01-02B-118 DTC P0442 [KL])						
P0443	EVAP control system purge control valve circuit malfunction	(See 01-02B-121 DTC P0443 [KL])						
P0446	EVAP control system vent control malfunction	(See 01-02B-122 DTC P0446 [KL])						
P0452	EVAP control system fuel tank pressure sensor low input	(See 01-02B-125 DTC P0452 [KL])						
P0453	EVAP control system fuel tank pressure sensor high input	(See 01-02B-128 DTC P0453 [KL])						
P0455	EVAP control system leak detected (gross leak)	(See 01-02B-131 DTC P0455 [KL])						
P0460	Fuel gauge sender unit circuit malfunction	(See 01-02B-136 DTC P0460 [KL])						
P0461	Fuel gauge sender unit circuit performance problem	(See 01-02B-138 DTC P0461 [KL])						
P0500	VSS circuit malfunction	(See 01-02B-140 DTC P0500 [KL])						
P0505	IAC system malfunction	(See 01-02B-142 DTC P0505 [KL])						
P0603	PCM Keep Alive Memory (KAM) test error	(See 01-02B-144 DTC P0603, P0605 [KL])						
P0605	PCM Read Only Memory (ROM) test error	(See 01-02B-144 DTC P0603, P0605 [KL])						
P0703	Brake switch input malfunction	(See 01-02B-145 DTC P0703 [KL])						
P0704	Clutch switch input circuit malfunction	(See 01-02B-147 DTC P0704 [KL])						
P0705	Transaxle range (TR) switch circuit malfunction (Short circuit)	ON	NO	1	CCM	—	—	(See 05-02B-13 DTC P0705 [GF4A-EL])
P0706	Transaxle range (TR) switch circuit malfunction (Open circuit)	ON	NO	2	CCM	—	—	(See 05-02B-16 DTC P0706 [GF4A-EL])

DTC	Description	MIL	O/D OFF indicator light flashes	DC	*Monitor item	On-Demand Self-Test		Page
						KOEO	KOER	
P0710	Transaxle fluid temperature (TFT) sensor circuit malfunction (Short to ground/open circuit)	ON	NO	1	CCM	—	—	(See 05-02B-19 DTC P0710 [GF4A-EL])
P0711	Transaxle fluid temperature (TFT) sensor circuit malfunction (Stuck)	ON	NO	2	CCM	—	—	(See 05-02B-22 DTC P0711 [GF4A-EL])
P0715	Input/turbine speed sensor circuit malfunction	ON	YES	1	CCM	—	—	(See 05-02B-24 DTC P0715 [GF4A-EL])
P0731	Gear 1 incorrect ratio	ON	NO	2	CCM	—	—	(See 05-02B-26 DTC P0731 [GF4A-EL])
P0732	Gear 2 incorrect ratio	ON	NO	2	CCM	—	—	(See 05-02B-29 DTC P0732 [GF4A-EL])
P0733	Gear 3 incorrect ratio	ON	NO	2	CCM	—	—	(See 05-02B-32 DTC P0733 [GF4A-EL])
P0734	Gear 4 incorrect ratio	ON	NO	2	CCM	—	—	(See 05-02B-35 DTC P0734 [GF4A-EL])
P0740	Torque converter clutch (TCC) system malfunction	ON	NO	2	CCM	—	—	(See 05-02B-38 DTC P0740 [GF4A-EL])
P0743	Torque converter clutch (TCC) control solenoid valve circuit malfunction	ON	YES	1	CCM	—	—	(See 05-02B-40 DTC P0743 [GF4A-EL])
P0745	Pressure control solenoid circuit malfunction	OFF	YES	1	CCM	—	—	(See 05-02B-43 DTC P0745 [GF4A-EL])
P0750	Shift solenoid A circuit malfunction	ON	YES	1	CCM	—	—	(See 05-02B-46 DTC P0750 [GF4A-EL])
P0755	Shift solenoid B circuit malfunction	ON	YES	1	CCM	—	—	(See 05-02B-49 DTC P0755 [GF4A-EL])
P0760	Shift solenoid C circuit malfunction	ON	YES	1	CCM	—	—	(See 05-02B-52 DTC P0760 [GF4A-EL])
P1001	DLC malfunction	(See 01-02B-149 DTC P1001 [KL])						
P1100	MAF sensor intermittent malfunction	(See 01-02B-152 DTC P1100 [KL])						
P1101	MAF sensor out of self test range	(See 01-02B-153 DTC P1101 [KL])						
P1112	IAT sensor intermittent malfunction	(See 01-02B-155 DTC P1112 [KL])						
P1116	ECT sensor out of self test range	(See 01-02B-156 DTC P1116 [KL])						
P1117	ECT sensor intermittent malfunction	(See 01-02B-158 DTC P1117 [KL])						
P1120	TP sensor out of range low	(See 01-02B-160 DTC P1120 [KL])						

DTC	Description	MIL	O/D OFF indicator light flashes	DC	*Monitor item	On-Demand Self-Test		Page
						KOEO	KOER	
P1121	TP sensor inconsistent with MAF sensor	(See 01-02B-161 DTC P1121 [KL])						
P1124	TP sensor out of self test range	(See 01-02B-163 DTC P1124 [KL])						
P1125	TP sensor intermittent problem	(See 01-02B-164 DTC P1125 [KL])						
P1127	Exhaust not warm enough	(See 01-02B-166 DTC P1127 [KL])						
P1130	Lack of HO2S (Front:RH) switch, adapted fuel limit	(See 01-02B-79 DTC P0171, P0172, P0174, P0175, P1130, P1131, P1132, P1150, P1151, P1152 [KL])						
P1131	Lack of HO2S (Front:RH) switch, sensor indicates lean							
P1132	Lack of HO2S (Front:RH) switch, sensor indicates rich							
P1137	Lack of HO2S (Rear:RH) switch, Sensor indicates lean	(See 01-02B-67 DTC P0136, P1137, P1138 [KL])						
P1138	Lack of HO2S (Rear:RH) switch, Sensor indicates rich							
P1143	HO2S (Rear) switch, sensor indicates lean	(See 01-02B-71 DTC P0142, P1143, P1144 [KL])						
P1144	HO2S (Rear) switch, sensor indicates rich							
P1150	Lack of HO2S (Front:LH) switch, adaptive fuel at limit	(See 01-02B-79 DTC P0171, P0172, P0174, P0175, P1130, P1131, P1132, P1150, P1151, P1152 [KL])						
P1151	Lack of HO2S (Front:LH) switch, sensor indicates lean							
P1152	Lack of HO2S (Front:LH) switch, sensor indicates rich							
P1157	HO2S (Rear:LH) switch, sensor indicates lean	(See 01-02B-166 DTC P1157, P1158 [KL])						
P1158	HO2S (Rear:LH) switch, sensor indicates rich							
P1250	PRC solenoid valve circuit malfunction	(See 01-02B-168 DTC P1250 [KL])						
P1409	EGR valve control circuit malfunction	(See 01-02B-170 DTC P1409 [KL])						
P1410	EGR boost sensor solenoid valve stuck	(See 01-02B-172 DTC P1410 [KL])						
P1450	EVAP control system malfunction (excessive vacuum)	(See 01-02B-174 DTC P1450 [KL])						
P1451	CDCV circuit malfunction	(See 01-02B-176 DTC P1451 [KL])						
P1460	WOT A/C control circuit malfunction	(See 01-02B-178 DTC P1460, P1464 [KL])						
P1464	A/C demand out of self test range							
P1474	Cooling fan control circuit malfunction	(See 01-02B-181 DTC P1474 [KL])						
P1479	Condenser fan control circuit malfunction	(See 01-02B-184 DTC P1479 [KL])						
P1487	EGR boost sensor solenoid valve circuit malfunction	(See 01-02B-186 DTC P1487 [KL])						
P1501	VSS out of self test range	(See 01-02B-189 DTC P1501 [KL])						
P1504	IAC valve circuit malfunction	(See 01-02B-191 DTC P1504 [KL])						
P1506	Idle control system RPM lower than expected	(See 01-02B-194 DTC P1506 [KL])						
P1507	Idle control system RPM higher than expected	(See 01-02B-195 DTC P1507 [KL])						
P1516	Neutral switch input circuit malfunction	(See 01-02B-198 DTC P1516 [KL])						
P1602	Immobilizer unit-PCM communication error	(See 01-02B-200 DTC P1602 [KL])						
P1603	Code word unregistered in PCM	(See 01-02B-203 DTC P1603 [KL])						
P1604	Key ID number unregistered in PCM	(See 01-02B-203 DTC P1604 [KL])						
P1621	Code word mismatch after engine cranking	(See 01-02B-204 DTC P1621 [KL])						
P1622	Key ID number mismatch	(See 01-02B-204 DTC P1622 [KL])						
P1623	Code word or key ID number read/write error in PCM	(See 01-02B-205 DTC P1623 [KL])						

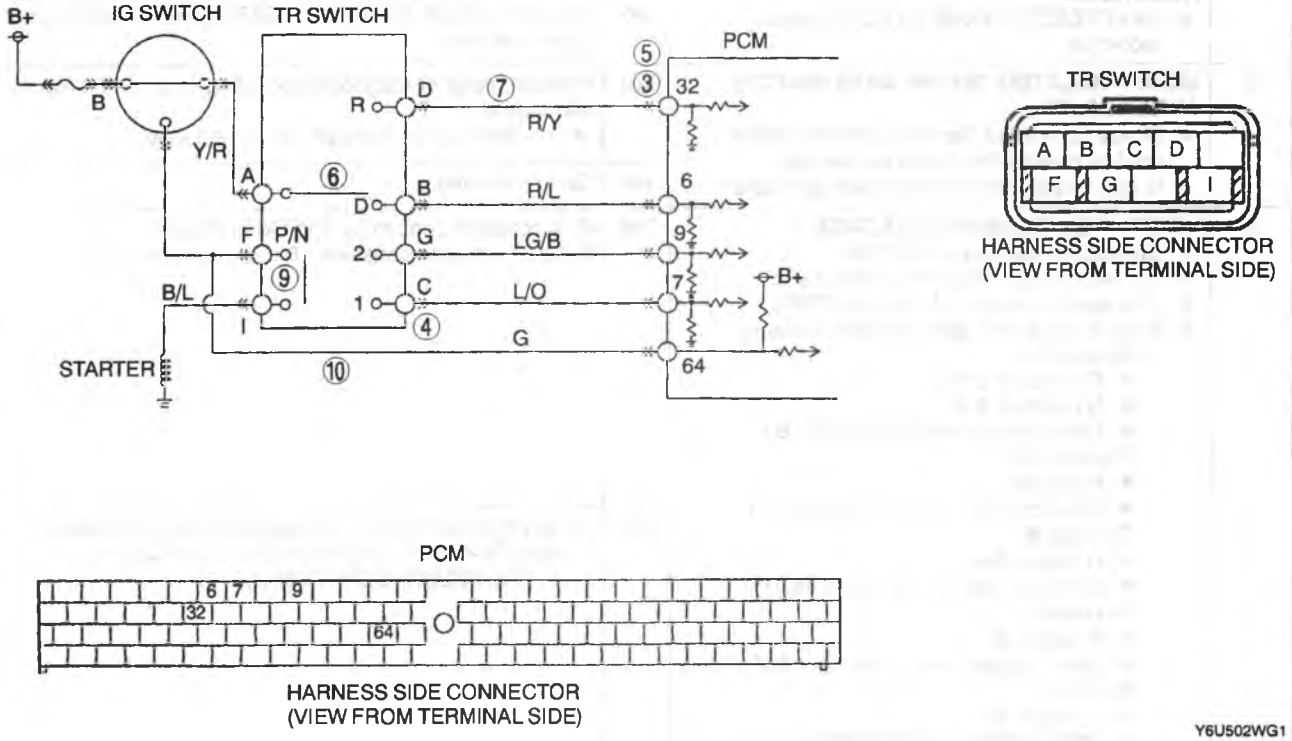
DTC	Description	MIL	O/D OFF Indicator light flashes	DC	*Monitor item	On-Demand Self-Test		Page
						KOEO	KOER	
P1624	Immobilizer system communication counter = 0	(See 01-02B-205 DTC P1624 [KL])						
P1633	PCM KAM voltage low	(See 01-02B-206 DTC P1633 [KL])						
P1650	PSP switch out of self test range	(See 01-02B-208 DTC P1650 [KL])						
P1652	PSP switch failed on	(See 01-02B-210 DTC P1652 [KL])						
P1703	Brake switch out of self test range	(See 01-02B-212 DTC P1703 [KL])						
P1705	Transaxle range (TR) switch out of self test range	ON	YES	1	—	—	×	(See 05-02B-55 DTC P1705 [GF4A-EL])
P1765	3-2 timing solenoid valve circuit malfunction	OFF	YES	1	CCM	—	—	(See 05-02B-57 DTC P1765 [GF4A-EL])
P1780	O/D OFF switch circuit malfunction (Open/short)	ON	NO	1	—	—	×	(See 05-02B-60 DTC P1780 [GF4A-EL])

* : Indicates the applicable item in On-Board System Readiness Test defined by CARB

DTC P0705 [GF4A-EL]

Z6U050201030W06

DTC P0705	Transaxle range (TR) switch circuit malfunction (short circuit)
DETECTION CONDITION	• Any of D range switch, S range switch, or L range switch is ON when both conditions below are satisfied: — Engine speed is **650 rpm or above**. — P/N position switch or R position switch is ON. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions during first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • O/D OFF indicator light does not flash. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• TR switch malfunction • Short to ground between TR switch terminal F and PCM terminal 64 • Short to power between TR switch terminal D and PCM terminal 32 • Short to power between TR switch terminal B and PCM terminal 6 • Short to power between TR switch terminal G and PCM terminal 9 • Short to power between TR switch terminal C and PCM terminal 7 • Damaged connector between TR switch and PCM • PCM malfunction



Troubleshooting Hint

TR switch description

- Six position ON/OFF type TR switch is used.
- TR switch is installed in the upper part of the transaxle.
- Detects the selector lever positions in P, R, N, D, 2, or 1 range, each respective range switch is turned ON.
- TR switch signal is used for following controls and monitors:
  - —Shift control
  - —Line pressure control
  - —Timing control
  - —TCC control
  - —Engine-transaxle total control (Torque reduction control)
  - —Engine-transaxle total control (N-D/R select control)
  - —Slope mode control
  - —OBD system

TR switch specification

Item	Ignition key to ON (engine OFF) or start engine					
	P	R	N	D	2	1
CPP/PNP PID	ON	OFF	ON	OFF	OFF	OFF
TR PID	PARK	REV	NTRL	O/D ON: O/D O/D OFF: DRIVE	MAN2	MAN1
TR V PID	Approx. 0 V	Approx. 3.5 V	Approx. 0 V	Approx. 3.5 V	Approx. 3.5 V	Approx. 3.5 V
PCM terminal 64 (P, N position)	Below 1.0 V	B+	Below 1.0 V	B+	B+	B+
PCM terminal 32 (R position)	Below 1.0 V	B+	Below 1.0 V	Below 1.0 V	Below 1.0 V	Below 1.0 V
PCM terminal 6 (D range)	Below 1.0 V	Below 1.0 V	Below 1.0 V	B+	Below 1.0 V	Below 1.0 V
PCM terminal 9 (2 range)	Below 1.0 V	Below 1.0 V	Below 1.0 V	Below 1.0 V	B+	Below 1.0 V
PCM terminal 7 (1 range)	Below 1.0 V	Below 1.0 V	Below 1.0 V	Below 1.0 V	Below 1.0 V	B+

Diagnostic procedure

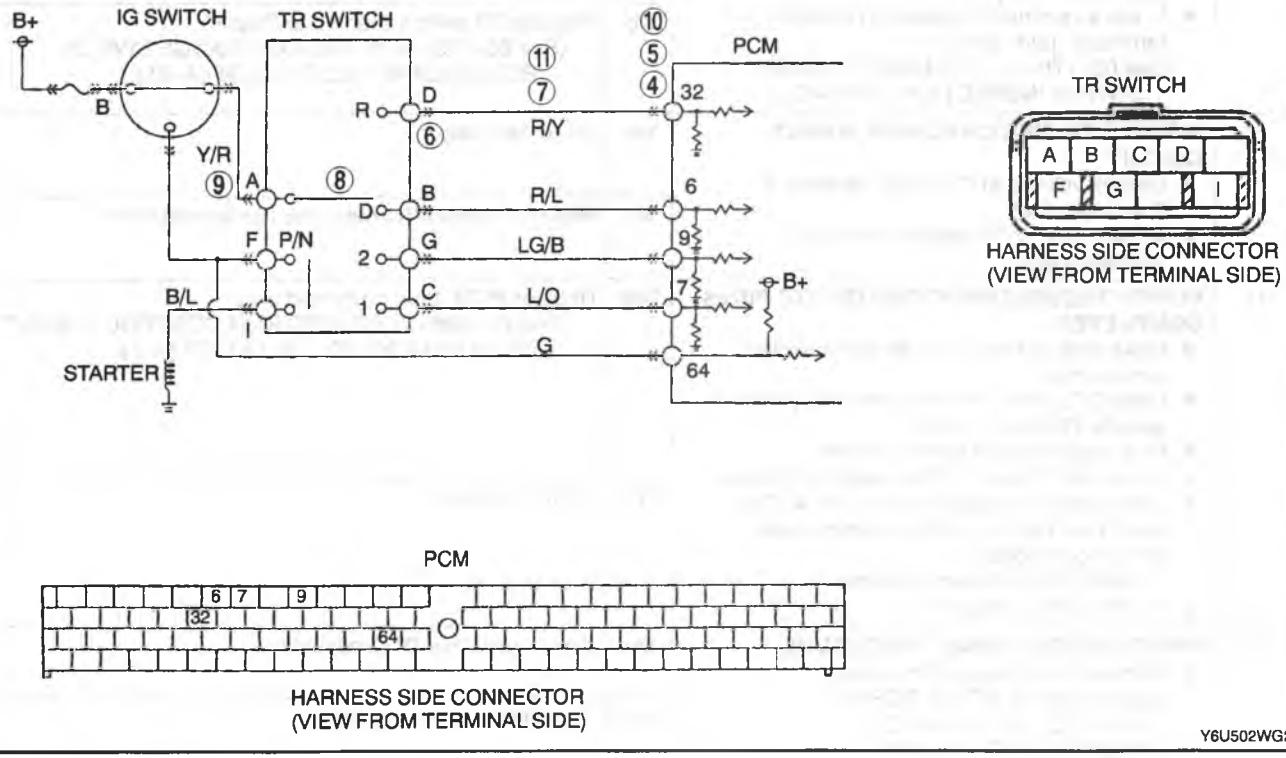
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
3	**VERIFY PCM TERMINAL VOLTAGE** • Connect breakout box to PCM. • Connect circuit tester to breakout box. • Turn ignition key to ON (engine OFF). • Inspect PCM connector terminal voltage. — Terminal 64 • P position: **0 V** • N position: **0 V** • Other position and all ranges: **B+** — Terminal 32 • R position: **B+** • Other positions and all ranges: **0 V** — Terminal 6 • D range: **B+** • Other ranges and all positions: **0 V** — Terminal 9 • 2 range: **B+** • Other ranges and all position: **0 V** — Terminal 7 • 1 range: **B+** • Other ranges and all position: **0 V** • Are two or more of above terminal voltage at the same time when shifting selector lever from P position to 1 range?	Yes	P, N positions constantly 0 V: Go to Step 8. R, D, 2, 1 ranges constantly **B+**: Go to next step.
		No	Go to intermittent concern troubleshooting procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
4	**INSPECT TR SWITCH CONNECTOR** • Turn ignition key to OFF. • Disconnect TR switch connector. • Inspect for bent terminal pins using mirror. • Are TR switch terminals okay?	Yes	Go to next step.
		No	Repair terminals or replace TR switch, then go to Step 11. (See 05-17B-24 TRANSAXLE RANGE SWITCH REMOVAL/INSTALLATION [GF4A-EL].)
5	**INSPECT TR SWITCH CIRCUIT MALFUNCTION** • Connect circuit tester to breakout box. • Turn ignition key to ON (engine OFF). • Does PCM terminal voltage change from **B+** to **0 V** when switch is disconnected?	Yes	Go to next step.
		No	Go to Step 7.

STEP	INSPECTION		ACTION
6	**INSPECT TR SWITCH CONTINUITY** • Turn ignition key to OFF. • Disconnect TR switch connector . • Inspect TR switch for continuity in positions/ranges failed in Step 3. • Is there continuity between TR switch terminals (part-side)? (See 05-17B-23 TRANSAXLE RANGE SWITCH INSPECTION [GF4A-EL])	Yes	Go to Step 11.
		No	Replace TR switch, then go to Step 11. (See 05-17B-24 TRANSAXLE RANGE SWITCH REMOVAL/INSTALLATION [GF4A-EL].)
7	**INSPECT TR SWITCH CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (engine OFF). • Measure voltage at TR switch terminals D, B, G, and C (harness-side). • Is there **0 V** at TR switch harness side connector?	Yes	Go to Step 11.
		No	Repair or replace wiring, then go to Step 11.
8	**INSPECT TR SWITCH CIRCUIT** • Disconnect TR switch connector. • Does terminal voltage change from **0 V** to **B+** when disconnected?	Yes	Go to next step.
		No	Go to Step 10.
9	**INSPECT TR SWITCH CONTINUITY** • Turn ignition key to OFF. • Is there continuity between TR switch terminals (part-side)? (See 05-17B-23 TRANSAXLE RANGE SWITCH INSPECTION [GF4A-EL].)	Yes	Go to Step 11.
		No	Replace TR switch, then go to Step 11. (See 05-17B-24 TRANSAXLE RANGE SWITCH REMOVAL/INSTALLATION [GF4A-EL].)
10	**INSPECT TR SWITCH POWER SUPPLY CIRCUIT** • Inspect voltage at TR switch terminal F (harness-side). • Is there **B+** at TR switch terminal F (harness-side)?	Yes	Go to next step.
		No	Repair or replace harness, then go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P0705 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Run engine at **530 rpm or above**. • Access RPM and TR PID using NGS tester. • Drive vehicle in each range (P, R, N, D, 2, and 1) for **100 seconds or more** under following condition. — RPM PID: **530 rpm or above** • Is same DTC present?	Yes	Replace PCM, then go to next step. (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform "After Repair Procedure". (See 05-02B-6 AFTER REPAIR PROCEDURE [GF4A-EL].) • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0706 [GF4A-EL]

Z6U050201030W07

DTC P0706	Transaxle range (TR) switch circuit malfunction (open circuit)
DETECTION CONDITION	• D, S, and L range switch signal is not inputted for **100 seconds or more** after following conditions are met: — Engine speed is **530 rpm or above**. — Vehicle speed is **20 km/h {12 mph} or above**. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions in two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • O/D OFF indicator light does not flash. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• Charging system malfunction • TR switch malfunction • TR switch misadjustment • Open circuit between TR switch terminal B and PCM terminal 6 • Open circuit between TR switch terminal G and PCM terminal 9 • Open circuit between TR switch terminal C and PCM terminal 7 • Open circuit between TR switch terminal A and ignition switch • Damaged connectors between TR switch and PCM • PCM malfunction



Y6U502WG2

Troubleshooting Hint

TR switch

- Six position ON/OFF type TR switch is used.
- TR switch is installed in the upper part of the transaxle.
- Detects the selector lever position in P, R, N, D, 2, or 1 range, each respective range switch is turned ON.
- TR switch signal is used for following controls and monitors:
  - —Shift control
  - —Line pressure control
  - —Timing control
  - —TCC control
  - —Engine-transaxle total control (Torque reduction control)
  - —Slope mode control
  - —OBD system

TR switch specification

Item	Ignition key to ON (engine OFF) and start engine					
	P	R	N	D	2	1
CPP/PNP PID	ON	OFF	ON	OFF	OFF	OFF
TR PID	PARK	REV	NTRL	O/D ON: O/D O/D OFF: DRIVE	MAN2	MAN1
TR V PID	Approx. 0 V	Approx. 3.5 V	Approx. 0 V	Approx. 3.5 V	Approx. 3.5 V	Approx. 3.5 V
PCM terminal 64 (P, N position)	Below 1.0 V	B+	Below 1.0 V	B+	B+	B+
PCM terminal 32 (R position)	Below 1.0 V	B+	Below 1.0 V	Below 1.0 V	Below 1.0 V	Below 1.0 V
PCM terminal 6 (D range)	Below 1.0 V	Below 1.0 V	Below 1.0 V	B+	Below 1.0 V	Below 1.0 V
PCM terminal 9 (2 range)	Below 1.0 V	Below 1.0 V	Below 1.0 V	Below 1.0 V	B+	Below 1.0 V
PCM terminal 7 (1 range)	Below 1.0 V	Below 1.0 V	Below 1.0 V	Below 1.0 V	Below 1.0 V	B+

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • 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 RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
3	**INSPECT BATTERY VOLTAGE** • Start engine. • Inspect battery voltage while idling. • Is battery voltage **10 V or above**?	Yes	Go to next step.
		No	Inspect charging system, then go to Step 12.
4	**VERIFY PCM TERMINAL VOLTAGE** • Turn ignition key to OFF. • connect breakout box to PCM. • Connect circuit tester to breakout box. • Turn ignition key to ON (engine OFF). • Inspect PCM terminal voltage. — Terminal 6 • D range: **B+** • Other ranges and all positions: **0 V** — Terminal 9 • 2 range: **B+** • Other ranges and all positions: **0 V** — Terminal 7 • 1 range: **B+** • Other ranges and all positions: **0 V** • Is there any terminal voltages that is out of specification?	Yes	Go to next step.
		No	Go to intermittent concern troubleshooting procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
5	**INSPECT TR SWITCH CIRCUIT** • Connect circuit tester to breakout box. • Inspect PCM terminal voltage. — Terminal 6 • D range: **B+** • Other ranges and all positions: **0 V** — Terminal 9 • 2 range: **B+** • Other ranges and all positions: **0 V** — Terminal 7 • 1 range: **B+** • Other ranges and all positions: **0 V** • Are any of following terminal voltage turned on for even a moment while shifting selector lever slowly from P position to 1 range?	Yes	Adjust TR switch, then go to Step 12. (See 05-17B-25 TRANSAXLE RANGE SWITCH ADJUSTMENT [GF4A-EL].)
		No	Go to next step.

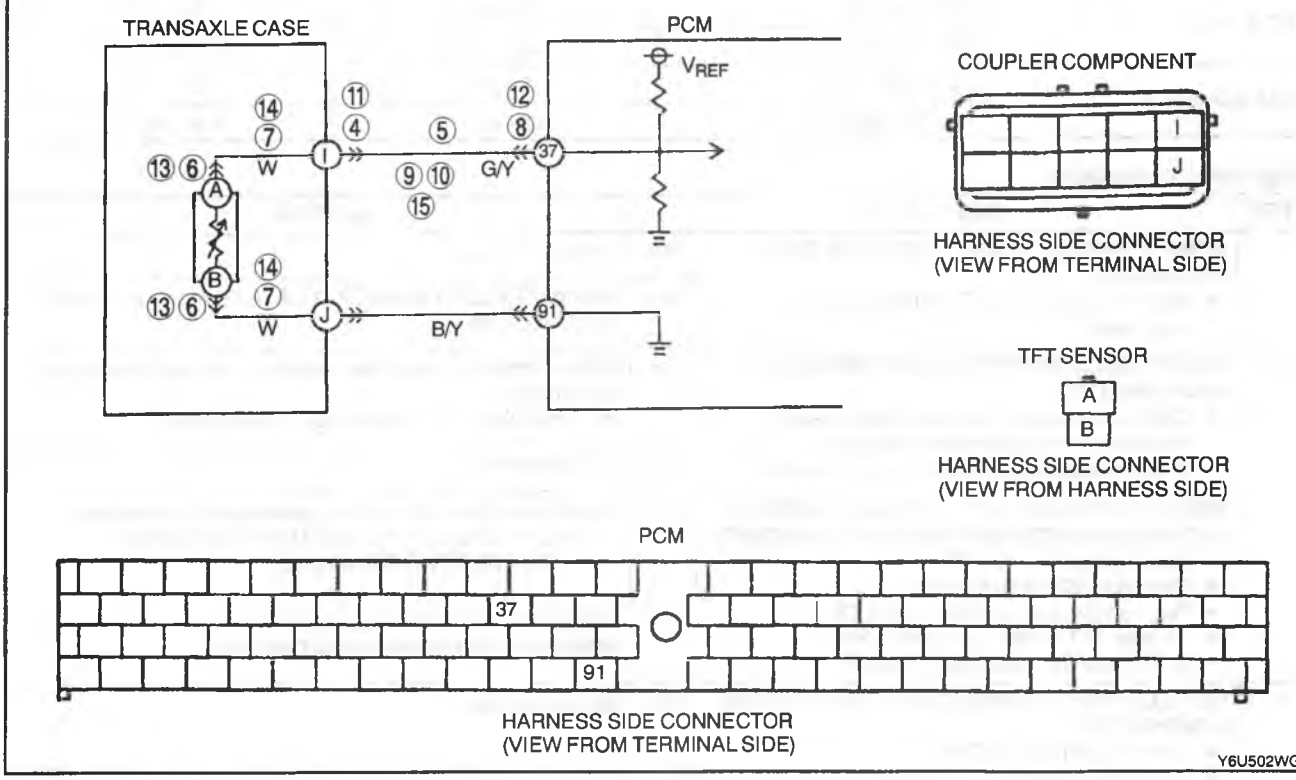
STEP	INSPECTION		ACTION
6	**INSPECT POOR CONNECTION OF TR SWITCH CONNECTOR** • Turn ignition key to OFF. • Inspect TR switch connector connection. • Check for poor connection (damaged, pull-out terminals, corrosion etc.). • Is connector okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminal, then go to Step 12.
7	**INSPECT TR SWITCH CIRCUIT** • Turn ignition key to ON (engine OFF). • Connect harness side connector power line and signal line using jumper wire. • Connect harness side connector power line and signal line using jumper wire. — D range: A and B — S range: A and G — L range: A and C • Inspect if terminal voltage changes **0 V** to **B+**. • Does terminal voltage change?	Yes	Go to next step.
		No	Go to Step 9.
8	**INSPECT TR SWITCH FOR OPEN** • Turn ignition key to OFF. • Disconnect TR switch connector. • Inspect for continuity between TR switch terminals (part-side). — D range: A and B — S range: A and G — L range: A and C • Is there continuity between TR switch terminals (part-side)? (See 05-17B-23 TRANSAXLE RANGE SWITCH INSPECTION [GF4A-EL].)	Yes	Go to Step 12.
		No	Replace TR switch, then go to Step 12. (See 05-17B-24 TRANSAXLE RANGE SWITCH REMOVAL/INSTALLATION [GF4A-EL].)
9	**INSPECT TR SWITCH POWER CIRCUIT FOR OPEN** • Check voltage at TR switch terminal A (harness-side). • Is there **B+** at TR switch terminal A (harness-side)?	Yes	Go to next step.
		No	Inspect main fuse. • If okay, repair or replace wiring, then go to Step 12.
10	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Check for poor connection (damaged pulled-out terminals, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminals, then go to Step 12.
11	**INSPECT TR SWITCH SIGNAL CIRCUIT FOR OPEN** • Check for continuity between TR switch terminals (harness-side) and PCM terminals (harness-side). — D range: B to 6 — S range: G to 9 — L range: C to 7 • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness, then go to next step.
12	**VERIFY TROUBLESHOOTING OF DTC P0706 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Access RPM, VSS, TR PIDs using NGS tester. • Drive vehicle in each range (D, 2, and 1) for **100 seconds or more** under following conditions while monitoring PIDs. — RPM PID: **530 rpm or above** — VSS PID: **20 km/h {12 mph} or above** • Verify that there is no input signal from TR switch for **100 seconds** • Is there pending code present?	Yes	Replace PCM, then go to next step. (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
		No	Go to next step.

STEP	INSPECTION		ACTION
13	**VERIFY AFTER REPAIR PROCEDURE** • Perform "After Repair Procedure". (See 05-02B-6 AFTER REPAIR PROCEDURE [GF4A-EL]) • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0710 [GF4A-EL]

Z6U050201030W08

DTC P0710	Transaxle fluid temperature (TFT) sensor circuit malfunction (short to ground/open circuit)
DETECTION CONDITION	• If PCM detects either of following conditions for **100 seconds or more**, PCM determines that TFT sensor circuit has a malfunction. — TFT sensor voltage is **0.1 V or below** and vehicle speed is **20 km/h {12 mph} or above**. — TFT sensor voltage is **4.9 V or above** and vehicle speed is **20 km/h {12 mph} or above**. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions during first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • O/D OFF indicator light does not flash. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• TFT sensor malfunction • Open circuit between TFT sensor terminal A and coupler component terminal I • Short to ground between TFT sensor terminal A and coupler component terminal I • Open circuit between TFT sensor terminal B and coupler component terminal J • Open circuit between coupler component terminal I and PCM terminal 37 • Short to ground between coupler component terminal I and PCM terminal 37 • Open circuit between coupler component terminal J and PCM terminal 91 • Damaged connectors between TFT sensor and PCM • PCM malfunction



Troubleshooting Hint

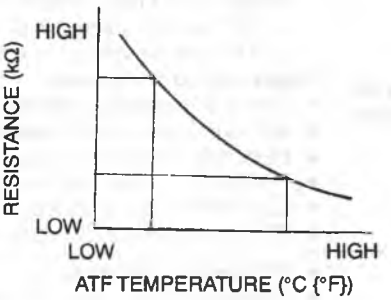
TFT sensor description

- The thermistor type transaxle fluid temperature (TFT) sensor is used.
- The TFT sensor is located on the valve body.
- The TFT sensor detects TFT temperature according to the resistance change in the thermistor and sends signals to the PCM.

- The PCM monitors the voltage across the TFT sensor to determine the ATF temperature. The PCM uses this signal to determine shift schedule and control line pressure for cold and hot temperature operation. The PCM also inhibits torque converter clutch (TCC) operation at low ATF temperature and adjusts pressure control solenoid.
- TFT sensor signal is used for following controls and monitors:
  - —Shift control
  - —Line pressure control
  - —Timing control
  - —TCC control
  - —Engine-transaxle total control (Torque reduction control)
  - —Slope mode control
  - —OBD system

TFT sensor signal characteristic

ATF temperature (°C {°F})	Resistance (kΩ)
-20 {-4}	13.47—17.17
0 {32}	5.445—6.678
20 {68}	2.441—2.894
40 {104}	1.193—1.374
60 {140}	0.6284—0.7048
80 {176}	0.3527—0.3865
100 {212}	0.2091—0.2245
120 {248}	0.1301—0.1372
130 {266}	0.1044—0.1090



Y6U502WG4

TFT sensor specification

Item		KOEO	KOER
TFT PID		Indicates ATF temperature	
TFT V PID	20 °C {68 °F}	3—4 V	3—4 V
	130 °C {266 °F}	0.2—0.7 V	0.2—0.7 V
PCM terminal 37	20 °C {68 °F}	3—4 V	3—4 V
	130 °C {266 °F}	0.2—0.7 V	0.2—0.7 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • 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 RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS - IS CONCERN INTERMITTENT OR CONSTANT** • Turn ignition key to OFF. • Connect NGS tester to DLC. • Turn ignition key to ON (engine OFF). • Access TFT V PID using NGS tester. • Is PID reading **within 0.1—4.9 V**?	Yes	Go to intermittent concern troubleshooting procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
		No	Voltage **0.1 V or below**: go to Step 11. Voltage **4.9 V or above**: go to next step.
4	**INSPECT POOR CONNECTION OF COUPLER COMPONENT** • Turn ignition key to OFF. • Disconnect coupler component. • Check for poor connection (damaged, pulled-out terminals, corrosion etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminals, then go to Step 16.

STEP	INSPECTION		ACTION
5	**INSPECT TFT SENSOR CIRCUIT** • Turn ignition key to ON (engine OFF). • Access TFT V PID using NGS tester. • Connect coupler component terminals I and J (vehicle harness-side) using jumper wire. • Verify that TFT V PID changes to **0.1 V or below**. • Does TFT V PID change?	Yes	Go to next step.
		No	Go to Step 8.
6	**INSPECT POOR CONNECTION OF TFT SENSOR CONNECTOR CONNECTION** • Turn ignition key to OFF. • Remove valve body cover. • Disconnect TFT sensor connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminal or replace TFT sensor, then go to Step 16. (See 05-17B-25 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION [GF4A-EL].)
7	**INSPECT TFT SENSOR CIRCUIT FOR OPEN** • Check for continuity between TFT sensor terminals (harness-side) and coupler component terminals (transaxle case side). — A and I — B and J • Is there continuity?	Yes	Replace TFT sensor, then go to Step 16. (See 05-17B-25 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION [GF4A-EL].)
		No	Repair or replace harness, then go to Step 16.
8	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Turn ignition key to OFF. • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminals, then go to Step 16.
9	**INSPECT HARNESS FOR OPEN CIRCUIT** • Disconnect coupler component • Connect the PCM connector. • Turn ignition key to ON (engine OFF). • Inspect voltage at coupler component terminal I (vehicle harness-side). • Is voltage **5 V**?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 16.
10	**INSPECT COUPLER COMPONENT CIRCUIT FOR OPEN** • Turn ignition key to OFF. • Check for continuity between coupler component terminal J (vehicle harness-side) and body ground. • Is there continuity?	Yes	Go to Step 16.
		No	Repair or replace harness, then go to Step 16.
11	**INSPECT TERMINAL CONDITION** • Turn ignition key to OFF. • Disconnect coupler component. • Inspect for bent terminals. • Are terminals bent?	Yes	Repair or replace terminals, then go to Step 16. • If terminals cannot be repaired, replace harness, then go to Step 16.
		No	Go to next step.
12	**INSPECT TFT SENSOR CIRCUIT** • Turn ignition key to ON (engine OFF). • Verify that TFT V PID changes to **4.9 V or above** when coupler component is disconnected. • Does TFT V PID change?	Yes	Go to next step.
		No	Go to Step 15.
13	**INSPECT TFT SENSOR TERMINALS CONDITION** • Turn ignition key to OFF. • Disconnect TFT sensor connector. • Inspect for bent TFT sensor terminals. • Are terminals bent?	Yes	Repair terminals or replace TFT sensor, then go to Step 16. (See 05-17B-25 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION [GF4A-EL].)
		No	Go to next step.

STEP	INSPECTION		ACTION
14	**INSPECT TFT SENSOR CIRCUIT FOR SHORT TO GROUND** • Check for continuity between TFT sensor terminals (harness-side) and body ground. — A and body ground — B and body ground • Is there continuity?	Yes	Repair or replace harness, then go to Step 16.
		No	Replace TFT sensor, then go to Step 16. (See 05-17B-25 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION [GF4A-EL].)
15	**INSPECT COUPLER COMPONENT CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Check for continuity between coupler component terminal I (vehicle harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness, then go to next step.
		No	Go to next step.
16	**VERIFY TROUBLESHOOTING OF DTC P0710 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Access VSS PID using NGS tester. • Drive vehicle under following condition for **100 seconds or more** while monitoring PID. — VSS PID: **20 km/h {12 mph}** • Is same DTC present?	Yes	Replace PCM, then go to next step. (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
		No	Go to next step.
17	**VERIFY AFTER REPAIR PROCEDURE** • Perform "After Repair Procedure". (See 05-02B-6 AFTER REPAIR PROCEDURE [GF4A-EL].) • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0711 [GF4A-EL]

Z6U050201030W09

DTC P0711	Transaxle fluid temperature (TFT) sensor circuit malfunction (stuck)
DETECTION CONDITION	• While driving the vehicle with vehicle speed **60 km/h {37 mph} or above** for **430 seconds or more**, TFT sensor signal stays **20 °C {68 °F} or below (3.6 V or above)** and DTC P0710 is not output. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions in two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • O/D OFF indicator light does not flash. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• TFT sensor malfunction • Connector corrosion • PCM malfunction

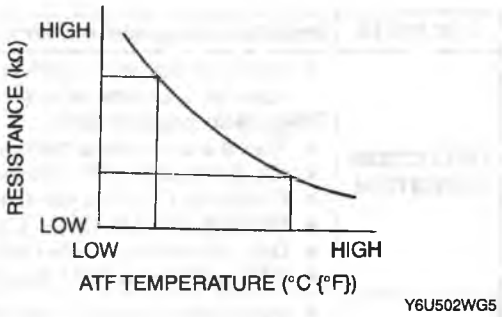
Troubleshooting Hint

TFT sensor description

- The thermistor type transaxle fluid temperature (TFT) sensor is used.
- The TFT sensor is located on the valve body.
- The TFT sensor detects ATF temperature according to the resistance change in the thermistor and sends signals to the PCM.
- The PCM monitors the voltage across the TFT sensor to determine the ATF temperature. The PCM uses this signal to determine shift schedule and control line pressure for cold and hot temperature operation. The PCM also inhibits torque converter clutch (TCC) operation at low ATF temperature and adjusts pressure control solenoid.
- TFT sensor signal is used for following controls and monitors:
  - —Shift control
  - —Line pressure control
  - —Timing control
  - —TCC control
  - —Engine-transaxle total control (Torque reduction control)
  - —Slope mode control
  - —OBD system

TFT sensor signal characteristic

ATF temperature (°C {°F})	Resistance (kΩ)
-20 {-4}	13.47—17.17
0 {32}	5.445—6.678
20 {68}	2.441—2.894
40 {104}	1.193—1.374
60 {140}	0.6284—0.7048
80 {176}	0.3527—0.3865
100 {212}	0.2091—0.2245
120 {248}	0.1301—0.1372
130 {266}	0.1044—0.1090



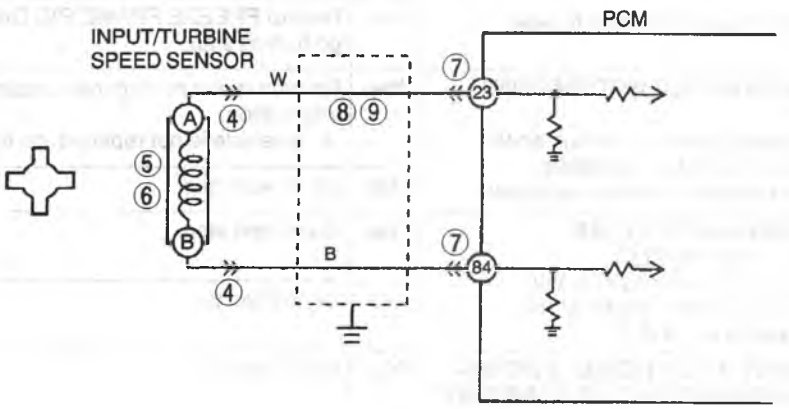
Diagnostic procedure

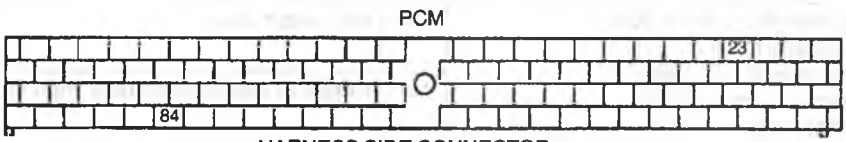
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
3	**INSPECT TFT SENSOR VOLTAGE** • Connect NGS tester to DLC. • Access TFT V PID using NGS tester. • Turn ignition key to ON (engine OFF). • Is TFT V **within 3.4— 3.6 V**?	Yes	Go to next step.
		No	Go to Step 6.
4	**VERIFY CURRENT INPUT SIGNAL STATUS - IS CONCERN INTERMITTENT OR CONSTANT** • Start engine. • Drive vehicle at **60 km/h {37 mph} or above** for **430 seconds or more**. — ATF **20 °C {68 °F}**: **Within 3.4—3.6 V** — ATF **130 °C {266 °F}**: **Within 0.4—0.5 V** • Does TFT V change?	Yes	Go to Step 6.
		No	Go to next step.
5	**INSPECT TERMINAL CONDITION** • Turn ignition key to OFF. • Disconnect coupler component. • Inspect terminals for corrosion. • Are terminals okay?	Yes	Go to next step.
		No	Repair or replace terminals, then go to next step.
6	**VERIFY TROUBLESHOOTING OF DTC P0711 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Access VSS, TFT V, and TFT PIDs using NGS tester. • Decrease ATF temperature to **20 °C {68 °F} or below**. • Drive vehicle under following condition for **430 seconds or more** while monitoring PID. — VSS PID: **60 km/h {37 mph}** • Is same DTC present?	Yes	Replace PCM, then go to next step. (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL])
		No	Go to next step.
7	**VERIFY AFTER REPAIR PROCEDURE** • Perform "After Repair Procedure". (See 05-02B-6 AFTER REPAIR PROCEDURE [GF4A-EL].) • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0715 [GF4A-EL]

Z6U050201030W10

DTC P0715	Input/turbine speed sensor circuit malfunction
DETECTION CONDITION	• While driving vehicle with vehicle speed **41 km/h {25 mph}**, input/turbine speed sensor signal is not input for **1 second or above**. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions during first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • O/D OFF indicator light flashes. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• Input/turbine speed sensor malfunction • Short to ground between input/turbine speed sensor terminal A and PCM terminal 23 • Short to ground between input/turbine speed sensor terminal B and PCM terminal 84 • Open circuit between input/turbine speed sensor terminal A and PCM terminal 23 • Open circuit between input/turbine speed sensor terminal B and PCM terminal 84 • Damaged connectors between input/turbine speed sensor and PCM • PCM malfunction





HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

INPUT/TURBINE SPEED SENSOR



HARNESS SIDE CONNECTOR
(VIEW FROM TERMINAL SIDE)

Y6U502WG6

Troubleshooting Hint

Input/turbine speed sensor description

- The input/turbine speed sensor is a magnetic pickup that sends a signal to the PCM that indicates reverse and forward drum input speed. The input/turbine speed sensor provides reverse and forward drum speed information for torque converter clutch (TCC) control strategy. Also, it is also used in determining static line pressure to pressure control solenoid setting during shift.
- The input/turbine speed sensor signal is used for following controls and monitors:
  - —Shift control
  - —Line pressure control
  - —Timing control
  - —TCC control

—Engine-transaxle total control (Torque reduction control)
—Engine-transaxle total control (N-D/R selector control)
—Slope mode control
—OBD system

Input/turbine speed sensor specification

Item	KOEO	KOER	
		IDLE	
		P, N	R, D, 2, 1
TSS PID	0 rpm	Approx. 700 rpm	0 rpm
TSS/ISS PID	0 rpm	Approx. 700 rpm	0 rpm
PCM terminal 84	0 V	0.1—1.0 V	0 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • 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 RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
3	**VERIFY CURRENT INPUT SIGNAL STATUS - IS CONCERN INTERMITTENT OR CONSTANT** • Turn ignition key to OFF. • Connect NGS tester to DLC. • Start engine. • Access TSS PID using NGS tester. — IG ON: **0 rpm** — Idle: **Within 600—700 rpm** • Are PID readings within specification?	Yes	Go to intermittent concern troubleshooting procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
		No	Go to next step.
4	**INSPECT POOR CONNECTION OF INPUT/TURBINE SPEED SENSOR CONNECTOR** • Turn ignition key to OFF. • Disconnect input/turbine speed sensor connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connection and/or terminals, then go to Step 10.
5	**INSPECT INPUT/TURBINE SPEED SENSOR RESISTANCE** • Measure resistance between input/turbine speed sensor terminals (part-side). • Is resistance **within 253—604** Ω between input/turbine speed sensor terminals (part-side)? (See 05-17B-26 INPUT/TURBINE SPEED SENSOR INSPECTION [GF4A-EL].)	Yes	Go to next step.
		No	Replace input/turbine speed sensor, then go to Step 10. (See 05-17B-27 INPUT/TURBINE SPEED SENSOR REMOVAL/INSTALLATION [GF4A-EL].)
6	**INSPECT INPUT/TURBINE SPEED SENSOR** • Remove input/turbine speed sensor. • Is there iron powder stuck on input/turbine speed sensor? (See 05-17B-27 INPUT/TURBINE SPEED SENSOR REMOVAL/INSTALLATION [GF4A-EL].)	Yes	Clean input/turbine speed sensor, then go to Step 10.
		No	Go to next step.
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminals, then go to Step 10.

STEP	INSPECTION		ACTION
8	**INSPECT INPUT/TURBINE SPEED SENSOR CIRCUIT FOR OPEN** • Check input/turbine speed sensor terminals (harness-side) and PCM terminals (harness-side). — A and 23 — B and 84 • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 10.
9	**INSPECT INPUT/TURBINE SPEED SENSOR CIRCUIT FOR SHORT TO GROUND** • Check input/turbine speed sensor terminals (harness-side) and body ground. — A and body ground — B and body ground • Is there continuity?	Yes	Repair or replace harness, then go to next step.
		No	Go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P0715 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Access VSS PID using NGS tester. • Drive vehicle with vehicle speed **41 km/h {25 mph} or above** for **1 second or more** while monitoring PID. • Is same DTC present?	Yes	Replace PCM, then go to next step. (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL])
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform "After Repair Procedure". (See 05-02B-6 AFTER REPAIR PROCEDURE [GF4A-EL].) • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0731 [GF4A-EL]

Z6U050201030W11

DTC P0731	Gear 1 Incorrect ratio
DETECTION CONDITION	• All conditions below are satisfied with ignition key turned to ON (Start engine.). — ATF temperature is **20 °C {68 °F} or above**. — Driving in 1GR, in D range. — Engine speed is **500 rpm or above**. — Turbine speed is **75 rpm or above**. — Vehicle speed is **within 6 km/h {4 mph}— 60 km/h {37 mph}**. — Throttle opening angle is **6.25 % or above**. — Brake pedal is not depressed. — Ratio of turbine speed to vehicle speed is under preset value. — None of DTCs P0500, P0710, P0715, P0750, P0755, P0760 are output. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions in two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • O/D OFF indicator light does not flash. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• ATF level is low. • Deteriorated ATF • Shift solenoids A, B, C or pressure control solenoid is stuck. • Line pressure is low. • Forward clutch is slipping. • One-way clutch 1 is slipping. • One-way clutch 2 is slipping. • Control valve is stuck. • PCM malfunction

Troubleshooting Hint

Description

- If the RPM difference between the reverse and forward drum (input/turbine speed sensor signal) and differential gear case (VSS signal) exceeds or falls below the pre-programmed RPM difference in the PCM while driving in 1GR, in D range, the PCM judges "gear incorrect".

Gear shift pattern under solenoid valve failure

Shift Pattern				Failed Part		
				Shift solenoid A	Shift solenoid B	Shift solenoid C
2	2	3	4	Stuck ON		
1	1	3	3	Stuck OFF		
1	2	2	2		Stuck ON	
3	4	3	4		Stuck OFF	
1	2	4	4			Stuck ON
1	2	3	3			Stuck OFF
2	2	2	2	Stuck ON	Stuck ON	
4	4	3	4	Stuck ON	Stuck OFF	
2	2	4	4	Stuck ON		Stuck ON
2	2	3	3	Stuck ON		Stuck OFF
1	1	1	1	Stuck OFF	Stuck ON	
3	3	3	3	Stuck OFF	Stuck OFF	
1	1	3	3	Stuck OFF		Stuck ON
1	1	3	3	Stuck OFF		Stuck OFF
1	2	2	2		Stuck ON	Stuck ON
1	2	2	2		Stuck ON	Stuck OFF
3	4	4	4		Stuck OFF	Stuck ON
3	3	3	3		Stuck OFF	Stuck OFF
2	2	2	2	Stuck ON	Stuck ON	Stuck ON
2	2	2	2	Stuck ON	Stuck ON	Stuck OFF
4	4	4	4	Stuck ON	Stuck OFF	Stuck ON
3	3	3	3	Stuck ON	Stuck OFF	Stuck OFF
1	1	1	1	Stuck OFF	Stuck ON	Stuck ON
1	1	1	1	Stuck OFF	Stuck OFF	Stuck ON
3	3	3	3	Stuck OFF	Stuck ON	Stuck OFF
3	3	3	3	Stuck OFF	Stuck OFF	Stuck OFF
1	2	3	4	No Failure		

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • 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 RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
3	**CHECK ATF CONDITION** • Turn ignition key to OFF. • Check ATF condition. — Clear red: Normal — Milky: Water mixed in fluid — Reddish brown: Deteriorated ATF • Is it okay? (See 05-17B-20 ATF Condition Inspection.)	Yes	Go to next step.
		No	If ATF color is milky or reddish brown, replace ATF, then go to Step 5. (See 05-17B-21 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [GF4A-EL].)

STEP	INSPECTION		ACTION
4	**CHECK ATF LEVEL** • Start engine. • Warm up ATX. • Is ATF level within specification? (See 05-17B-20 ATF Level Inspection.)	Yes	Go to next step.
		No	Adjust ATF level, then go to Step 9. (See 05-17B-20 ATF Level Inspection.)
5	**INSPECT LINE PRESSURE** • Start engine. • Measure line pressure. **Specification** Idle: **420—530 kPa {4.2—5.5 kgf/cm², 60—75 psi}** Stall: **1,100—1,170 kPa {11.2—12.0 kgf/cm², 160—170 psi}** • Is line pressure within specification? (See 05-17B-13 Line Pressure Test.)	Yes	Go to next step.
		No	• All ranges: Replace oil pump or control valve body, then go to Step 9. • Any of D, 2, or 1 ranges: Replace ATX, then go to Step 9. (See 05-17B-33 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [GF4A-EL].) (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98).)
6	**INSPECT STALL SPEED** • Measure stall speed in D range. **Specification** **2,000—2,500 rpm** • Is stall speed within specification? (See 05-17B-14 Stall Speed Test.)	Yes	Go to Step 9.
		No	Go to next step.
7	**INSPECT TURBINE SPEED WHEN DRIVING WITH VEHICLE SPEED 20 KM/H {12 MPH} IN D RANGE** • Turn ignition key to OFF. • Connect NGS tester to DLC-2. • Start engine. • Access VSS, TR, TSS, and TP V PIDs using NGS tester. • Drive vehicle while monitoring PIDs. — VSS PID: **20 km/h {12 mph}** — TR PID: O/D — 1GR — TP V PID: **1.4—2.4 V** • Is TSS PID okay? **TSS PID:** **Approx. 2,100 rpm**	Yes	Go to Step 9.
		No	Go to next step.
8	**CLICK TEST OF SOLENOID VALVES** • Turn ignition key to OFF. • Remove the shift solenoids A, B, C, and pressure control solenoids. • Are there click sound? (See 05-17B-29 SOLENOID VALVES INSPECTION [GF4A-EL])	Yes	Replace control valve body, then go to next step. (See 05-17B-40 CONTROL VALVE BODY REMOVAL/INSTALLATION [GF4A-EL].)
		No	Replace shift solenoids A, B, C, or pressure control solenoid, then go to next step. (See 05-17B-30 SOLENOID VALVE REMOVAL/INSTALLATION [GF4A-EL].)
9	**VERIFY TROUBLESHOOTING OF DTC P0731 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine. • Warm up ATX. • Access VSS, TP V, and TR PID using NGS tester. • Drive vehicle under following conditions for **15 seconds or more** while monitoring PIDs. — VSS PID: **Within 8 km/h {5 mph}—48 km/h {30 mph}** — 1GR — TR PID: O/D — TP V PID: **1.1 v or above** • Is there pending code present?	Yes	Replace PCM, then go to next step. (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform "After Repair Procedure". (See 05-02B-6 AFTER REPAIR PROCEDURE [GF4A-EL].) • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0732 [GF4A-EL]

Z6U050201030W12

DTC P0732	Gear 2 Incorrect ratio
DETECTION CONDITION	• All conditions below are satisfied. — ATF temperature is **20 °C {68 °F} or above**. — Driving in 2GR, in D range. — Engine speed is **500 rpm or above**. — Turbine speed is **75 rpm or above**. — Vehicle speed is **within 9 km/h {6 mph}— 106 km/h {66 mph}**. — Throttle opening angle is **6.25 % or above**. — Brake pedal is not depressed. — Ratio of turbine speed to vehicle speed is under preset value. — None of DTCs P0500, P0710, P0715, P0750, P0755, P0760 are output. **Diagnostic support note:** • This is continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions in two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • O/D OFF indicator light does not flash. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• ATF level is low. • Deteriorated ATF • Shift solenoids A, B, C, or pressure control solenoid is stuck. • Line pressure is low. • 2-4 brake band slippage • Forward clutch slippage • 1-2 shift valve is stuck. • 3-4 shift valve is stuck. • Pressure regulator valve is stuck. • Pressure modifier valve is stuck. • Solenoid reducing valve is stuck. • Oil pump malfunction • PCM malfunction

Troubleshooting Hint

Description

- If the RPM difference between the reverse and forward drum (input/turbine speed sensor signal) and differential gear case (VSS signal) exceeds or falls below the pre-programmed RPM difference in the PCM while driving in 2GR, in D range, the PCM judges "gear incorrect".

Gear shift pattern under solenoid valve failure

Shift Pattern				Failed Part		
				Shift solenoid A	Shift solenoid B	Shift solenoid C
2	2	3	4	Stuck ON		
1	1	3	3	Stuck OFF		
1	2	2	2		Stuck ON	
3	4	3	4		Stuck OFF	
1	2	4	4			Stuck ON
1	2	3	3			Stuck OFF
2	2	2	2	Stuck ON	Stuck ON	
4	4	3	4	Stuck ON	Stuck OFF	
2	2	4	4	Stuck ON		Stuck ON
2	2	3	3	Stuck ON		Stuck OFF
1	1	1	1	Stuck OFF	Stuck ON	
3	3	3	3	Stuck OFF	Stuck OFF	
1	1	3	3	Stuck OFF		Stuck ON
1	1	3	3	Stuck OFF		Stuck OFF
1	2	2	2		Stuck ON	Stuck ON
1	2	2	2		Stuck ON	Stuck OFF
3	4	4	4		Stuck OFF	Stuck ON

Shift Pattern				Failed Part		
				Shift solenoid A	Shift solenoid B	Shift solenoid C
3	3	3	3		Stuck OFF	Stuck OFF
2	2	2	2	Stuck ON	Stuck ON	Stuck ON
2	2	2	2	Stuck ON	Stuck ON	Stuck OFF
4	4	4	4	Stuck ON	Stuck OFF	Stuck ON
3	3	3	3	Stuck ON	Stuck OFF	Stuck OFF
1	1	1	1	Stuck OFF	Stuck ON	Stuck ON
1	1	1	1	Stuck OFF	Stuck OFF	Stuck ON
3	3	3	3	Stuck OFF	Stuck ON	Stuck OFF
3	3	3	3	Stuck OFF	Stuck OFF	Stuck OFF
1	2	3	4	No Failure		

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • 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 RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
3	**CHECK ATF CONDITION** • Turn ignition key to OFF. • Check ATF condition. — Clear red: Normal — Milky: Water mixed in fluid — Reddish brown: Deteriorated ATF • Is it okay? (See 05-17B-20 ATF Condition Inspection.)	Yes	Go to next step.
		No	If ATF color is milky or reddish brown, replace ATF, then go to Step 5. (See 05-17B-21 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [GF4A-EL])
4	**CHECK ATF LEVEL** • Start engine. • Warm up ATX. • Is ATF level within specification? (See 05-17B-20 ATF Level Inspection.)	Yes	Go to next step.
		No	Adjust ATF level, then go to Step 10. (See 05-17B-20 ATF Level Inspection.)
5	**INSPECT LINE PRESSURE** • Start engine. • Measure line pressure. **Specification** Idle: **420—530 kPa {4.2—5.5 kgf/cm^2, 60—75 psi}** Stall: **1,100—1,170 kPa {11.2—12.0 kgf/cm^2, 160—170 psi}** • Is line pressure within specification? (See 05-17B-13 Line Pressure Test.)	Yes	Go to next step.
		No	All ranges: Replace oil pump or control valve body, then go to Step 10. Any of D, 2, or 1 ranges: Replace or overhaul automatic transaxle, then go to Step 10. (See 05-17B-33 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [GF4A-EL].) (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-152H-98).)
6	**INSPECT STALL SPEED** • Measure stall speed in 2 range. **Specification** **2,000—2,500 rpm** • Is stall speed within specification? (See 05-17B-14 Stall Speed Test.)	Yes	Go to next step.
		No	Replace ATX, then go to Step 9. (See 05-17B-33 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [GF4A-EL])

STEP	INSPECTION		ACTION
7	**INSPECT TURBINE SPEED WHEN DRIVING WITH VEHICLE SPEED 35 KM/H {22 MPH} IN D RANGE** • Turn ignition key to OFF. • Connect NGS tester to DLC-2. • Start engine. • Access VSS, TR, TSS, and TP V PIDs using NGS tester. • Drive vehicle while monitoring PIDs. — VSS PID: **35 km/h {22 mph}** — TR PID: O/D — 2GR — TP V PID: **Within 1.4—2.4 V** • Is TSS PID okay? **TSS PID:** **Approx. 2,000 rpm**	Yes	Go to step 10.
		No	Go to next step.
8	**CLICK TEST OF SOLENOID VALVES** • Turn ignition key to OFF. • Remove shift solenoids A, B, C, and pressure control solenoid. • Are there click sounds? (See 05-17B-29 SOLENOID VALVES INSPECTION [GF4A-EL].)	Yes	Go to next step.
		No	Replace shift solenoids A, B, C, or pressure control solenoid, then go to Step 10. (See 05-17B-40 CONTROL VALVE BODY REMOVAL/INSTALLATION [GF4A-EL].)
9	**CHECK OPERATION OF EACH VALVE AND EACH SPRING** • Remove control valve body. • Disassemble control valve body. • Are operations of each valve and return spring okay? (See 05-17B-40 CONTROL VALVE BODY REMOVAL/INSTALLATION [GF4A-EL].) (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98).)	Yes	2-4 brake band slipping. Replace or overhaul automatic transaxle, then go to next step. (See ATX Workshop Manual GF4A-EL (9999-95-192H-98).)
		No	Repair or replace shift valves and/or return springs, then go to next step. • 1-2 shift valve and/or 1-2 shift spring • 2-3 shift vale and/or 2-3 shift spring • 3-4 shift valve and/or 3-4 shift spring (See 05-17B-40 CONTROL VALVE BODY REMOVAL/INSTALLATION [GF4A-EL].) (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98).)
10	**VERIFY TROUBLESHOOTING OF DTC P0732 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine. • Warm up ATX. • Access VSS and TR PIDs using NGS tester. • Drive vehicle under following conditions for **15 seconds or more** while monitoring PIDs. — VSS PID: **Within 10 km/h {6 mph}—87 km/h {54 mph}** — 2GR — TR PID: O/D • Is there pending code present?	Yes	Replace PCM, then go to next step. (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform "After Repair Procedure". (See 05-02B-6 AFTER REPAIR PROCEDURE [GF4A-EL].) • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0733 [GF4A-EL]

Z6U050201030W13

DTC P0733	Gear 3 incorrect ratio
DETECTION CONDITION	• All conditions below are satisfied. — ATF temperature is **20 °C {68 °F} or above**. — Driving in 3GR, in D range. — Engine speed is **500 rpm or above**. — Turbine speed is **75 rpm or above**. — Vehicle speed is **within 30 km/h {19 mph}— 48 km/h {30 mph}**. — Brake pedal is not depressed. — Ratio of turbine speed to vehicle speed is under preset value. — None of DTCs P0500, P0710, P0715, P0750, P0755, P0760 are output. **Diagnostic support note:** • This is continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions in two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • O/D OFF indicator light does not flash. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• ATF level is low. • Deteriorated ATF • Shift solenoids A, B, C or pressure control solenoid is stuck. • Line pressure is low. • 3-4 clutch is slipping. • 3-4 shift valve is stuck. • 2-3 shift valve is stuck. • Pressure regulator valve is stuck. • Pressure modifier valve is stuck. • Solenoid reducing valve is stuck. • Oil pump malfunction • PCM malfunction

Troubleshooting Hint

Description

- If the RPM difference between the reverse and forward drum (input/turbine speed sensor signal) and differential gear case (VSS signal) exceeds or falls below the pre-programmed RPM difference in the PCM while driving in 3GR, in D range, the PCM judges "gear incorrect".

Gear shift pattern under solenoid valve failure

Shift Pattern				Failed Part		
				Shift solenoid A	Shift solenoid B	Shift solenoid C
2	2	3	4	Stuck ON		
1	1	3	3	Stuck OFF		
1	2	2	2		Stuck ON	
3	4	3	4		Stuck OFF	
1	2	4	4			Stuck ON
1	2	3	3			Stuck OFF
2	2	2	2	Stuck ON	Stuck ON	
4	4	3	4	Stuck ON	Stuck OFF	
2	2	4	4	Stuck ON		Stuck ON
2	2	3	3	Stuck ON		Stuck OFF
1	1	1	1	Stuck OFF	Stuck ON	
3	3	3	3	Stuck OFF	Stuck OFF	
1	1	3	3	Stuck OFF		Stuck ON
1	1	3	3	Stuck OFF		Stuck OFF
1	2	2	2		Stuck ON	Stuck ON
1	2	2	2		Stuck ON	Stuck OFF
3	4	4	4		Stuck OFF	Stuck ON
3	3	3	3		Stuck OFF	Stuck OFF
2	2	2	2	Stuck ON	Stuck ON	Stuck ON

Shift Pattern				Failed Part		
				Shift solenoid A	Shift solenoid B	Shift solenoid C
2	2	2	2	Stuck ON	Stuck ON	Stuck OFF
4	4	4	4	Stuck ON	Stuck OFF	Stuck ON
3	3	3	3	Stuck ON	Stuck OFF	Stuck OFF
1	1	1	1	Stuck OFF	Stuck ON	Stuck ON
1	1	1	1	Stuck OFF	Stuck OFF	Stuck ON
3	3	3	3	Stuck OFF	Stuck ON	Stuck OFF
3	3	3	3	Stuck OFF	Stuck OFF	Stuck OFF
1	2	3	4	No Failure		

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • 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 RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
3	**CHECK ATF CONDITION** • Turn ignition key to OFF. • Check ATF condition. — Clear red: Normal — Milky: Water mixed in fluid — Reddish brown: Deteriorated ATF • Is it okay? (See 05-17B-20 ATF Condition Inspection.)	Yes	Go to next step.
		No	If ATF color is milky or reddish brown, replace ATF, then go to Step 5. (See 05-17B-21 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [GF4A-EL])
4	**CHECK ATF LEVEL** • Start engine. • Warm up ATX. • Is ATF level within specification? (See 05-17B-20 ATF Level Inspection.)	Yes	Go to next step.
		No	Adjust ATF level, then go to Step 10. (See 05-17B-20 ATF Level Inspection.)
5	**INSPECT LINE PRESSURE** • Start engine. • Measure line pressure. **Specification** Idle: **420—530 kPa {4.2—5.5 kgf/cm², 60—75 psi}** Stall: **1,100—1,170 kPa {11.2—12.0 kgf/cm², 160—170 psi}** • Is line pressure within specification? (See 05-17B-13 Line Pressure Test.)	Yes	Go to next step.
		No	All ranges: Replace oil pump or control valve body, then go to Step 10. Any of D, 2, or 1 ranges: Replace or overhaul ATX, then go to Step 10. (See 05-17B-33 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [GF4A-EL]) (See Automatic transaxle Workshop Manual GF4A-EL (9999-95-192H-98).)
6	**INSPECT STALL SPEED** • Disconnect coupler component (fix in 3GR). • Measure stall speed. **Specification** **2,000—2,500 rpm** • Is stall speed within specification? (See 05-17B-14 Stall Speed Test.)	Yes	Go to next step.
		No	Go to Step 9.

STEP	INSPECTION		ACTION
7	**INSPECT TURBINE SPEED WHEN DRIVING WITH VEHICLE SPEED 40 KM/H {25 MPH} IN D RANGE** • Turn ignition key to OFF. • Connect NGS tester to DLC-2. • Start engine. • Access VSS, TR, TSS, and TP V PIDs using NGS tester. • Drive vehicle while monitoring PIDs. — VSS PID: **40 km/h {25 mph}** — TR PID: O/D — 3 GR — TP V PID: **Within 1.1—1.7 V** • Is TSS PID okay? **TSS PID**: **Approx. 1,500 rpm**	Yes	Go to Step 10.
		No	Go to next step.
8	**CLICK TEST OF SOLENOID VALVES** • Turn ignition key to OFF. • Remove shift solenoids A, B, C and pressure control solenoid. • Are there click sounds? (See 05-17B-29 SOLENOID VALVES INSPECTION [GF4A-EL].)	Yes	Go to next step.
		No	Replace shift solenoids A, B, C or pressure control solenoid, then go to Step 10. (See 05-17B-30 SOLENOID VALVE REMOVAL/INSTALLATION [GF4A-EL].)
9	**CHECK OPERATION OF EACH VALVE AND EACH SPRING** • Remove the control valve body. • Disassemble control valve body. • Are operations of each valve and return spring okay? (See 05-17B-40 CONTROL VALVE BODY REMOVAL/INSTALLATION [GF4A-EL].)	Yes	3-4 clutch, forward clutch, or coasting clutch slipping. Replace or overhaul ATX, then go to next step. (See 05-17B-33 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [GF4A-EL].) (See Automatic transaxle Workshop Manual GF4A-EL (9999-95-192H-98).)
		No	Repair or replace shift vales and/or return springs, then go to next step. • 1-2 shift valve and/or 1-2 shift spring • 2-3 shift valve and/or 2-3 shift spring • 3-4 shift valve and/or 3-4 shift spring (See 05-17B-40 CONTROL VALVE BODY REMOVAL/INSTALLATION [GF4A-EL].) (See Automatic transaxle Workshop Manual GF4A-EL (9999-95-192H-98).)
10	**VERIFY TROUBLESHOOTING OF DTC P0733 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine. • Warm up ATX. • Access VSS, and TR PIDs using NGS tester. • Drive vehicle under following condition for 5 seconds or more while monitoring PIDs. — VSS PID: **Within 27 km/h {17 mph}—48 km/h {30 mph}** — 3GR — TR PID: O/D • Is there pending code present?	Yes	Replace PCM, then go to next step. (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform "After Repair Procedure". (See 05-02B-6 AFTER REPAIR PROCEDURE [GF4A-EL].) • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0734 [GF4A-EL]

Z6U050201030W14

DTC P0734	Gear 4 incorrect ratio
DETECTION CONDITION	• All conditions below are satisfied. — ATF temperature is **20 °C {68 °F} or above**. — Driving in 4GR, in D range. — Engine speed is **500 rpm or above**. — Turbine speed is **within 75 rpm— 4,986 rpm**. — Vehicle speed is **within 76 km/h {47 mph}— 104 km/h {64 mph}**. — Brake pedal is not depressed. — Ratio of turbine speed to vehicle speed is under preset valve. — None of DTCs P0500, P0710, P0715, 0750, P0755, P0760 are output. **Diagnostic support note:** • This is continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions in two consecutive drive cycles. • PENDING CODE is available. • FREEZE FRAME DATA is available. • O/D OFF indicator light does not flash. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• ATF level is low. • Deteriorated ATF • Shift solenoids A, B, C, or pressure control solenoid is stuck. • Line pressure is low. • 2-4 brake band is slipping. • 3-4 clutch is slipping. • 1-2 shift valve is stuck. • 2-3 shift valve is stuck. • 3-4 shift valve is stuck. • Pressure regulator valve is stuck. • Pressure modifier valve is stuck. • Solenoid reducing valve is stuck. • Oil pump malfunction • PCM malfunction

Troubleshooting Hint

Description

- If the PCM difference between the reverse and forward drum (input/turbine speed sensor signal) and differential gear case (VSS signal) exceeds or falls below the pre-programmed RPM difference in the PCM while driving in 4GR, in D range, the PCM judges "gear incorrect".

Gear shift pattern under solenoid valve failure

Shift Pattern				Failed Part		
				Shift solenoid A	Shift solenoid B	Shift solenoid C
2	2	3	4	Stuck ON		
1	1	3	3	Stuck OFF		
1	2	2	2		Stuck ON	
3	4	3	4		Stuck OFF	
1	2	4	4			Stuck ON
1	2	3	3			Stuck OFF
2	2	2	2	Stuck ON	Stuck ON	
4	4	3	4	Stuck ON	Stuck OFF	
2	2	4	4	Stuck ON		Stuck ON
2	2	3	3	Stuck ON		Stuck OFF
1	1	1	1	Stuck OFF	Stuck ON	
3	3	3	3	Stuck OFF	Stuck OFF	
1	1	3	3	Stuck OFF		Stuck ON
1	1	3	3	Stuck OFF		Stuck OFF
1	2	2	2		Stuck ON	Stuck ON
1	2	2	2		Stuck ON	Stuck OFF
3	4	4	4		Stuck OFF	Stuck ON
3	3	3	3		Stuck OFF	Stuck OFF

Shift Pattern				Failed Part		
				Shift solenoid A	Shift solenoid B	Shift solenoid C
2	2	2	2	Stuck ON	Stuck ON	Stuck ON
2	2	2	2	Stuck ON	Stuck ON	Stuck OFF
4	4	4	4	Stuck ON	Stuck OFF	Stuck ON
3	3	3	3	Stuck ON	Stuck OFF	Stuck OFF
1	1	1	1	Stuck OFF	Stuck ON	Stuck ON
1	1	1	1	Stuck OFF	Stuck OFF	Stuck ON
3	3	3	3	Stuck OFF	Stuck ON	Stuck OFF
3	3	3	3	Stuck OFF	Stuck OFF	Stuck OFF
1	2	3	4	No Failure		

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • 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 RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
3	**CHECK ATF CONDITION** • Turn ignition key to OFF. • Check ATF condition. — Clear red: Normal — Milky: water mixed in fluid — Reddish brown: Deteriorated ATF • Is it okay? (See 05-17B-20 ATF Condition Inspection.)	Yes	Go to next step.
		No	If ATF color is milky or reddish brown, replace ATF, then go to Step 5. (See 05-17B-21 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [GF4A-EL].)
4	**CHECK ATF LEVEL** • Start engine. • Warm up ATX. • Is ATF level within specification? (See 05-17B-20 ATF Level Inspection.)	Yes	Go to next step.
		No	Adjust ATF level, then go to Step 10. (See 05-17B-20 ATF Level Inspection.)
5	**INSPECT LINE PRESSURE** • Measure line pressure at idle. **Specification** Idle: **420—530 kPa {4.2—5.5 kgf/cm², 60—75 psi}** Stall: **1,100—1,170 kPa {11.2—12.0 kgf/cm², 160—170 psi}** • Is line pressure within specification? (See 05-17B-13 Line Pressure Test.)	Yes	Go to next step.
		No	All ranges: Replace oil pump or control valve body, then go to Step 10. Any of D, 2, or 1 ranges: Replace or overhaul ATX, then go to Step 10. (See 05-17B-33 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [GF4A-EL].) (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98).)
6	**INSPECT STALL SPEED** • Measure stall speed in 2 range. **Specification** **2,000—2,500 rpm** • Is stall speed within specification? (See 05-17B-14 Stall Speed Test.)	Yes	Replace or overhaul ATX, then go to Step 10. (See 05-17B-33 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [GF4A-EL]) (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98)))
		No	Go to Step 9.

STEP	INSPECTION		ACTION
7	**INSPECT TURBINE SPEED WHEN DRIVING WITH VEHICLE SPEED 60 KM/H {37 MPH} IN D RANGE** ● Turn ignition key to OFF. ● Connect NGS tester to DLC-2 ● Start engine. ● Access VSS, TR, TSS, and TP V PIDs using NGS tester. ● Drive vehicle while monitoring PIDs. — VSS PID: **60 km/h {37 mph}** — TR PID: O/D — 4GR — TP V PID: **Within 1.1—1.7 V** ● Is TSS PID okay? **TSS PID** **Approx. 1,550 rpm**	Yes	Go to Step 10.
		No	Go to next step.
8	**CLICK TEST OF SOLENOID VALVES** ● Turn ignition key to OFF. ● Remove the shift solenoids A, B, C, and pressure control solenoid. ● Are there click sounds? (See 05-17B-29 SOLENOID VALVES INSPECTION [GF4A-EL].)	Yes	Go to next step.
		No	Replace shift solenoids A, B, C, or pressure control solenoid, then go to Step 10. (See 05-17B-30 SOLENOID VALVE REMOVAL/INSTALLATION [GF4A-EL].)
9	**CHECK OPERATION OF EACH VALVE AND EACH SPRING** ● Disassemble control valve body. ● Are operations of each valve and return spring okay? (See 05-17B-40 CONTROL VALVE BODY REMOVAL/INSTALLATION [GF4A-EL].) (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98).)	Yes	2-4 brake band and/or 3-4 clutch slipping. Replace or overhaul ATX, then go to next step. (See 05-17B-33 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [GF4A-EL].) (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98))
		No	Replace or overhaul control valve body, then go to next step. ● 1-2 shift valve and/or 1-2 shift spring ● 2-3 shift valve and/or 2-3 shift spring ● 3-4 shift valve and/or 3-4 shift spring (See 05-17B-40 CONTROL VALVE BODY REMOVAL/INSTALLATION [GF4A-EL].) (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98).)
10	**VERIFY TROUBLESHOOTING OF DTC P0734 COMPLETED** ● Make sure to reconnect all disconnected connectors. ● Clear DTC from memory using NGS tester generic OBD-II function. ● Start engine. ● Warm up ATX ● Access VSS and TR PIDs using NGS tester. ● Drive vehicle under following conditions for **15 seconds or more** while monitoring PIDs. — VSS PID: **Within 77 km/h {48 mph}—104 km/h {64 mph}** — 4GR — TR PID: O/D ● Is there pending code present?	Yes	Replace PCM, then go to next step. (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** ● Perform "After Repair Procedure". (See 05-02B-6 AFTER REPAIR PROCEDURE [GF4A-EL].) ● Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0740 [GF4A-EL]

Z6U050201030W15

DTC P0740	Torque converter clutch (TCC) system malfunction
DETECTION CONDITION	● All conditions below are satisfied. — ATF temperature is **20 °C {68 °F} or above**. — Driving in 4GR, in D range. — Engine speed is **500 rpm or above**. — Turbine speed is **75 rpm or above**. — Vehicle speed is **within 76 km/h {47 mph}— 104 km/h {64 mph}**. — Throttle opening angle is other than closed throttle position. — Brake pedal is not depressed. — Difference between engine speed and turbine speed is above preset value. — Torque converter clutch operation — HOLD switch is OFF. — None of DTC P0500, P0710, P0715, P0750, P0755, P0760 are output. **Diagnostic support note:** ● This is a continuous monitor (CCM). ● MIL illuminates if PCM detects the above malfunction conditions in two consecutive drive cycles. ● PENDING CODE is available. ● FREEZE FRAME DATA is available. ● O/D OFF indicator light does not flash. ● DTC is stored in PCM memory.
POSSIBLE CAUSE	● ATF level is low. ● Deteriorated ATF ● Torque converter clutch (TCC) control solenoid valve or pressure control solenoid is stuck. ● Torque converter clutch (in torque converter) is slipping. ● Line pressure is low. ● TCC shift valve is stuck. ● Converter relief valve is stuck. ● Pressure modifier valve is stuck. ● Pressure regulator valve is stuck. ● Solenoid reducing valve is stuck. ● Oil pump malfunction ● PCM malfunction

Troubleshooting Hint

Description

● If the RPM difference between the crank shaft (CKP sensor signal) and reverse and forward drum (input/turbine speed sensor signal) exceeds or falls below the pre-programmed RPM difference in the PCM while driving in 4GR, in D range, the PCM judges "gear incorrect".

Diagnostic procedure

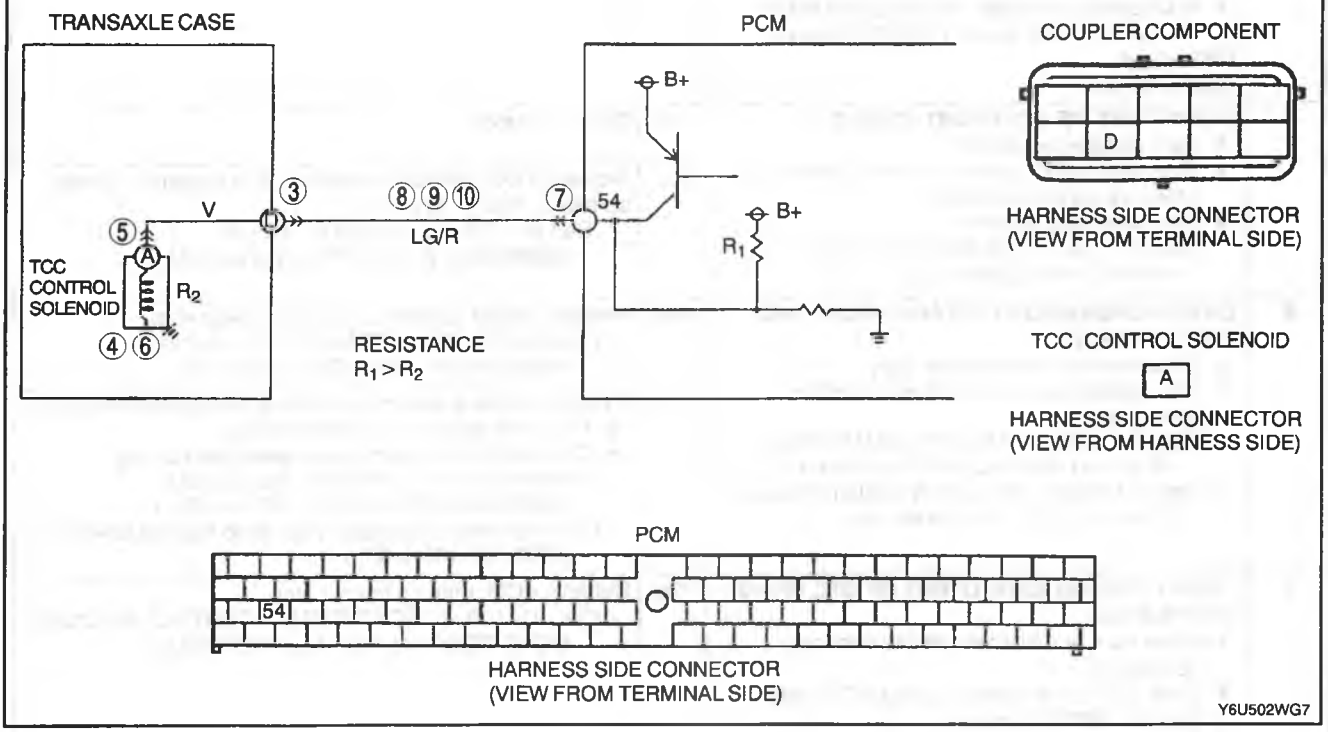
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** ● Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** ● Check for related Service Bulletins and/or on-line repair information availability. ● Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. ● If vehicle is not repaired, go to next step.
		No	Go to next step.
3	**CHECK ATF CONDITION** ● Turn ignition key to OFF. ● Check ATF condition. — Transparent red: Normal — Milky: Water mixed in fluid — Reddish brown: Deteriorated ATF ● Is it okay? (See 05-17B-20 ATF Condition Inspection.)	Yes	Go to next step.
		No	If ATF color is milky or reddish brown, replace ATF, then go to Step 5. (See 05-17B-21 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [GF4A-EL].)
4	**CHECK ATF LEVEL** ● Start engine. ● Warm up ATX. ● Is ATF level within specification? (See 05-17B-20 ATF Level Inspection.)	Yes	Go to next step.
		No	Adjust ATF level, then go to Step 9. (See 05-17B-20 ATF Level Inspection.)

STEP	INSPECTION		ACTION
5	**INSPECT LINE PRESSURE** • Start engine. • Measure line pressure. **Specification** Idle: **420—530 kPa {4.2—5.5 kgf/cm², 60—75 psi}** Stall: **1,100—1,170 kPa {11.2—12.0 kgf/cm², 160—170 psi}** • Is line pressure within specification? (See 05-17B-13 Line Pressure Test.)	Yes	Go to next step.
		No	• All ranges: Replace oil pump or control valve body, then go to Step 9. • Any ranges: Replace ATX, then go to Step 9. (See 05-17B-33 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [GF4A-EL].) (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98).)
6	**INSPECT DIFFERENCE BETWEEN ENGINE SPEED AND TURBINE SPEED** • Turn ignition key to OFF. • Connect NGS tester to DLC. • Start engine. • Access TSS, TCC, and RPM PIDs using NGS tester. • Check difference between engine speed and turbine speed during TCC operation in 4GR. • Drive vehicle under following conditions while monitoring PIDs. — 4GR — TCC PID: **100 %** • Is difference between engine speed (RPM PID) and turbine speed (TSS PID) okay? **Difference** **Below 99 rpm**	Yes	Go to Step 9.
		No	Go to next step.
7	**CLICK TEST OF SOLENOID VALVES** • Turn ignition key to OFF. • Remove the TCC control solenoid valve and pressure control solenoid. • Are there click sounds? (See 05-17B-29 SOLENOID VALVES INSPECTION [GF4A-EL].)	Yes	Go to next step.
		No	Replace TCC control solenoid valve or pressure control solenoid, then go to Step 9. (See 05-17B-30 SOLENOID VALVE REMOVAL/INSTALLATION [GF4A-EL].)
8	**CHECK OPERATION OF EACH VALVE AND EACH SPRING** • Disassemble control valve body. • Are operations of each valve and return spring okay? (See 05-17B-40 CONTROL VALVE BODY REMOVAL/INSTALLATION [GF4A-EL].) (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98).)	Yes	Replace torque converter, then go to next step. (See 05-17B-33 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [GF4A-EL].)
		No	Repair or replace control valve body, then go to next step. • TCC shift valve or TCC shift spring • Converter relief valve or converter relief spring (See 05-17B-40 CONTROL VALVE BODY REMOVAL/INSTALLATION [GF4A-EL].) (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98).)
9	**VERIFY TROUBLESHOOTING OF DTC P0740 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Start engine. • Warm up ATX. • Access VSS, TR, and TCC PIDs using NGS tester. • Drive vehicle under following conditions for **15 seconds or more** while monitoring PIDs. — VSS PID: **Within 76 km/h {47 mph}—104 km/h {64 mph}** — 4GR — TR PID: O/D — TCC PID: **100 %** • Is there pending code present?	Yes	Replace PCM, then go to next step. (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
		No	Go to next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform "After Repair Procedure". (See 05-02B-6 AFTER REPAIR PROCEDURE [GF4A-EL].) • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0743 [GF4A-EL]

Z6U050201030W16

DTC P0743	Torque converter clutch (TCC) control solenoid valve circuit malfunction
DETECTION CONDITION	• If PCM detects either of following conditions, PCM determines that TCC control solenoid valve circuit has a malfunction: — TCC control solenoid valve voltage is stuck at **B+** after engine start. — TCC control solenoid valve voltage is stuck at **0 V** after engine start. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions during first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • O/D OFF indicator light flashes. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• TCC control solenoid valve malfunction • Short to ground between TCC control solenoid valve terminal A and coupler component terminal D • Short to ground between coupler component terminal D and PCM terminal 54 • Short to power between TCC control solenoid valve terminal A and coupler component terminal D • Short to power between coupler component terminal D and PCM terminal 54 • Open circuit between TCC control solenoid valve terminal A and coupler component terminal D • Open circuit between coupler component terminal D and PCM terminal 54 • Damaged connector between TCC control solenoid valve and PCM • PCM malfunction



Troubleshooting Hint

TCC control solenoid valve description

- The solenoid valve is located on the control valve body.
- The solenoid valve is switched ON and OFF by electric signals from the PCM.

Solenoid valve operation chart

The following solenoid operation chart shows normal solenoid operation for given operation mode.

Range	O/D OFF switch position	Mode	Gear position	Solenoid valve				
				Shift A	Shift B	Shift C	3-2 timing	TCC control
P	—	—	—	OFF	OFF	ON	OFF	OFF
R	—	—	Reverse	OFF	ON	ON	OFF	OFF
N	—	—	—	OFF	OFF	ON	OFF	OFF

Range	O/D OFF switch position	Mode	Gear position	Solenoid valve				
				Shift A	Shift B	Shift C	3-2 timing	TCC control
D	OFF	Normal, power*3, slope*1	1GR	OFF	ON	ON	OFF	OFF
			2GR	ON	ON	OFF	OFF	OFF
			3GR	ON	OFF	OFF	OFF	OFF
			4GR	ON	OFF	ON	OFF	OFF
			4GR (TCC Operation)	ON	OFF	ON	OFF	ON
	ON	Normal, power*3	1GR	OFF	ON	ON	OFF	OFF
			2GR	ON	ON	OFF	OFF	OFF
			3GR	ON	OFF	OFF	OFF	OFF
			3GR (TCC Operation)	ON	OFF	OFF	OFF	ON
2	—	—	1GR*2	OFF	ON	ON	OFF	OFF
			2GR	ON	ON	OFF	OFF	OFF
1	—	—	1GR	OFF	ON	OFF	OFF	OFF

*1 : The PCM automatically switches between NORMAL and SLOPE modes according to the engine load and vehicle acceleration.

*2 : Vehicle with TCS

*3 : The PCM automatically switches between POWER and NORMAL modes according to the speed at which the accelerator pedal is depressed.

Torque converter clutch (TCC) control solenoid valve specification

Item		KOER	
		Solenoid OFF	Solenoid ON
TCC control solenoid valve	TCC PID	0 %	100 %
	PCM terminal 54	Below 1.0 V	B+

Diagnostic procedure

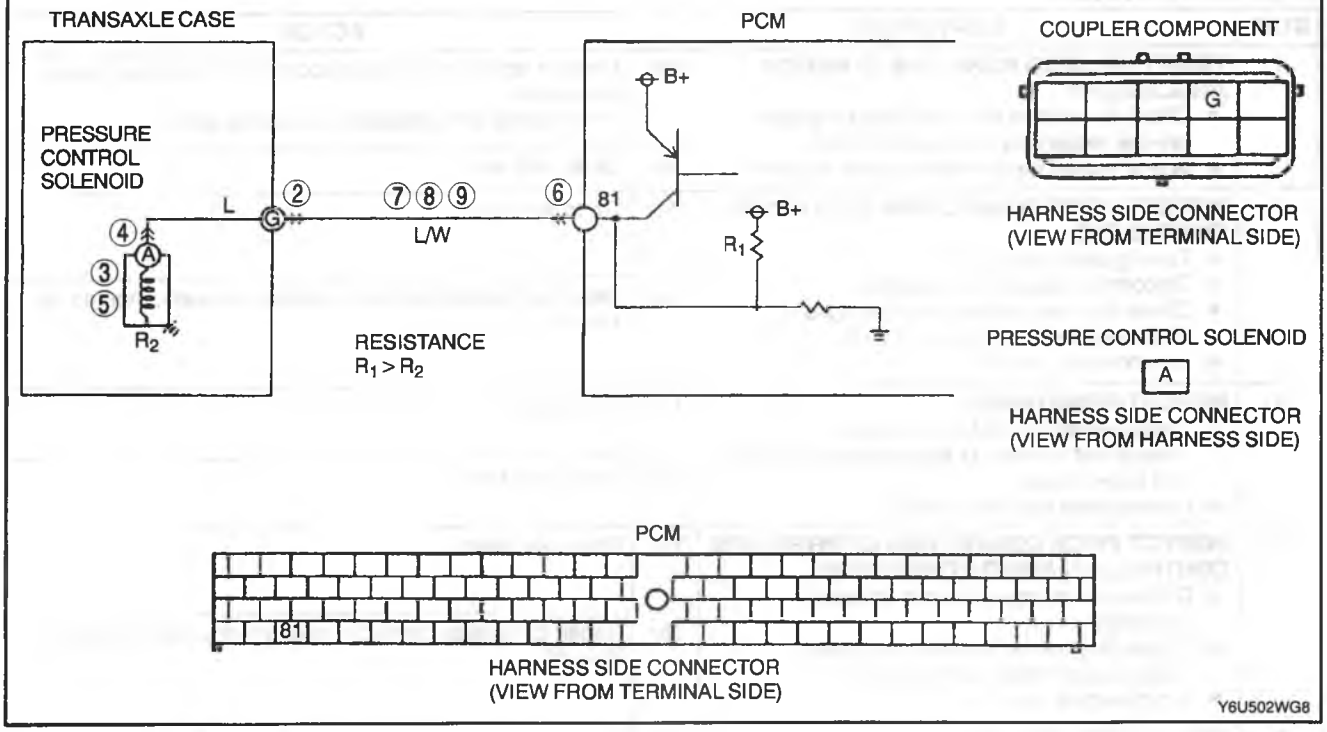
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
3	**INSPECT POOR CONNECTION OF COUPLER COMPONENT** • Turn ignition key to OFF. • Disconnect coupler component. • Check for poor connection (damaged, pulled-out, terminals, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminals, then go to Step 11.
4	**INSPECT RESISTANCE** • Check resistance between coupler component terminal D (transaxle case side) and body ground. • Is resistance **within 11-27 Ω**?	Yes	Go to Step 7.
		No	Go to next step.
5	**INSPECT POOR CONNECTION OF TCC CONTROL SOLENOID VALVE CONNECTOR** • Disconnect TCC control solenoid valve connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminal, then go to Step 11.

STEP	INSPECTION		ACTION
6	**INSPECT RESISTANCE** • Check resistance between TCC control solenoid valve terminal A (part-side) and body ground. • Is resistance **within 11—27 Ω**? (See 05-17B-29 Resistance Inspection (Off-Vehicle).)	Yes	Replace solenoid harness, then go to Step 11.
		No	Verify TCC control solenoid valve installation. • If solenoid is installed correctly, replace TCC control solenoid valve, then go to Step 11. (See 05-17B-30 SOLENOID VALVE REMOVAL/INSTALLATION [GF4A-EL].)
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminals, then go to Step 11.
8	**INSPECT COUPLER COMPONENT CIRCUIT FOR OPEN** • Check for continuity between PCM terminal 54 (harness-side) and coupler component terminal D (vehicle harness-side). • Is there continuity between terminals?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 11.
9	**INSPECT COUPLER COMPONENT CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (engine OFF). • Check voltage at coupler component terminal D (vehicle harness-side). • Is voltage **0 V**?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 11.
10	**INSPECT PCM CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Check continuity between PCM terminal 54 (harness-side) and body ground. • Is there any continuity?	Yes	Repair or replace harness, then go to next step.
		No	Go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P0743 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Access TCC PID using NGS tester. • Drive vehicle in D range and make sure that gears shift smoothly from 1GR to 4GR and TCC is operated. • Is same DTC present?	Yes	Replace PCM, then go to next step. (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform "After Repair Procedure". (See 05-02B-6 AFTER REPAIR PROCEDURE [GF4A-EL].) • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0745 [GF4A-EL]

Z6U050201030W17

DTC P0745	Pressure control solenoid circuit malfunction
DETECTION CONDITION	• If PCM detects either of following conditions, PCM determines that pressure control solenoid circuit has a malfunction: — Pressure control solenoid voltage is stuck at **0 V** after engine start. — Pressure control solenoid voltage is stuck at **B +** after engine start. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL does not illuminate if PCM detects the above malfunction conditions during first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is not available. • O/D OFF indicator light flashes. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• Pressure control solenoid malfunction • Short to ground between pressure control solenoid terminal A and coupler component terminal G • Short to ground between coupler component terminal G and PCM terminal 81 • Short to power between pressure control solenoid terminal A and coupler component terminal G • Short to power between coupler component terminal G and PCM terminal 81 • Open circuit between pressure control solenoid terminal A and coupler component terminal G • Open circuit between coupler component terminal G and PCM terminal 81 • Damaged connector between pressure control solenoid and PCM • PCM malfunction

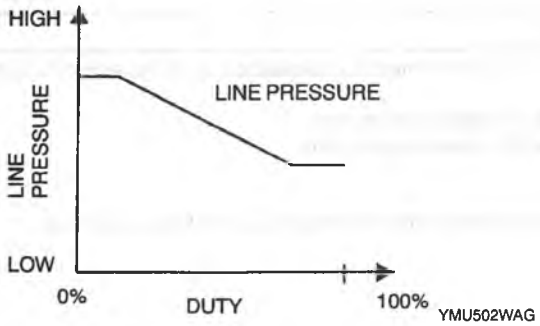


Troubleshooting Hint

Pressure control solenoid description

- A duty cycle type pressure control solenoid is used.
- The PCM controls the pressure control solenoid to regulate modifier pressure.
- This modifier pressure as a signal pressure controls the pressure regulator valves to adjust the hydraulic pressure discharged from the oil pump to the optimum line pressure corresponding to driving conditions.
- Pressure control solenoid signal is used for line pressure control and monitoring.

Pressure control solenoid signal characteristic



Pressure control solenoid specification

Item	KOEO	KOER
	CTP	CTP
EPC PID	55 %	55 %
PCM terminal 81	Approx. 7 V	Approx. 7 V

Diagnostic procedure

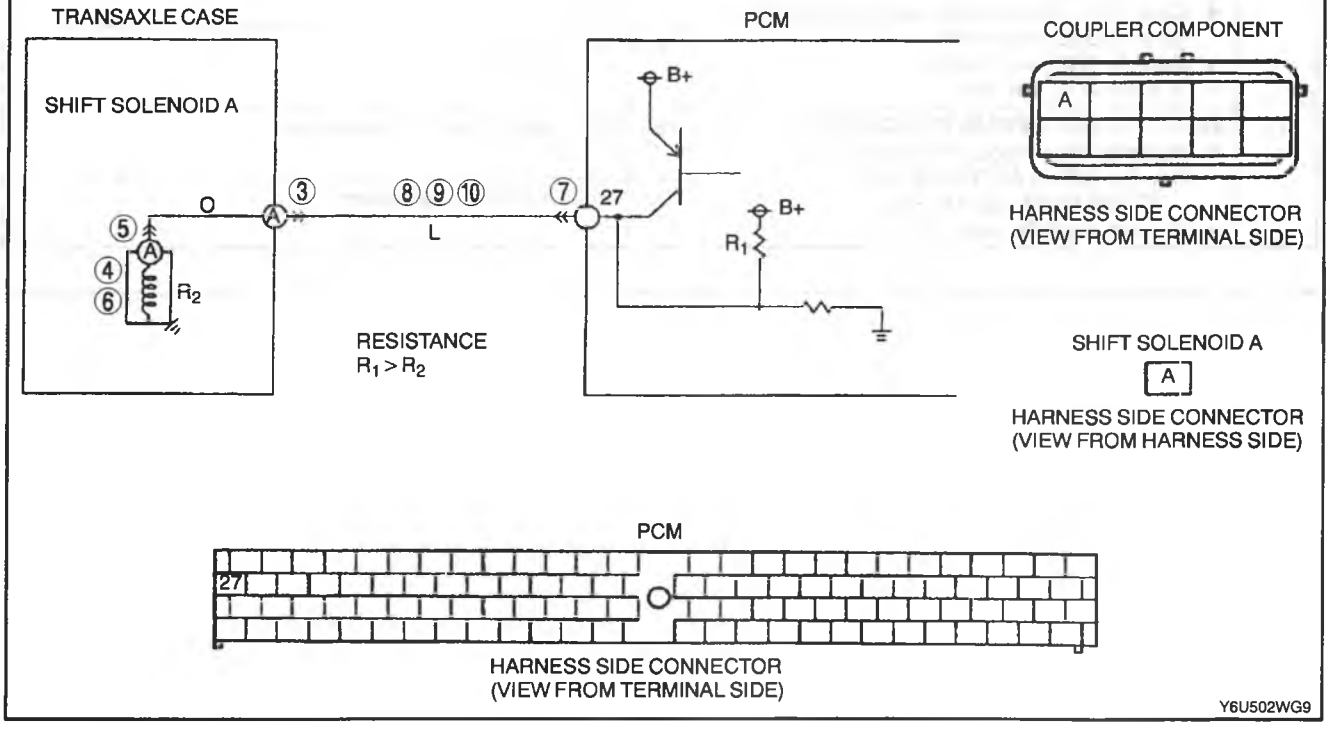
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
2	**INSPECT POOR CONNECTION OF COUPLER COMPONENT** • Turn ignition key to OFF. • Disconnect coupler component. • Check for poor connection (damaged, pulled-out terminal, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminals, then go to step 10.
3	**INSPECT RESISTANCE** • Check resistance between coupler component terminal G (transaxle case side) and body ground. • Is resistance **within 9—18 Ω**?	Yes	Go to Step 6.
		No	Go to next step.
4	**INSPECT POOR CONNECTION OF PRESSURE CONTROL SOLENOID CONNECTOR** • Disconnect pressure control solenoid connector. • Check for poor connection (damaged, pulled-out terminal, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminals, then go to Step 10.
5	**INSPECT RESISTANCE** • Check resistance between pressure control solenoid terminal A (part-side) and body ground. • Is resistance **within 9—18 Ω**? (See 05-17B-29 Resistance Inspection (Off-Vehicle).)	Yes	Replace solenoid harness, then go to Step 10.
		No	Verify pressure control solenoid installation. • If solenoid installed correctly, replace pressure control solenoid, then go to Step 10. (See 05-17B-30 SOLENOID VALVE REMOVAL/INSTALLATION [GF4A-EL].)
6	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminals, then go to Step 10.

STEP	INSPECTION		ACTION
7	**INSPECT COUPLER COMPONENT CIRCUIT FOR OPEN** • Check for continuity between PCM terminal 81 (harness-side) and coupler component terminal G (vehicle harness-side). • Is there continuity between terminals?	Yes	Go to next step.
		No	Repair or replace harness, the go to Step 10.
8	**INSPECT COUPLER COMPONENT CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (engine OFF). • Inspect voltage at coupler component terminal G (vehicle harness-side). • Is voltage **0 V**?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 10.
9	**INSPECT PCM CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Check for continuity between PCM terminal 81 (harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness, then go to next step.
		No	Go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P0745 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Drive in 1GR, in D range. • Is same DTC present?	Yes	Replace PCM, then go to next step. (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform "After Repair Procedure". (See 05-02B-6 AFTER REPAIR PROCEDURE [GF4A-EL].) • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0750 [GF4A-EL]

Z6U050201030W18

DTC P0750	Shift solenoid A circuit malfunction
DETECTION CONDITION	• If PCM detects either of following conditions, PCM determines that shift solenoid A circuit has a malfunction: — Shift solenoid A voltage is stuck at **B+** after engine start. — Shift solenoid A voltage is stuck at **0 V** after engine start. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions during first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • O/D OFF indicator light flashes. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Shift solenoid A malfunction • Short to ground between shift solenoid A terminal A and coupler component terminal A • Short to ground between coupler component terminal A and PCM terminal 27 • Short to power between shift solenoid A terminal A and coupler component terminal A • Short to power between coupler component terminal A and PCM terminal 27 • Open circuit between shift solenoid A terminal A and coupler component terminal A • Open circuit between coupler component terminal A and PCM terminal 27 • Damaged connector between shift solenoid A and PCM • PCM malfunction



Y6U502WG9

Troubleshooting Hint

Shift solenoid A description

- The solenoid valve is located on the control valve body.
- The solenoid valve is switched ON and OFF by electric signals from the PCM.

Solenoid valve operation chart

The following solenoid operation chart shows normal solenoid operation for given operation mode.

Range	O/D OFF switch position	Mode	Gear position	Solenoid valve				
				Shift A	Shift B	Shift C	3-2 timing	TCC control
P	—	—	—	OFF	OFF	ON	OFF	OFF
R	—	—	Reverse	OFF	ON	ON	OFF	OFF
N	—	—	—	OFF	OFF	ON	OFF	OFF

Range	O/D OFF switch position	Mode	Gear position	Solenoid valve				
				Shift A	Shift B	Shift C	3-2 timing	TCC control
D	OFF	Normal, power*3, slope*1	1GR	OFF	ON	ON	OFF	OFF
			2GR	ON	ON	OFF	OFF	OFF
			3GR	ON	OFF	OFF	OFF	OFF
			4GR	ON	OFF	ON	OFF	OFF
			4GR (TCC Operation)	ON	OFF	ON	OFF	ON
	ON	Normal, power*3	1GR	OFF	ON	ON	OFF	OFF
			2GR	ON	ON	OFF	OFF	OFF
			3GR	ON	OFF	OFF	OFF	OFF
			3GR (TCC Operation)	ON	OFF	OFF	OFF	ON
2	—	—	1GR*2	OFF	ON	ON	OFF	OFF
			2GR	ON	ON	OFF	OFF	OFF
1	—	—	1GR	OFF	ON	OFF	OFF	OFF

*1 : The PCM automatically switches between NORMAL and SLOPE modes according to the engine load and vehicle acceleration.

*2 : Vehicle with TCS

*3 : The PCM automatically switches between POWER and NORMAL modes according to the speed at which the accelerator pedal is depressed.

Shift solenoid A specification

Item		KOEO		KOER	
		Solenoid OFF	Solenoid ON	Solenoid OFF	Solenoid ON
Shift solenoid A	SS1 PID	OFF	ON	OFF	ON
	PCM terminal 27	Below 1.0 V	B+	Below 1.0 V	B+

Diagnostic procedure

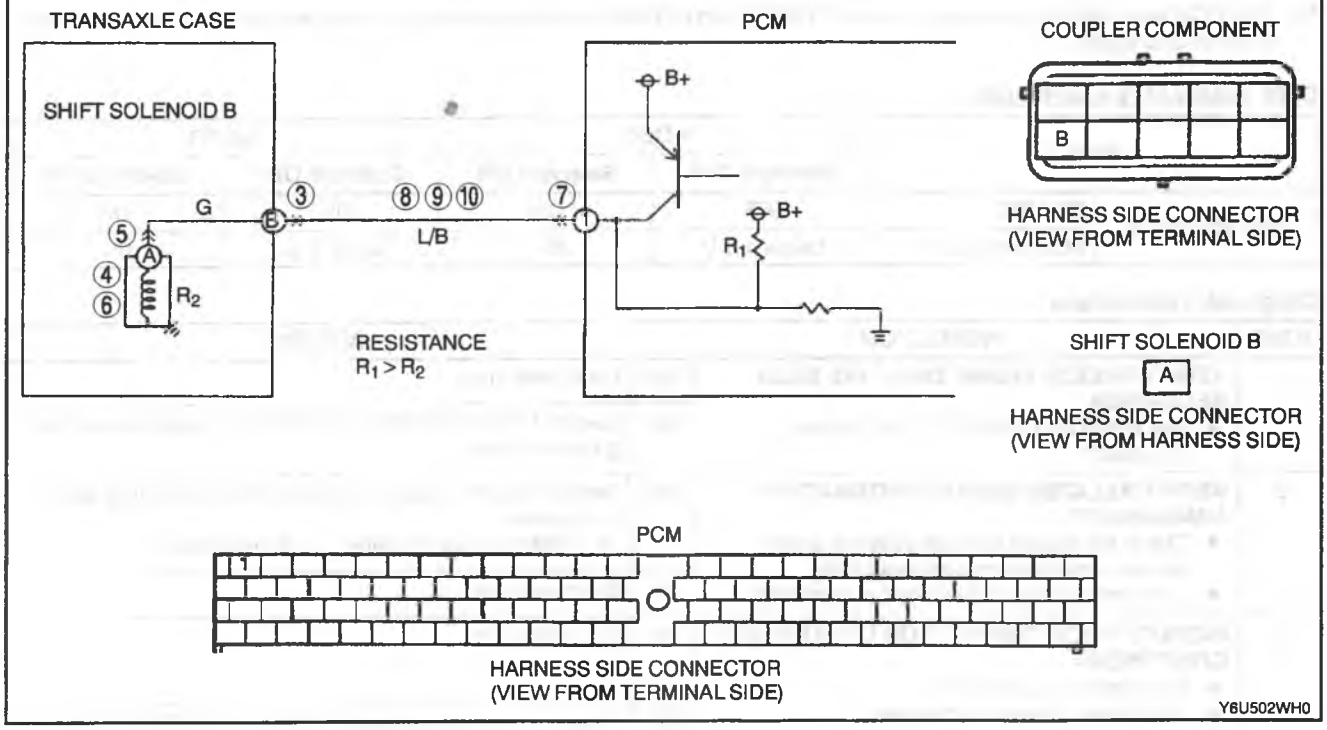
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
3	**INSPECT POOR CONNECTION OF COUPLER COMPONENT** • Turn ignition key to OFF. • Disconnect coupler component. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminals, then go to Step 11.
4	**INSPECT RESISTANCE** • Check resistance between coupler component terminal A (transaxle case side) and body ground. • Is resistance **within 11—27 Ω**?	Yes	Go to Step 7.
		No	Go to next step.
5	**INSPECT POOR CONNECTION OF SHIFT SOLENOID A CONNECTOR** • Disconnect shift solenoid A connector. • Check for connection (damaged, pulled-out terminals, connections, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminals, then go to Step 11.

STEP	INSPECTION		ACTION
6	**INSPECT RESISTANCE** • Check resistance between shift solenoid A terminal A (part-side) and body ground. • Is resistance **within 11—27 Ω** ? (See 05-17B-29 Resistance Inspection (Off-Vehicle).)	Yes	Replace solenoid harness, then go to Step 11.
		No	Verify shift solenoid A installation. • If solenoid is installed correctly, replace solenoid, then go to Step 11. (See 05-17B-30 SOLENOID VALVE REMOVAL/INSTALLATION [GF4A-EL].)
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out terminals, corrosions, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminals, then go to Step 11.
8	**INSPECT COUPLER COMPONENT CIRCUIT FOR OPEN** • Check for continuity between PCM terminal 27 (harness-side) and coupler component terminal A (vehicle harness-side). • Is there continuity between terminals?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 11.
9	**INSPECT COUPLER COMPONENT CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (engine OFF). • Check voltage at coupler component terminal A (vehicle harness-side). • Is voltage **0 V**?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 11.
10	**INSPECT PCM CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Check for continuity between PCM terminal 27 (harness-side) and body ground. • Is there any continuity?	Yes	Repair or replace harness, then go to next step.
		No	Go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P0750 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Drive vehicle in D range and make sure that gears shift smoothly from 1GR to 4GR. • Is same DTC present?	Yes	Replace PCM, then go to next step. (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform "After Repair Procedure". (See 05-02B-6 AFTER REPAIR PROCEDURE [GF4A-EL].) • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0755 [GF4A-EL]

Z6U050201030W19

DTC P0755	Shift solenoid B circuit malfunction
DETECTION CONDITION	• If PCM detects either of following conditions, PCM determines that shift solenoid B circuit has a malfunction: — Shift solenoid B voltage is stuck at **B+** after engine start. — Shift solenoid B voltage is stuck at **0 V** after engine start. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction condition during first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • O/D OFF indicator light flashes. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Shift solenoid B malfunction • Short to ground between Shift solenoid B terminal A and coupler component terminal B • Short to ground between coupler component terminal B and PCM terminal 1 • Short to power between shift solenoid B terminal A and coupler component terminal B • Short to power between coupler component terminal B and PCM terminal 1 • Open circuit between shift solenoid B terminal A and coupler component terminal B • Open circuit between coupler component terminal B and PCM terminal 1 • Damaged connector between shift solenoid B valve and PCM • PCM malfunction



Troubleshooting Hint

Shift solenoid B description

- The solenoid valve is located on the control valve body.
- The solenoid valve is switched ON and OFF by electric signals from the PCM.

Solenoid valve operation chart

The following solenoid operation chart shows normal solenoid operation for given operation mode.

Range	O/D OFF switch position	Mode	Gear position	Solenoid valve				
				Shift A	Shift B	Shift C	3-2 timing	TCC control
P	—	—	—	OFF	OFF	ON	OFF	OFF
R	—	—	Reverse	OFF	ON	ON	OFF	OFF
N	—	—	—	OFF	OFF	ON	OFF	OFF

Range	O/D OFF switch position	Mode	Gear position	Solenoid valve				
				Shift A	Shift B	Shift C	3-2 timing	TCC control
D	OFF	Normal, power*3, slope*1	1GR	OFF	ON	ON	OFF	OFF
			2GR	ON	ON	OFF	OFF	OFF
			3GR	ON	OFF	OFF	OFF	OFF
			4GR	ON	OFF	ON	OFF	OFF
			4GR (TCC Operation)	ON	OFF	ON	OFF	ON
	ON	Normal, power*3	1GR	OFF	ON	ON	OFF	OFF
			2GR	ON	ON	OFF	OFF	OFF
			3GR	ON	OFF	OFF	OFF	OFF
			3GR (TCC Operation)	ON	OFF	OFF	OFF	ON
2	—	—	1GR*2	OFF	ON	ON	OFF	OFF
			2GR	ON	ON	OFF	OFF	OFF
1	—	—	1GR	OFF	ON	OFF	OFF	OFF

*1 : The PCM automatically switches between NORMAL and SLOPE modes according to the engine load and vehicle acceleration.

*2 : Vehicle with TCS

*3 : The PCM automatically switches between POWER and NORMAL modes according to the speed at which the accelerator pedal is depressed.

Shift solenoid B specification

Item		KOEO		KOER	
		Solenoid OFF	Solenoid ON	Solenoid OFF	Solenoid ON
Shift solenoid B	SS2 PID	OFF	ON	OFF	ON
	PCM terminal 1	Below 1.0 V	B+	Below 1.0 V	B+

Diagnostic procedure

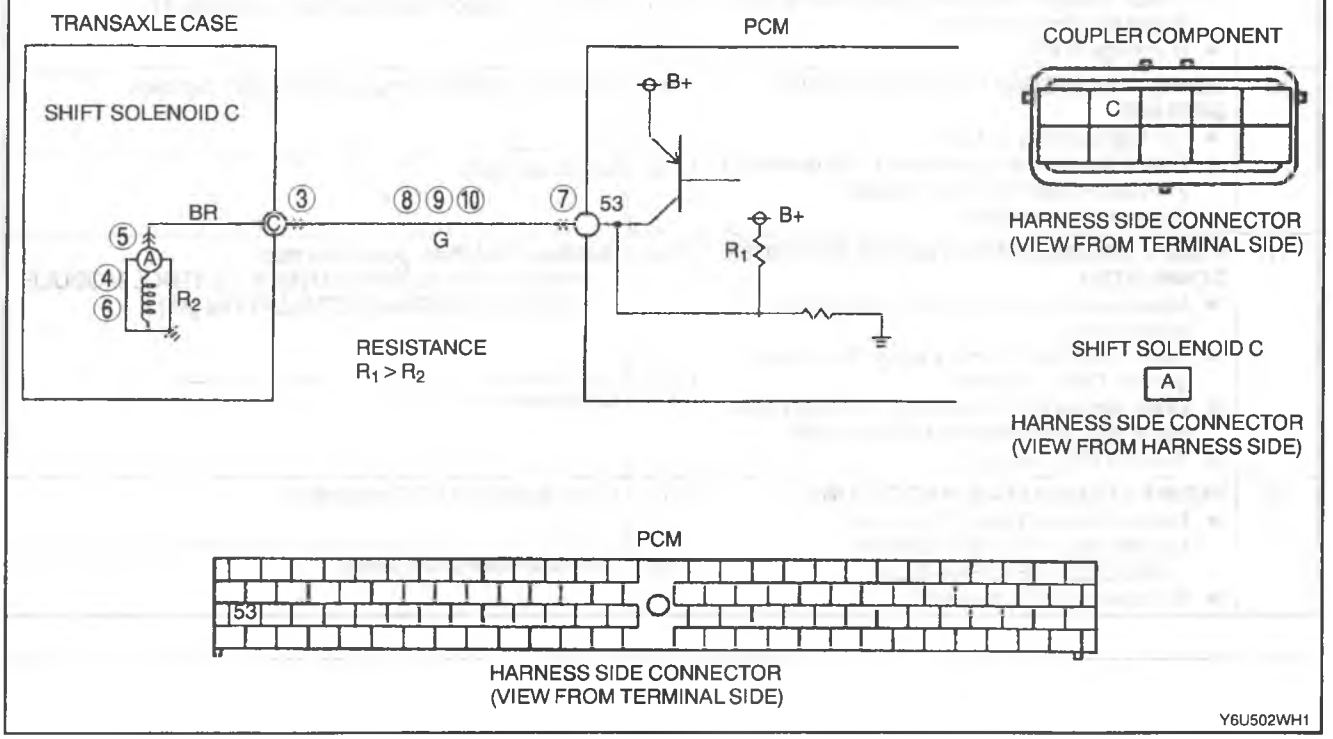
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** ● Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** ● Check for related Service Bulletins and/or on-line repair information availability. ● Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. ● If vehicle is not repaired, go to next step.
		No	Go to next step.
3	**INSPECT POOR CONNECTION OF COUPLER COMPONENT** ● Turn ignition key to OFF. ● Disconnect coupler component. ● Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). ● Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminals, then go to Step 11.
4	**INSPECT RESISTANCE** ● Check resistance between coupler component terminal B (transaxle case side) and body ground. ● Is resistance **within 11—27 Ω**?	Yes	Go to Step 7.
		No	Go to next step.
5	**INSPECT POOR CONNECTION OF SHIFT SOLENOID B CONNECTOR** ● Disconnect shift solenoid B connector. ● Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). ● Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminals, then go to Step 11.

STEP	INSPECTION		ACTION
6	**INSPECT RESISTANCE** • Check resistance between shift solenoid B terminal A (part-side) and body ground. • Is resistance **within 11—27 Ω**? (See 05-17B-29 Resistance Inspection (Off-Vehicle).)	Yes	Replace solenoid harness, then go to Step 11.
		No	Verify shift solenoid B installation. • If solenoid is installed correctly, replace solenoid, then go to Step 11. (See 05-17B-30 SOLENOID VALVE REMOVAL/INSTALLATION [GF4A-EL].)
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminals, then go to Step 11.
8	**INSPECT COUPLER COMPONENT CIRCUIT FOR OPEN** • Check for continuity between PCM terminal 1 (harness-side) and coupler component terminal B (vehicle harness-side). • Is there continuity between terminals?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 11.
9	**INSPECT COUPLER COMPONENT CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (engine OFF). • Check voltage at coupler component terminal B (vehicle harness-side). • Is voltage **0 V**?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 11.
10	**INSPECT PCM CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Check for continuity between PCM terminal 1 (harness-side) and body ground. • Is there any continuity?	Yes	Repair or replace harness, then go to next step.
		No	Go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P0755 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Drive vehicle in D range and make sure that gears shift smoothly from 1GR to 4GR. • Is same DTC present?	Yes	Replace PCM, then go to next step. (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform "After Repair Procedure". (See 05-02B-6 AFTER REPAIR PROCEDURE [GF4A-EL].) • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P0760 [GF4A-EL]

Z6U050201030W20

DTC P0760	Shift solenoid C circuit malfunction
DETECTION CONDITION	• If PCM detects either of following conditions, PCM determines that shift solenoid C circuit has a malfunction: — Shift solenoid C voltage is stuck at **B +** after engine start. — Shift solenoid C voltage is stuck at **0 V** after engine start. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL illuminates if PCM detects the above malfunction conditions during first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is available. • O/D OFF indicator light flashes. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Shift solenoid C malfunction • Short to ground between shift solenoid C terminal A and coupler component terminal C • Short to ground between coupler component terminal C and PCM terminal 53 • Short to power between shift solenoid C terminal A and coupler component terminal C • Short to power between coupler component terminal C and PCM terminal 53 • Open circuit between shift solenoid C terminal A and coupler component terminal C • Open circuit between coupler component terminal C and PCM terminal 53 • Damaged connector between shift solenoid C and PCM • PCM malfunction



Troubleshooting Hint

Shift solenoid C description

- The solenoid valve is located on the control valve body.
- The solenoid valve is switched ON and OFF by electric signals from the PCM.

Solenoid valve operation chart

The following solenoid operation chart shows normal solenoid operation for given operation mode.

Range	O/D OFF switch position	Mode	Gear position	Solenoid valve				
				Shift A	Shift B	Shift C	3-2 timing	TCC control
P	—	—	—	OFF	OFF	ON	OFF	OFF
R	—	—	Reverse	OFF	ON	ON	OFF	OFF
N	—	—	—	OFF	OFF	ON	OFF	OFF

Range	O/D OFF switch position	Mode	Gear position	Solenoid valve				
				Shift A	Shift B	Shift C	3-2 timing	TCC control
D	OFF	Normal, power*3, slope*1	1GR	OFF	ON	ON	OFF	OFF
			2GR	ON	ON	OFF	OFF	OFF
			3GR	ON	OFF	OFF	OFF	OFF
			4GR	ON	OFF	ON	OFF	OFF
			4GR (TCC Operation)	ON	OFF	ON	OFF	ON
	ON	Normal, power*3	1GR	OFF	ON	ON	OFF	OFF
			2GR	ON	ON	OFF	OFF	OFF
			3GR	ON	OFF	OFF	OFF	OFF
			3GR (TCC Operation)	ON	OFF	OFF	OFF	ON
2	—	—	1GR*2	OFF	ON	ON	OFF	OFF
			2GR	ON	ON	OFF	OFF	OFF
1	—	—	1GR	OFF	ON	OFF	OFF	OFF

*1 : The PCM automatically switches between NORMAL and SLOPE modes according to the engine load and vehicle acceleration.

*2 : Vehicle with TCS

*3 : The PCM automatically switches between POWER and NORMAL modes according to the speed at which the accelerator pedal is depressed.

Shift solenoid C specification

Item		KOEO		KOER	
		Solenoid OFF	Solenoid ON	Solenoid OFF	Solenoid ON
Shift solenoid C	SS3 PID	OFF	ON	OFF	ON
	PCM terminal 53	Below 1.0 V	B+	Below 1.0 V	B+

Diagnostic procedure

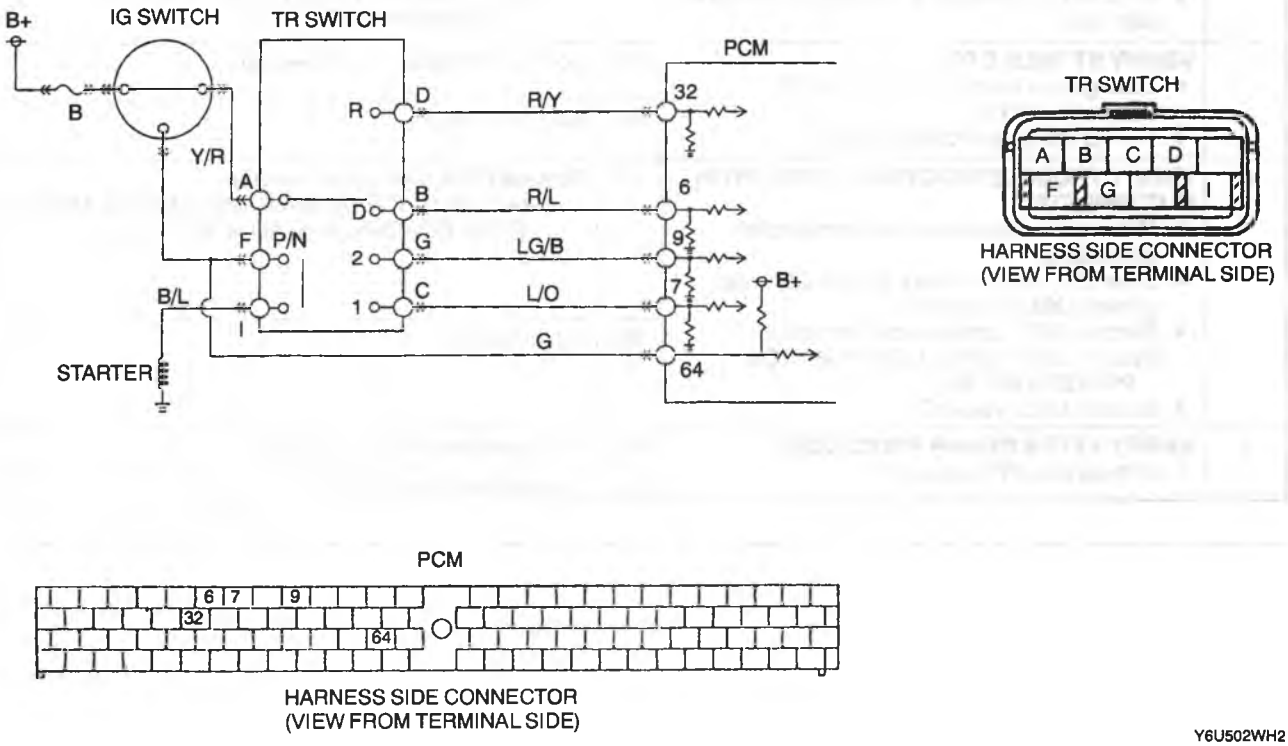
STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA HAS BEEN RECORDED** • Has FREEZE FRAME PID DATA been recorded?	Yes	Go to next step.
		No	Record FREEZE FRAME PID DATA on repair order, then go to next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
3	**INSPECT POOR CONNECTION OF COUPLER COMPONENT** • Turn ignition key to OFF. • Disconnect coupler component. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminals, then go to Step 11.
4	**INSPECT RESISTANCE** • Check resistance between coupler component terminal C (transaxle case side) and body ground. • Is resistance **within 11—27 Ω**?	Yes	Go to Step 7.
		No	Go to next step.
5	**INSPECT POOR CONNECTION OF SHIFT SOLENOID C CONNECTOR** • Disconnect shift solenoid C connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminal, then go to Step 11.

STEP	INSPECTION		ACTION
6	**INSPECT RESISTANCE** • Check resistance between shift solenoid C terminal A (part-side) and body ground. • Is resistance **within 11—27 Ω**? (See 05-17B-29 Resistance Inspection (Off-Vehicle).)	Yes	Replace solenoid harness, then go to Step 11.
		No	Verify shift solenoid C installation. • If solenoid is installed correctly, replace solenoid, then go to Step 11. (See 05-17B-30 SOLENOID VALVE REMOVAL/INSTALLATION [GF4A-EL].)
7	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminals, then go to Step 11.
8	**INSPECT COUPLER COMPONENT CIRCUIT FOR OPEN** • Check for continuity between PCM terminal 53 (harness-side) and coupler component terminal C (vehicle harness-side). • Is there continuity between terminals?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 11.
9	**INSPECT COUPLER COMPONENT CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (engine OFF). • Check voltage at coupler component terminal C (vehicle harness-side). • Is voltage **0 V**?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 11.
10	**INSPECT PCM CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Check for continuity between PCM terminal 53 (harness-side) and body ground. • Is there any continuity?	Yes	Repair or replace harness, then go to next step.
		No	Go to next step.
11	**VERIFY TROUBLESHOOTING OF DTC P0760 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Access SHIFT C PID using NGS tester. • Drive vehicle in D range and make sure that gears shift smoothly from 1GR to 4GR. • Is same DTC present?	Yes	Replace PCM, then go to next step. (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
		No	Go to next step.
12	**VERIFY AFTER REPAIR PROCEDURE** • Perform "After Repair Procedure". (See 05-02B-6 AFTER REPAIR PROCEDURE [GF4A-EL].) • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P1705 [GF4A-EL]

Z6U050201030W21

DTC P1705	Transaxle range (TR) switch circuit malfunction
DETECTION CONDITION	• The PCM detects improper transaxle range (TR) switch position during self test. **Diagnostic support note:** • This DTC is also detected by KOER self-test. • MIL does not illuminate. • PENDING CODE is not available. • FREEZE FRAME DATA is not available. • O/D OFF indicator light does not flash. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• TR switch malfunction • TR switch misadjustment • Short to ground between TR switch terminal F and PCM terminal 64 • Short to power between TR switch terminal D and PCM terminal 32 • Short to power between TR switch terminal B and PCM terminal 6 • Short to power between TR switch terminal G and PCM terminal 9 • Short to power between TR switch terminal C and PCM terminal 7 • Open circuit between TR switch terminal B and PCM terminal 6 • Open circuit between TR switch terminal G and PCM terminal 9 • Open circuit between TR switch terminal C and PCM terminal 7 • Open circuit between TR switch terminal A and ignition switch • Damaged connector between TR switch and PCM • PCM malfunction



Y6U502WH2

Troubleshooting Hint

TR switch description

- Six position ON/OFF type TR switch is used.
- TR switch is installed in the upper part of the transaxle.
- Detects the selector lever positions in P, R, N, D, 2, or 1 range, each respective range switch is turned ON.
- TR switch signal is used for following controls and monitors:
  - —Shift control
  - —Line pressure control
  - —Timing control
  - —TCC control
  - —Engine-transaxle total control (Torque reduction control)
  - —Engine-transaxle total control (N-D/R select control)
  - —Slope mode control
  - —OBD system

TR switch specification

Item	Ignition key to ON (engine OFF) or start engine					
	P	R	N	D	2	1
CPP/PNP PID	ON	OFF	ON	OFF	OFF	OFF
TR PID	PARK	REV	NTRL	O/D ON: O/D O/D OFF: DRIVE	MAN2	MAN1
TR V PID	Approx. 0 V	Approx. 3.5 V	Approx. 0 V	Approx. 3.5 V	Approx. 3.5 V	Approx. 3.5 V
PCM terminal 64 (P, N position)	Below 1.0 V	B+	Below 1.0 V	B+	B+	B+
PCM terminal 32 (R position)	Below 1.0 V	B+	Below 1.0 V	Below 1.0 V	Below 1.0 V	Below 1.0 V
PCM terminal 6 (D range)	Below 1.0 V	Below 1.0 V	Below 1.0 V	B+	Below 1.0 V	Below 1.0 V
PCM terminal 9 (2 range)	Below 1.0 V	Below 1.0 V	Below 1.0 V	Below 1.0 V	B+	Below 1.0 V
PCM terminal 7 (1 range)	Below 1.0 V	Below 1.0 V	Below 1.0 V	Below 1.0 V	Below 1.0 V	B+

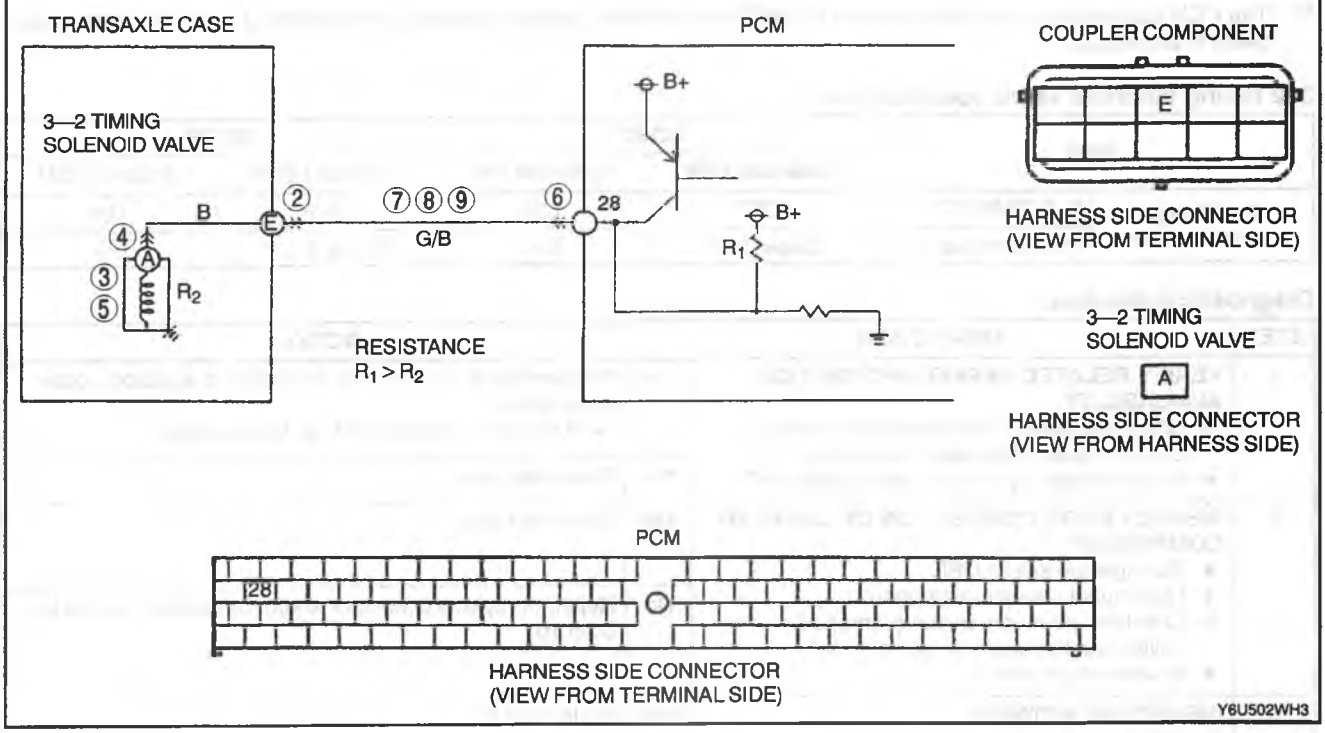
Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** ● Perform DTC Confirmation Procedure. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) ● Is same DTC present during KOEO or KOER self-test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERNS TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**VERIFY STORED DTC** ● Turn ignition key to ON (engine OFF). ● Verify stored DTC. ● Is DTC P0705 or P0706 present?	Yes	Go to appropriate DTC inspection.
		No	Go to next step.
3	**VERIFY TROUBLESHOOTING OF DTC P1705 IS COMPLETED** ● Make sure to reconnect all disconnected connectors. ● Clear DTC from memory using NGS tester generic OBD-II function. ● Perform DTC Confirmation Procedure. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) ● Is same DTC present?	Yes	Replace PCM, then go to next step. (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
		No	Go to next step.
4	**VERIFY AFTER REPAIR PROCEDURE** ● Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P1765 [GF4A-EL]

Z6U050201030W22

DTC P1765	3-2 timing solenoid valve circuit malfunction
DETECTION CONDITION	• If PCM detects either of following conditions, PCM determines that 3-2 timing solenoid valve circuit has a malfunction: — 3-2 timing solenoid valve voltage is stuck at **B+** after engine start. — 3-2 timing solenoid valve voltage is stuck at **0 V** after engine start. **Diagnostic support note:** • This is a continuous monitor (CCM). • MIL does not illuminate if PCM detects the above malfunction conditions during first drive cycle. • PENDING CODE is not available. • FREEZE FRAME DATA is not available. • O/D OFF indicator light flashes. • DTC is stored in the PCM memory.
POSSIBLE CAUSE	• 3-2 timing solenoid valve malfunction • Short to ground between 3-2 timing solenoid valve terminal A and coupler component terminal E • Short to ground between coupler component terminal E and PCM terminal 28 • Short to power between 2-3 timing solenoid valve terminal A and coupler component terminal E • Short to power between coupler component terminal E and PCM terminal 28 • Open circuit between 3-2 timing solenoid valve terminal A and coupler component terminal E • Open circuit between coupler component terminal E and PCM terminal 28 • Damaged connector between 3-2 timing solenoid valve and PCM • PCM malfunction



Troubleshooting Hint

3-2 timing solenoid valve description

- The solenoid valve is located on the control valve body.
- The solenoid valve is switched ON and OFF by electric signals from the PCM.

Solenoid valve operation chart

The following solenoid operation chart shows normal solenoid operation for given operation mode.

Range	O/D OFF switch position	Mode	Gear position	Solenoid valve				
				Shift A	Shift B	Shift C	3-2 timing	TCC control
P	—	—	—	OFF	OFF	ON	OFF	OFF
R	—	—	Reverse	OFF	ON	ON	OFF	OFF
N	—	—	—	OFF	OFF	ON	OFF	OFF

Range	O/D OFF switch position	Mode	Gear position	Solenoid valve				
				Shift A	Shift B	Shift C	3-2 timing	TCC control
D	OFF	Normal, power*3, slope*1	1GR	OFF	ON	ON	OFF	OFF
			2GR	ON	ON	OFF	OFF	OFF
			3GR	ON	OFF	OFF	OFF	OFF
			4GR	ON	OFF	ON	OFF	OFF
			4GR (TCC Operation)	ON	OFF	ON	OFF	ON
	ON	Normal, power*3	1GR	OFF	ON	ON	OFF	OFF
			2GR	ON	ON	OFF	OFF	OFF
			3GR	ON	OFF	OFF	OFF	OFF
			3GR (TCC Operation)	ON	OFF	OFF	OFF	ON
2	—	—	1GR*2	OFF	ON	ON	OFF	OFF
			2GR	ON	ON	OFF	OFF	OFF
1	—	—	1GR	OFF	ON	OFF	OFF	OFF

*1 : The PCM automatically switches between NORMAL and SLOPE modes according to the engine load and vehicle acceleration.

*2 : Vehicle with TCS

*3 : The PCM automatically switches between POWER and NORMAL modes according to the speed at which the accelerator pedal is depressed.

3-2 timing solenoid valve specification

Item		KOEO		KOER	
		Solenoid OFF	Solenoid ON	Solenoid OFF	Solenoid ON
3-2 timing solenoid valve	3-2 TIME PID	OFF	ON	OFF	ON
	PCM terminal 28	Below 1.0 V	B+	Below 1.0 V	B+

Diagnostic procedure

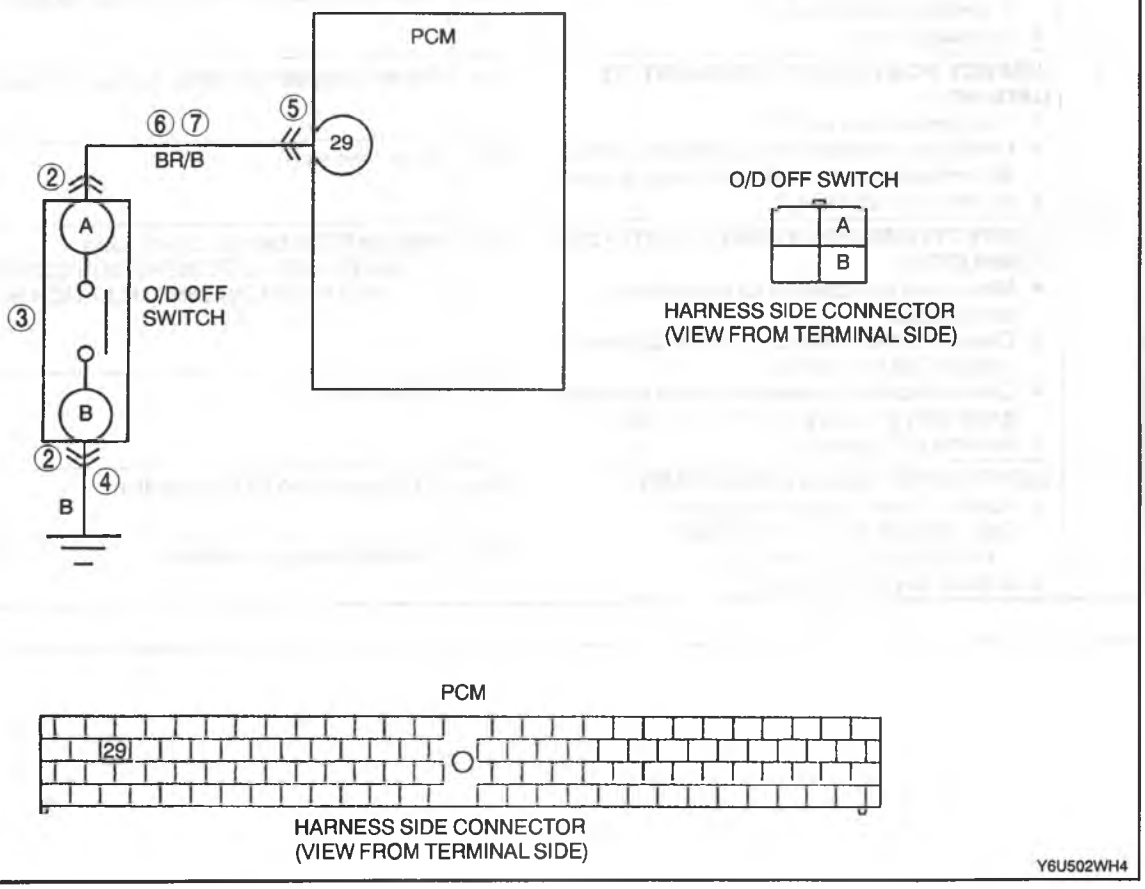
STEP	INSPECTION		ACTION
1	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Check for related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to available repair information. • If vehicle is not repaired, go to next step.
		No	Go to next step.
2	**INSPECT POOR CONNECTION OF COUPLER COMPONENT** • Turn ignition key to OFF. • Disconnect coupler component. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminals, then go to Step 10.
3	**INSPECT RESISTANCE** • Check resistance between coupler component terminal E (transaxle case side) and body ground. • Is resistance **within 11—27 Ω**?	Yes	Go to Step 6.
		No	Go to next step.
4	**INSPECT POOR CONNECTION OF 3-2 TIMING SOLENOID CONNECTOR** • Disconnect 3-2 timing solenoid valve connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminal, then go to Step 10.
5	**INSPECT RESISTANCE** • Check resistance between 3-2 timing solenoid valve terminal A (part-side) and body ground. • Is resistance **within 11—27 Ω**? (See 05-17B-29 Resistance Inspection (Off-Vehicle).)	Yes	Replace solenoid harness, then go to Step 10.
		No	Verify 3-2 timing solenoid valve installation. • If solenoid is installed correctly, replace solenoid, then go to Step 10. (See 05-17B-30 SOLENOID VALVE REMOVAL/INSTALLATION [GF4A-EL].)

STEP	INSPECTION		ACTION
6	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Disconnect PCM connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminals, then go to Step 10.
7	**INSPECT COUPLER COMPONENT CIRCUIT FOR OPEN** • Check for continuity between PCM terminal 28 (harness-side) and coupler component terminal E (harness-side). • Is there continuity between terminals?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 10.
8	**INSPECT COUPLER COMPONENT CIRCUIT FOR SHORT TO POWER** • Turn ignition key to ON (engine OFF). • Check voltage at coupler component terminal E (vehicle harness-side). • Is voltage **0 V**?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 10.
9	**INSPECT PCM CIRCUIT FOR SHORT TO GROUND** • Turn ignition key to OFF. • Check for continuity between PCM terminal 28 (vehicle harness-side) and body ground. • Is there any continuity?	Yes	Repair or replace harness, then go to next step.
		No	Go to next step.
10	**VERIFY TROUBLESHOOTING OF DTC P1765 COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear DTC from memory using NGS tester generic OBD-II function. • Drive vehicle in D range and make sure that gears shift smoothly from 1GR to 4GR. • Is same DTC present?	Yes	Replace PCM, then go to next step. (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
		No	Go to next step.
11	**VERIFY AFTER REPAIR PROCEDURE** • Perform "After Repair Procedure". (See 05-02B-6 AFTER REPAIR PROCEDURE [GF4A-EL].) • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

DTC P1780 [GF4A-EL]

Z6U050201030W23

DTC P1780	O/D OFF switch signal malfunction
DETECTION CONDITION	• O/D OFF switch not cycled during self-test. **Diagnostic support note:** • This DTC is also detected by KOER self-test. • MIL does not illuminate. • PENDING CODE is not available. • FREEZE FRAME DATA is not available. • O/D OFF indicator light does not flash. • DTC is stored in PCM memory.
POSSIBLE CAUSE	• O/D OFF switch malfunction • Short to ground between O/D OFF switch terminal A and PCM terminal 29 • Open circuit between O/D OFF switch terminal A and PCM terminal 29 • Open circuit between O/D OFF switch terminal B and body ground • Damaged connector between O/D OFF switch and PCM • PCM malfunction



Troubleshooting Hint

O/D OFF switch description

- The O/D OFF switch is a momentary contact switch. When the O/D OFF switch is pressed, a signal is sent to the PCM.
- The PCM then energizes the O/D OFF indicator lamp and engages or disengages 4GR operation and provides coast braking in 2GR and 3GR.

O/D OFF switch specification

Item	KOEO		KOER	
	Switch released	Switch depressed	Switch released	Switch depressed
TCS PID	OFF	ON	OFF	ON
PCM 29	B+	Below 1.0 V	B+	Below 1.0 V

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**PERFORM DTC CONFIRMATION PROCEDURE** • Perform DTC Confirmation Procedure. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present during KOEO or KOER self-test?	Yes	Go to next step.
		No	Intermittent concern exists. Go to INTERMITTENT CONCERNS TROUBLESHOOTING procedure. (See 01-03B-3 INTERMITTENT CONCERN TROUBLESHOOTING [KL])
2	**INSPECT POOR CONNECTION OF O/D OFF SWITCH CONNECTOR** • Turn ignition key to OFF. • Disconnect O/D OFF switch connector. • Check for poor connection (damaged, pulled-out terminals, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminal, then go to Step 8.
3	**INSPECT O/D OFF SWITCH CONTINUITY** • Check for continuity between O/D OFF switch connector terminal (part-side). • Is there continuity between O/D OFF switch connector terminals A and B (part-side)? (See 05-17B-22 O/D OFF SWITCH INSPECTION [GF4A-EL])	Yes	Go to next step.
		No	Replace O/D OFF switch, then go to Step 8. (See 05-17B-24 TRANSAXLE RANGE SWITCH REMOVAL/INSTALLATION [GF4A-EL].)
4	**INSPECT O/D OFF SWITCH CIRCUIT FOR OPEN** • Check for continuity between O/D OFF switch connector terminal B (vehicle harness-side) and body ground. • Is there continuity?	Yes	Go to next step.
		No	Repair or replace wiring, then go to Step 8.
5	**INSPECT POOR CONNECTION OF PCM CONNECTOR** • Check for poor connection (damaged pulled-out terminals, corrosion, etc.). • Is connection okay?	Yes	Go to next step.
		No	Repair or replace connector and/or terminals, then go to Step 8.
6	**INSPECT O/D OFF SWITCH CIRCUIT FOR OPEN** • Inspect for continuity between O/D OFF switch terminal A (vehicle harness-side) and PCM terminal 29 (harness-side). • Is there continuity?	Yes	Go to next step.
		No	Repair or replace harness, then go to Step 8.
7	**INSPECT O/D OFF SWITCH CIRCUIT FOR SHORT TO GROUND** • Check for continuity between O/D OFF switch connector terminal A (vehicle harness-side) and body ground. • Is there continuity?	Yes	Repair or replace harness, then go to next step.
		No	Go to next step.
8	**VERIFY TROUBLESHOOTING OF DTC P1780 COMPLETED** • Connect NGS tester to DLC. • Clear DTC from memory using NGS tester generic OBD-II function. • Perform DTC Confirmation Procedure. (See 01-02B-18 DTC CONFIRMATION PROCEDURE [KL]) • Is same DTC present?	Yes	Replace PCM, then go to next step. (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
		No	Go to next step.
9	**VERIFY AFTER REPAIR PROCEDURE** • Is there any DTC present?	Yes	Go to applicable DTC inspection.
		No	Troubleshooting completed.

PID/DATA MONITOR INSPECTION [GF4A-EL]

Z6U050201030W24

1. Connect the **SSTs** (NGS tester) to the DLC.
2. Turn the ignition switch to ON.
3. Select the "PID/DATA MONITOR AND RECORD" function on the **SSTs** (NGS tester) display and press TRIGGER.
4. Select the appropriate PID on the **SSTs** (NGS tester) display and press START.
5. Measure the PID value.

Note

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

PID/DATA MONITOR AND RECORD function table

Monitor item (Definition)	Unit/ Condition	Condition/Specification	Action	PCM terminal
3-2TIME (3-2 timing solenoid valve)	ON/OFF	Ignition switch ON: OFF Engine running: Indicates solenoid valve control signal status	Inspect following PIDs: TR, TSS, TP V	—
CPP/PNP (TR switch)	ON/OFF	Selector lever in P or N position: ON Other: OFF	Inspect TR switch. (See 05-17B-23 TRANSAXLE RANGE SWITCH INSPECTION [GF4A-EL].)	64
EPC	%	Idle (After warm up): **Approx. 55 %**	Inspect following PIDs: TP V, TSS, VSS, TFT, TR	—
GEAR	DECIMAL	Indicates gear position	Inspect solenoid valves. (See 05-17B-29 SOLENOID VALVES INSPECTION [GF4A-EL].)	1, 27, 53
SS1	ON/OFF	1GR: OFF 2GR: ON 3GR: ON 4GR: ON	Inspect following PIDs: TP V, TSS, TR	—
SS2	ON/OFF	1GR: ON 2GR: ON 3GR: OFF 4GR: OFF	Inspect following PIDs: TP V, TSS, TR	—
SS3	ON/OFF	1GR: OFF 2GR: OFF 3GR: OFF 4GR: ON	Inspect following PIDs: TP V, TSS, TR	—
TCC (TCC control solenoid valve)	%	Ignition switch is ON: **0 %** TCC non operation: **0 %** TCC operation: **100 %** Indicates TCC solenoid control signal	Inspect following PIDs: TP V, TSS, TR	—
TCCMACT	RPM	Absolute value of slip	Inspect following PIDs: TSS, RPM, TP V, TR	—
TCCRAT	—	Speed ratio across torque converter (output/input)	Inspect following PIDs: TSS, RPM	—
TCS	ON/OFF	O/D OFF switch is pressed: ON Others: OFF	Inspect O/D OFF switch. (See 05-17B-22 O/D OFF SWITCH INSPECTION [GF4A-EL])	29
TFT	°C {°F}	Idle (After warm up): **Approx. 60 °C {140 °F}**	Inspect TFT sensor. (See 05-17B-26 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION [GF4A-EL].)	37

Monitor item (Definition)	Unit/ Condition	Condition/Specification	Action	PCM terminal
TFT V	V	Transaxle fluid temperature **20 °C {68 °F}: Approx. 3.5 V**	Inspect TFT sensor. (See 05-17B-26 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION [GF4A-EL].)	37
TR	MODE	Selector lever in P position: NTRL Selector lever in R position: REV Selector lever in N position: NTRL Selector lever in D range: O/D Selector lever in 2 range: DRIVE Selector lever in 1 range: MAN1	Inspect TR switch. (See 05-17B-23 TRANSAXLE RANGE SWITCH INSPECTION [GF4A-EL])	64, 6, 9, 7, 32
TR V	V	Selector lever in D, 2, or 1 range or R position: **Approx. 3.5 V** Others: **Approx. 0 V**	Inspect TR switch. (See 05-17B-23 TRANSAXLE RANGE SWITCH INSPECTION [GF4A-EL])	64
TRANRAT	ratio	Indicates gear ratio	Inspect following PIDs: TR, TP V, TSS	—
TSS	RPM	Idle (After warm up): **Approx. 700 rpm**	Inspect input/turbine speed sensor. (See 05-17B-26 INPUT/TURBINE SPEED SENSOR INSPECTION [GF4A-EL])	23, 84
TSS/ISS	RPM	Idle (After warm up): **Approx. 700 rpm**	Inspect input/turbine speed sensor. (See 05-17B-26 INPUT/TURBINE SPEED SENSOR INSPECTION [GF4A-EL].)	—
VSS	ON/OFF	Indicates vehicle speed	Inspect vehicle speedometer sensor. (See 05-17B-28 VEHICLE SPEEDOMETER SENSOR INSPECTION [GF4A-EL])	33, 58

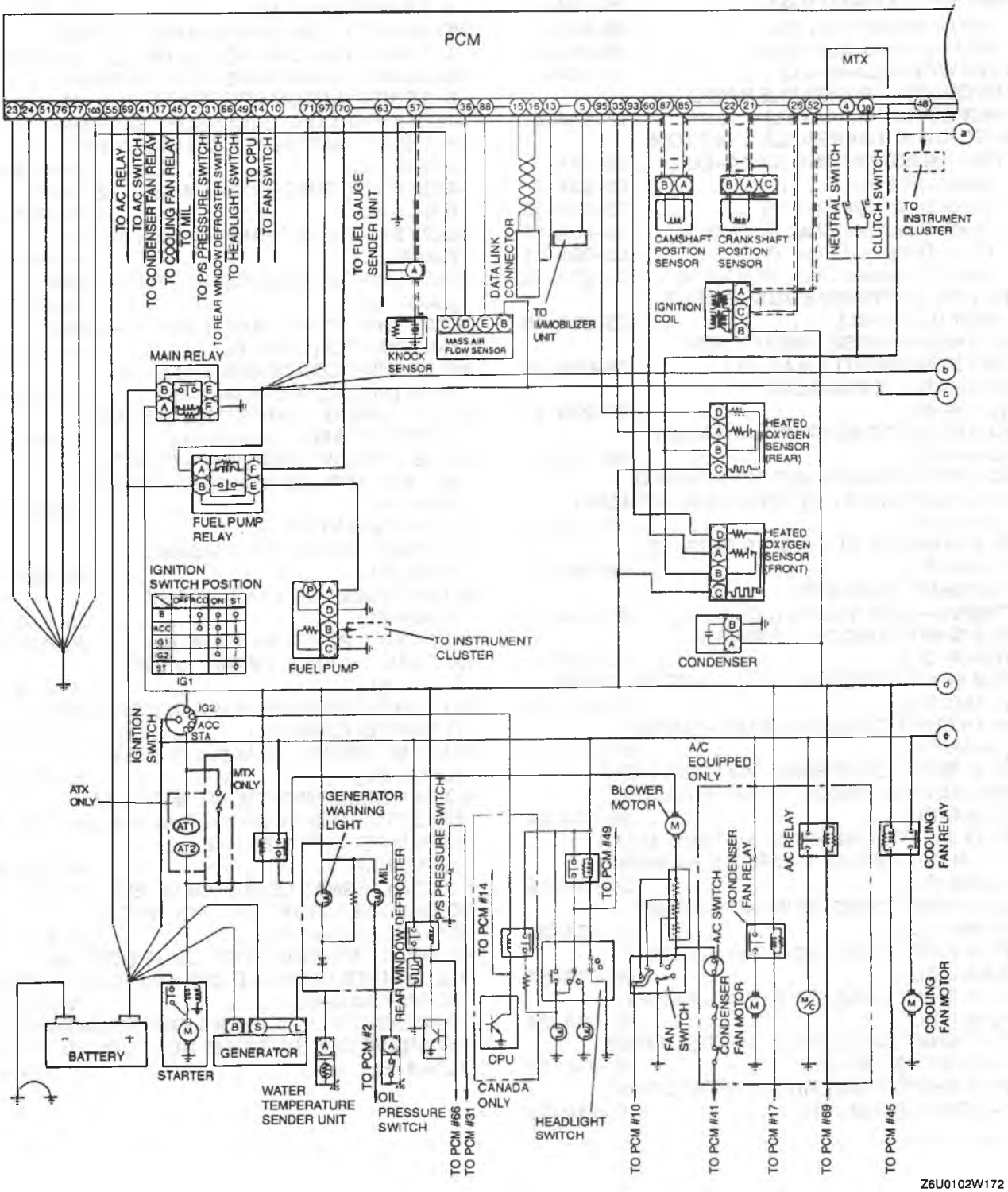
05-03A SYMPTOM TROUBLESHOOTING [LA4A-EL]

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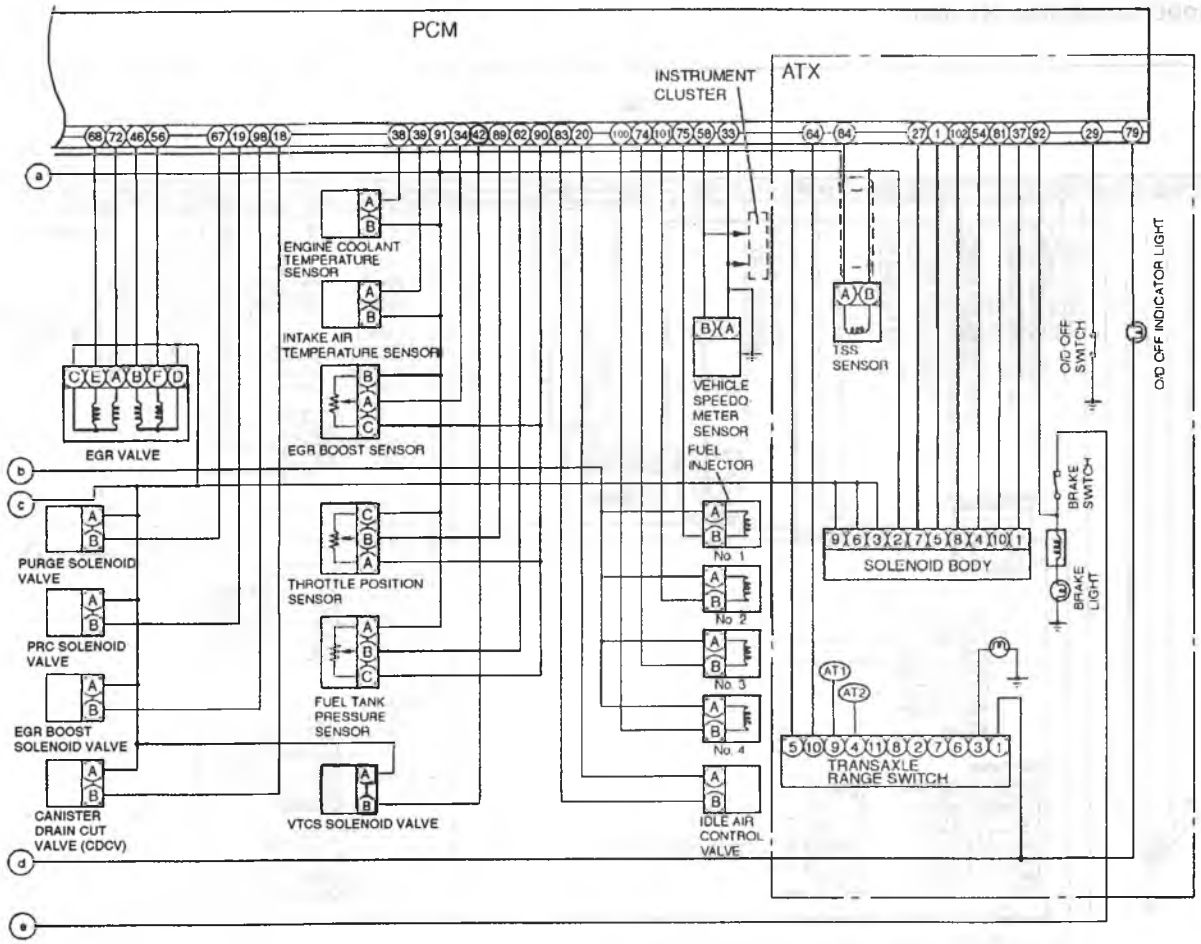
AUTOMATIC TRANSAXLE CONTROL SYSTEM WIRING DIAGRAM [LA4A-EL]

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With Immobilizer System

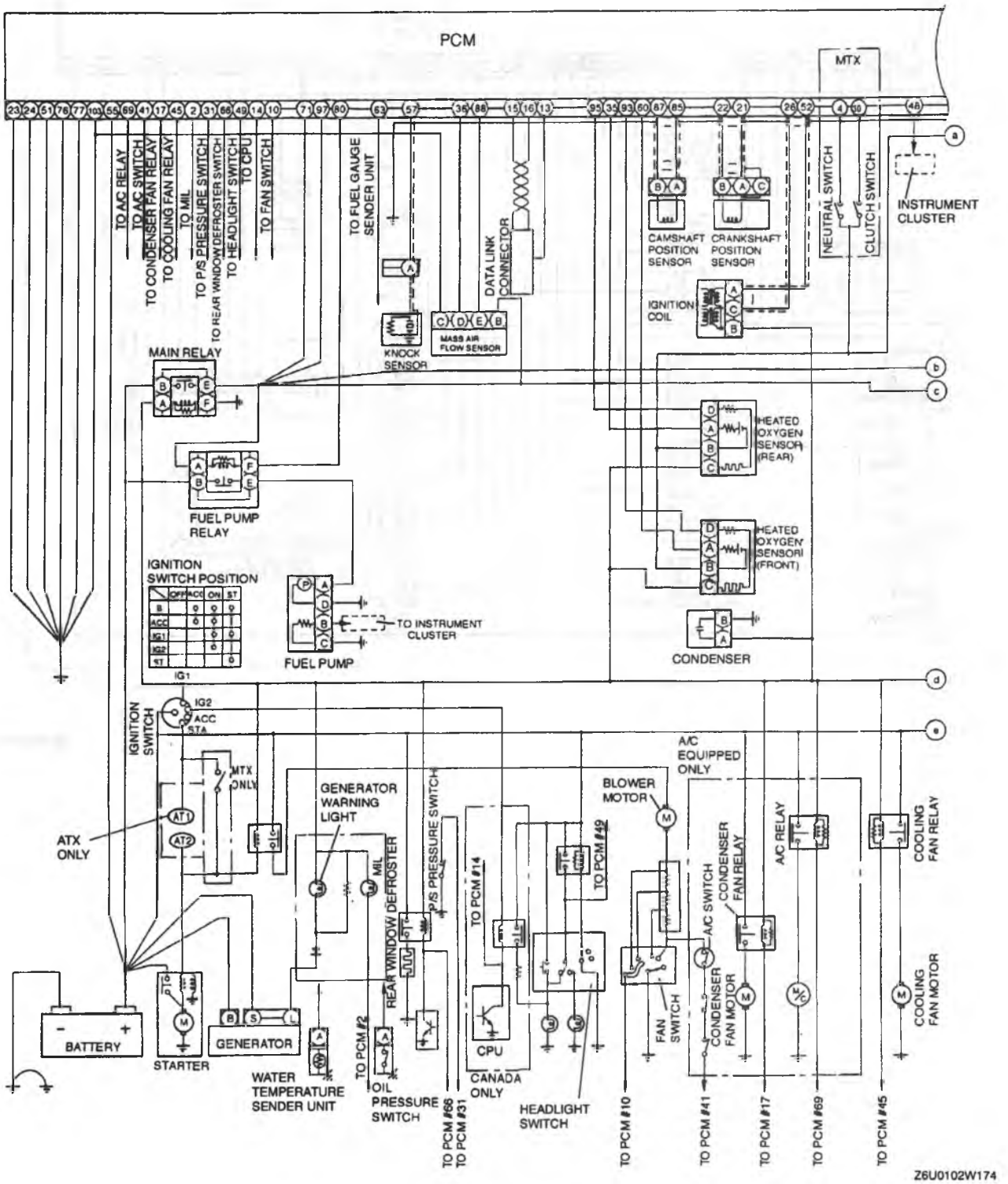


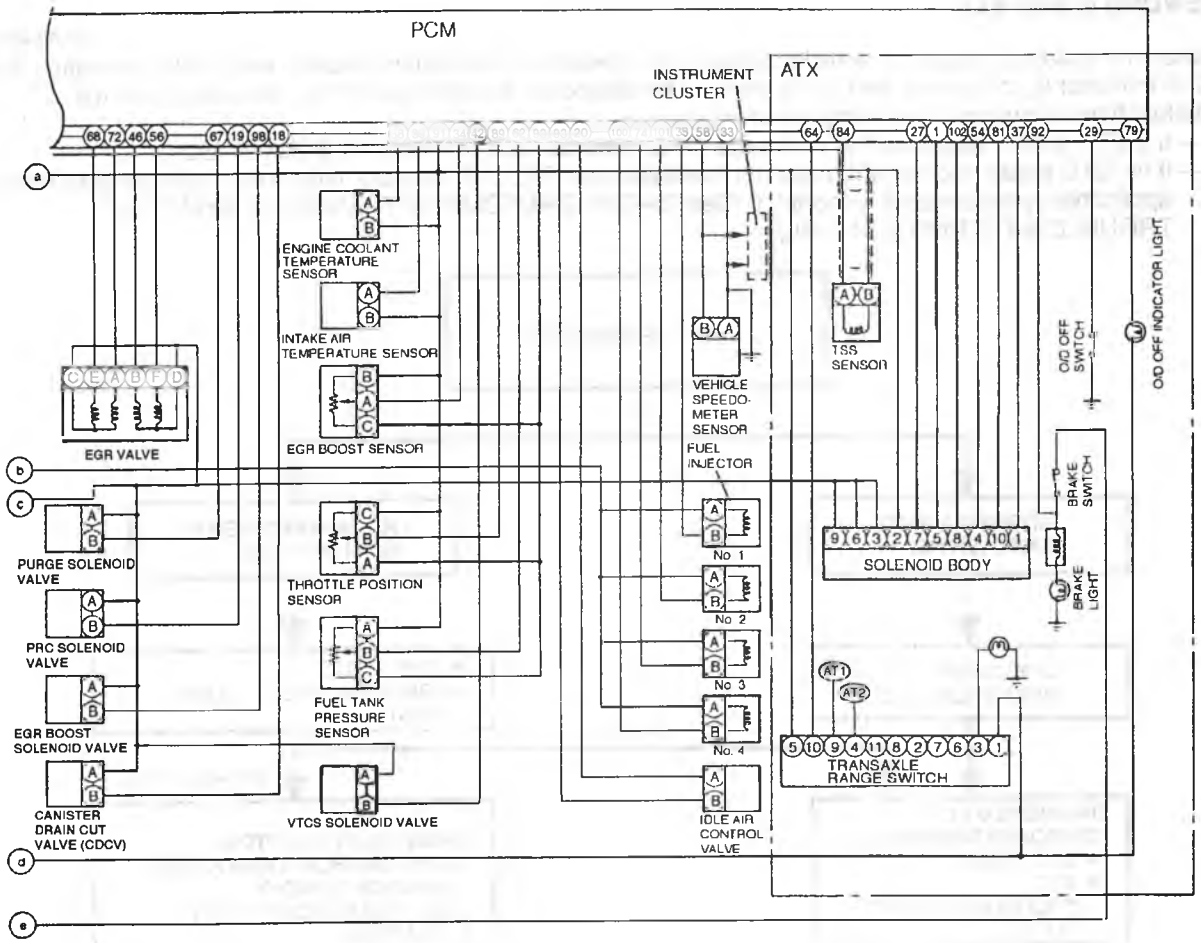
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Without Immobilizer System



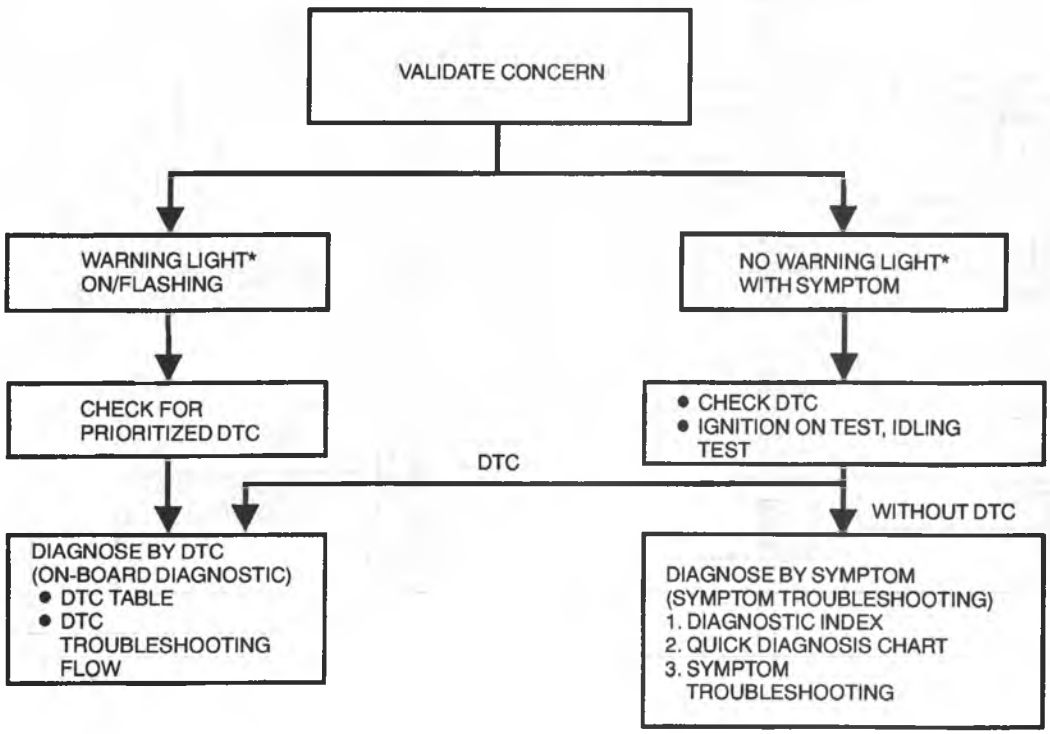


Z6U0102W173

FOREWORD [LA4A-EL]

Z6U050301030W33

- When the customer reports a vehicle malfunction, check the malfunction indicator lamp (MIL) indication, O/D OFF indicator light flashing, and PCM memory for diagnostic trouble code (DTC), then diagnose the malfunction according to following flowchart.
  - —If a DTC exists, diagnose the applicable DTC. (See 05-02A-7 DTC TABLE [LA4A-EL].)
  - —If no DTC exists and the MIL does not illuminate and O/D OFF indicator light does not flash, diagnose the applicable symptom troubleshooting. (See 05-03A-7 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [LA4A-EL].)



Z6U0102W316

* : Malfunction Indicator Lamp (MIL), O/D OFF indicator light

AUTOMATIC TRANSAXLE BASIC INSPECTION [LA4A-EL]

Z6U050301030W34

STEP	INSPECTION		ACTION
1	• Turn ignition switch to ON. • Does O/D OFF indicator light (illuminate/go out) correspond to O/D OFF switch position (ON/OFF)?	Yes	Go to next step.
		No	Perform malfunction diagnosis according to No.39 "O/D OFF INDICATOR LIGHT DOES NOT ILLUMINATE WHEN O/D OFF SWITCH IS TURNED TO ON", or No.40 "O/D OFF INDICATOR LIGHT ILLUMINATES WHEN O/D OFF SWITCH IS NOT TURNED TO ON".
2	• Check the ATF color and condition. (See 05-17A-22 ATF Condition Inspection) • Are ATF color and odor normal?	Yes	Go to next step.
		No	Repair or replace any defective parts.
3	• Perform the line pressure test. (See 05-17A-16 Line Pressure Test) • Is line pressure okay?	Yes	Go to next step.
		No	Repair or replace any defective parts.
4	• Perform the stall test. (See 05-17A-17 Stall Speed Test) • Is stall speed okay?	Yes	Go to next step.
		No	Repair or replace any defective parts.

STEP	INSPECTION		ACTION
5	• Check voltage at the following PCM terminals (See 01-40A-15 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [FS]) — Throttle position sensor signal — Transaxle fluid temperature sensor signal — Speedometer signal • Are terminal voltages okay?	Yes	Perform symptom troubleshooting.
		No	Repair or replace any defective parts.

AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [LA4A-EL]

Z6U050301030W35

Diagnosis Index

No.	TROUBLESHOOTING ITEM		PAGE
1	No forward engagement only		(See 05-03A-13 NO.1 NO FORWARD ENGAGEMENT ONLY [LA4A-EL])
2	No reverse engagement (No movement)		(See 05-03A-14 NO.2 NO REVERSE ENGAGEMENT (NO MOVEMENT) [LA4A-EL])
3	Harsh engagement		(See 05-03A-15 NO.3 HARSH ENGAGEMENT [LA4A-EL])
4	Delayed/soft engagement		(See 05-03A-17 NO.4 DELAYED/SOFT ENGAGEMENT [LA4A-EL])
5	No forward and no reverse engagements (No vehicle movement)		(See 05-03A-18 NO.5 NO FORWARD AND NO REVERSE ENGAGEMENTS (NO VEHICLE MOVEMENT) [LA4A-EL])
6	Some or all shifts missing		(See 05-03A-20 NO.6 SOME OR ALL SHIFTS MISSING [LA4A-EL])
7	Shift concern	Timing-early/late	(See 05-03A-20 NO.7 SHIFT CONCERN: TIMING-EARLY/LATE [LA4A-EL])
8		Erratic	(See 05-03A-21 NO.8 SHIFT CONCERN: ERRATIC [LA4A-EL])
9		Feel-soft/slipping	(See 05-03A-22 NO.9 SHIFT CONCERN: FEEL-SOFT/SLIPPING [LA4A-EL])
10		Feel harsh	(See 05-03A-23 NO.10 SHIFT CONCERN: FEEL-HARSH [LA4A-EL])
11		No first gear engagement in higher gear (D range)	(See 05-03A-24 NO.11 SHIFT CONCERNS: NO FIRST GEAR ENGAGES IN HIGHER GEAR (D RANGE) [LA4A-EL])

No.	TROUBLESHOOTING ITEM		PAGE
12	Shift concern	No first gear in 1 range (First gear in D range okay)	(See 05-03A-25 NO.12 SHIFT CONCERNS: NO FIRST GEAR IN 1 RANGE (FIRST GEAR IN D RANGE) [LA4A-EL])
13		No 1-2 shift	(See 05-03A-26 NO.13 SHIFT CONCERNS: NO1-2 SHIFT [LA4A-EL])
14		No 2-3 shift	(See 05-03A-27 NO.14 SHIFT CONCERNS: NO 2-3 SHIFT [LA4A-EL])
15		No 3-4 shift	(See 05-03A-28 NO.15 SHIFT CONCERNS: NO 3-4 SHIFT [LA4A-EL])
16		Soft/slipping 1-2 shift	(See 05-03A-29 NO.16 SHIFT CONCERNS: SOFT/SLIPPING 1-2 SHIFT [LA4A-EL])
17		Soft/slipping 2-3 shift	(See 05-03A-30 NO.17 SHIFT CONCERNS: SOFT/SLIPPING 2-3 SHIFT [LA4A-EL])
18		Soft/slipping 3-4 shift	(See 05-03A-31 NO.18 SHIFT CONCERNS: SOFT/SLIPPING 3-4 SHIFT [LA4A-EL])
19		Soft/slipping 4-3 shift (Automatic)	(See 05-03A-32 NO.19 SHIFT CONCERNS: SOFT/SLIPPING 4-3 SHIFT (AUTOMATIC) [LA4A-EL])
20		Soft/slipping 3-2 shift (Automatic)	(See 05-03A-33 NO.20 SHIFT CONCERNS: SOFT/SLIPPING 3-2 SHIFT (AUTOMATIC) [LA4A-EL])
21		Soft/slipping 2-1 shift (Automatic or kickdown)	(See 05-03A-34 NO.21 SHIFT CONCERNS: SOFT/SLIPPING 2-1 SHIFT (AUTOMATIC OR KICKDOWN) [LA4A-EL])
22		Harsh 1-2 shift	(See 05-03A-34 NO.22 SHIFT CONCERNS: HARSH 1-2 SHIFT [LA4A-EL])
23		Harsh 2-3 shift	(See 05-03A-35 NO.23 SHIFT CONCERNS: HARSH 2-3 SHIFT [LA4A-EL])
24		Harsh 3-4 shift	(See 05-03A-36 NO.24 SHIFT CONCERNS: HARSH 3-4 SHIFT [LA4A-EL])
25		Harsh 4-3 shift (Automatic)	(See 05-03A-38 NO.25 SHIFT CONCERNS: HARSH 4-3 SHIFT (AUTOMATIC) [LA4A-EL])

No.	TROUBLESHOOTING ITEM		PAGE
26	Shift concern	Harsh 3-2 shift (Automatic)	(See 05-03A-39 NO.26 SHIFT CONCERNS: HARSH 3-2 SHIFT(AUTOMATIC) [LA4A-EL])
27	Torque converter clutch	Does not apply	(See 05-03A-40 NO.27 TORQUE CONVERTER CLUTCH: DOES NOT APPLY [LA4A-EL])
28		Always applied/may stall engine	(See 05-03A-40 NO.28 TORQUE CONVERTER CLUTCH: ALWAYS APPLIED/MAY STALL ENGINE [LA4A-EL])
29	Poor vehicle acceleration/performance		(See 05-03A-41 NO.29 POOR VEHICLE ACCELERATION/PERFORMANCE [LA4A-EL])
30	Engine will not crank		(See 05-03A-42 NO.30 ENGINE WILL NOT CRANK [LA4A-EL])
31	No P position		(See 05-03A-42 NO.31 NO P POSITION [LA4A-EL])
32	Transaxle overheating		(See 05-03A-43 NO.32 TRANSAXLE OVERHEATING [LA4A-EL])
33	No engine braking in first gear (1 range)		(See 05-03A-44 NO.33 NO ENGINE BRAKING IN FIRST GEAR (1 RANGE) [LA4A-EL])
34	No engine braking in 2 range		(See 05-03A-45 NO.34 NO ENGINE BRAKING IN 2 RANGE [LA4A-EL])
35	Vehicle movement with gear selector in N position		(See 05-03A-46 NO.35 VEHICLE MOVEMENT WITH GEAR SELECTOR IN N POSITION [LA4A-EL])
36	Shift efforts high		(See 05-03A-46 NO.36 SHIFT EFFORTS HIGH [LA4A-EL])
37	External leaks		(See 05-03A-47 NO.37 EXTERNAL LEAKS [LA4A-EL])
38	Noise/vibration—forward/reverse		(See 05-03A-47 NO.38 NOISE/VIBRATION-FORWARD/REVERSE [LA4A-EL])
39	O/D OFF indicator light does not illuminate when O/D OFF switch is turned to ON		(See 05-03A-48 NO.39 O/D OFF INDICATOR LIGHT DOES NOT ILLUMINATE WHEN O/D OFF SWITCH IS TURNED TO ON [LA4A-EL])
40	O/D OFF Indicator light illuminates when O/D OFF switch is not turned to ON		(See 05-03A-48 NO.40 O/D OFF INDICATOR LIGHT ILLUMINATES WHEN O/D OFF SWITCH IS NOT TURNED TO ON [LA4A-EL])

Quick Diagnosis Chart (I)

Inspection method	Cause of trouble: Preliminary: ATF level and condition	Selector lever	Stall test	Line pressure test	Road test	Emission control system: Powertrain control module	Fuel injection control system	Mass air flow sensor	Throttle position sensor	Engine coolant temperature sensor	A/C relay	EC-AT control system: Transaxle fluid temperature sensor	Transaxle range switch	Brake switch	Vehicle speedometer sensor	Turbine shaft speed sensor	O/D OFF switch	Shift solenoid No.1	Shift solenoid No.2	Electronic pressure control solenoid	Torque converter clutch solenoid	3–2 timing/coasting clutch solenoid	Hydraulic control system: Oil pump	Control valve body	Thermostatic oil level control valve	Torque converter	Oil filter and seal	Oil cooler	Chain pan
Stall test																							×	×		×			
Line pressure test																				×			×	×					
Road test					×			×	×	×	×	×	×	×	×	×	×	×	×	×	×	×							
Diagnostic trouble code						×	×	×	×	×		×	×	×	×	×	×	×	×	×	×	×							

Y6U503WK1

Quick Diagnosis Chart (I) (Cont'd)

Inspection method	Cause of trouble: Powertrain: Forward clutch	Coasting clutch	Direct clutch	Reverse clutch	2/4 band and servo	Low/reverse clutch	Chain and sprocket	Forward/coasting/direct clutch cylinder	Reverse/fourth (REV/4GR) carrier component	REV/4GR sun gear and shell	Forward one-way clutch	Low one-way clutch	Converter one-way clutch	Low-intermediate carrier component	Planetaly gearsets (Differential)	Parking mechanism	Turbine shaft	Final drive and differential	Exterior: Transaxle case	Converter housing	Other: Joint shaft	Engine mount	Drive plate	Tire size
Stall test	×			×	×	×					×													
Line pressure test	×		×	×	×	×																		
Road test	×	×	×		×	×					×		×			×								×
Diagnostic trouble code																								

Y6U503WK2

Quick Diagnosis Chart (II)

	Symptom		Cause of trouble: Preliminary: ATF level and condition	Selector lever	Stall test	Line pressure test	Road test	Emission control system: Powertrain control module	Fuel injection control system	Mass air flow sensor	Throttle position sensor	Engine coolant temperature sensor	Electronic system: Transaxle fluid temperature sensor	Transaxle range switch	Brake switch	Vehicle speedometer sensor	Turbine shaft speed sensor	O/D OFF switch	Shift solenoid No.1	Shift solenoid No.2	Electronic pressure control solenoid	Torque converter clutch solenoid	3-2 timing/coasting clutch solenoid	Hydraulic control system: Oil pump	Control valve body	Thermostatic oil level control valve	Torque converter	Oil filter and seal	Oil cooler	Chain pan
1	No forward engagement only			×				×																×	×					
2	No reverse engagement (No movement)			×		×		×						×					×					×	×					
3	Harsh engagement		×	×		×		×					×								×		×		×			×		
4	Delayed/soft engagement		×	×		×																		×	×			×		
5	No forward and no reverse engagements		×	×		×																		×	×		×	×		
6	Some or all shifts missing		×	×				×			×			×		×			×	×										
7	Shift concern	Timing-early/late						×			×		×			×														
8		Erratic	×								×			×	×	×	×		×	×	×	×	×		×					
9		Feel-soft/slipping	×	×		×		×		×	×		×								×			×	×			×		
10		Feel harsh	×			×		×		×	×		×	×		×	×				×	×	×		×		×			
11		No first gear engages in higher gear (D range)		×				×						×				×	×	×					×					
12		No first gear in 1 range (First gear in D range okay)		×				×						×					×	×					×					
13		No 1–2 shift				×		×						×				×	×	×					×					
14		No 2–3 shift				×		×						×				×	×	×				×	×					
15		No 3–4 shift				×		×						×				×	×	×					×					
16		Soft/slipping 1–2 shift						×					×								×				×					
17		Soft/slipping 2–3 shift						×					×								×			×	×					
18		Soft/slipping 3–4 shift						×					×								×				×					
19		Soft/slipping 4–3 shift (Automatic)						×		×	×					×					×				×					
20		Soft/slipping 3–2 shift (Automatic)						×		×	×					×					×		×	×	×					
21		Soft/slipping 2–1 shift (Automatic or kickdown)						×		×	×		×								×			×						
22		Harsh 1–2 shift						×		×	×		×	×		×	×				×	×		×	×					
23		Harsh 2–3 shift						×		×			×	×		×	×				×	×		×	×					
24		Harsh 3–4 shift						×		×	×		×	×		×	×				×	×	×	×	×					
25		Harsh 4–3 shift (Automatic)						×		×	×		×	×		×	×				×	×	×	×	×					
26		Harsh 3–2 shift (Automatic)						×		×	×		×	×		×	×				×	×	×	×	×					
27	Torque converter clutch	Does not apply						×					×		×		×					×			×		×			
28		Always applied/may stall engine						×					×										×	×	×		×			
29	Poor vehicle acceleration/performance			×				×			×		×					×									×			
30	Engine will not crank			×				×						×																
31	No P position			×																										
32	Transaxle overheating		×					×					×					×				×			×	×	×	×	×	×
33	No engine braking in first gear (1 range)							×															×	×	×					
34	No engine braking in 2 range			×				×															×	×	×					
35	Vehicle movement with gear selector in N position			×																				×						
36	Shift efforts high			×																					×					
37	External leaks		×																											
38	Noise/vibration—forward/reverse		×	×																				×			×		×	×
39	O/D OFF indicator light does not illuminate when O/D OFF switch is turned to ON																	×												
40	O/D OFF indicator light illuminates when O/D OFF switch is not turned to ON																	×												

Y6U503WK3

Quick Diagnosis Chart (II) (Cont'd)

	Symptom		Cause of trouble: Powertrain: Forward clutch	Coasting clutch	Direct clutch	Reverse clutch	2/4 band and servo	Low/reverse clutch	Chain and sprocket	Forward/coasting/direct clutch cylinder	Reverse/fourth (REV/4GR) carrier component	HEV/4GR sun gear and shell	Forward one-way clutch	Low one-way clutch	Converter one-way clutch	Low-intermediate carrier component	Planetaly gearsets differential	Parking mechanism	Turbine shaft	Final drive and differential	Exterior: Transaxle case	Converter housing	Other: Joint shaft	Engine mount	Drive plate	Tire size
1	No forward engagement only		×	×									×	×		×										
2	No reverse engagement (No movement)					×		×		×	×										×					
3	Harsh engagement		×		×	×		×															×	×		
4	Delayed/soft engagement		×			×		×		×																
5	No forward and no reverse engagements								×								×	×	×	×			×			
6	Some or all shift missing																									
7	Shift concern	Timing-early/late																								×
8		Erratic																								
9		Feel-soft/slipping																								
10		Feel harsh																						×	×	
11		No first gear engages in higher gear (D range)			×		×																			
12		No first gear in 1 range (First gear in D range okay)																								
13		No 1-2 shift					×					×		×							×					
14		No 2-3 shift			×		×														×					
15		No 3-4 shift		×			×						×								×					
16		Soft/slipping 1-2 shift	×				×	×					×	×							×					
17		Soft/slipping 2-3 shift			×		×						×								×					
18		Soft/slipping 3-4 shift			×																×					
19		Soft/slipping 4-3 shift (Automatic)	×	×	×		×																			
20		Soft/slipping 3-2 shift (Automatic)			×		×														×					
21		Soft/slipping 2-1 shift (Automatic or kickdown)	×				×							×												
22		Harsh 1-2 shift	×				×														×					
23		Harsh 2-3 shift			×		×														×					
24		Harsh 3-4 shift		×	×		×														×					
25		Harsh 4-3 shift (Automatic)		×			×														×					
26		Harsh 3-2 shift (Automatic)			×		×														×					
27	Torque converter clutch	Does not apply																								
28		Always applied/may stall engine																			×					
29	Poor vehicle acceleration/performance														×											
30	Engine will not crank																									
31	No P position																	×								
32	Transaxle overheating																				×	×				
33	No engine braking in first gear (1 range)		×				×																			
34	No engine braking in 2 range		×										×													
35	Vehicle movement with gear selector in N position	×	×																							
36	Shift efforts high																	×								
37	External leaks																									
38	Noise/vibration—forward/reverse								×				×				×			×			×	×	×	
39	O/D OFF indicator light does not illuminate when O/D OFF switch is turned to ON																									
40	O/D OFF indicator light illuminates when O/D OFF switch is not turned to ON																									

Y6U503WK4

NO.1 NO FORWARD ENGAGEMENT ONLY [LA4A-EL]

Z6U050301030W36

1	No forward engagement only
POSSIBLE CAUSE	• Malfunction of internal or external shift linkages • Malfunction of oil pump • Malfunction of control valve body • Malfunction of forward clutch and coasting clutch component • Malfunction of low one-way clutch component • Malfunction of forward one-way clutch component • Malfunction of low intermediate carrier component

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Internal or external shift linkages** • Do any of the following problems exist? • Damaged • Misadjusted • Misassembled (See 05-18-2 SELECTOR LEVER AND CABLE REMOVAL/INSTALLATION)	Yes	Service as required
		No	Go to next step
2	**Control valve body** • Do any of the following problems exist? • Bolts are not torqued to specification • Gaskets are damaged, or leaking • Pressure tap plate/Gasket are leaking or damaged • Separator plates are damaged • Hydraulic passages are damaged • Main regulator valve is stuck, damaged, or misassembled • Forward accumulator is leaking	Yes	Service as required
		No	Go to next step
3	**Oil pump** • Do any of the following problems exist? • Bolts are not torqued to specification • Gaskets are damaged • Porosity/cross leaks and/or ball plug is missing, or leaking, or a plugged hole • Pump support seal rings, #3 and #4 are damaged	Yes	Service as required
		No	Go to next step
4	**Forward clutch and coasting clutch component** • Do any of the following problems exist? • Seals or pistons damaged • Return spring is damaged • Ball check valve are damaged • Friction elements are severely damaged or worn • Forward/coasting/direct (F/C/D) clutch cylinder are damaged, leaking, misassembled, or binding • Welding between cylinder and hub is broken, or splines are damaged	Yes	Service as required
		No	Go to next step
5	**Low one-way clutch component** • Do any of the following problems exist? • Wear • Damage • Misassembly	Yes	Service as required
		No	Go to next step
6	**Forward one-way clutch component** • Do any of the following problems exist? • Wear • Damage • Misassembly	Yes	Service as required
		No	Go to next step
7	**Low intermediate carrier** • Do any of the following problems exist? • Damage • Misassembly	Yes	Service as required
		No	The problem is fixed

NO.2 NO REVERSE ENGAGEMENT (NO MOVEMENT) [LA4A-EL]

Z6U050301030W37

2	No reverse engagement (no movement)
POSSIBLE CAUSE	• Malfunction of powertrain control system • Improper pressures • Malfunction of internal or external shift linkages • Malfunction of control valve body • Malfunction of oil pump • Malfunction of reverse clutch component • Malfunction of low/reverse clutch component • Malfunction of forward/coasting/direct (F/C/D) clutch cylinder component • Malfunction of transaxle case • Malfunction of reverse/fourth gear (REV/4GR) carrier component

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** • Are there any problems with the following? • Electrical input/output • Vehicle wiring harness • PCM • Shift solenoid No.1 (SS1) (ON) • Transaxle range (TR) switch (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD tests Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
2	**Improper pressures** • Is there low line pressure? (See 05-17A-16 Line Pressure Test)	Yes	Go to step 4 for checking the following possible components Control valve body, oil pump, reverse clutch component, low/reverse clutch component
		No	Go to next step
3	**Internal or external shift linkages** • Do any of the following problems exist? • Damage • Misadjustment (See 05-18-2 SELECTOR LEVER AND CABLE REMOVAL/INSTALLATION)	Yes	Service as required
		No	Go to step 9
4	**Control valve body** • Do any of the following problems exist? • Bolts are not torqued to specification • Gasket is damaged • 1-2 shift valve, SS1, main regulator valve, low/reverse modulator valve, low/reverse accumulator piston, pressure tap plate are damaged, missing, stuck, or misassembled • Separator plates are damaged • Hydraulic passages are damaged	Yes	Service as required
		No	Go to next step
5	**Oil pump** • Do any of the following problems exist? • Bolts are not torqued to specification • Gasket is damaged • Porosity/cross leaks/ball plug are missing or leaking, or plugged hole • Pump support seal rings, #6 and #7, are damaged	Yes	Service as required
		No	Go to next step
6	**Reverse clutch component** • Do any of the following problems exist? • Seals or piston are damaged • Ball check valves are damaged • Friction elements worn, are severely damaged, or misassembled • Piston return spring damaged • Reverse clutch hub to F/C/D clutch hub splines are damaged	Yes	Service as required
		No	Go to next step

STEP	INSPECTION		ACTION
7	**Low/reverse clutch component** ● Do any of the following problems exist? ● Seals or piston are damaged ● Friction elements are worn or severely damaged ● Piston return spring is damaged ● Wave spring is missing ● Piston bore is damaged	Yes	Service as required
		No	Go to next step
8	**Forward/coasting/direct clutch cylinder** ● Are any of the reverse seal rings damaged, missing, or misassembled?	Yes	Service as required
		No	Go to next step
9	**Reverse/fourth (REV/4GR) carrier component** ● Is there any damage?	Yes	Service as required
		No	Go to next step
10	**Transaxle case** ● Is there any severe cross leakage from the reverse clutch to low/reverse clutch feeds?	Yes	Service as required
		No	The problem is fixed

NO.3 HARSH ENGAGEMENT [LA4A-EL]

Z6U050301030W38

3	Harsh engagement
POSSIBLE CAUSE	● ATF ● Malfunction of powertrain control system ● Improper pressure ● Malfunction of control valve body ● Malfunction of oil filter and seal ● Malfunction of internal and external linkages ● Malfunction of joint shafts ● Malfunction of engine mounts ● Malfunction of forward clutch component (Forward only) ● Malfunction of reverse clutch component (Reverse only) ● Malfunction of low/reverse clutch component (Reverse only) ● Malfunction of direct clutch component (Reverse only)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**ATF** ● Are there any problems with the following? ● Level ● Condition (See 05-17A-22 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION [LA4A-EL])	Yes	Service as required
		No	Go to next step
2	**Powertrain control system** ● Are there any problems with the following? ● Electrical input/output ● Vehicle wiring harness ● PCM ● Electrical pressure control (EPC) solenoid ● Transaxle fluid temperature (TFT) sensor ● 3-2 timing/coasting clutch solenoid (3-2 T/CCS) (Harsh forward only) (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD test Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
3	**Improper pressure** ● Is line pressure higher than normal? (See 05-17A-16 Line Pressure Test)	Yes	Verify engagements at minimum EPC using the transaxle tester If line remains high, check the following components: control valve body, oil filter and seal component
		No	Go to next step

STEP	INSPECTION		ACTION
4	**Control valve body** • Do any of the following problems exist? • Bolts are not torqued to specification • Gaskets are damaged • Low/reverse accumulator piston and spring (Reverse), main regulator valve, coast clutch valve (Forward) are damaged, missing stuck, or misassembled • Accumulator piston and spring are misassembled, stuck, or damaged • EPC solenoid is stuck, or damaged	Yes	Service as required
		No	Go to next step
5	**Oil Filter and seal component** • Do any of the following problems exist? • Filter/seal is damaged or plugged • Recirculation seal is damaged, plugged, or out of position	Yes	Replace as required
		No	Go to next step
6	**Internal or external shift linkages** • Do any of the following problems exist? • Damage • Misadjustment (See 05-18-2 SELECTOR LEVER AND CABLE REMOVAL/INSTALLATION)	Yes	Service as required
		No	Go to next step
7	**Joint shafts** • Is there spline damage? (See 05-17A-34 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [LA4A-EL])	Yes	Service as required
		No	Go to next step
8	**Engine mounts** • Do any of the following problems exist? • Loose, broken, missing or misaligned parts • Powertrain is contacting with other vehicle components (See 05-17A-34 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [LA4A-EL])	Yes	Service as required
		No	Go to next step
9	**F/C/D clutch component (Forward only)** • Do any of the following problems exist? • Forward/coasting/direct (F/C/D) clutch cylinders are damaged • Piston bore is damaged • Friction elements are damaged or worn • Forward clutch return spring are damaged or missing • Check ball is damaged • Piston or seals are damaged	Yes	Service as required
		No	Go to next step
10	**Reverse clutch component (Reverse only)** • Do any of the following problems exist? • Seals or piston are damaged • Reverse piston is damaged • Friction elements are damaged, worn, or misassembled • Return spring component is damaged or worn • Ball check is damaged or missing	Yes	Service as required
		No	Go to next step
11	**Low/reverse clutch component (Reverse only)** • Do any of the following problems exist? • Seals or piston are damaged • Wave spring is damaged • Friction elements are damaged, worn, misassembled • Return spring component is damaged, worn, or misassembled • Piston bore is damaged	Yes	Service as required
		No	Go to next step
12	**Direct clutch component (Reverse only)** • Are any of the friction elements severely damaged?	Yes	Service as required
		No	The problem is fixed

NO.4 DELAYED/SOFT ENGAGEMENT [LA4A-EL]

Z6U050301030W39

4	Delayed/soft engagement
POSSIBLE CAUSE	• ATF • Improper pressure • Malfunction of internal or external shift linkages • Malfunction of control valve body • Malfunction of oil filter and seal component • Malfunction of oil pump • Malfunction of forward clutch component • Malfunction of reverse clutch component • Malfunction of low/reverse clutch component • Malfunction of forward/coasting/direct (F/C/D) clutch cylinder component

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**ATF** • Are there any problems with the following? • Level • Condition (See 05-17A-22 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION [LA4A-EL])	Yes	Service as required
		No	Go to next step
2	**Improper pressure** • Is line pressure lower than normal? (See 05-17A-16 Line Pressure Test)	Yes	Check the following components: control valve body, oil pump, oil filter and seal component, recirculating seal, clutch components
		No	Go to next step
3	**Internal or external shift linkages** • Do any of the following problems exist? • Damage • Misadjustment • Misassembly (See 05-18-2 SELECTOR LEVER AND CABLE REMOVAL/INSTALLATION)	Yes	Service as required
		No	The problem is fixed
4	**Control valve body** • Do any of the following problems exist? • Bolts are not torqued to specification • Gaskets are damaged • Manual valve, main regulator valve, or low/reverse modulator regulator valve is stuck, damaged, or misassembled • Separator plates are damaged • Pressure tap plate/gasket leaks, are damaged, or misassembled	Yes	Service as required
		No	Go to next step
5	**Oil filter and seal component** • Do any of the following problems exist? • Filter/seal is damaged, or plugged • Recirculating Seal is damaged or out of position	Yes	Service as required
		No	Go to next step
6	**Oil pump** • Do any of the following problems exist? • Bolts are not torqued to specification • Gaskets are damaged • Porosity/cross leaks/ball plug are missing or leaking, or passage blockage • Pump support seal rings, #3 and #4 (Forward), or #6 and #7 (Reverse), are damaged • Pump gear/pocket is damaged • Separator plate is damaged	Yes	Service as required
		No	Go to next step
7	**Forward clutch component (Forward only)** • Do any of the following problems exist? • Seals or piston are damaged • Ball check are damaged, missing, or not seating properly • Friction elements are damaged, worn, or there is excessive end clearance	Yes	Service as required
		No	Go to next step

STEP	INSPECTION		ACTION
8	**Reverse clutch component (Reverse only)** • Do any of the following problems exist? • Seals or piston are damaged • Check ball is damaged • Friction elements are damaged, worn • Return spring is worn or damaged • Piston bore is damaged • Excessive clutch pack end clearance	Yes	Service as required
		No	Go to next step
9	**Low/reverse clutch component (Reverse only)** • Do any of the following problems exist? • Piston or seals are damaged • Friction elements are damaged or worn • Return spring is damaged • Piston bore is damaged • Excessive clutch pack end clearance	Yes	Service as required
		No	Go to next step
10	**Forward/coasting/direct (F/C/D) clutch cylinder component** • Do any of the following problems exist? • Reverse Seal Ring is damaged or missing • Cylinder is damaged or leaking	Yes	Service as required
		No	Go to step 3

NO.5 NO FORWARD AND NO REVERSE ENGAGEMENTS (NO VEHICLE MOVEMENT) [LA4A-EL]

Z6U050301030W40

5	**No forward and no reverse engagements (no vehicle movement)**
POSSIBLE CAUSE	• ATF • Improper pressure • Malfunction of internal or external linkages • Malfunction of control valve body • Malfunction of oil filter and seal component • Malfunction of oil pump • Malfunction of drive plate • Malfunction of turbine shaft to forward/coasting/direct (F/C/D) clutch cylinder • Malfunction of torque converter • Malfunction of chain and sprocket component • Malfunction of park mechanism • Malfunction of joint shafts • Malfunction of final drive and differential component • Malfunction of planetary gearsets (Differential)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**ATF** • Are there any problems with the following? • Level • Condition (See 05-17A-22 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION [LA4A-EL])	Yes	Service as required
		No	Go to next step
2	**Improper pressures** • Do any of the following problems exist? • Low line pressure • No line pressure (See 05-17A-16 Line Pressure Test)	Yes	If pressure is low, check the following components: Control valve body, oil filter and seal component, oil pump Go to step 4 If okay, proceed to turbine shaft Check torque converter pump shaft and component Go to step 7
		No	Go to next step
3	**Internal or external shift linkages** • Do any of the following problems exist? • Damage • Misadjustment • Misassembly (See 05-18-2 SELECTOR LEVER AND CABLE REMOVAL/INSTALLATION)	Yes	Service as required
		No	Go to step 10

STEP	INSPECTION		ACTION
4	**Control valve body** ● Do any of the following problems exist? ● Bolts are not torqued to specification ● Gaskets are damaged ● Pressure plate/gasket are damaged, or missing ● Main regulator valve, manual valve are stuck, damaged, plugged, or missing, "Z" Link is not connected	Yes	Service as required
		No	Go to next step
5	**Oil filter and seal component** ● Do any of the following problems exist? ● Filter/seal is damaged, plugged, or missing ● Recirculating seal is damaged or out of position	Yes	Service as required
		No	Go to next step
6	**Oil pump** ● Do any of the following problems exist? ● Bolts are not torqued to specification ● Gasket is damaged, missing ● Porosity/cross leaks, or passage(s) are blocked ● Pump support seal rings are missing ● Oil pump shaft is broken or damaged	Yes	Service as required
		No	Go to step 3
7	**Drive plate** ● Do any of the following problems exist? ● Damaged ● Broken (See 05-17A-50 DRIVE PLATE REMOVAL/INSTALLATION [LA4A-EL])	Yes	Service as required
		No	Go to next step
8	**Turbine shaft to forward/coasting/direct clutch cylinder housing** ● Is there spline damaged?	Yes	Service as required
		No	Go to next step
9	**Torque converter component** ● Do any of the following problems exist? ● Oil pump shaft insert is damaged ● Studs are broken or damaged ● Splines are damaged ● Internal blades are damaged or broken	Yes	Service as required
		No	Go to step 3
10	**Chain and sprocket component** ● Do any of the following problems exist? ● Broken ● Damaged	Yes	Service as required
		No	Go to next step
11	**Park mechanism** ● Are any of the parking pawl return springs damaged, missing, or misassembled?	Yes	Service as required
		No	Go to next step
12	**Joint shaft** ● Do any of the following problems exist? ● Broken parts ● Splines damaged (See 05-17A-34 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [LA4A-EL])	Yes	Service as required
		No	Go to next step
13	**Final drive and differential component** ● Do any of the following problems exist? ● Splines are damaged ● Gearset is damaged	Yes	Service as required
		No	Go to next step
14	**Planetary gearsets (differential)** ● Are there any problems with the following? ● Gear Teeth ● Carriers ● Splines	Yes	Service as required
		No	The problem is fixed

NO.6 SOME OR ALL SHIFTS MISSING [LA4A-EL]

Z6U050301030W41

6	Some or all shifts missing
POSSIBLE CAUSE	• ATF • Malfunction of powertrain control system • Malfunction of internal and external shift linkages • Malfunction of speed input

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**ATF** • Is there improper level? (See 05-17A-23 ATF Level Inspection)	Yes	Adjust fluid to proper level
		No	Go to next step
2	**Powertrain control system** • Are there any problems with the following? • Electrical input/output • Vehicle wiring harness • PCM • Shift solenoids • Transaxle range (TR) switch • Throttle position (TP) sensor • Vehicle speedometer sensor (VSS) • O/D OFF switch (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD test Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
3	**Internal and external shift linkages** • Do any of the following problems exist? • Damage • Misadjustment • Misassembly (See 05-18-2 SELECTOR LEVER AND CABLE REMOVAL/INSTALLATION)	Yes	Service as required
		No	Go to next step
4	**Speed input** • Is the vehicle speedometer sensor drive gear damaged?	Yes	Service as required
		No	For further diagnosis, refer to the appropriate shift routine(s): Shift / No shift 1–2 / 13 2–3 / 14 3–4 / 15 W6U501WAE

NO.7 SHIFT CONCERN: TIMING—EARLY/LATE [LA4A-EL]

Z6U050301030W42

7	Shift concern: timing—early/late
POSSIBLE CAUSE	• Malfunction of powertrain control system • Malfunction of tire size • Malfunction of speed input

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** • Are there any problems with the following? • Electrical input/output • Vehicle wiring harness • PCM • Throttle position (TP) sensor • Vehicle speedometer sensor (VSS) • Transaxle fluid temperature (TFT) sensor (See 05-17A-16 Line Pressure Test)	Yes	Run OBD test Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step

STEP	INSPECTION		ACTION
2	**Possible components** ● Do any of the following problems exist? ● Tire size change ● Vehicle speedometer sensor drive gear is damaged	Yes	Service as required
		No	The problem is not in the automatic transaxle Go to engine symptom troubleshooting (See 01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS])

NO.8 SHIFT CONCERN: ERRATIC [LA4A-EL]

Z6U050301030W43

8	Shift concern: erratic
POSSIBLE CAUSE	● ATF ● Malfunction of powertrain control system ● Malfunction of vehicle speed input ● Malfunction of control valve body

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**ATF** ● Are there any problems with the following? ● Level ● Condition (See 05-17A-22 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION [LA4A-EL])	Yes	Service as required
		No	Go to next step
2	**Powertrain control system** ● Are there any problems with the following? ● Electrical input/output ● Vehicle wiring harness ● PCM ● Shift solenoid No.1 (SS1), Shift solenoid No.2 (SS2) ● Transaxle range (TR) switch ● Brake switch ● TCC solenoid ● Vehicle speedometer sensor (VSS) ● Throttle position (TP) sensor ● Turbine shaft speed (TSS) sensor ● Electrical pressure control (EPC) solenoid ● 3-2 timing/coasting clutch solenoid (3-2T/CCS) (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD tests Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
3	**Vehicle speed input** ● Is the vehicle speedometer sensor drive gear damaged?	Yes	Service as required
		No	Go to next step
4	**Control valve body** ● Do any of the following problems exist? ● Bolts are not torqued to specification ● Gaskets are damaged ● 3-2 timing valve, 2-4 accumulator valve, servo release shuttle valve, 3-2 control valve are stuck, damaged, or misassembled ● Solenoid screen is blocked ● Separator plates are damaged, blocked ● Pressure tap plate/gasket are damaged ● Shift solenoid No.1 (SS1), Shift solenoid No.2 (SS2), or 3-2 timing/coasting clutch solenoid (3-2T/CCS) are stuck or damaged	Yes	Service as required
		No	Refer to the appropriate shift for further diagnosis

Shift	No shift	Soft/slip	Harsh
1–2	13	16	22
2–3	14	17	23
3–4	15	18	24
4–3	—	19	25
3–2	—	20	26
2–1	—	21	—

W6U501WAF

NO.9 SHIFT CONCERN: FEEL—SOFT/SLIPPING [LA4A-EL]

Z6U050301030W44

9	Shift concern: feel— soft/slipping
POSSIBLE CAUSE	• ATF • Malfunction of powertrain control system • Malfunction of internal or external shift linkages • Improper pressure • Malfunction of control valve body • Malfunction of oil pump • Malfunction of oil filter and seal component

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**ATF** • Are there any problems with the following? • Level • Condition (See 05-17A-22 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION [LA4A-EL])	Yes	Service as required
		No	Go to next step
2	**Powertrain control system** • Are there any problems with the following? • Electrical input/output • Vehicle wiring harness • PCM • Electrical pressure control (EPC) solenoid • Transaxle fluid temperature (TFT) sensor • Throttle position (TP) sensor • Mass air flow (MAF) sensor (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD Tests, Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
3	**Internal or external shift linkages** • Do any of the following problems exist? • Damage • Misadjustment • Misassembly (See 05-18-2 SELECTOR LEVER AND CABLE REMOVAL/INSTALLATION)	Yes	Service as required
		No	Go to next step
4	**Improper pressure** • Is there low line pressure? (See 05-17A-16 Line Pressure Test)	Yes	Check the line pressure If pressures are low or all shifts are soft/slipping, go to step 6 If pressures are okay and a specific shift is soft/slipping, refer to the following chart:
		No	Go to next step
5	**Control valve body** • Do any of the following problems exist? • Bolts are not torqued to specification • Gaskets are damaged • Main regulator valve, line modulator valve are stuck, damaged, or misassembled, or springs are missing, tangled or damaged • Electrical pressure control (EPC) solenoid is stuck or damaged • Separator plates are damaged or blocked • Pressure tap plate/gasket are damaged, or missing	Yes	Service as required
		No	Go to next step

Shift	No shift
1–2	16
2–3	17
3–4	18
4–3	19
3–2	20
2–1	21

W6U501WAG

STEP	INSPECTION		ACTION
6	**Oil pump** • Do any of the following problems exist? • Bolts are not torqued to specification • Gaskets are damaged • Porosity/cross leaks	Yes	Service as required
		No	Go to next step
7	**Oil filter and seal component** • Do any of the following problems exist? • Filter/seal is damaged, plugged, or missing • Recirculating seal is damaged or out of position	Yes	Service as required
		No	The problem is not in the automatic transaxle Go to engine symptom troubleshooting (See 01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS])

NO.10 SHIFT CONCERN: FEEL—HARSH [LA4A-EL]

Z6U050301030W45

10	Shift concern: feel—harsh
POSSIBLE CAUSE	• ATF • Malfunction of powertrain control system • Malfunction of joint shafts • Malfunction of engine mounts • Malfunction of improper pressure • Malfunction of control valve body • Malfunction of torque converter component

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**ATF** • Are there any problems with the following? • Level • Condition (See 05-17A-22 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION [LA4A-EL])	Yes	Service as required
		No	Go to next step
2	**Powertrain control system** • Are there any problems with the following? • Electrical input/output • Vehicle wiring harness • PCM • Electrical pressure control (EPC) solenoid • Transaxle fluid temperature (TFT) sensor • Turbine shaft speed (TSS) sensor • Throttle position (TP) sensor • Vehicle speedometer sensor (VSS) • Mass air flow (MAF) sensor • TCC solenoid • Transaxle range (TR) switch • 3-2 timing/coasting clutch solenoid (3-2T/CCS) (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD Tests Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
3	**Joint shafts** • Do any of the following problems exist? • Damage • Loose parts • Splines damaged (See 05-17A-34 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [LA4A-EL])	Yes	Service as required
		No	Go to next step
4	**Engine mounts** • Do any of the following problems exist? • Damage • Loose parts • Missing (See 05-17A-34 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [LA4A-EL])	Yes	Service as required
		No	Go to next step

STEP	INSPECTION		ACTION
5	**Improper pressure** ● Is there high line pressure? (See 05-17A-16 Line Pressure Test)	Yes	Check the line pressure Service as required If pressures are okay and a specific shift is harsh, refer to the following chart: Shift / Harsh 1–2 / 22 2–3 / 23 3–4 / 24 4–3 / 25 3–2 / 26 2–1 / — W6U501WAH
		No	Go to next step
6	**Control valve body** ● Do any of the following problems exist? ● Bolts are not torqued to specification ● Gaskets are damaged ● Main regulator valve, by-pass valve, line modulator valve are stuck, damaged, or misassembled springs are tangled, missing, or damaged ● Electrical pressure control (EPC) solenoid is stuck or damaged ● Hydraulic passages are damaged ● Separator plate is damaged or blocked	Yes	Service as required
		No	Go to next step
7	**Torque converter component** ● TCC applied during shifts ● Do any of the following problems exist? ● Piston is damaged ● Pump support seal #1 (CBY) is leaking, missing or damaged ● Case leakage ● Converter component is damaged	Yes	Service as required If heat stained, replace converter
		No	The problem is not in the automatic transaxle Go to engine symptom troubleshooting (See 01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS])

NO.11 SHIFT CONCERNS: NO FIRST GEAR ENGAGES IN HIGHER GEAR (D RANGE) [LA4A-EL]

Z6U050301030W46

11	Shift concerns: no first gear engages in higher gear (D range)
POSSIBLE CAUSE	● Malfunction of powertrain control system ● Malfunction of internal or external shift linkage ● Malfunction of control valve body ● Malfunction of seals ● Malfunction of direct clutch ● Malfunction of 2/4 band and servo

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** ● Are there any problems with the following? ● Electrical input/output ● Vehicle wiring harness ● PCM ● Shift solenoid No.1 (SS1), Shift solenoid No.2 (SS2) ● Transaxle range (TR) switch ● O/D OFF switch (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD test Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step

STEP	INSPECTION		ACTION
2	**Internal or external shift linkages** ● Do any of the following problems exist? ● Damage ● Misadjustment ● Misassembly (See 05-18-2 SELECTOR LEVER AND CABLE REMOVAL/INSTALLATION)	Yes	Service as required After servicing linkage, verify that the TR switch is properly adjusted (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])
		No	Go to next step
3	**Control valve body** ● Do any of the following problems exist? ● Bolts are not torqued to specification ● Gaskets are damaged ● Solenoid regulator valve, shift valves are stuck, damaged, or misassembled ● Solenoid filter gasket is damaged, or misassembled ● Hydraulic passages are damaged ● SS1, SS2 solenoid malfunction	Yes	Service as required
		No	Go to next step
4	**Mechanical** ● Do any of the following problems exist? ● Seals, clutches are damaged or worn ● Direct clutch, 2/4 band, 2/4 servo are damaged, stuck on	Yes	Service as required
		No	Refer to the appropriate shift for further diagnosis Shift / No shift: 1–2 / 13; 2–3 / 14; 3–4 / 15 W6U501WAJ

NO.12 SHIFT CONCERNS: NO FIRST GEAR IN 1 RANGE (FIRST GEAR IN D RANGE) [LA4A-EL]

Z6U050301030W47

12	**Shift concerns: no first gear in 1 range (first gear in D range okay)**
POSSIBLE CAUSE	● Malfunction of powertrain control system ● Malfunction of internal or external shift linkages ● Malfunction of control valve body

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** ● Are there any problems with the following? ● Electrical input/output ● Vehicle wiring harness ● PCM ● Shift solenoid No.1 (SS1), Shift solenoid No.2 (SS2) ● Transaxle range (TR) switch (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD test Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
2	**Internal or external shift linkages** ● Do any of the following problems exist? ● Damage ● Misadjustment ● Misassembly (See 05-18-2 SELECTOR LEVER AND CABLE REMOVAL/INSTALLATION)	Yes	Service as required After servicing linkage, verify that the TR switch is properly adjusted (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])
		No	Go to next step
3	**Control valve body** ● Do any of the following problems exist? ● Bolts are not torqued to specification ● Gaskets are damaged ● Shift solenoid No.2 (SS2) is stuck "ON" ● Hydraulic passages are damaged ● Separator plates are damaged or blocked	Yes	Service as required
		No	The problem is not in the automatic transaxle Go to engine symptom troubleshooting (See 01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS])

NO.13 SHIFT CONCERNS: NO1–2 SHIFT [LA4A-EL]

Z6U050301030W48

13	Shift concerns: no 1–2 shift
POSSIBLE CAUSE	• Malfunction of powertrain control system • Improper pressure • Malfunction of control valve body • Malfunction of 2/4 band and servo • Malfunction of low OWC component • Malfunction of reverse/fourth gear (REV/4GR) sun gear and shell • Malfunction of transaxle case

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** • Do any of the following problems exist? • Electrical input/output • Vehicle wiring harness • PCM • Shift solenoid No.1 (SS1), Shift solenoid No.2 (SS2) • Transaxle range (TR) switch (See 05–17A–24 ELECTRICAL SYSTEM TEST [LA4A–EL])	Yes	Run OBD test Perform DTC troubleshooting (See 05–02A–6 AUTOMATIC TRANSAXLE ON–BOARD DIAGNOSTIC FUNCTION [LA4A–EL])
		No	Go to next step
2	**Improper pressure** • Do any of the following problems exist? • High line pressure • Low line pressure (See 05–17A–16 Line Pressure Test)	Yes	Go to next step
		No	Go to step 4
3	**Control valve body** • Do any of the following problems exist? • Bolts are not torqued to specification • Gaskets are damaged • 1–2 shift valve, 2/4 accumulator, main regulator valve are stuck, damaged, or misassembled • SS1, SS2 malfunction • Pressure tap plate/gasket are damaged • Separator plates are damaged • Hydraulic passages are damaged	Yes	Service as required
		No	Go to next step
4	**2/4 band and servo component** • Also no fourth gear • Do any of the following problems exist? • Seals are damaged or missing • Piston is damaged • Band is damaged or worn • Springs are damaged • Servo rod or rod bore is damaged	Yes	Service as required
		No	Go to next step
5	**Low OWC component** • Is there damage?	Yes	Service as required
		No	Go to next step
6	**Reverse/fourth gear sun gear and shell** • Do any of the following problems exist? • Damaged, or broken weld • Lugs are damaged	Yes	Service as required
		No	Go to next step
7	**Transaxle case** • Do any of the following problems exist? • Band anchor area is damaged • Porosity/leakage in servo apply, servo release circuits	Yes	Service or replace case as required
		No	The problem is not in the automatic transaxle Go to engine symptom troubleshooting (See 01–03A–5 SYMPTOM DIAGNOSTIC INDEX [FS])

NO.14 SHIFT CONCERNS: NO 2–3 SHIFT [LA4A-EL]

Z6U050301030W49

14	Shift concerns: no 2–3 shift
POSSIBLE CAUSE	• Malfunction of powertrain control system • Improper pressure • Malfunction of control valve body • Malfunction of oil pump • Malfunction of direct clutch component • Malfunction of 2/4 servo • Malfunction of transaxle case

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** • Do any of the following problems exist? • Electrical input/output • Vehicle wiring harness • PCM • Shift solenoid No.1 (SS1), Shift solenoid No.2 (SS2) • Transaxle range (TR) switch (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD test Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
2	**Improper pressure** • Do any of the following problems exist? • High line pressure • Low line pressure (See 05-17A-16 Line Pressure Test)	Yes	Go to next step
		No	Go to step 5
3	**Control valve body** • Do any of the following problems exist? • Bolts are not torqued to specification • Gasket leaks • 2-3 shift valve (also no fourth), main regulator valve are stuck, damaged, or misassembled • SS1, SS2 malfunction (also no fourth) • Separator plates are damaged • Pressure tap plate/gasket leaks • Hydraulic passages are damaged	Yes	Service as required
		No	Go to next step
4	**Oil pump** • Do any of the following problems exist? • Bolts are not torqued to specification • Gaskets are damaged • Porosity/cross leaks • Pump support seal rings, #4 and #5, are damaged	Yes	Service as required
		No	Go to next step
5	**Direct clutch component** • Do any of the following problems exist? • Seals or piston is damaged • Piston bore is damaged • Friction is severely damaged, worn • Ball check is not seating properly • Return spring component is damaged • Cylinder bore/splines is damaged • Shell/hub are damaged	Yes	Service as required
		No	Go to next step
6	**2/4 servo** • Do any of the following problems exist? • Piston or piston bore is damaged • Rod bore or rod is damaged or leaking	Yes	Service as required
		No	Go to next step
7	**Transaxle case** • Does the following problem exist? • Leakage in the servo apply, servo release or direct clutch circuits	Yes	Service or replace case as required
		No	The problem is not in the automatic transaxle Go to engine symptom troubleshooting (See 01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS])

NO.15 SHIFT CONCERNS: NO 3–4 SHIFT [LA4A-EL]

Z6U050301030W50

15	Shift concerns: no 3–4 shift
POSSIBLE CAUSE	• Malfunction of powertrain control system • Improper pressures • Malfunction of control valve body • Malfunction of 2/4 band and servo component • Malfunction of coasting clutch component • Malfunction of forward OWC component • Malfunction of transaxle case

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** • Do any of the following problems exist? • Electrical input/output • Vehicle wiring harness • PCM • Shift solenoid No.1 (SS1), Shift solenoid No.2 (SS2) • Transaxle range (TR) switch (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD test Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
2	**Improper pressure** • Do any of the following problems exist? • High line pressure • Low line pressure (See 05-17A-16 Line Pressure Test)	Yes	Go to next step
		No	Go to step 4
3	**Control valve body** • Do any of the following problems exist? • Bolts are not torqued to specification • Gasket leaks • 3-4 Shift Valve, main regulator valve are stuck, damaged, or misassembled • SS1, SS2 malfunction (Also no first gear) • Separator plates are damaged, or orifice is blocked	Yes	Service as required
		No	Go to next step
4	**2/4 band and servo component** • Also no second gear • Do any of the following problems exist? • 2/4 band is damaged or worn • Servo rod or rod bore is damaged • Servo piston or cover is damaged or leaking • Springs are damaged	Yes	Service as required
		No	Go to next step
5	**Coasting clutch component** • Do any of the following problems exist? • Seals are damaged or missing • Piston is damaged • Friction is severely damaged or worn • Check ball is severely damaged	Yes	Service as required
		No	Go to next step
6	**Forward OWC component** • Is there damage?	Yes	Service as required
		No	Go to next step
7	**Transaxle case** • Also no second gear • Do any of the following problems exist? • Band anchor is damaged • Leakage in the servo apply and servo release	Yes	Service as required
		No	Go to next step

NO.16 SHIFT CONCERNS: SOFT/SLIPPING 1–2 SHIFT [LA4A-EL]

Z6U050301030W51

16	Shift concerns: soft/slipping 1–2 shift
POSSIBLE CAUSE	• Malfunction of powertrain control system • Malfunction of control valve body • Malfunction of 2/4 band and servo component • Malfunction of forward OWC component • Malfunction of forward clutch component • Malfunction of low OWC component • Malfunction of low/reverse clutch component • Malfunction of transaxle case

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** • Are there any problems with the following? • Electrical input/output • Vehicle wiring harness • PCM • Electrical pressure control (EPC) solenoid • Transaxle fluid temperature (TFT) sensor (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD test Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
2	**Control valve body** • Do any of the following problems exist? • Bolts are not torqued to specification • Gaskets are damaged • 2/4 accumulator piston plug and seal (also soft 3-4 shift), main regulator valve, or line modulator valve (also soft 3-4 shift) are stuck, damaged, or misassembled • Hydraulic passages are damaged • Pressure tap plate/gasket is damaged • Separator plates are damaged	Yes	Service as required
		No	Go to next step
3	**2/4 band and servo component** • Do any of the following problems exist? • Piston seals or piston bore are damaged, or missing • Servo rod or rod bore is damaged • 2/4 band and/or reverse clutch drum component are worn, damaged, or misassembled • Springs are damaged • Servo cover and seal are damaged	Yes	Service as required
		No	Go to next step
4	**Forward OWC component (Slips in first gear)** • Is the forward OWC component damaged or not holding?	Yes	Service as required
		No	Go to next step
5	**Forward clutch component (Slip in first gear)** • Do any of the following problems exist? • Seals are damaged • Return spring is damaged • Friction elements are damaged • Pump support seals #3, #4 are damaged	Yes	Service as required
		No	Go to next step
6	**Low OWC component** • Is the low OWC component damaged or not overrunning?	Yes	Service as required
		No	Go to next step
7	**Low/reverse clutch component** • Is there severe friction damage?	Yes	Service as required
		No	Go to next step
8	**Transaxle case** • Do any of the following problems exist? • Band anchor is damaged • Porosity/leakage in servo apply/servo release circuits	Yes	Service as required
		No	The problem is not in the automatic transaxle Go to engine symptom troubleshooting (See 01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS])

NO.17 SHIFT CONCERNS: SOFT/SLIPPING 2–3 SHIFT [LA4A-EL]

Z6U050301030W52

17	Shift concerns: soft/slipping 2–3 shift
POSSIBLE CAUSE	• Malfunction of powertrain control system • Malfunction of control valve body • Malfunction of oil pump • Malfunction of direct clutch component • Malfunction of 2/4 servo • Malfunction of forward OWC component • Malfunction of transaxle case

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** • Are there any problems with the following? • Electrical input/output • Vehicle wiring harness • PCM • Electrical pressure control (EPC) solenoid • Transaxle fluid temperature (TFT) sensor (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD test Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
2	**Control valve body** • Do any of the following problems exist? • Bolts are not torqued to specification • Gasket leaks • Line modulator valve (also soft 1-2 and 3-4 shifts), servo release shuttle valve are stuck, damaged, or misassembled • Hydraulic passages are damaged • Separator plates are damaged • Pressure tap plate/gasket leaks	Yes	Service as required
		No	Go to next step
3	**Oil pump** • Do any of the following problems exist? • Bolts are not torqued to specification • Gaskets are damaged • Pump support seals #4 and #5 are damaged, or missing	Yes	Service as required
		No	Go to next step
4	**Direct clutch component** • Do any of the following problems exist? • Seals or piston are damaged • Piston bore is damaged • Friction is damaged, worn, or excessive end clearance • Check ball is not seating properly • Return spring component is damaged	Yes	Service as required
		No	Go to next step
5	**2/4 Servo** • Do any of the following problems exist? • Piston or piston bore is damaged • Servo rod or rod bore is damaged	Yes	Service as required
		No	Go to next step
6	**Forward OWC component** • Is the forward OWC component damaged or not holding?	Yes	Service as required
		No	Go to next step
7	**Transaxle case** • Do any of the following problems exist? • Leakage in the servo apply, servo release or direct clutch circuits	Yes	Service as required
		No	The problem is not in the automatic transaxle Go to engine symptom troubleshooting (See 01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS])

NO.18 SHIFT CONCERNS: SOFT/SLIPPING 3–4 SHIFT [LA4A-EL]

Z6U050301030W53

18	Shift concerns: soft/slipping 3–4 shift
POSSIBLE CAUSE	• Malfunction of powertrain control system • Malfunction of control valve body • Malfunction of 2/4 band and servo component • Malfunction of direct clutch component • Malfunction of transaxle case

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** • Are there any problems with the following? • Electrical input/output • Vehicle wiring harness • PCM • Electrical pressure control (EPC) solenoid • Transaxle fluid temperature (TFT) sensor (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD test Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
2	**Control valve body** • Do any of the following problems exist? • Bolts are not torqued to specification • Gasket leaks • Line modulator valve, 2/4 accumulator valve plug and seal (also soft 1–2 shift), are stuck, damaged, or misassembled • Pressure tap plate/gasket leaks • Hydraulic passages are damaged • Separator plates are damaged, or orifice is blocked	Yes	Service as required
		No	Go to next step
3	**2/4 band and servo component** • Do any of the following problems exist? • 2/4 Band and/or reverse clutch drum component are worn, damaged, or misassembled • Piston seals or piston bore is damaged or missing • Servo cover or seal is damaged • Servo rod or rod bore is damaged • Springs are damaged	Yes	Service as required
		No	Go to next step
4	**Direct clutch component** • May also have third gear slip • Do any of the following problems exist? • Seals are damaged or missing • Pistons are damaged • Check ball is damaged, missing, or leaking • Return spring is damaged • Friction elements are damaged	Yes	Service as required
		No	Go to next step
5	**Transaxle case** • Do any of the following problems exist? • Band anchor is damaged • Leakage in the servo apply and servo release	Yes	Service as required
		No	The problem is not in the automatic transaxle Go to engine symptom troubleshooting (See 01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS])

NO.19 SHIFT CONCERNS: SOFT/SLIPPING 4–3 SHIFT (AUTOMATIC) [LA4A-EL]

Z6U050301030W54

19	Shift concerns: soft/slipping 4–3 shift (automatic)
POSSIBLE CAUSE	• Malfunction of powertrain control system • Malfunction of control valve body • Malfunction of 2/4 band and servo component • Malfunction of direct clutch component • Malfunction of forward/coasting clutch component • Malfunction of transaxle case

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** • Are there any problems with the following? • Electrical input/output • Vehicle wiring harness • PCM • Electrical pressure control (EPC) solenoid • Vehicle speedometer sensor (VSS) • Mass air flow (MAF) sensor • Throttle position (TP) sensor (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD test Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
2	**Control valve body** • Do any of the following problems exist? • Bolts are not torqued to specification • Gasket leaks • Servo release shutter valve, main regulator valve are stuck, damaged, or misassembled • Hydraulic passages are damaged • Pressure tap plate/gasket leaks, or damaged • Separator plates are damaged or blocked	Yes	Service as required
		No	Go to next step
3	**2/4 band and servo component** • Do any of the following problems exist? • 2/4 band and/or reverse clutch drum component are damaged, worn, or misassembled • Servo return spring is broken • Servo rod is damaged • Piston seal is damaged	Yes	Service as required
		No	Go to next step
4	**Direct clutch component** • Do any of the following problems exist? • Seals are damaged or missing • Piston is damaged • Check ball is damaged, missing, or leaking • Return spring is damaged • Friction elements are damaged	Yes	Service as required
		No	Go to next step
5	**Forward/coasting clutch component** • Do any of the following problems exist? • Seals are damaged or missing • Piston is damaged • Friction elements are worn or damaged • Check ball is not functioning • Forward clutch piston and return spring are damaged	Yes	Service as required
		No	Go to next step
6	**Transaxle case** • Do any of the following problems exists? • Porosity/cross leaks in servo apply, servo release, direct clutch circuits	Yes	Service as required
		No	The problem is not in the automatic transaxle Go to engine symptom troubleshooting (See 01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS])

NO.20 SHIFT CONCERNS: SOFT/SLIPPING 3–2 SHIFT (AUTOMATIC) [LA4A-EL]

Z6U050301030W55

20	Shift concerns: soft/slipping 3–2 shift (automatic)
POSSIBLE CAUSE	• Malfunction of powertrain control system • Malfunction of control valve body • Malfunction of oil pump • Malfunction of 2/4 band and servo component • Malfunction of direct clutch component • Malfunction of transaxle case

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** • Are there any problems with the following? • Electrical input/output • Vehicle wiring harness • PCM • Electrical pressure control (EPC) solenoid • Throttle position (TP) sensor • Vehicle speedometer sensor (VSS) • MAF • 3–2 timing/coasting clutch solenoid (3–2T/CCS) (See 05–17A–24 ELECTRICAL SYSTEM TEST [LA4A–EL])	Yes	Run OBD test Perform DTC troubleshooting (See 05–02A–6 AUTOMATIC TRANSAXLE ON–BOARD DIAGNOSTIC FUNCTION [LA4A–EL])
		No	Go to next step
2	**Control valve body** • Do any of the following problems exist? • Bolts are not torqued to specification • Gasket is damaged • 3–2 Timing valve, solenoid regulator valve, 3–2 control valve are stuck, damaged, or misassembled • 3–2T/CCS solenoid malfunction • Pressure tap plate/gasket leaks or is damaged • Separator plates are damaged or blocked	Yes	Service as required
		No	Go to next step
3	**Oil pump** • Do any of the following problems exist? • Bolts are not torqued to specification • Gaskets are damaged • Porosity/cross leaks • Pump support seal Rings #4, 5, 6 are damaged or misassembled • Forward to direct passage leaks	Yes	Service as required
		No	Go to next step
4	**2/4 band and servo component** • Do any of the following problems exist? • 2/4 band and/or reverse clutch drum component are damaged, worn, or misassembled • Servo piston are damaged • Servo return and cushion springs are damaged, or misassembled • Springs are damaged or misassembled • Servo rod is bent or damaged	Yes	Service as required
		No	Go to next step
5	**Direct clutch component** • Do any of the following problems exist? • Return spring is damaged or broken • Friction elements is damaged or worn • Check ball is not releasing • Piston or seal is damaged	Yes	Service as required
		No	Go to next step
6	**Transaxle case** • Do any of the following problems exist? • Band anchor is damaged • Leakage in the servo apply/release circuits • Case bore is damaged (Servo Rod)	Yes	Service as required
		No	The problem is not in the automatic transaxle Go to engine symptom troubleshooting (See 01–03A–5 SYMPTOM DIAGNOSTIC INDEX [FS])

NO.21 SHIFT CONCERNS: SOFT/SLIPPING 2–1 SHIFT (AUTOMATIC OR KICKDOWN) [LA4A-EL]

Z6U050301030W56

21	Shift concerns: soft/slipping 2–1 shift (automatic or kickdown)
POSSIBLE CAUSE	• Malfunction of powertrain control system • Malfunction of oil pump • Malfunction of 2/4 band and servo component • Malfunction of forward clutch component • Malfunction of low one-way clutch (OWC) component

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** • Are there any problems with the following? • Electrical input/output • Vehicle wiring harness • PCM • Electrical pressure control (EPC) solenoid • Transaxle fluid temperature (TFT) sensor • Throttle position (TP) sensor • Mass air flow (MAF) sensor (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD test Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
2	**Oil pump** • Do any of the following problems exist? • Gaskets are damaged • Porosity/cross leaks • Pump support seals #3 and 4 are leaking, misassembled, or damaged	Yes	Service as required
		No	Go to next step
3	**2/4 band and servo component** • Do either of the following problems exist? • Piston is damaged • Return spring is damaged	Yes	Service as required
		No	Go to next step
4	**Forward clutch component** • Do either of the following problems exist? • Piston or seals are damaged • Friction elements are damaged	Yes	Service as required
		No	Go to next step
5	**Low OWC component** • Is the low OWC damaged or not holding?	Yes	Service as required
		No	The problem is not in the automatic transaxle Go to engine symptom troubleshooting (See 01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS])

NO.22 SHIFT CONCERNS: HARSH 1–2 SHIFT [LA4A-EL]

Z6U050301030W57

22	Shift concerns: harsh 1–2 shift
POSSIBLE CAUSE	• Malfunction of powertrain control system • Malfunction of control valve body • Malfunction of oil pump • Malfunction of 2/4 band and servo component • Malfunction of forward clutch component • Malfunction of transaxle case

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** ● Are there any problems with the following? ● Electrical input/output ● Vehicle wiring harness ● PCM ● Electrical pressure control (EPC) solenoid ● Transaxle fluid temperature (TFT) sensor ● Turbine shaft speed (TSS) sensor ● Throttle position (TP) sensor ● Vehicle speedometer sensor (VSS) ● Mass air flow (MAF) sensor ● TCC ● Transaxle range (TR) switch (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD test Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
2	**Control valve body** ● Do any of the following problems exist? ● Bolts are not torqued to specification ● Gasket leaks ● 2/4 accumulator valve, 3-2 control valve (also harsh 3-4 shift) are stuck, damaged, or misassembled ● Separator plates are damaged ● Hydraulic passages are damaged	Yes	Service as required
		No	Go to next step
3	**Oil pump** ● Do any of the following problems exist? ● Bolts are not torqued to specification ● Gaskets are damaged ● Pump support seal rings #3 and #4 are damaged ● Porosity/cross leaks	Yes	Service as required
		No	Go to next step
4	**2/4 band and servo component** ● Do any of the following problems exist? ● Cushion return springs are damaged ● Band is damaged, worn ● 2/4 band and/or reverse clutch drum component are worn, damaged, or misassembled	Yes	Service as required
		No	Go to next step
5	**Forward clutch component** ● Do any of the following problems exist? ● Seals are damaged ● Return spring is damaged ● Friction elements are damaged	Yes	Service as required
		No	Go to next step
6	**Transaxle case** ● Is the band anchor area damaged?	Yes	Service as required
		No	The problem is not in the automatic transaxle Go to engine symptom troubleshooting (See 01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS])

NO.23 SHIFT CONCERNS: HARSH 2-3 SHIFT [LA4A-EL]

Z6U050301030W58

23	Shift concerns: harsh 2-3 shift
POSSIBLE CAUSE	● Malfunction of powertrain control system ● Malfunction of control valve body ● Malfunction of oil pump ● Malfunction of direct clutch component ● Malfunction of 2/4 servo ● Malfunction of transaxle case

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** ● Are there any problems with the following? ● Electrical input/output ● Vehicle wiring harness ● PCM ● Electrical pressure control (EPC) solenoid ● Transaxle range (TR) switch ● Vehicle speedometer sensor (VSS) ● Transaxle fluid temperature (TFT) sensor ● Mass air flow (MAF) sensor ● TCC solenoid ● Turbine shaft speed (TSS) sensor (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD test Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
2	**Control valve body** ● Do any of following problems exist? ● Bolts are not torqued to specification ● Gasket leaks ● Line modulator valve (also 1-2 and 3-4 harsh shift), servo release shuttle valve are stuck, damaged, or misassembled ● Separator plates are damaged ● Hydraulic passages are damaged	Yes	Service as required
		No	Go to next step
3	**Oil pump** ● Do any of the following problems exist? ● Bolts are not torqued to specification ● Gasket is damaged ● Porosity/cross leaks ● Pump support seal rings #4 and #5 are damaged	Yes	Service as required
		No	Go to next step
4	**Direct clutch component** ● Do any of the following problems exist? ● Piston or piston bore is damaged ● Friction elements are damaged or worn ● Check ball is not seating properly ● Return spring component is damaged ● Forward/coasting/direct (F/C/D) clutch cylinder splines are damaged	Yes	Service as required
		No	Go to next step
5	**2/4 Band Servo** ● Do either of the following problems exist? ● Piston or piston bore is damaged ● Servo rod is damaged	Yes	Service as required
		No	Go to next step
6	**Transaxle Case** ● Do either of the following problems exist? ● Leakage in the servo apply, servo release, or direct clutch circuits ● Servo rod bore is damaged	Yes	Service as required
		No	The problem is not in the automatic transaxle Go to engine symptom troubleshooting (See 01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS])

NO.24 SHIFT CONCERNS: HARSH 3–4 SHIFT [LA4A-EL]

Z6U050301030W59

24	Shift concerns: harsh 3–4 shift
POSSIBLE CAUSE	● Malfunction of powertrain control system ● Malfunction of control valve body ● Malfunction of oil pump ● Malfunction of 2/4 band and servo component ● Malfunction of coasting clutch component ● Malfunction of direct clutch component ● Malfunction of transaxle case

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** ● Are there any problems with the following? ● Electrical input/output ● Vehicle wiring harness ● PCM ● Electrical pressure control (EPC) solenoid ● Transaxle range (TR) switch ● Vehicle speedometer sensor (VSS) ● 3–2 timing/coasting clutch solenoid (3–2T/CCS) ● Transaxle fluid temperature (TFT) sensor ● Turbine shaft speed (TSS) sensor ● Throttle position (TP) sensor ● Mass air flow (MAF) sensor ● TCC solenoid (See 05–17A–24 ELECTRICAL SYSTEM TEST [LA4A–EL])	Yes	Run OBD test Perform DTC troubleshooting (See 05–02A–6 AUTOMATIC TRANSAXLE ON–BOARD DIAGNOSTIC FUNCTION [LA4A–EL])
		No	Go to next step
2	**Control valve body** ● Do any of the following problems exist? ● Bolts are not torqued to specification ● Gasket leaks ● Line modulator valve (also harsh 1–2 and 2–3 shifts), 3–2 control valve, 2/4 accumulator valve, coasting clutch valve are stuck, damaged, or misassembled ● Hydraulic passages are damaged ● Separator plates are damaged or blocked	Yes	Service as required
		No	Go to next step
3	**Oil pump** ● Do any of the following problems exist? ● Bolts are not torqued to specification ● Gasket is damaged ● Porosity/cross leaks ● Coasting clutch Teflon seals are damaged	Yes	Service as required
		No	Go to next step
4	**2/4 band and servo component** ● Do any of the following problems exist? ● 2/4 band and/or reverse clutch drum component are damaged, worn, or misassembled ● Servo piston or cover is damaged or leaking ● Springs are damaged	Yes	Service as required
		No	Go to next step
5	**Coasting clutch component** ● Do any of the following problems exist? ● Piston or seals are damaged or missing ● Friction is damaged or worn ● Check ball is not functioning	Yes	Service as required
		No	Go to next step
6	**Direct clutch component** ● Do any of the following problems exist? ● Piston or seals are damaged or missing ● Check ball is damaged, missing, or leaking ● Return spring is damaged ● Friction elements are damaged ● F/C/D clutch cylinder splines are damaged	Yes	Service as required
		No	Go to next step
7	**Transaxle Case** ● Is the band anchor damaged?	Yes	Service as required
		No	The problem is not in the automatic transaxle Go to engine symptom troubleshooting (See 01–03A–5 SYMPTOM DIAGNOSTIC INDEX [FS])

NO.25 SHIFT CONCERNS: HARSH 4–3 SHIFT (AUTOMATIC) [LA4A-EL]

Z6U050301030W60

25	Shift concerns: harsh 4–3 shift (automatic)
POSSIBLE CAUSE	• Malfunction of powertrain control system • Malfunction of control valve body • Malfunction of oil pump • Malfunction of 2/4 band and servo component • Malfunction of coasting clutch component • Malfunction of transaxle case

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** • Are there any problems with the following? • Electrical input/output • Vehicle wiring harness • PCM • Electrical pressure control (EPC) solenoid • Transaxle range (TR) switch • Vehicle speedometer sensor (VSS) • Throttle position (TP) sensor • Transaxle fluid temperature (TFT) sensor • Mass air flow (MAF) sensor • Turbine shaft speed (TSS) sensor • 3-2 timing/coasting clutch solenoid (3-2T/CCS) • TCC solenoid (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD test Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
2	**Control valve body** • Do any of the following problems exist? • Bolts are not torqued to specification • Gasket leaks • Servo release shutter valve, 3-2 timing/coast clutch valve are stuck, damaged, or misassembled • Hydraulic passages are damaged • Separator plates are damaged or blocked	Yes	Service as required
		No	Go to next step
3	**Oil pump** • Do any of the following problems exist? • Bolts are not torqued to specification • Porosity/cross leaks, seal rings are damaged, missing or ball plug is leaking • Gasket damaged • Pump support seal rings #2, 3, 4, and #5 (coast and direct circuits) are damaged	Yes	Service as required
		No	Go to next step
4	**2/4 band and servo component** • Do either of the following problems exist? • Servo rod is bent or damaged • Servo return spring is broken	Yes	Service as required
		No	Go to next step
5	**Coasting clutch component** • Do any of the following problems exist? • Seals are damaged or missing • Piston is damaged • Friction elements are worn, or damaged • Check ball is not functioning • Forward clutch piston and return spring are damaged	Yes	Service as required
		No	Go to next step
6	**Transaxle Case** • Does the following problem exist? • Porosity/cross leaks in servo apply, servo release, direct clutch, coasting clutch circuits	Yes	Service as required
		No	The problem is not in the automatic transaxle Go to engine symptom troubleshooting (See 01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS])

NO.26 SHIFT CONCERNS: HARSH 3–2 SHIFT(AUTOMATIC) [LA4A-EL]

Z6U050301030W61

26	Shift concerns: harsh 3–2 shift (automatic)
POSSIBLE CAUSE	• Malfunction of powertrain control system • Malfunction of control valve body • Malfunction of oil pump • Malfunction of direct clutch component • Malfunction of 2/4 band and servo component • Malfunction of transaxle case

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** • Are there any problems with the following? • Electrical input/output • Vehicle wiring harness • PCM • Electrical pressure control (EPC) solenoid • Transaxle range (TR) switch • Vehicle speedometer sensor (VSS) • 3–2 timing/coasting clutch solenoid (3–2T/CCS) • Transaxle fluid temperature (TFT) sensor • Mass air flow (MAF) sensor • Throttle position (TP) sensor • Turbine shaft speed (TSS) sensor • TCC solenoid (See 05–17A–24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD test Perform DTC troubleshooting (See 05–02A–6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
2	**Control valve body** • Do any of the following problems exist? • Bolts are not torqued to specification • Gasket is damaged • 3–2 timing valve, solenoid regulator valve, 3–2 control valve are stuck, damaged, or misassembled • Hydraulic passages are damaged • Separator plates are damaged or blocked • 3–2T/CCS solenoid malfunction	Yes	Service as required
		No	Go to next step
3	**Oil pump** • Do any of the following problems exist? • Bolts are not torqued to specification • Gaskets are damaged • Porosity/cross leaks • Pump support seal rings are damaged or misassembled	Yes	Service as required
		No	Go to next step
4	**Direct clutch component** • Do any of the following problems exist? • Return springs are damaged or broken • Friction elements are damaged or worn • Check ball is not exhausting • Servo rod is bent or damaged	Yes	Service as required
		No	Go to next step
5	**2/4 band and servo component** • Do any of the following problems exist? • 2/4 band and/or reverse clutch drum component are damaged, worn, or misassembled • Servo piston is damaged • Servo return and cushion springs are damaged or misassembled • Springs are damaged or misassembled	Yes	Service as required
		No	Go to next step
6	**Transaxle case** • Do any of the following problems exist? • Band anchor is damaged • Leaks • Servo rod bore is damaged	Yes	Service as required
		No	The problem is not in the automatic transaxle Go to engine symptom troubleshooting (See 01–03A–5 SYMPTOM DIAGNOSTIC INDEX [FS])

NO.27 TORQUE CONVERTER CLUTCH: DOES NOT APPLY [LA4A-EL]

Z6U050301030W62

27	Torque converter clutch: does not apply
POSSIBLE CAUSE	• Malfunction of powertrain control system • Malfunction of control valve body • Malfunction of torque converter component

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** • Are there any problems with the following? • Electrical input/output • Vehicle wiring harness • PCM • Transaxle fluid temperature (TFT) sensor • TCC solenoid • Brake switch • Turbine shaft speed (TSS) sensor (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD test Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
2	**Control valve body** • Do any of the following problems exist? • Bolts are not torqued to specification • Gaskets are damaged • Solenoid pressure regulator valve, bypass clutch control valve and plunger, converter regulator valve are stuck, damaged, or misassembled • TCC solenoid is malfunctioning or stuck • Hydraulic passages are damaged • Separator plates are damaged or blocked	Yes	Service as required
		No	Go to next step
3	**Torque converter component** • Do either of the following problems exist? • Leakage • Internal damage	Yes	Perform torque converter test (See 05-17A-19 Torque Converter Clutch Operation Test)
		No	Replace the torque converter component

NO.28 TORQUE CONVERTER CLUTCH: ALWAYS APPLIED/MAY STALL ENGINE [LA4A-EL]

Z6U050301030W63

28	Torque converter clutch: Always applied/may stall engine
POSSIBLE CAUSE	• Malfunction of powertrain control system • Malfunction of control valve body • Malfunction of oil pump • Malfunction of torque converter component • Malfunction of transaxle case

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** • Are there any problems with the following? • Electrical input/output • Vehicle wiring harness • PCM • Transaxle fluid temperature (TFT) sensor • TCC solenoid (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD test Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step

STEP	INSPECTION		ACTION
2	**Control valve body** ● Do any of the following problems exist? ● Bolts are not torqued to specification ● Gaskets are damaged ● Bypass clutch control valve and plunger (always applied), converter regulator valve are stuck, damaged, or misassembled ● Separator plates are damaged or blocked ● Converter is not applied in first gear or reverse gear ● TCC solenoid malfunction ● Pressure tap plate/gasket are damaged ● Hydraulic Passages are damaged	Yes	Service as required
		No	Go to next step
3	**Oil pump** ● Do any of the following problems exist? ● Bolts are not torqued to specification ● Gaskets are damaged ● Pump support seal ring #1 is damaged, missing, misassembled	Yes	Service as required
		No	Go to next step
4	**Torque converter component** ● Do either of the following problems exist? ● Internal seals are damaged ● Piston plate is damaged or stuck to cover	Yes	Service as required
		No	Go to next step
5	**Transaxle case** ● Does the following problem exist? ● Porosity/cross leaks in CBY circuit	Yes	Service as required
		No	The problem is fixed

NO.29 POOR VEHICLE ACCELERATION/PERFORMANCE [LA4A-EL]

Z6U050301030W64

29	Poor vehicle acceleration/performance
POSSIBLE CAUSE	● Malfunction of powertrain control system ● Malfunction of internal and external shift linkages ● Malfunction of torque converter clutch ● Malfunction of converter OWC

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** ● Are there any problems with the following? ● Engine ● Electrical input/output ● Vehicle wiring harness ● PCM ● Transaxle fluid temperature (TFT) sensor ● Throttle position (TP) sensor ● O/D OFF switch (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD test If the problem is engine related, go to engine symptom troubleshooting (See 01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS]) If the problem is not engine related, perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
2	**Internal and external shift linkages** ● Do any of the following problems exist? ● Damaged ● Misadjusted ● Misassembled (See 05-18-2 SELECTOR LEVER AND CABLE REMOVAL/INSTALLATION)	Yes	Service as required
		No	Go to next step
3	**Torque converter clutch** ● Is the torque converter clutch always applied?	Yes	Perform Symptom Troubleshooting No.28 (See 05-03A-7 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [LA4A-EL])
		No	Go to next step

STEP	INSPECTION		ACTION
4	**Converter one-way clutch (OWC)** • Is the converter OWC damaged?	Yes	Service as required
		No	Perform road test and verify proper shift schedule and engagements Service as required (See 05-17A-19 ROAD TEST [LA4A-EL])

NO.30 ENGINE WILL NOT CRANK [LA4A-EL]

Z6U050301030W65

30	Engine will not crank
POSSIBLE CAUSE	• Malfunction of powertrain control system • Malfunction of internal or external shift linkages • Malfunction of transaxle range (TR) switch

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** • Are there any problems with the following? • Engine • Electrical input/output • Vehicle wiring harness • PCM • Transaxle range (TR) switch (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD test If the problem is engine related, go to engine symptom troubleshooting (See 01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS]) If the problem is not engine related, perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
2	**Internal and external shift linkages or TR switch** • Do any of the following problems exist? • Damaged • Misadjusted • Misassembled (See 05-18-2 SELECTOR LEVER AND CABLE REMOVAL/INSTALLATION) (See 05-17A-34 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [LA4A-EL])	Yes	Service as required
		No	Go to next step
3	**Starter/drive plate** • Do either of the following problems exist? • Damaged • Misassembled (See 01-19-3 STARTER INSPECTION) (See 05-17A-50 DRIVE PLATE REMOVAL/INSTALLATION [LA4A-EL])	Yes	Service as required
		No	The problem is fixed

NO.31 NO P POSITION [LA4A-EL]

Z6U050301030W66

31	No P position
POSSIBLE CAUSE	• Malfunction of internal or external shift linkages • Malfunction of park mechanism

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Internal or external shift linkages** • Does the following problem exist? • Damaged • Misadjusted • Misassembled (See 05-18-2 SELECTOR LEVER AND CABLE REMOVAL/INSTALLATION)	Yes	Service as required
		No	Go to next step

STEP	INSPECTION		ACTION
2	**Park mechanism** ● Do any of following problems exist? ● Park gear on driven sprocket component, parking pawl return spring, park pawl ratcheting springs, park pawl shaft ● Manual lever, cam apply lever ● Manual lever detent spring ● TR switch, parking pawl apply cam ● Manual shaft nut is damaged ● Missing or misassembled	Yes	Service as required
		No	The problem is fixed

NO.32 TRANSAXLE OVERHEATING [LA4A-EL]

Z6U050301030W67

32	Transaxle overheating
POSSIBLE CAUSE	● ATF ● Malfunction of powertrain control system ● Malfunction of oil cooler ● Malfunction of control valve body ● Malfunction of torque converter clutch ● Malfunction of oil pump ● Malfunction of chain pan ● Malfunction of thermostatic oil level control valve ● Malfunction of transaxle case/converter housing/starter support

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**ATF** ● Are there any problems with the following? ● Level ● Condition (See 05-17A-22 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION [LA4A-EL])	Yes	Service as required
		No	Go to next step
2	**Powertrain control system** ● Are there any problems with the following? ● Electrical input/output ● Vehicle wiring harness ● PCM ● TCC solenoid ● Transaxle fluid temperature (TFT) sensor ● Turbine shaft speed (TSS) sensor (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD Tests Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
3	**Oil cooler** ● Do any of the following problems exist? ● Damaged ● Blocked ● Reversed ● Restricted ● Leaking ● Misassembled (See 05-17A-48 OIL COOLER REMOVAL/INSTALLATION [LA4A-EL])	Yes	Service as required
		No	Go to next step
4	**Control valve body** ● Do any of the following problems exist? ● Bolts are not torqued to specification ● Main regulator valve, bypass clutch control valve, converter regulator valve are stuck, damaged, or misassembled ● Hydraulic passages are damaged ● Separator plates/gaskets are damaged ● TCC solenoid malfunction (OFF)	Yes	Service as required
		No	Go to next step
5	**Torque converter clutch** ● Does the torque converter clutch apply?	Yes	Go to next step
		No	Perform symptom troubleshooting No.27 (See 05-03A-7 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [LA4A-EL])

STEP	INSPECTION		ACTION
6	**Oil pump** • Does either of the following problems exist? • Gasket is damaged • Rear lube passage is blocked	Yes	Service as required
		No	Go to next step
7	**Chain pan** • Is it missing?	Yes	Install the chain pan
		No	Go to next step
8	**Thermostatic oil level control valve** • Do any of the following problems exist? • Stuck open or damaged • Gasket is damaged or missing • Bolt or bracket is damaged missing, or improperly installed	Yes	Service as required
		No	Go to next step
9	**Transaxle case/converter housing/starter support** • Do either of the following problems exist? • Front lube passage is blocked or restricted • TC, CI, CT passages are blocked or restricted	Yes	Service as required
		No	The problem is not in the automatic transaxle Check cooling system

NO.33 NO ENGINE BRAKING IN FIRST GEAR (1 RANGE) [LA4A-EL]

Z6U050301030W68

33	No engine braking in first gear (1 range)
POSSIBLE CAUSE	• Malfunction of powertrain control system • Malfunction of control valve body • Malfunction of oil pump • Malfunction of coasting clutch component • Malfunction of low/reverse clutch component

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** • Are there any problems with the following? • Electrical input/output • Vehicle wiring harness • PCM • 3-2 timing/coasting clutch solenoid (3-2T/CCS) (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD test Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
2	**Control Valve Body** • Do any of the following problems exist? • Bolts are not torqued to specification • Gaskets are damaged • Low/reverse modulator valve, coasting clutch valve are stuck damaged, or misassembled • 3-2T/CCS is stuck or damaged • Hydraulic passages are damaged • Pressure tap plate/gasket is damaged • Separator plate/gasket is damaged	Yes	Service as required
		No	Go to next step
3	**Oil pump** • Does the following problem exist? • Pump support seal rings #2 and #3 for the coast clutch circuit are damaged or missing	Yes	Service as required
		No	Go to next step
4	**Coasting clutch component** • Do any of the following problems exist? • Component misassembled or damaged • Forward clutch hub seal is damaged • Piston or seals are damaged • Check ball is damaged or missing	Yes	Service as required
		No	Go to next step

STEP	INSPECTION		ACTION
5	**Low/reverse clutch component** ● Do any of the following problems exist? ● Misassembled ● Damaged ● Piston or seals are damaged	Yes	Service as required
		No	The problem is fixed

NO.34 NO ENGINE BRAKING IN 2 RANGE [LA4A-EL]

Z6U050301030W69

34	**No engine braking in 2 range**
POSSIBLE CAUSE	● Malfunction of powertrain control system ● Malfunction of internal or external shift linkages ● Malfunction of control valve body ● Malfunction of oil pump ● Malfunction of forward one-way clutch (OWC) component ● Malfunction of coasting clutch component

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Powertrain control system** ● Are there any problems with the following? ● Electrical inputs/outputs ● Vehicle wiring harness ● PCM ● 3-2T/CCS (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL])	Yes	Run OBD tests Perform DTC troubleshooting (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL])
		No	Go to next step
2	**Internal or external shift linkages** ● Do any of the following problems exist? ● Damaged ● Misadjusted ● Misassembled (See 05-18-2 SELECTOR LEVER AND CABLE REMOVAL/INSTALLATION)	Yes	Service as required
		No	Go to next step
3	**Control valve body** ● Do either of the following problems exist? ● 3-4 Shift valve, 1-2 shift valve, or coasting clutch control valve are stuck or damaged ● 3-2 timing/coasting clutch solenoid (3-2T/CCS) is stuck or damaged	Yes	Service as required
		No	Go to next step
4	**Oil Pump** ● Does the following problem exist? ● Pump support seal rings #2 and #3 for the coasting clutch circuit are damaged or missing	Yes	Service as required
		No	Go to next step
5	**Forward OWC component** ● Do either of the following problems exist? ● Damaged ● Misassembled	Yes	Service as required
		No	Go to next step
6	**Coasting clutch component** ● Do any of the following problems exist? ● Assembly misassembled, damaged ● Forward clutch hub seal is damaged ● Piston or seals are damaged ● Check ball is damaged or missing	Yes	Service as required
		No	The problem is not in the automatic transaxle Go to engine symptom troubleshooting (See 01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS])

NO.35 VEHICLE MOVEMENT WITH GEAR SELECTOR IN N POSITION [LA4A-EL]

Z6U050301030W70

35	Vehicle movement with gear selector in N position
POSSIBLE CAUSE	• Malfunction of internal or external shift linkages • Malfunction of oil pump • Malfunction of forward/coasting clutch component

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Internal or external shift linkages** • Do any of the following problems exist? • Damaged • Misadjusted • Misassembled (See 05-18-2 SELECTOR LEVER AND CABLE REMOVAL/INSTALLATION)	Yes	Service as required
		No	Go to next step
2	**Oil pump** • Do either of the following problems exist? • Gaskets are severely damaged • Pump support seal ring #2 is damaged, leakage from lube circuit into FC circuit	Yes	Service as required
		No	Go to next step
3	**Forward/coasting clutch component** • Do any of the following problems exist? • Friction plates are severely damaged • Return spring is damaged • Check ball is damaged or missing	Yes	Service as required
		No	The problem is fixed

NO.36 SHIFT EFFORTS HIGH [LA4A-EL]

Z6U050301030W71

36	Shift efforts high
POSSIBLE CAUSE	• Malfunction of shift interlock • Malfunction of internal or external shift linkage • Malfunction of transaxle case • Malfunction of control valve body

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Shift Interlock** • Is there any problem? (See 05-18-2 SELECTOR LEVER AND CABLE REMOVAL/INSTALLATION)	Yes	Service as required
		No	Go to next step
2	**Internal or external shift linkages** • Do any of the following problems exist? • Damaged • Misadjusted • Misassembled (See 05-18-2 SELECTOR LEVER AND CABLE REMOVAL/INSTALLATION)	Yes	Service as required
		No	Go to next step
3	**Transaxle case** • Do any of the following problems exist? • Manual lever is damaged • Park mechanism is damaged • Shaft is bent • Detent lever shaft bore (in case) is damaged • Detent spring is bent or damaged • Nut is loose	Yes	Service as required
		No	Go to next step
4	**Control valve body** • Do either of the following problems exist? • Bolts are not torqued to specification • Manual valve is stuck or damaged	Yes	Service as required
		No	The problem is fixed

NO.37 EXTERNAL LEAKS [LA4A-EL]

Z6U050301030W72

37	External leaks
POSSIBLE CAUSE	• ATF

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**ATF** • Is ATF level improper? (See 05-17A-22 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION [LA4A-EL])	Yes	Service as required
		No	Go to next step
2	**Seals/gaskets** Differential seal, speedometer seal, pump, main control cover, servo cover, split frange converter impeller hub, manual shift seal **Others** • Cooler fitting, pressure tap plug, line pressure plug, case porosity, case are cracked • Vent is blocked or damaged **Connectors/sensors** • Transaxle connector, Transaxle range (TR) switch, Turbine shaft speed (TSS) sensor seal		Locate source of leak Service as required

NO.38 NOISE/VIBRATION—FORWARD/REVERSE [LA4A-EL]

Z6U050301030W73

38	Noise/vibration—forward/reverse
POSSIBLE CAUSE	• For noises/vibrations that change with engine speed • For noises/vibrations that change with vehicle speed • Other noises/vibrations

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**For noises/vibrations that change with engine speed** • Are there any problems with the following? • Torque converter • ATF level (low) pump cavitation • Oil pump • Engine drive accessories • Cooler lines grounding out • Drive plate	Yes	Service as required
		No	Go to next step
2	**For noises/vibrations that change with vehicle speed** • Are there any problems with the following? • Engine mount • Tires • Drive shaft or joint shaft • Differential (final drive/chain) • Suspension • Planetary gear sets • Chain grounding to chain pan • Forward one-way clutch • Torque converter	Yes	Service as required
		No	Go to next step
3	**Other noise/vibrations** • Are there any problems with the following? • Shift cable vibration grounding • Cooler lines grounding	Yes	Service as required
		No	The problem is fixed

NO.39 O/D OFF INDICATOR LIGHT DOES NOT ILLUMINATE WHEN O/D OFF SWITCH IS TURNED TO ON [LA4A-EL]

Z6U050301030W74

39	O/D OFF indicator light does not illuminate when O/D OFF switch turned to on
POSSIBLE CAUSE	• The malfunction is in the O/D OFF switch

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Are other indicator lights illuminated with ignition switch at ON?	Yes	Inspect meter fuse
		No	Go to next step
2	• Check O/D OFF switch • Is O/D OFF switch okay?	Yes	Go to next step
		No	Repair or replace any detective parts
3	• Check voltage at the following PCM terminal (See 01-40A-15 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [FS]) • O/D OFF indicator light signal • Is terminal voltage okay?	Yes	Service as required
		No	Replace PCM (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS])
4	• Check O/D OFF indicator light • Is O/D OFF indicator light okay?	Yes	Inspect for open circuit or disconnected connector in harness between the following • Ignition switch and O/D OFF indicator light • O/D OFF indicator light and PCM
		No	Repair or replace any defective parts

NO.40 O/D OFF INDICATOR LIGHT ILLUMINATES WHEN O/D OFF SWITCH IS NOT TURNED TO ON [LA4A-EL]

Z6U050301030W75

40	O/D OFF indicator light illuminates when O/D OFF switch is not turned to on
POSSIBLE CAUSE	• O/D OFF switch malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Check O/D OFF switch • Is O/D OFF switch okay?	Yes	Go to next step
		No	Repair or replace any defective parts
2	• Check voltage at the following PCM terminal (See 01-40A-15 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [FS]) • O/D OFF indicator light signal • Is terminal voltage okay?	Yes	Inspect for short circuit or disconnected connector in harness between the following • O/D OFF indicator light and PCM
		No	Replace PCM (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS])

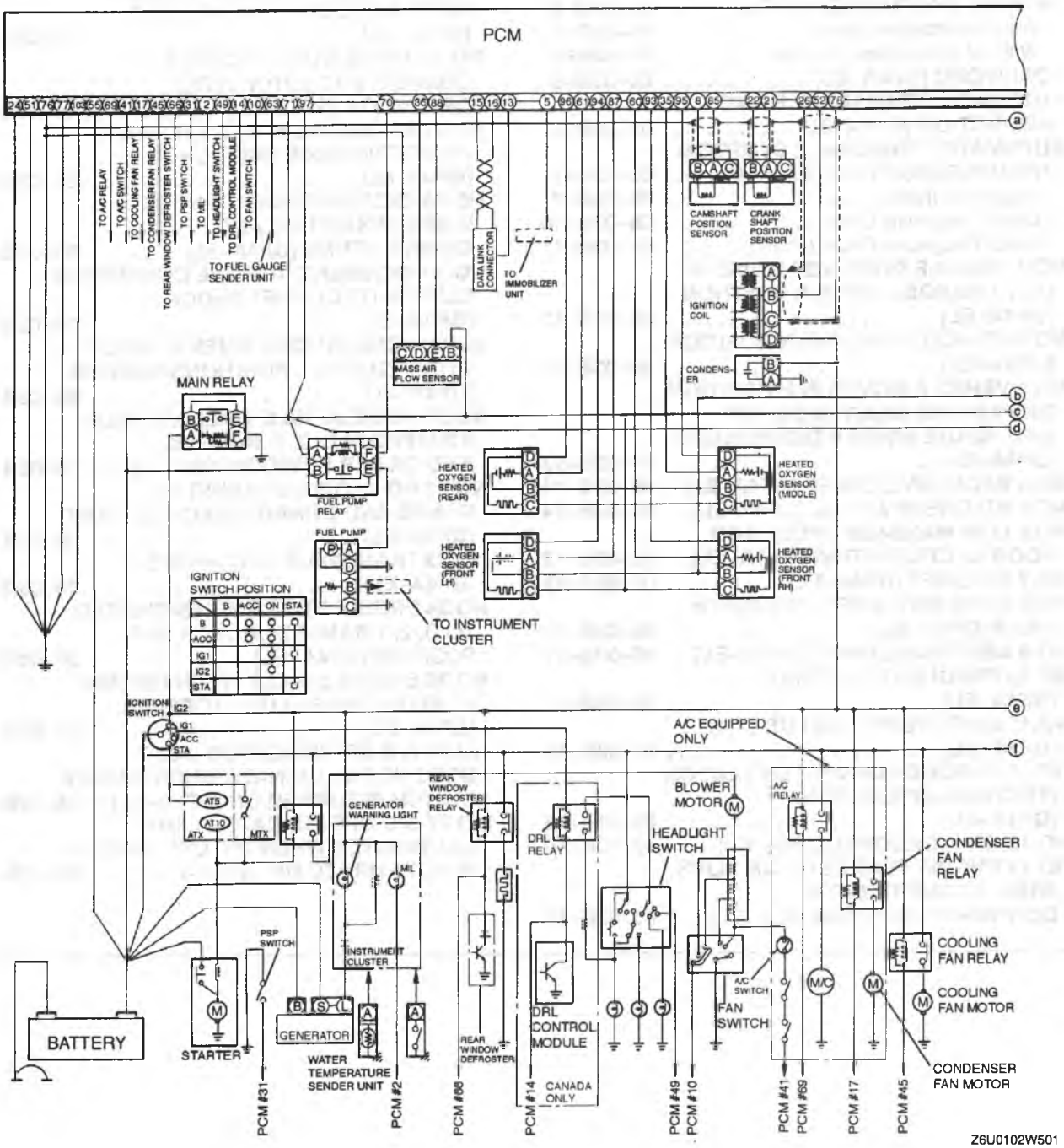
05-03B SYMPTOM TROUBLESHOOTING [GF4A-EL]

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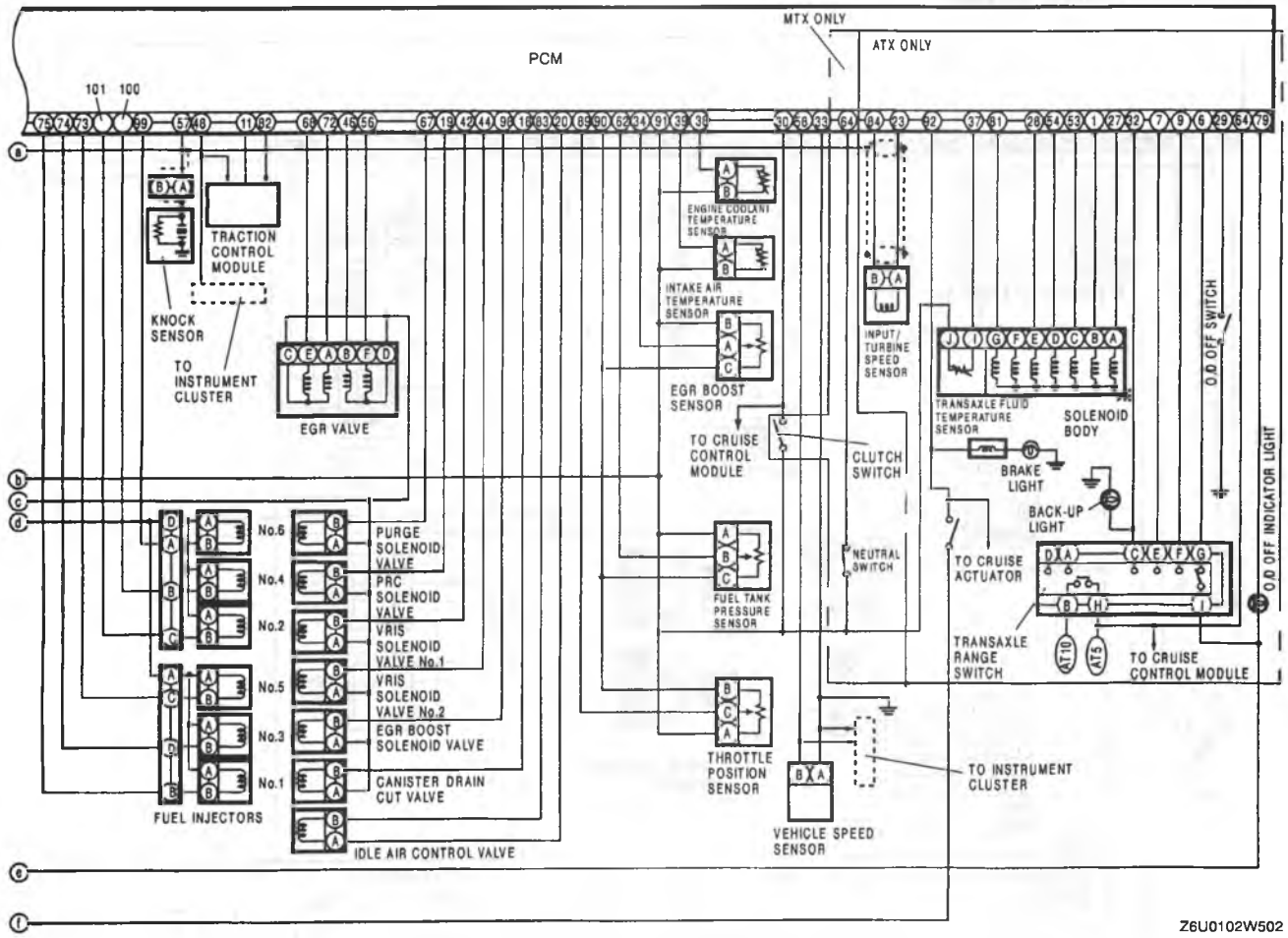
AUTOMATIC TRANSAXLE CONTROL SYSTEM WIRING DIAGRAM [GF4A-EL]

Z6U050301030W01

With Immobilizer System

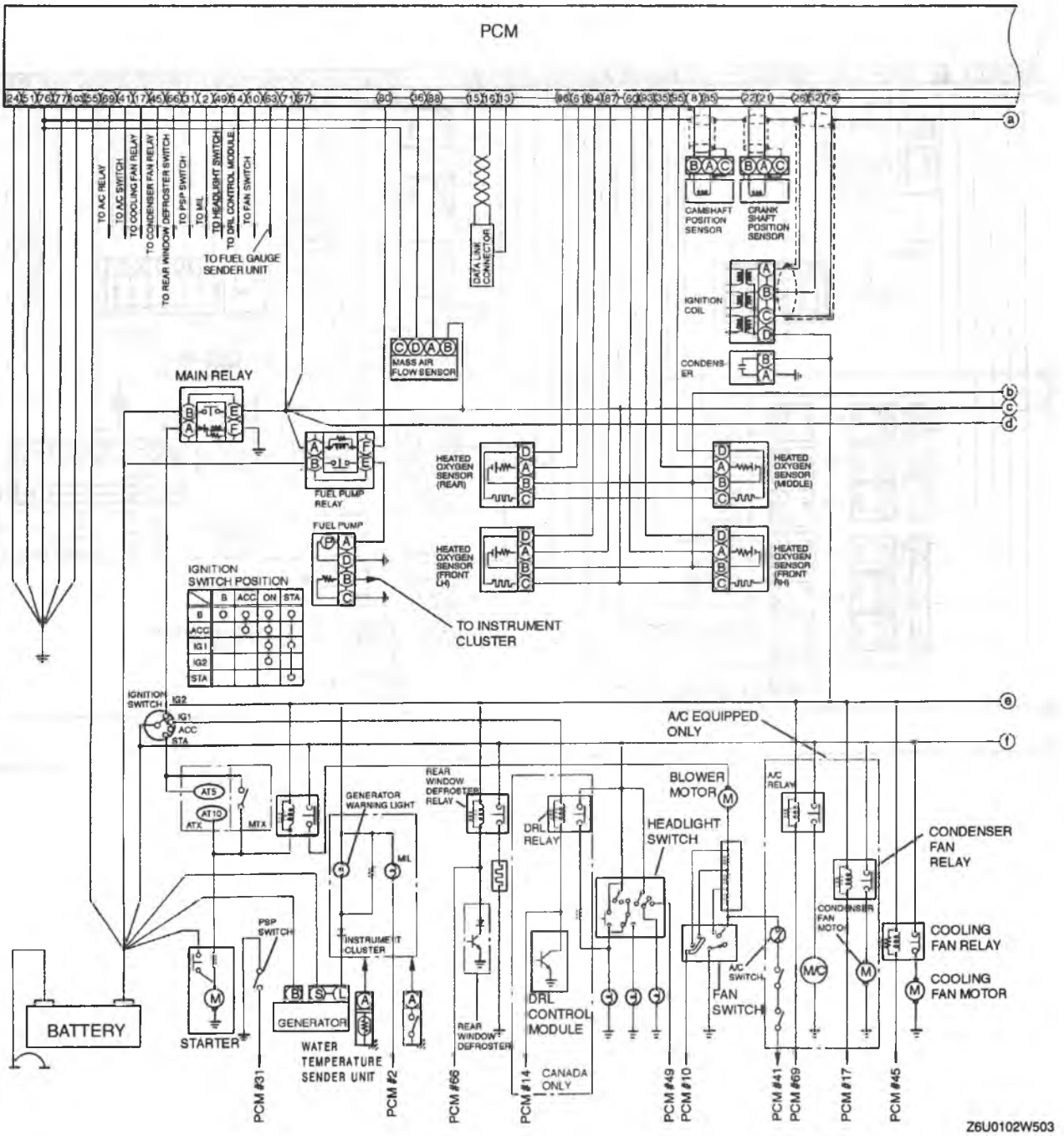


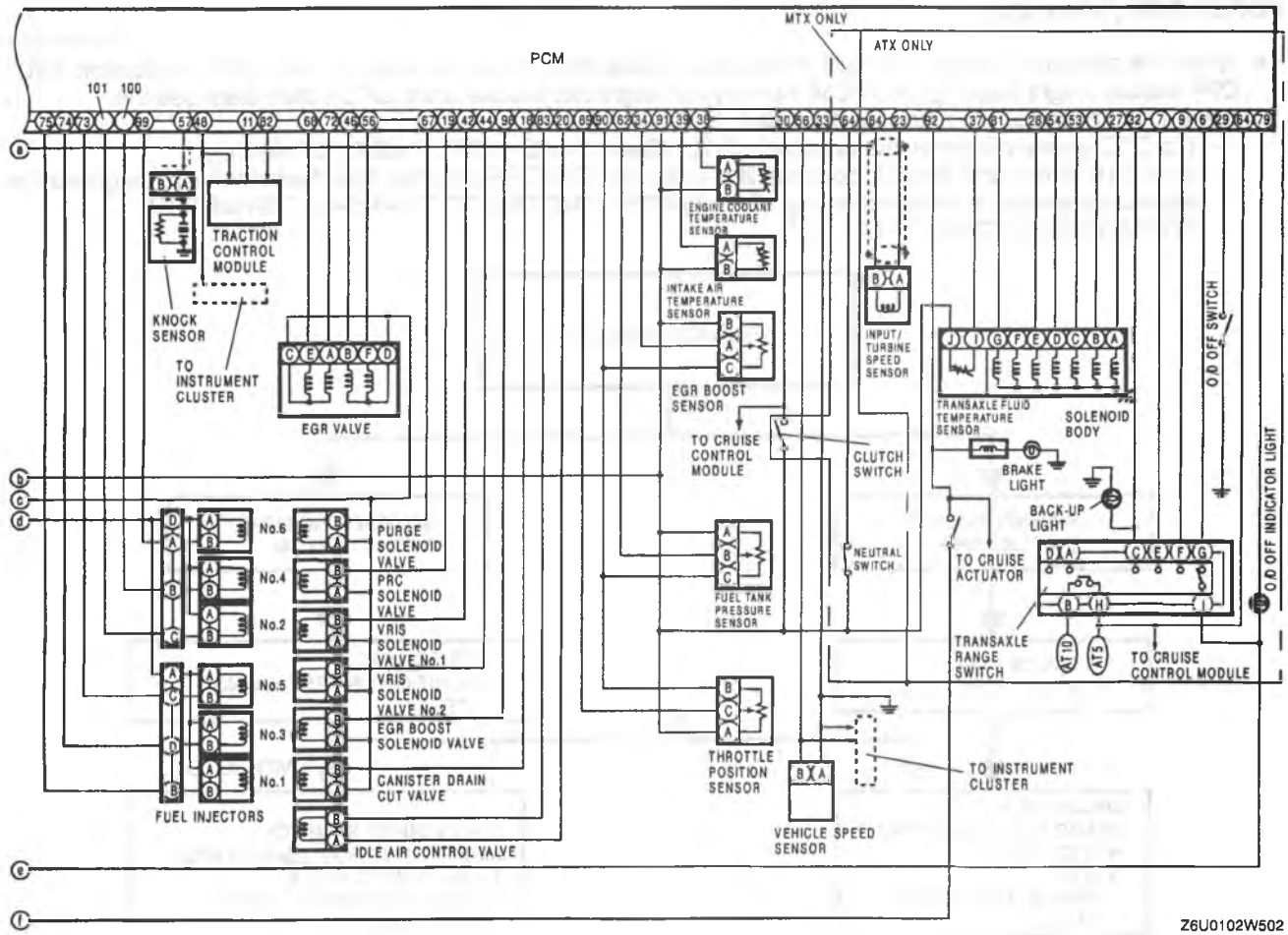
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Without Immobilizer System

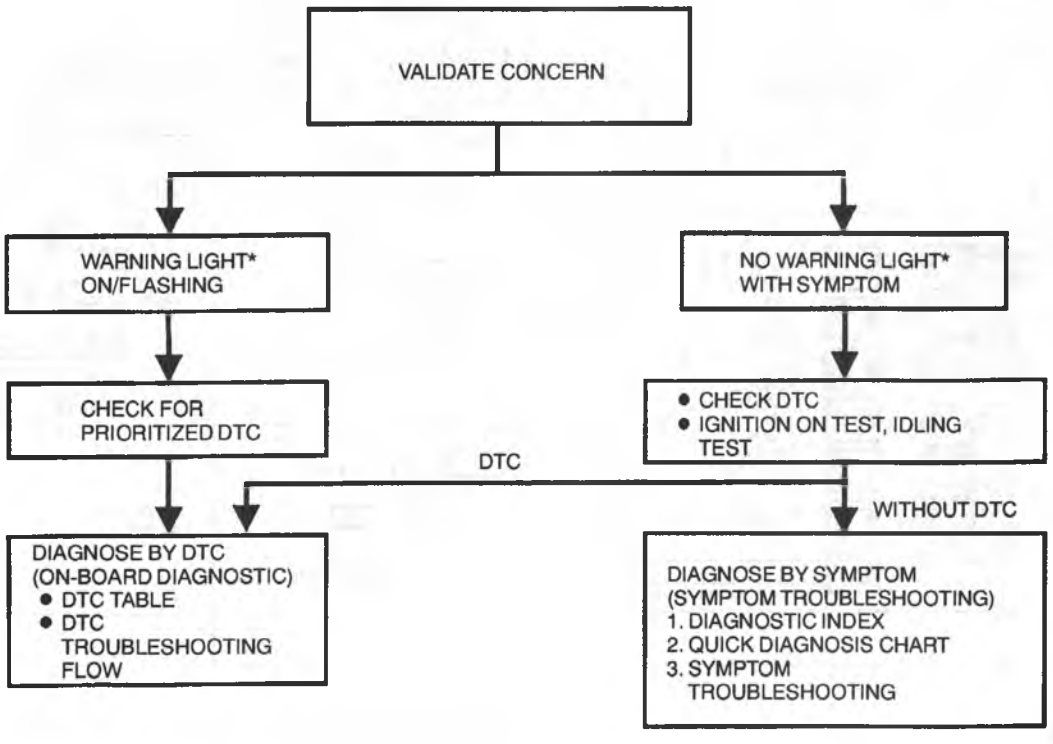



MTX ONLY
ATX ONLY
PCM
101
100
TRACTION CONTROL MODULE
KNOCK SENSOR
TO INSTRUMENT CLUSTER
EGR VALVE
ENGINE COOLANT TEMPERATURE SENSOR
INTAKE AIR TEMPERATURE SENSOR
EGR BOOST SENSOR
TO CRUISE CONTROL MODULE
CLUTCH SWITCH
INPUT/ TURBINE SPEED SENSOR
TRANSAXLE FLUID TEMPERATURE SENSOR
SOLENOID BODY
O/D OFF SWITCH
BRAKE LIGHT
BACK-UP LIGHT
TO CRUISE ACTUATOR
O/D OFF INDICATOR LIGHT
NEUTRAL SWITCH
FUEL TANK PRESSURE SENSOR
TRANSAXLE RANGE SWITCH
TO CRUISE CONTROL MODULE
No.6
No.4
No.2
No.5
No.3
No.1
PURGE SOLENOID VALVE
PRC SOLENOID VALVE
VRIS SOLENOID VALVE No.1
VRIS SOLENOID VALVE No.2
EGR BOOST SOLENOID VALVE
CANISTER DRAIN CUT VALVE
FUEL INJECTORS
IDLE AIR CONTROL VALVE
THROTTLE POSITION SENSOR
VEHICLE SPEED SENSOR
TO INSTRUMENT CLUSTER
Z6U0102W502

FOREWORD [GF4A-EL]

Z6U050301030W02

- When the customer reports a vehicle malfunction, check the malfunction indicator lamp (MIL) indication, O/D OFF indicator light flashing, and PCM memory for diagnostic trouble code (DTC), then diagnose the malfunction according to following flowchart.
  - —If a DTC exists, diagnose the applicable DTC. (See 05-02B-8 DTC TABLE [GF4A-EL].)
  - —If no DTC exists and the MIL does not illuminate and O/D OFF indicator light does not flash, diagnose the applicable symptom troubleshooting. (See 05-03B-7 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [GF4A-EL].)



* : Malfunction Indicator Lamp (MIL), O/D OFF indicator light

AUTOMATIC TRANSAXLE BASIC INSPECTION [GF4A-EL]

Z6U050301030W03

STEP	INSPECTION		ACTION
1	• Turn ignition switch to ON • Does O/D OFF indicator light illuminates/goes out corresponding to O/D OFF switch position (ON/OFF)?	Yes	Go to next step
		No	Perform malfunction diagnosis according to No.26 "O/D OFF INDICATOR LIGHT DOES NOT ILLUMINATE WHEN O/D OFF SWITCH IS TURNED ON", or No.27 "O/D OFF INDICATOR LIGHT ILLUMINATES WHEN O/D OFF SWITCH IS NOT TURNED ON"
2	• Check ATF color and condition (See 05-17B-20 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION [GF4A-EL]) • Are ATF color and odor normal?	Yes	Go to next step
		No	Repair or replace any defective parts
3	• Perform line pressure test (See 05-17B-13 Line Pressure Test) • Is line pressure okay?	Yes	Go to next step
		No	Repair or replace any defective parts
4	• Perform stall test (See 05-17B-14 Stall Speed Test) • Is stall speed okay?	Yes	Go to next step
		No	Repair or replace any defective parts

STEP	INSPECTION		ACTION
5	• Check voltage at the following PCM terminals (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — Throttle position sensor signal — Transaxle fluid temperature sensor signal — Vehicle speedometer sensor signal — Transaxle range switch signal (D, 2, 1 ranges and R position) • Are terminal voltages okay?	Yes	Perform symptom troubleshooting
		No	Repair or replace any defective parts

AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [GF4A-EL]

Z6U050301030W04

Diagnosis Index

- Use the chart below to verify the symptoms of the trouble in order to diagnose the appropriate area.

No.	TROUBLESHOOTING ITEM	DESCRIPTION	PAGE
1	Vehicle does not move in D, 2, 1 ranges, or in R position	Vehicle does not move when accelerator pedal depressed.	(See 05-03B-12 NO.1 VEHICLE DOES NOT MOVE IN D, 2, 1 RANGES, OR IN R POSITION [GF4A-EL])
2	Vehicle moves in N position	Vehicle creeps in N position. Vehicle creeps if brake pedal is not depressed in N position.	(See 05-03B-13 NO.2 VEHICLE MOVES IN N POSITION [GF4A-EL])
3	Vehicle moves in P position, or parking gear does not disengage when P disengaged	Vehicle rolls when on a downward slope and tires do not lock in P position. Tires are locked when P disengaged, vehicle does not move in D, 2, 1 ranges, and R position when accelerator pedal is depressed, and engine remains in stall condition.	(See 05-03B-13 NO.3 VEHICLE MOVES IN P POSITION, OR PARKING GEAR DOES NOT DISENGAGE WHEN P DISENGAGED [GF4A-EL])
4	Excessive creep	Vehicle accelerates in D, 2, 1 ranges, and R position without depressing accelerator pedal.	(See 05-03B-14 NO.4 EXCESSIVE CREEP [GF4A-EL])
5	No creep at all	Vehicle does not move in D, 2, 1 ranges, or R position when idling on a flat paved road.	(See 05-03B-14 NO.5 NO CREEP AT ALL [GF4A-EL])
6	Low maximum speed and poor acceleration	Vehicle acceleration is poor at start. Delayed acceleration when accelerator pedal is depressed while driving.	(See 05-03B-15 NO.6 LOW MAXIMUM SPEED AND POOR ACCELERATION [GF4A-EL])
7	No shift	Single shift range only. Sometimes shifts correctly.	(See 05-03B-16 NO.7 NO SHIFT [GF4A-EL])
8	Does not shift to fourth gear	Vehicle does not upshift from 3GR to 4GR even though vehicle speed increased. Vehicle does not shift to 4GR even though accelerator pedal is released in D range at 60 km/h {37 mph}.	(See 05-03B-16 NO.8 DOES NOT SHIFT TO FOURTH GEAR [GF4A-EL])
9	Abnormal shift	Shifts incorrectly (incorrect shift pattern).	(See 05-03B-17 NO.9 ABNORMAL SHIFT [GF4A-EL])
10	Frequent shifting	Downshifting occurs immediately even when accelerator pedal is depressed slightly in D, 2, 1 ranges (O/D OFF switch OFF).	(See 05-03B-18 NO.10 FREQUENT SHIFTING [GF4A-EL])
11	Shift point high or low	Shift point considerably different from automatic shift diagram. Shifts delayed when accelerating. Shifts occur quickly when accelerating and engine speed does not increase.	(See 05-03B-18 NO.11 SHIFT POINT HIGH OR LOW [GF4A-EL])

No.	TROUBLESHOOTING ITEM	DESCRIPTION	PAGE
12	Torque converter clutch (TCC) non-operation	TCC does not operate when vehicle reaches TCC operation range.	(See 05-03B-18 NO.12 TORQUE CONVERTER CLUTCH (TCC) NON-OPERATION [GF4A-EL])
13	No kickdown	Does not downshift when accelerator pedal is fully depressed when within kickdown range.	(See 05-03B-19 NO.13 NO KICKDOWN [GF4A-EL])
14	Engine flares up or slips when upshifting or downshifting	When accelerator pedal is depressed for drive away, engine speed increases but vehicle speed increases slowly. When accelerator is depressed while driving, engine speed increases but vehicle speed does not.	(See 05-03B-19 NO.14 ENGINE FLARES UP OR SLIPS WHEN UPSHIFTING OR DOWNSHIFTING [GF4A-EL])
15	Engine flares up or slips when accelerating vehicle	Engine flares up when accelerator pedal is depressed for upshifting. Engine flares up suddenly when accelerator pedal is depressed for downshifting.	(See 05-03B-20 NO.15 ENGINE FLARES UP OR SLIPS WHEN ACCELERATING VEHICLE [GF4A-EL])
16	Judder upon torque converter clutch (TCC) operation	Vehicle jolts when TCC engaged.	(See 05-03B-20 NO.16 JUDDER UPON TORQUE CONVERTER CLUTCH (TCC) OPERATION [GF4A-EL])
17	Excessive N to D or N to R position/range shift shock	Strong shock felt when shifting from N to D or N to R position/range at idle.	(See 05-03B-21 NO.17 EXCESSIVE N TO D OR N TO R POSITION/RANGE SHIFT SHOCK [GF4A-EL])
18	Excessive shift shock when upshifting and downshifting	Excessive shift shock felt when depressing accelerator pedal to accelerate at upshifting. During cruising, excessive shift shock felt when depressing accelerator pedal at downshifting.	(See 05-03B-22 NO.18 EXCESSIVE SHIFT SHOCK WHEN UPSHIFTING AND DOWNSHIFTING [GF4A-EL])
19	Excessive torque converter clutch (TCC) shift shock	Strong shock felt when TCC engaged.	(See 05-03B-23 NO.19 EXCESSIVE TORQUE CONVERTER CLUTCH (TCC) SHIFT SHOCK [GF4A-EL])
20	Noise at idle when vehicle stopped in all positions/ranges	Transaxle noisy in all positions and ranges when vehicle is idling.	(See 05-03B-23 NO.20 NOISE AT IDLE WHEN VEHICLE STOPPED IN ALL POSITIONS/RANGES [GF4A-EL])
21	Noise at idle when vehicle stopped in D, 2, 1, ranges, and/or in R position	Transaxle noisy in driving ranges when vehicle is idling.	(See 05-03B-24 NO.21 NOISE AT IDLE WHEN VEHICLE STOPPED IN D, 2, 1, RANGES, AND/OR IN R POSITION [GF4A-EL])
22	No engine braking in 1 range and 2 range (Second gear)	Engine speed drops to idle but vehicle coasts when accelerator pedal released during cruising at medium to high speeds. Engine speed drops to idle but vehicle coasts when accelerator pedal released when in 1 range at low vehicle speed.	(See 05-03B-24 NO.22 NO ENGINE BRAKING IN 1 RANGE AND 2 RANGE (SECOND GEAR) [GF4A-EL])
23	Transaxle overheats	Burnt smell emitted from transaxle. Smoke emitted from transaxle.	(See 05-03B-25 NO.23 TRANSAXLE OVERHEATS [GF4A-EL])

No.	TROUBLESHOOTING ITEM	DESCRIPTION	PAGE
24	Engine stalls when shifted to D, 2, 1 ranges, and/or in R position	Engine stalls when shifting from N or P position to D, 2, 1 ranges or R position at idle.	(See 05-03B-25 NO.24 ENGINE STALLS WHEN SHIFTED TO D, 2, 1 RANGES, AND/OR IN R POSITION [GF4A-EL])
25	Engine stalls when driving at slow speeds or stopping	Engine stalls when brake pedal depressed while driving at low speeds or stopping.	(See 05-03B-26 NO.25 ENGINE STALLS WHEN DRIVING AT SLOW SPEEDS OR STOPPING [GF4A-EL])
26	O/D OFF indicator light does not illuminate when O/D OFF switch is turned ON	O/D OFF indicator light in dashboard does not illuminate when O/D OFF switch is turned on and ignition switch is at ON.	(See 05-03B-26 NO.26 O/D OFF INDICATOR LIGHT DOES NOT ILLUMINATE WHEN O/D OFF SWITCH IS TURNED ON [GF4A-EL])
27	O/D OFF indicator light illuminates when O/D OFF switch is not turned ON	O/D OFF indicator light in dashboard illuminates even though O/D OFF switch is turned OFF and ignition switch is at ON.	(See 05-03B-27 NO.27 O/D OFF INDICATOR LIGHT ILLUMINATES WHEN O/D OFF SWITCH IS NOT TURNED ON [GF4A-EL])

Quick Diagnosis Chart

No.	Item	Selector lever misadjusted	Ignition system malfunction	Not within line pressure specification	Idle speed misadjusted	Ignition timing misadjusted	Transaxle range switch misadjusted	Throttle position sensor: Signal is not output	Throttle position sensor: Malfunction signal is output	Input/turbine speed sensor: Signal is not output	Input/turbine speed sensor: Malfunction signal is output	Transaxle range switch: D, 2,1 ranges and R, N position signal is not output	O/D OFF switch: Signal is not output	O/D OFF switch: Malfunction signal is output	Brake switch: Signal is not input	Brake switch: Malfunction signal is output	Vehicle speedometer sensor: Signal is not input	Vehicle speedometer sensor: Malfunction signal is output	Poor ground
	Symptom / Cause of trouble / Inspection method / Item							Electrical system components: ATX outer parts											
1	Vehicle does not move in D, 2, 1 ranges, or in R position	×		×				×	×	×	×								×
2	Vehicle moves in N position	×		×				×	×	×	×								×
3	Vehicle moves in P position, or parking gear does not disengage when P disengaged	×																	
4	Excessive creep			×	×	×													
5	No creep at all	×		×				×	×	×	×								×
6	Low maximum speed and poor acceleration			×		×	×	×	×	×	×	×	×	×					×
7	No shift			×				×	×	×	×	×	×	×					×
8	Does not shift to fourth gear			×			×	×	×	×	×		×	×					×
9	Abnormal shift	×		×			×	×	×	×	×	×							×
10	Frequent shifting			×				×	×	×	×								×
11	Shift point high or low				×	×		×	×	×	×	×							×
12	Torque converter clutch (TCC) non-operation			×			×	×	×	×	×	×	×	×			×	×	×
13	No kickdown							×	×										×
14	Engine flares up or slips when upshifting or downshifting	×		×				×	×	×	×								×
15	Engine flares up or slips when accelerating vehicle	×		×				×	×	×	×								×
16	Judder upon torque converter clutch (TCC) operation			×		×		×	×	×	×				×				
17	Excessive N to D or N to R position/range shift shock			×	×				×	×	×	×							
18	Excessive shift shock when upshifting and downshifting			×				×	×	×	×	×							
19	Excessive torque converter clutch (TCC) shift shock			×				×	×	×	×								
20	Noise at idle when vehicle stopped in all positions/ranges							×	×										
21	Noise at idle when vehicle stopped in D, 2, 1, ranges, and/or in R position	×					×	×	×										
22	No engine braking in 1 range or 2 range (Second gear)	×		×			×	×	×	×	×								
23	Transaxle overheats			×															
24	Engine stalls when shifted to D, 2, 1 ranges, and/or in R position				×		×												
25	Engine stalls when driving at slow speeds or stopping				×		×												
26	O/D OFF indicator light does not illuminate when O/D OFF switch is turned ON												×	×					
27	O/D OFF indicator light illuminates when O/D OFF switch is not turned ON												×	×					
	Line pressure test																		
	Stall test																		
	Time lag test																		
	Diagnostic trouble code							×		×		×	×		×		×		

Y6U503WA0

Quick Diagnosis Chart (cont'd)

No.	Item	TFT sensor: Signal is not output	TFT sensor: Malfunction signal is output	Shift solenoid A (Open or short)	Shift solenoid B (Open or short)	Shift solenoid C (Open or short)	TCC control solenoid valve (Open or short)	3-2 timing solenoid valve (Open or short)	Pressure control solenoid valve (Open or short)	Control valve not operating properly	1-2 accumulator not operating properly	2-3 accumulator not operating properly	N-D accumulator not operating properly	N-R accumulator not operating properly	Oil cooler not operating properly	Slipping (Brake, clutch)	Burnt (Brake, clutch)	Torque converter not operating properly	TCC piston burnt
		Electrical system components: ATX inner parts								Hydraulic system components						Powertrain system			
1	Vehicle does not move in D, 2, 1 ranges, or in R position			×	×	×			×	×						×	×	×	
2	Vehicle moves in N position			×	×	×			×	×							×		
3	Vehicle moves in P position, or parking gear does not disengage when P disengaged																×		
4	Excessive creep																		
5	No creep at all			×	×	×			×	×						×	×	×	
6	Low maximum speed and poor acceleration	×		×	×	×			×	×						×	×	×	
7	No shift			×	×	×			×	×						×	×		
8	Does not shift to fourth gear	×	×	×	×	×				×						×			
9	Abnormal shift			×	×	×			×	×						×	×		
10	Frequent shifting								×	×						×			
11	Shift point high or low																		
12	Torque converter clutch (TCC) non-operation	×	×				×			×						×		×	
13	No kickdown			×	×	×				×						×	×		
14	Engine flares up or slips when upshifting or downshifting			×	×	×			×	×						×			
15	Engine flares up or slips when accelerating vehicle			×	×	×			×	×						×			
16	Judder upon torque converter clutch (TCC) operation						×			×								×	×
17	Excessive N to D or N to R position/range shift shock								×	×			×	×		×	×		
18	Excessive shift shock when upshifting and downshifting			×	×	×		×	×	×	×	×				×	×		
19	Excessive torque converter clutch (TCC) shift shock						×			×									
20	Noise at idle when vehicle stopped in all positions/ranges			×		×			×									×	
21	Noise at idle when vehicle stopped in D, 2, 1, ranges, and/or in R position								×									×	
22	No engine braking in 1 range or 2 range (Second gear)					×				×						×			
23	Transaxle overheats	×	×				×		×						×		×		×
24	Engine stalls when shifted to D, 2, 1 ranges, and/or in R position						×			×									×
25	Engine stalls when driving at slow speeds or stopping						×			×									×
26	O/D OFF indicator light does not illuminate when O/D OFF switch is turned ON																		
27	O/D OFF indicator light illuminates when O/D OFF switch is not turned ON																		

Symptom / Cause of trouble / Inspection method / Item

Item	Signal is not output	Malfunction signal is output	Shift solenoid A (Open or short)	Shift solenoid B (Open or short)	Shift solenoid C (Open or short)	TCC control solenoid valve (Open or short)	3-2 timing solenoid valve (Open or short)	Pressure control solenoid valve (Open or short)	Control valve not operating properly	1-2 accumulator not operating properly	2-3 accumulator not operating properly	N-D accumulator not operating properly	N-R accumulator not operating properly	Oil cooler not operating properly	Slipping (Brake, clutch)	Burnt (Brake, clutch)	Torque converter not operating properly	TCC piston burnt
Line pressure test									×						×	×		
Stall test									×						×	×	×	
Time lag test												×	×		×	×		
Diagnostic trouble code	×		×	×	×	×	×	×										

Y6U503WA1

NO.1 VEHICLE DOES NOT MOVE IN D, 2, 1 RANGES, OR IN R POSITION [GF4A-EL]

Z6U050301030W05

1	Vehicle does not move in D, 2, 1 ranges, or in R position
DESCRIPTION	• Vehicle does not move when accelerator pedal depressed.
POSSIBLE CAUSE	• If the vehicle does not move in D, 2, 1 ranges or R position, basically, the malfunction is in the automatic transaxle. (Vehicle will move even with a malfunction in the PCM.) Since a malfunction in the sensor circuit or output circuit is the cause of the malfunction in the automatic transaxle, inspect the sensors, output circuit, and the related harnesses. — Clutch slippage, worn (D, 2, 1 ranges—Forward clutch, R position—Reverse clutch, Low and reverse brake) • Line pressure low • Malfunction of throttle position sensor (Disparity in setting sensor settings) • Malfunction of vehicle speedometer sensor (Disparity in setting sensor settings) • Malfunction of input/turbine speed sensor (Disparity in setting sensor settings) • Malfunction of sensor ground (Disparity in setting sensor settings) • Malfunction of shift solenoid A (Sticking) • Malfunction of shift solenoid B (Sticking) • Malfunction of shift solenoid C (Sticking) • Malfunction of pressure control solenoid valve (Sticking) • Malfunction of body ground • Malfunction of manual valve (Poor operation, sticking) • Malfunction of pressure regulator valve (Poor operation, sticking) • Malfunction of pressure modifier valve (Poor operation, sticking) • Malfunction of pilot valve (Poor operation, sticking) — Malfunction of selector lever — Parking mechanism not properly operation

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• With vehicle stopped on a flat, level road and engine off, does vehicle move when pushed (in D, 2 ranges or N, R positions with brake pedal released)?	Yes	Go to next step
		No	Check parking mechanism (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98)
2	• Does vehicle move when selector lever is in between N position and D range?	Yes	Go to next step
		No	Inspect or adjust the selector lever (See 05-18-1 SELECTOR LEVER INSPECTION) (See 05-18-2 SELECTOR LEVER ADJUSTMENT)
3	• Check voltage at the following PCM terminal (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — Pressure control solenoid signal • Is terminal voltage okay?	Yes	Go to next step
		No	Repair or replace any defective parts
4	• Check duty of pressure control solenoid (See 05-17B-30 Inspection of Output Duty) • Is duty okay?	Yes	Overhaul control valve body and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98) If problem remains, overhaul transaxle and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98)
		No	Check voltage at the following PCM terminals (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) • Throttle position sensor signal • Ground (Engine, body) Repair or replace any defective parts

NO.2 VEHICLE MOVES IN N POSITION [GF4A-EL]

Z6U050301030W06

2	Vehicle moves in N position
DESCRIPTION	• Vehicle creeps in N position. • Vehicle creeps if brake pedal is not depressed in N position.
POSSIBLE CAUSE	• If the vehicle moves in N position, basically, the malfunction is in the automatic transaxle. Since a malfunction in the sensor circuit or output circuit is the cause of the malfunction in the automatic transaxle, inspect the sensors, output circuit, and the related harnesses. — Clutch burned (Forward clutch, coasting clutch) • Line pressure low • Malfunction of throttle position sensor (Disparity in setting sensor settings) • Malfunction of vehicle speedometer sensor (Disparity in setting sensor settings) • Malfunction of input/turbine speed sensor (Disparity in setting sensor settings) • Malfunction of sensor ground (Disparity in setting sensor settings) • Malfunction of shift solenoid A (Sticking) • Malfunction of shift solenoid B (Sticking) • Malfunction of shift solenoid C (Sticking) • Malfunction of pressure control solenoid valve (Sticking) • Malfunction of body ground (Sticking) • Malfunction of control valve body system — Selector lever position disparity (Although the selector indicator light shows N position, the hydraulic circuit shows D range, R position)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Does vehicle creep when selector lever is moved slightly in N position?	Yes	Go to next step
		No	Adjust selector lever (See 05-18-2 SELECTOR LEVER ADJUSTMENT)
2	• Check voltage at the following PCM terminal (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — Pressure control solenoid signal • Is terminal voltage okay?	Yes	Go to next step
		No	Repair or replace any defective parts
3	• Check duty of pressure control solenoid (See 05-17B-30 Inspection of Output Duty) • Is duty okay?	Yes	Overhaul control valve body and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98) If problem remains, overhaul transaxle and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98)
		No	Check the voltage at the following PCM terminals (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) • Throttle position sensor signal • Ground (Engine, body) Repair or replace any defective parts

NO.3 VEHICLE MOVES IN P POSITION, OR PARKING GEAR DOES NOT DISENGAGE WHEN P DISENGAGED [GF4A-EL]

Z6U050301030W07

3	Vehicle moves in P position, or parking gear does not disengage when P disengaged
DESCRIPTION	• Vehicle rolls when on a downward slope and tires do not lock in P position. • Tires are locked when P disengaged, vehicle does not move in D, 2, 1 ranges, and R position when accelerator pedal is depressed, and engine remains in stall condition.
POSSIBLE CAUSE	• Malfunction of parking mechanism (May have effect on noise or shock from transaxle) • Poor adjustment of selector lever (Only if vehicle moves when in P position or 1 range) • If vehicle moves in N position, perform No.2 "VEHICLE MOVES IN N POSITION"

NO.4 EXCESSIVE CREEP [GF4A-EL]

Z6U050301030W08

4	Excessive creep
DESCRIPTION	• Vehicle accelerates in D, 2, 1 ranges, and R position without depressing accelerator pedal.
POSSIBLE CAUSE	• Engine idle speed high (transaxle system is not cause of problem) • Go to No.8 "Engine runs rough/rolling idle" (See 01-03B-5 SYMPTOM DIAGNOSTIC INDEX [KL])

NO.5 NO CREEP AT ALL [GF4A-EL]

Z6U050301030W09

5	No creep at all
DESCRIPTION	• Vehicle does not move in D, 2, 1 ranges, or R position when idling on a flat paved road.
POSSIBLE CAUSE	• If the vehicle creeps only in 1 range, the fail-safe is operating. Otherwise, either the transaxle is stuck in third gear position, or there is clutch circuit slippage because the 3-4 clutch is stuck. — Clutch burned • Line pressure low • Malfunction of throttle position sensor • Malfunction of vehicle speedometer sensor • Malfunction of input/turbine speed sensor • Malfunction of sensor ground • Malfunction of shift solenoid A (Sticking) • Malfunction of shift solenoid B (Sticking) • Malfunction of shift solenoid C (Sticking) • Malfunction of pressure control solenoid valve (Sticking) • Malfunction of body ground (Sticking) • Malfunction of control valve body system • Transaxle fixed in 3GR (Operation of fail-safe function) — Short or open circuit in wiring — Poor connection of connector — Malfunction of the electronic parts of output and input systems • The engine torque is not start — Malfunction of the torque converter

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Does vehicle creep in any range/position?	Yes	Go to next step
		No	Inspect or adjust selector lever (See 05-18-1 SELECTOR LEVER INSPECTION) (See 05-18-2 SELECTOR LEVER ADJUSTMENT)
2	• Check voltage at the following PCM terminal (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — Pressure control solenoid signal • Is terminal voltage okay?	Yes	Go to next step
		No	Repair or replace any defective parts
3	• Check duty of pressure control solenoid (See 05-17B-30 Inspection of Output Duty) • Is duty okay?	Yes	Overhaul control valve body and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98) If problem remains, overhaul transaxle and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98)
		No	Check voltage at the following PCM terminals (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) • Throttle position sensor signal • Ground (Engine, body) Repair or replace any defective parts

NO.6 LOW MAXIMUM SPEED AND POOR ACCELERATION [GF4A-EL]

Z6U050301030W10

6	Low maximum speed and poor acceleration
DESCRIPTION	• Vehicle acceleration is poor at start. • Delayed acceleration when accelerator pedal is depressed while driving.
POSSIBLE CAUSE	• If the clutch is stuck or does not stay in third or fourth gear, the malfunction is in the engine circuit. — Clutch slippage, burned • Line pressure low • Malfunction of throttle position sensor • Malfunction of vehicle speedometer sensor • Malfunction of input/turbine speed sensor • Malfunction of sensor ground • Malfunction of shift solenoid A (Sticking) • Malfunction of shift solenoid B (Sticking) • Malfunction of shift solenoid C (Sticking) • Malfunction of pressure control solenoid valve (Sticking) • Malfunction of body ground (Sticking) • Malfunction of control valve body system — Transaxle fixed in 3GR (Operation of fail-safe function) • Short or open circuit in wiring • Poor connection of connector • Malfunction of electronic parts of output and input systems — Insufficient starting torque (Suspected when in-gear condition, shift control, and engine circuit are normal) • Malfunction of the torque converter (Poor operation, sticking) — Enlargement of TCC operation range (Operation of fail-safe function) • Malfunction of TFT sensor (Short or open circuit)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• With ignition switch at ON, does O/D OFF indicator light indication correspond to O/D OFF switch operation?	Yes	Go to next step
		No	Go to No.26 "O/D OFF INDICATOR LIGHT DOES NOT ILLUMINATE WHEN O/D OFF SWITCH IS TURNED ON", No.27 "O/D OFF INDICATOR LIGHT ILLUMINATES WHEN O/D OFF SWITCH IS NOT TURNED ON"
2	• Go to No.14 "Poor fuel economy" (See 01-03B-5 SYMPTOM DIAGNOSTIC INDEX [KL]) • Does CIS system okay?	Yes	Go to next step
		No	Repair or replace any defective parts
3	• Disconnect solenoid connector • Does vehicle operate as follows? **D range — 3GR (fixed)** **2 range — 2GR (fixed)** **1 range — 1GR (fixed)** **R position — Reverse**	Yes	Go to next step
		No	Overhaul control valve body and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98) If problem remains, overhaul transaxle and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98)
4	• Drive vehicle in D, 2, and 1 ranges (O/D off switch OFF).Does vehicle start from stop in first gear?	Yes	Go to next step
		No	Check voltage at the following PCM terminals (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) • Throttle position sensor signal • Vehicle speedometer sensor signal • Input/turbine speed sensor • D, 2, 1 range signals Repair or replace any defective parts
5	• Check voltage at the following PCM terminals (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — Shift solenoid A signal — Shift solenoid B signal — Shift solenoid C signal • Are terminal voltages okay?	Yes	Go to next step
		No	Check voltage at the following PCM terminals (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) • Throttle position sensor signal • Input/turbine speed sensor • Vehicle speedometer sensor signal Repair or replace any defective parts

STEP	INSPECTION		ACTION
6	• Perform the stall test (See 05-17B-14 Stall Speed Test) • Is stall speed okay?	Yes	Reverify symptoms of malfunction
		No	Overhaul transaxle and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98)

NO.7 NO SHIFT [GF4A-EL]

Z6U050301030W11

7	No shift
DESCRIPTION	• Single shift range only. • Sometimes shifts correctly.
POSSIBLE CAUSE	• When the gear position is fixed in third gear due to the fail-safe operation, the malfunction is in the automatic transaxle. Perform malfunction diagnosis according to No.6 "LOW MAXIMUM SPEED AND POOR ACCELERATION". — Clutch burned • Line pressure low • Malfunction of throttle position sensor • Malfunction of vehicle speedometer sensor • Malfunction of input/turbine speed sensor • Malfunction of sensor ground • Malfunction of shift solenoid A (Sticking) • Malfunction of shift solenoid B (Sticking) • Malfunction of shift solenoid C (Sticking) • Malfunction of pressure control solenoid valve (Sticking) • Malfunction of body ground (Sticking) • Malfunction of control valve body system (Poor operation, sticking) — The 3GR is fixed (Operation in fail-safe function) • Short or open circuit in wiring • Poor connection of connector • Malfunction of electronic parts of output and input systems

NO.8 DOES NOT SHIFT TO FOURTH GEAR [GF4A-EL]

Z6U050301030W12

8	Does not shift to fourth gear
DESCRIPTION	• Vehicle does not upshift from 3GR to 4GR even though vehicle speed increased. • Vehicle does not shift to 4GR even though accelerator pedal is released in D range at 60 km/h {37 mph}.
POSSIBLE CAUSE	• Although the malfunction is basically the same as No.7 "NO SHIFT", there are also other unique malfunctions. — Operation in transaxle range switch fail-safe function (Judge of 2 range) • Short or open circuit in wiring • Poor connection of connector • Malfunction of sensor • Selector lever adjustment incorrect — The 3GR is fixed (Operation in fail-safe function) • Short or open circuit in wiring • Poor connection of connector • Malfunction of Input/output signal system

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• With indicator switch at ON, does O/D OFF indicator light indication correspond to O/D OFF switch operation?	Yes	Go to next step
		No	Go to No.26 "O/D OFF INDICATOR LIGHT DOES NOT ILLUMINATE WHEN O/D OFF SWITCH IS TURNED ON", No.27 "O/D OFF INDICATOR LIGHT ILLUMINATES WHEN O/D OFF SWITCH IS NOT TURNED ON"

STEP	INSPECTION		ACTION
2	• Check voltage at the following PCM terminal (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — TFT sensor signal • Is terminal voltage okay?	Yes	Go to next step
		No	Repair or replace any defective parts
3	• Check voltage at the following PCM terminals (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — Shift solenoid A signal — Shift solenoid B signal — Shift solenoid C signal • Are terminal voltages OK?	Yes	Overhaul control valve body and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98) If problem remains, overhaul transaxle and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98)
		No	Check voltage at the following PCM terminals (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) • D range signal • Input/turbine speed sensor signal • Ground (Engine, body) • Vehicle speedometer sensor signal Repair or replace any defective parts

NO.9 ABNORMAL SHIFT [GF4A-EL]

Z6U050301030W13

9	Abnormal shift
DESCRIPTION	• Shifts incorrectly (incorrect shift pattern).
POSSIBLE CAUSE	• There is a malfunction in the signal circuit which controls shifting (throttle position sensor, input/turbine speed sensor, vehicle speedometer sensor), the control valve is stuck, or the clutch circuit is stuck. — Clutch slipping, burned • Line pressure low • Malfunction of throttle position sensor • Malfunction of vehicle speedometer sensor • Malfunction of input/turbine speed sensor • Malfunction of sensor ground • Malfunction of shift solenoid A (Sticking) • Malfunction of shift solenoid B (Sticking) • Malfunction of shift solenoid C (Sticking) • Malfunction of pressure control solenoid valve (Sticking) • Malfunction of body ground (Sticking) • Malfunction of control valve body system (Poor operation, sticking) — Throttle position sensor malfunction (Not operating linearly) — Input/turbine speed sensor, vehicle speedometer sensor malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Check the voltage between ground terminal of PCM and transaxle case (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) • Is voltage 0 V?	Yes	Go to next step
		No	Inspection ground circuit
2	• Check voltage at the following PCM terminals (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — Throttle position sensor signal — Input/turbine speed sensor signal — Vehicle speedometer sensor signal • Are terminal voltages okay?	Yes	Overhaul control valve body and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98) If problem remains, overhaul transaxle and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98)
		No	Repair or replace any defective parts

NO.10 FREQUENT SHIFTING [GF4A-EL]

Z6U050301030W14

10	Frequent shifting
DESCRIPTION	• Downshifting occurs immediately even when accelerator pedal is depressed slightly in D, 2, 1 ranges (O/D OFF switch OFF).
POSSIBLE CAUSE	• The circuit which is the cause is basically the same as for No.9 "ABNORMAL SHIFT". However, a malfunction of the input signal to the throttle position sensor, input/turbine speed sensor, vehicle speedometer sensor (including the sensor ground, sensor harness, and connector), or clutch slippage (clutch stuck, low pressure in line) may also be the cause.

NO.11 SHIFT POINT HIGH OR LOW [GF4A-EL]

Z6U050301030W15

11	Shift point high or low
DESCRIPTION	• Shift point considerably different from automatic shift diagram. • Shifts delayed when accelerating. • Shifts occur quickly when accelerating and engine speed does not increase.
POSSIBLE CAUSE	• If the transaxle does not shift abnormally, there is a malfunction of the input signal to the throttle position sensor, input/turbine speed sensor, or vehicle speedometer sensor. • If the engine speed is high or low regardless that shifting is normal, inspect the tachometer. • Verify that the output signal of the throttle sensor changes linearly.

NO.12 TORQUE CONVERTER CLUTCH (TCC) NON-OPERATION [GF4A-EL]

Z6U050301030W16

12	Torque converter clutch (TCC) non-operation
DESCRIPTION	• TCC does not operate when vehicle reaches TCC operation range.
POSSIBLE CAUSE	**Caution** • **If the TCC or piston is stuck, inspect them. In addition, inspect the oil cooler for foreign particles which may have mixed in with the ATF.** • Basically, the TCC does not operate when the fail-safe is operating. Verify the diagnostic trouble code at first. If the TCC operates when driving at high speeds only, the malfunction (poor adjustment) is in the O/D OFF switch circuit or transaxle range switch circuit. — TCC piston slipping, burned • Line pressure low • Malfunction of throttle position sensor • Malfunction of engine coolant temperature sensor • Malfunction of vehicle speedometer sensor • Malfunction of input/turbine speed sensor • Malfunction of sensor ground • Malfunction of torque converter clutch control solenoid valve (Sticking) • Malfunction of control valve body system (Poor operation, sticking) — Malfunction of throttle position sensor (Not operating linearly) — Malfunction of input/turbine speed sensor or vehicle speedometer sensor

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• With indicator switch at ON, does O/D OFF indicator light indication correspond to O/D OFF switch operation?	Yes	Go to next step
		No	Go to No.26 "O/D OFF INDICATOR LIGHT DOES NOT ILLUMINATE WHEN O/D OFF SWITCH IS TURNED ON", No.27 "O/D OFF INDICATOR LIGHT ILLUMINATES WHEN O/D OFF SWITCH IS NOT TURNED ON"
2	• Check voltage at the following PCM terminal (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — TCC control solenoid valve signal • Is terminal voltage okay?	Yes	Go to next step
		No	Repair or replace any defective parts

STEP	INSPECTION		ACTION
3	• Check voltage at the following PCM terminals (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — Throttle position sensor signal — Vehicle speedometer sensor signal — NE signal — Ground (Engine, body) • Are terminal voltages okay?	Yes	Replace PCM (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL])
		No	Repair or replace any defective parts

NO.13 NO KICKDOWN [GF4A-EL]

Z6U050301030W17

13	No kickdown
DESCRIPTION	• Does not downshift when accelerator pedal is fully depressed when within kickdown range.
POSSIBLE CAUSE	• If the transaxle does not downshift though shifting is normal, the malfunction is in the throttle position sensor circuit (including the sensor ground, sensor harness, and connector).

NO.14 ENGINE FLARES UP OR SLIPS WHEN UPSHIFTING OR DOWNSHIFTING [GF4A-EL]

Z6U050301030W18

14	Engine flares up or slips when upshifting or downshifting
DESCRIPTION	• When accelerator pedal is depressed for driveaway, engine speed increases but vehicle speed increases slowly. • When accelerator depressed while driving, engine speed increases but vehicle speed does not.
POSSIBLE CAUSE	• There is clutch slip because the clutch is stuck or the line pressure is low. — Clutch stuck, slipping (forward clutch, 3-4 clutch, 2-4 brake band, one-way clutch 1, one-way clutch 2) • Line pressure low • Malfunction of throttle position sensor • Malfunction of vehicle speedometer sensor • Malfunction of input/turbine speed sensor • Malfunction of sensor ground • Malfunction of shift solenoid A (Sticking) • Malfunction of shift solenoid B (Sticking) • Malfunction of shift solenoid C (Sticking) • Malfunction of pressure control solenoid valve (Sticking) • Malfunction of body ground (Sticking) • Malfunction of control valve body (Poor operation, sticking) — Poor operating of mechanical pressure • Selector lever position disparity • Transaxle range switch position disparity

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is shift point okay?	Yes	Go to next step
		No	Go to No.9 "ABNORMAL SHIFT"
2	• Check the voltage at the following PCM terminal (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — Pressure control solenoid signal • Is terminal voltage okay?	Yes	Go to next step
		No	Repair or replace any defective parts

STEP	INSPECTION		ACTION
3	• Check duty of pressure control solenoid (See 05-17B-30 Inspection of Output Duty) • Is duty okay?	Yes	Overhaul control valve body and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98) If problem remains, overhaul transaxle and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98)
		No	• Check voltage at the following PCM terminals (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — Throttle position sensor signal — Ground (Engine, body) • Repair or replace any defective parts

NO.15 ENGINE FLARES UP OR SLIPS WHEN ACCELERATING VEHICLE [GF4A-EL]

Z6U050301030W19

15	Engine flares up or slips when accelerating vehicle
DESCRIPTION	• Engine flares up when accelerator pedal is depressed for upshifting. • Engine flares up suddenly when accelerator pedal is depressed for downshifting.
POSSIBLE CAUSE	• The malfunction is basically the same as for No.14 "ENGINE FLARES UP OR SLIPS WHEN UPSHIFTING OR DOWNSHIFTING". If conditions for No.14 worsen, the malfunction will develop into No.15.

NO.16 JUDDER UPON TORQUE CONVERTER CLUTCH (TCC) OPERATION [GF4A-EL]

Z6U050301030W20

16	Judder upon torque converter clutch (TCC) operation
DESCRIPTION	• Vehicle jolts when TCC engaged.
POSSIBLE CAUSE	**Caution** • **If the TCC or piston is stuck, inspect them. In addition, inspect the oil cooler for foreign particles which may have mixed in with the ATF.** • Poor TCC engagement due to either slippage because the TCC piston is stuck or the line pressure is low. — Torque converter clutch piston slipping, burned • Line pressure low • Malfunction of throttle position sensor • Malfunction of vehicle speedometer sensor • Malfunction of input/turbine speed sensor • Malfunction of sensor ground • Malfunction of torque converter clutch control solenoid valve (Sticking) • Malfunction of control valve body system (Poor operation, sticking)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Check voltage at the following PCM terminal (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — TCC control solenoid valve signal • Is terminal voltage okay?	Yes	Go to next step
		No	Repair or replace any defective parts
2	• Check the voltage at the following PCM terminals (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — Throttle position sensor signal — Vehicle speedometer sensor signal — Input/turbine speed sensor signal — Ground (Engine, body) • Are terminal voltage okay?	Yes	Replace PCM (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL])
		No	Repair or replace any defective parts

STEP	INSPECTION		ACTION
3	• Check voltage at the following PCM terminal (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — Pressure control solenoid signal • Is terminal voltage okay?	Yes	Go to next step
		No	Repair or replace any defective parts
4	• Check duty of pressure control solenoid (See 05-17B-30 Inspection of Output Duty) • Is duty okay?	Yes	Overhaul control valve body and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98) If problem remains, overhaul transaxle and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98)
		No	Go to step 3

NO.17 EXCESSIVE N TO D OR N TO R POSITION/RANGE SHIFT SHOCK [GF4A-EL]

Z6U050301030W21

17	Excessive N to D or N to R position/range shift shock
DESCRIPTION	• Strong shock felt when shifting from N to D or N to R position/range at idle.
POSSIBLE CAUSE	• Shift shock may worsen when the fail-safe is operating. Verify the diagnostic trouble code at first. However, if no diagnostic trouble code is output, the shift shock may worsen due to poor operation of the control valve body or sticking of the clutch. — Clutch burned (N→D: Forward clutch, N→R: Reverse clutch or low and reverse brake) • Line pressure low • Malfunction of throttle position sensor • Malfunction of TFT sensor • Malfunction of sensor ground • Malfunction of pressure control solenoid valve (Sticking) • Malfunction of pressure regulator valve (Poor operation, sticking) • Malfunction of pressure modifier valve (Poor operation, sticking) • Malfunction of pilot valve (Poor operation, sticking) — Poor hydraulic operation (Malfunction in range change) — Idle speed high — Poor tightening torque of engine mount, exhaust mount

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Does shift shock occur only when engine cold?	Yes	Check voltage at the following PCM terminals (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) • Throttle position sensor signal • TFT sensor signal • Ground (Engine, body) Are terminal voltages okay?
		No	Go to next step
2	• Perform the stall test (See 05-17B-14 Stall Speed Test) • Is stall speed okay?	Yes	Go to next step
		No	Go to step 4
3	• Check the voltage at the following PCM terminals (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — D range signal — Load/no load distinction signal • Are terminal voltages okay?	Yes	Overhaul control valve body and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98) If problem remains, overhaul transaxle and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98)
		No	Repair or replace any defective parts

STEP	INSPECTION		ACTION
4	• Check the voltage at the following PCM terminal (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — Pressure control solenoid signal • Is terminal voltage okay?	Yes	Go to next step
		No	Repair or replace any defective parts
5	• Check duty of pressure control solenoid (See 05-17B-30 Inspection of Output Duty) • Is duty okay?	Yes	Overhaul control valve body and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98) If problem remains, overhaul transaxle and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98)
		No	Check voltage at the following PCM terminals (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) • Throttle position sensor signal • Ground (Engine, body) Repair or replace any defective parts

NO.18 EXCESSIVE SHIFT SHOCK WHEN UPSHIFTING AND DOWNSHIFTING [GF4A-EL]

Z6U050301030W22

18	Excessive shift shock when upshifting and downshifting
DESCRIPTION	• Excessive shift shock felt when depressing accelerator pedal to accelerate at upshifting. During cruising, excessive shift shock felt when depressing accelerator pedal at downshifting.
POSSIBLE CAUSE	• Shift shock may worsen when the fail-safe is operating. Verify the diagnostic trouble code at first. The shift shock has worsened if the throttle position sensor, input/turbine speed sensor, or vehicle speedometer sensor signal malfunctions. — Clutch slipping, burned (2-4 brake band, 3-4 clutch) • Line pressure low, high • Malfunction of throttle position sensor • Malfunction of vehicle speedometer sensor • Malfunction of input/turbine speed sensor • Malfunction of TFT sensor • Malfunction of sensor ground • Malfunction of shift solenoid A (Sticking) • Malfunction of shift solenoid B (Sticking) • Malfunction of shift solenoid C (Sticking) • Malfunction of 3-2 timing solenoid valve (Sticking) • Malfunction of pressure control solenoid valve (Sticking) • Malfunction of body ground (Sticking) • Malfunction of control valve body system (Poor operation, sticking)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Perform the stall test (See 05-17B-14 Stall Speed Test) • Is stall speed okay?	Yes	Go to next step
		No	Repair or replace any defective parts
2	• Check the voltage at the following PCM terminal (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — Pressure control solenoid signal • Is terminal voltage okay?	Yes	Go to next step
		No	Repair or replace any defective parts

STEP	INSPECTION		ACTION
3	• Check duty of pressure control solenoid (See 05-17B-30 Inspection of Output Duty) • Is duty okay?	Yes	Overhaul control valve body and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98) If problem remains, overhaul transaxle and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98)
		No	Check voltage at the following PCM terminals (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) • Throttle position sensor signal • Ground (Engine, body) Repair or replace any defective parts

NO.19 EXCESSIVE TORQUE CONVERTER CLUTCH (TCC) SHIFT SHOCK [GF4A-EL]

Z6U050301030W23

19	Excessive torque converter clutch (TCC) shift shock
DESCRIPTION	• Strong shock felt when TCC engaged.
POSSIBLE CAUSE	• The troubleshooting flow is the same as for No.16 "JUDDER UPON TORQUE CONVERTER CLUTCH (TCC) OPERATION".

NO.20 NOISE AT IDLE WHEN VEHICLE STOPPED IN ALL POSITIONS/RANGES [GF4A-EL]

Z6U050301030W24

20	Noise at idle when vehicle stopped in all positions/ranges
DESCRIPTION	• Transaxle noisy in all positions and ranges when vehicle is idling.
POSSIBLE CAUSE	• The malfunction is in the line pressure solenoid valve or oil pump which causes a high-pitched noise to be emitted from the transaxle at idle. **Note** • If a noise is emitted during shifting only, the malfunction is in shift solenoids A, B or C. If a noise is emitted during shifting at certain gears only or during deceleration only, it is gear noise.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Does noise stop when solenoid connector is disconnected?	Yes	Go to next step
		No	Overhaul control valve body and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98) If problem remains, overhaul transaxle and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98)
2	• Check the voltage at the following PCM terminal (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — Pressure control solenoid signal • Is terminal voltage okay?	Yes	Go to next step
		No	Repair or replace any defective parts

STEP	INSPECTION		ACTION
3	• Check duty of pressure control solenoid (See 05-17B-30 Inspection of Output Duty) • Is duty okay?	Yes	Overhaul control valve body and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98) If problem remains, overhaul transaxle and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98)
		No	Go to next step
4	• Check voltage at the following PCM terminals (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — Throttle position sensor signal — Vehicle speedometer sensor signal — Input/turbine speed sensor signal — Ground (Engine, body) • Are terminal voltages okay?	Yes	Replace PCM (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL])
		No	Repair or replace any defective parts

NO.21 NOISE AT IDLE WHEN VEHICLE STOPPED IN D, 2, 1, RANGES, AND/OR IN R POSITION [GF4A-EL]

Z6U050301030W25

21	Noise at idle when vehicle stopped in D, 2, 1, ranges, and/or in R position
DESCRIPTION	• Transaxle noisy in driving ranges when vehicle is idling.
POSSIBLE CAUSE	• Although the malfunction is basically the same as for No.20 "NOISE AT IDLE WHEN VEHICLE STOPPED IN ALL POSITIONS/RANGES", other causes may include selector lever position disparity or transaxle range switch position disparity.

NO.22 NO ENGINE BRAKING IN 1 RANGE AND 2 RANGE (SECOND GEAR) [GF4A-EL]

Z6U050301030W26

22	No engine braking in 1 range and 2 range (second gear)
DESCRIPTION	• Engine speed drops to idle but vehicle coasts when accelerator pedal released during cruising at medium to high speeds. • Engine speed drops to idle but vehicle coasts when accelerator pedal released when in 1 range at low vehicle speed.
POSSIBLE CAUSE	• Clutch slipping, burned (Coasting clutch, low and reverse brake) — Line pressure low — Malfunction of vehicle speedometer sensor — Malfunction of input/turbine speed sensor — Malfunction of sensor ground — Malfunction of shift solenoid C (Sticking) — Malfunction of control valve body system (Poor operation, sticking)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Connect NGS tester to DLC. Select TR PID. Turn the ignition switch ON. Verify TR PID reading is correct when selecting range	Yes	Go to next step
		No	• Check for transaxle range switch adjustment. (See 05-17B-25 TRANSAXLE RANGE SWITCH ADJUSTMENT [GF4A-EL]) • Check for transaxle range switch. Readjust or replace if necessary.
2	• Do the following symptoms concurrently occur? — Engine flares up or slips while accelerating — Engine flares up or slips when shifting	Yes	Go to No.15 "ENGINE FLARES UP OR SLIPS WHEN ACCELERATING VEHICLE", No.14 "ENGINE FLARES UP OR SLIPS WHEN UPSHIFTING OR DOWNSHIFTING"
		No	Go to next step

STEP	INSPECTION		ACTION
3	• Check voltage at the following PCM terminals (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — Shift solenoid C signal — Input/turbine speed sensor signal — Vehicle speedometer sensor signal • Are terminals voltage okay?	Yes	Overhaul control valve body and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98) If problem remains, overhaul transaxle and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98)
		No	Repair or replace any defective parts

NO.23 TRANSAXLE OVERHEATS [GF4A-EL]

Z6U050301030W27

23	Transaxle overheats
DESCRIPTION	• Burnt smell emitted from transaxle. • Smoke emitted from transaxle.
POSSIBLE CAUSE	• The malfunction is restricted to hinderance of coolant at the oil cooler. In addition, overheating of the transaxle may be caused by a malfunction of the transaxle fluid temperature sensor. — Line pressure low • ATF level low • Malfunction of throttle position sensor • Malfunction of pressure control solenoid valve (Short, open, poor operation) — Oil cooler circuit malfunction (Foreign material mixed in with ATF) — TFT sensor malfunction — Excessive amount of ATF

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Perform stall test (See 05-17B-14 Stall Speed Test) • Is stall speed okay?	Yes	Go to next step
		No	Repair or replace any defective parts
2	• Check voltage at the following PCM terminal (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — Pressure control solenoid signal • Is terminal voltage okay?	Yes	Go to next step
		No	Repair or replace any defective parts
3	• Check duty of pressure control solenoid (See 05-17B-30 Inspection of Output Duty) • Is duty okay?	Yes	Overhaul control valve body and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98) If problem remains, overhaul transaxle and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98)
		No	Check voltage at the following PCM terminals (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) • Throttle position sensor signal • Ground (Engine, body) Repair or replace any defective parts

NO.24 ENGINE STALLS WHEN SHIFTED TO D, 2, 1 RANGES, AND/OR IN R POSITION [GF4A-EL]

Z6U050301030W28

24	Engine stalls when shifted to D, 2, 1 ranges, and/or in R position
DESCRIPTION	• Engine stalls when shifting from N or P position to D, 2, 1 ranges or R position at idle.
POSSIBLE CAUSE	• The malfunction is on the engine control side (idle air control). Otherwise, the malfunction is in the input/turbine speed sensor (engine sometimes starts) or TCC piston circuit (engine always stalls).

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Go to No.5 "Engine stalls-after start/at idle" (See 01-03B-5 SYMPTOM DIAGNOSTIC INDEX [KL]) • Is EGI system okay?	Yes	Go to next step
		No	Repair or replace any defective parts
2	• Check the voltage at the following PCM terminals (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — Load/no load distinction signal — R position, D, 2, 1 ranges signal — TCC control solenoid valve signal • Are terminal voltages okay?	Yes	Go to next step
		No	Repair or replace any defective parts
3	• Check duty of pressure control solenoid (See 05-17B-30 Inspection of Output Duty) • Is duty okay?	Yes	Overhaul control valve body and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98) If problem remains, overhaul transaxle and repair or replace any defective parts (See Automatic Transaxle Workshop Manual GF4A-EL (9999-95-192H-98)
		No	Check voltage at the following PCM terminals (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) • Throttle position sensor signal • Vehicle speedometer sensor signal Repair or replace any defective parts

NO.25 ENGINE STALLS WHEN DRIVING AT SLOW SPEEDS OR STOPPING [GF4A-EL]

Z6U050301030W29

25	Engine stalls when driving at slow speeds or stopping
DESCRIPTION	• Engine stalls when brake pedal depressed while driving at low speeds or stopping.
POSSIBLE CAUSE	• The malfunction is on the engine control side (fuel injection control, idle air control)

Diagnostic procedure

STEP	INSPECTION	ACTION
1	• Go to No.15 "Emissions compliance" (See 01-03B-5 SYMPTOM DIAGNOSTIC INDEX [KL]) • Is EGI system okay?	Go to No.24 "ENGINE STALLS WHEN SHIFTED TO D, 2, 1, RANGES, AND/OR IN R POSITION"
		Repair or replace any defective parts

NO.26 O/D OFF INDICATOR LIGHT DOES NOT ILLUMINATE WHEN O/D OFF SWITCH IS TURNED ON [GF4A-EL]

Z6U050301030W30

26	O/D OFF indicator light does not illuminate when O/D OFF switch is turned on
DESCRIPTION	• O/D OFF indicator light in dashboard does not illuminate when O/D OFF switch is turned on and ignition switch is at ON.
POSSIBLE CAUSE	• The malfunction is in the O/D OFF switch

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Are other indicator lights illuminated with ignition switch at ON?	Yes	Inspect meter fuse
		No	Go to next step

STEP	INSPECTION		ACTION
2	• Check the O/D OFF switch (See 05-17B-22 O/D OFF SWITCH INSPECTION [GF4A-EL]) • Is O/D OFF switch okay?	Yes	Go to next step
		No	Repair or replace any detective parts
3	• Check voltage at the following PCM terminal (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — O/D OFF indicator light signal • Is terminal voltage okay?	Yes	Go to next step
		No	Replace PCM (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL])
4	• Check the O/D OFF indicator light • Is O/D OFF indicator light okay?	Yes	Inspect for open circuit or disconnected connector in harness between the following • Ignition switch and O/D OFF indicator light • O/D OFF indicator light and PCM
		No	Repair or replace any defective parts

NO.27 O/D OFF INDICATOR LIGHT ILLUMINATES WHEN O/D OFF SWITCH IS NOT TURNED ON [GF4A-EL]

Z6U050301030W31

27	O/D OFF indicator light illuminates when O/D OFF switch is not turned on
DESCRIPTION	• O/D OFF indicator light in dashboard illuminates even though O/D OFF switch is turned OFF and ignition switch is at ON.
POSSIBLE CAUSE	• O/D OFF switch malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Check the O/D OFF switch (See 05-17B-22 O/D OFF SWITCH INSPECTION [GF4A-EL]) • Is O/D OFF switch okay?	Yes	Go to next step
		No	Repair or replace any defective parts
2	• Check voltage at the following PCM terminal (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) — O/D OFF indicator light signal • Is terminal voltage okay?	Yes	Inspect for short circuit or disconnected connector in harness between the following • O/D OFF indicator light and PCM
		No	Replace PCM (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL])

05-10 CLUTCH

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GENERAL PROCEDURES (CLUTCH)

Z6U051016003W01

Clutch Pipe Removal/Installation

1. If any clutch pipe has been disconnected at any time during the procedure, add brake fluid, bleed the air, and inspect for leakage after the procedure has been completed.
2. If removing the clutch pipe, remove it using the **SST** (49 0259 770B). If installing the clutch pipe, adjust the clutch pipe tightening torque to allow for the use of a torque wrench-**SST** (49 0259 770B) combination, and then tighten the clutch pipe using the **SST** (49 0259 770B).

CLUTCH FLUID INSPECTION

Z6U051016010W01

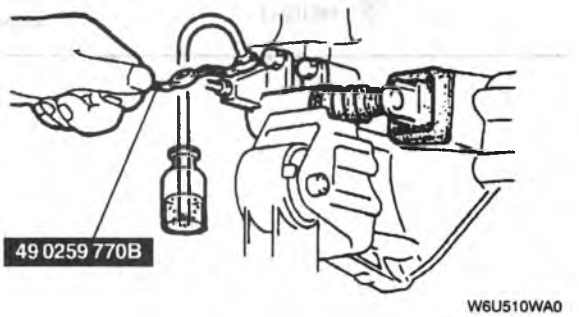
Note
- The fluid in the reservoir must be maintained between the MIN/MAX level during replacement.

CLUTCH FLUID REPLACEMENT

Z6U051016010W02

Caution
- **Be careful not to spill clutch fluid on a painted surface. If this should happen, wash it off immediately.**
- **Do not mix different brands of clutch fluid.**
- **Do not reuse drained clutch fluid.**

1. Draw the fluid from the reservoir with a suction pump.
2. Remove the bleeder cap from the clutch release cylinder and attach a vinyl hose to the bleeder plug.
3. Place the other end of the vinyl hose into a container.
4. Slowly pump the clutch pedal several times.
5. With the clutch pedal depressed, loosen the bleeder screw by using the **SST** to let fluid escape. Close the bleeder screw using the **SST**.



W6U510WA0

6. Repeat steps 4 and 5 until only clean fluid is seen.
7. Tighten the bleeder screw.

Tightening torque
5.9—8.8 N·m {60—90 kgf·cm, 53—78 in·lbf}

8. Add fluid to the MAX mark.
9. Inspect for correct clutch operation.

CLUTCH PEDAL ADJUSTMENT

Z6U051041030W01

Clutch Pedal Height

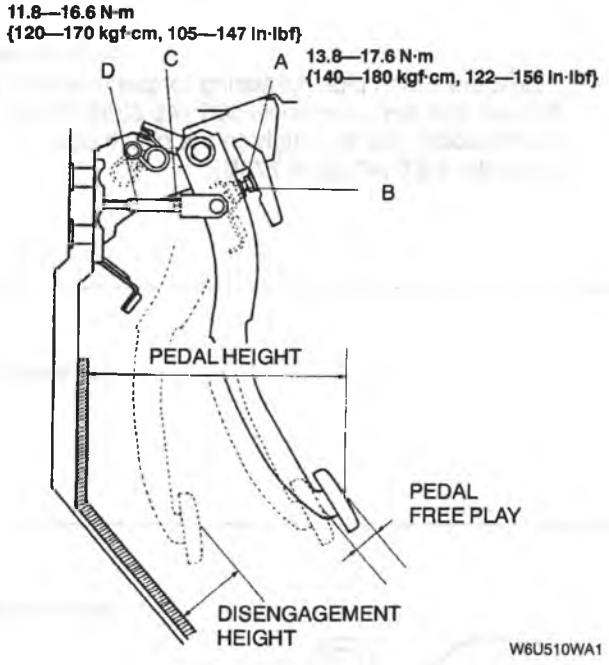
1. Measure the distance from the upper surface of the pedal pad to the carpet.
   - As necessary, adjust the pedal height by turning adjustment bolt A and locknut B.

Pedal height
194—202 mm {7.64—7.95 in} (with carpet)

Clutch Pedal Free Play

1. Gently depress the clutch pedal by hand until clutch resistance is felt, and measure the pedal free play.
   - As necessary, adjust the pedal free play by turning locknut C and adjusting push rod D.

Pedal free play
1.0—3.0 mm {0.04—0.11 in}



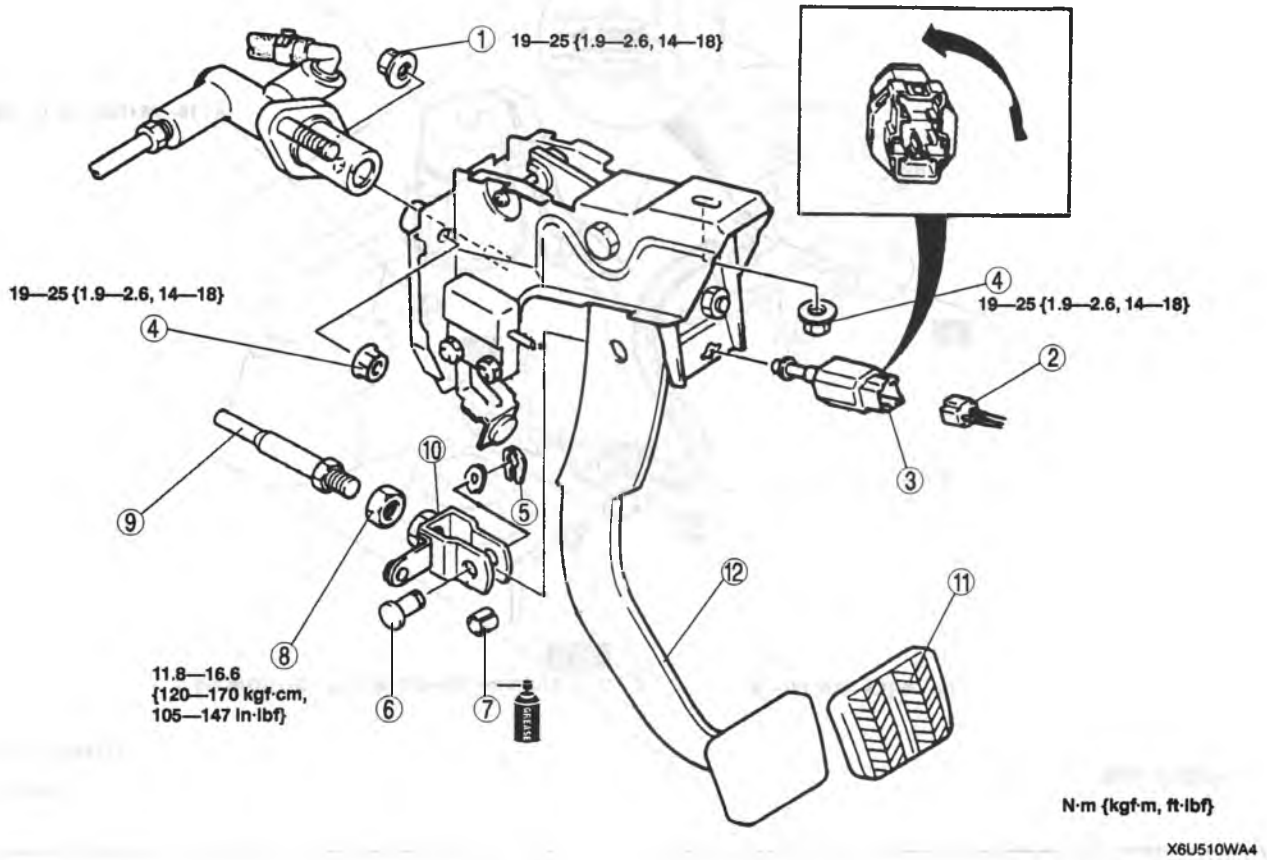
2. Verify that the disengagement height (from the upper surface of the pedal pad to the carpet) is correct when the pedal is fully depressed.

Minimum disengagement height
38 mm {1.50 in} (With carpet)

CLUTCH PEDAL REMOVAL/INSTALLATION

Z6U051041030W02

1. Disconnect the negative battery cable.
2. Remove the lower panel.
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.



1	Nut
2	Clutch switch connector
3	Clutch switch
4	Nut
5	E clip
6	Pin
7	Bushing

8	Locknut
9	Push rod
10	Clevis
11	Pedal pad
12	Clutch pedal (See 05-10-3 Clutch Pedal Installation Note)

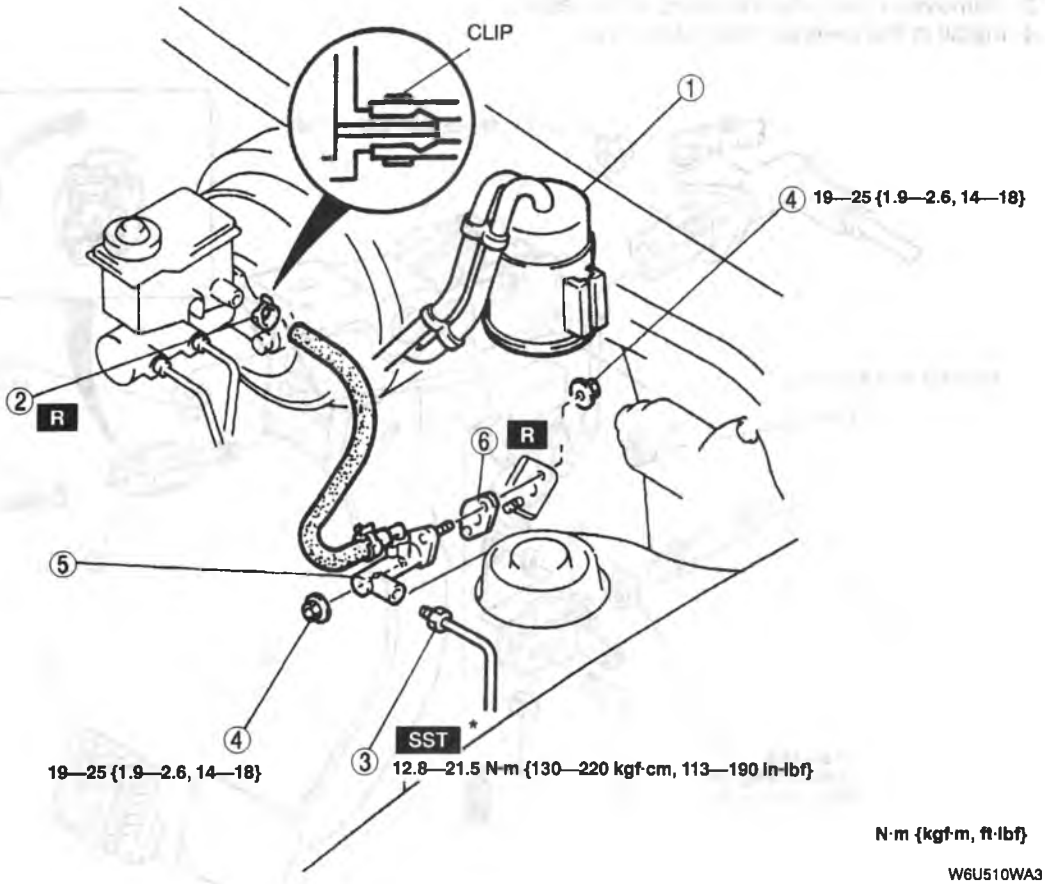
Clutch Pedal Installation Note

1. After installation, adjust the pedal height and free play. (See 05-10-2 CLUTCH PEDAL ADJUSTMENT.)

CLUTCH MASTER CYLINDER REMOVAL/INSTALLATION

Z6U051041990W01

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



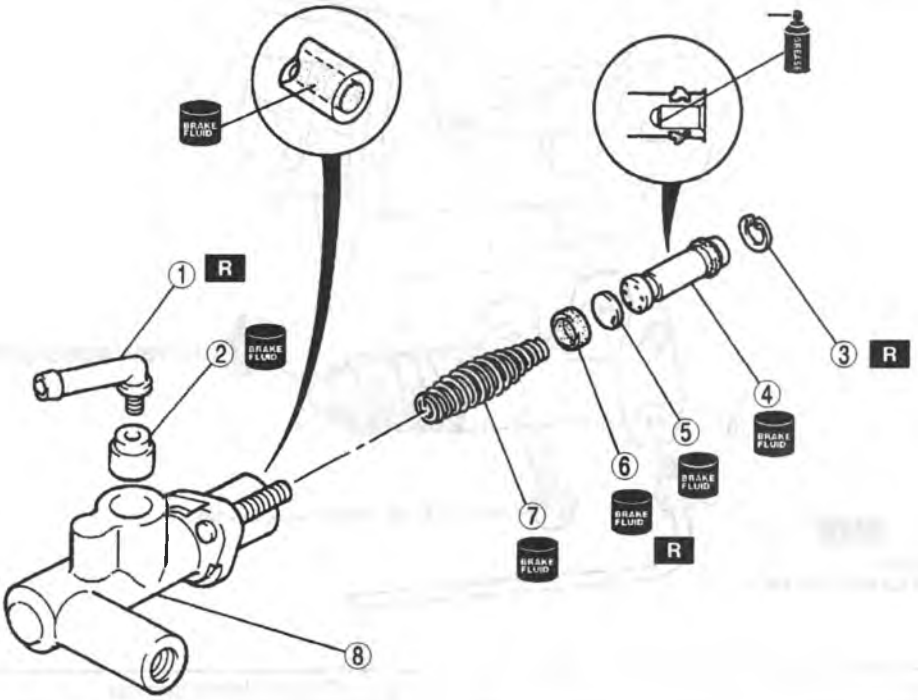
1	Charcoal canister
2	Clip
3	Clutch pipe

4	Nut
5	Clutch master cylinder
6	Gasket

CLUTCH MASTER CYLINDER DISASSEMBLY/ASSEMBLY

Z6U051041990W02

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



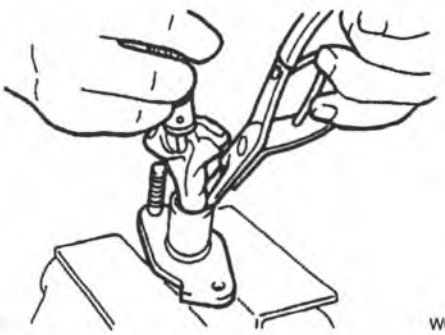
W6U510WA4

1	Joint
2	Bushing
3	Snap ring (See 05-10-5 Snap Ring Disassembly Note) (See 05-10-5 Snap Ring Assembly Note)
4	Piston and secondary cap

5	Spacer
6	Primary cap
7	Return spring
8	Master cylinder body

Snap Ring Disassembly Note

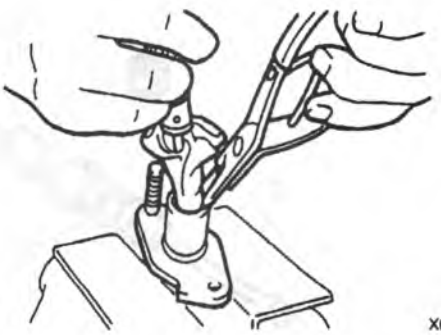
1. Hold the piston down using a cloth-wrapped pin punch, then remove the snap ring with snap ring pliers.



W6U510WA5

Snap Ring Assembly Note

1. Hold the piston down using a cloth-wrapped pin punch, then install the snap ring with snap ring pliers.

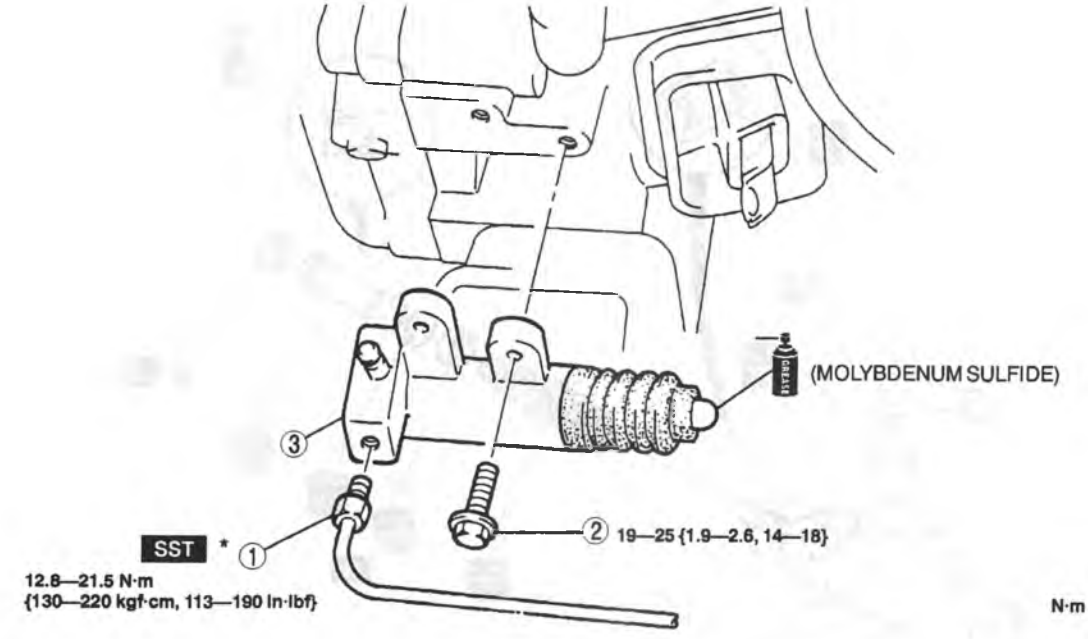


X6U510WA2

CLUTCH RELEASE CYLINDER REMOVAL/INSTALLATION

Z6U051041920W01

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



* 49 0259 770B

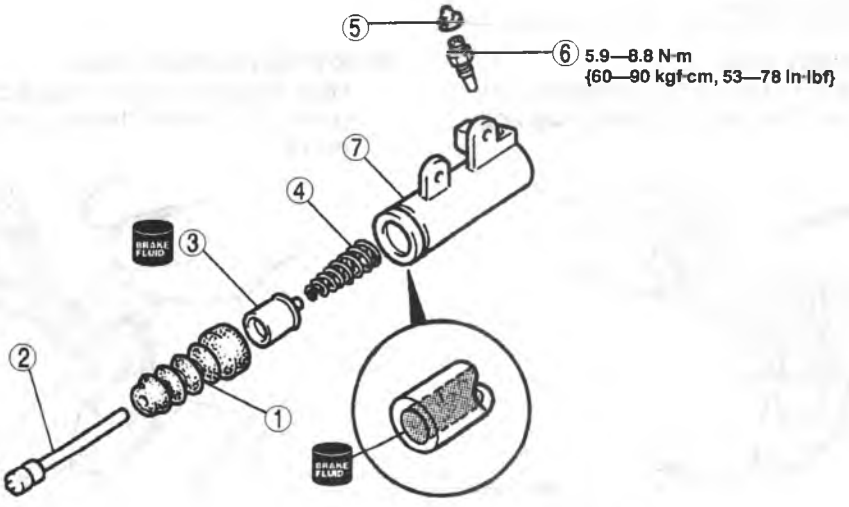
X6U510WA0

1	Clutch pipe
2	Bolt
3	Clutch release cylinder

CLUTCH RELEASE CYLINDER DISASSEMBLY/ASSEMBLY

Z6U051041920W02

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



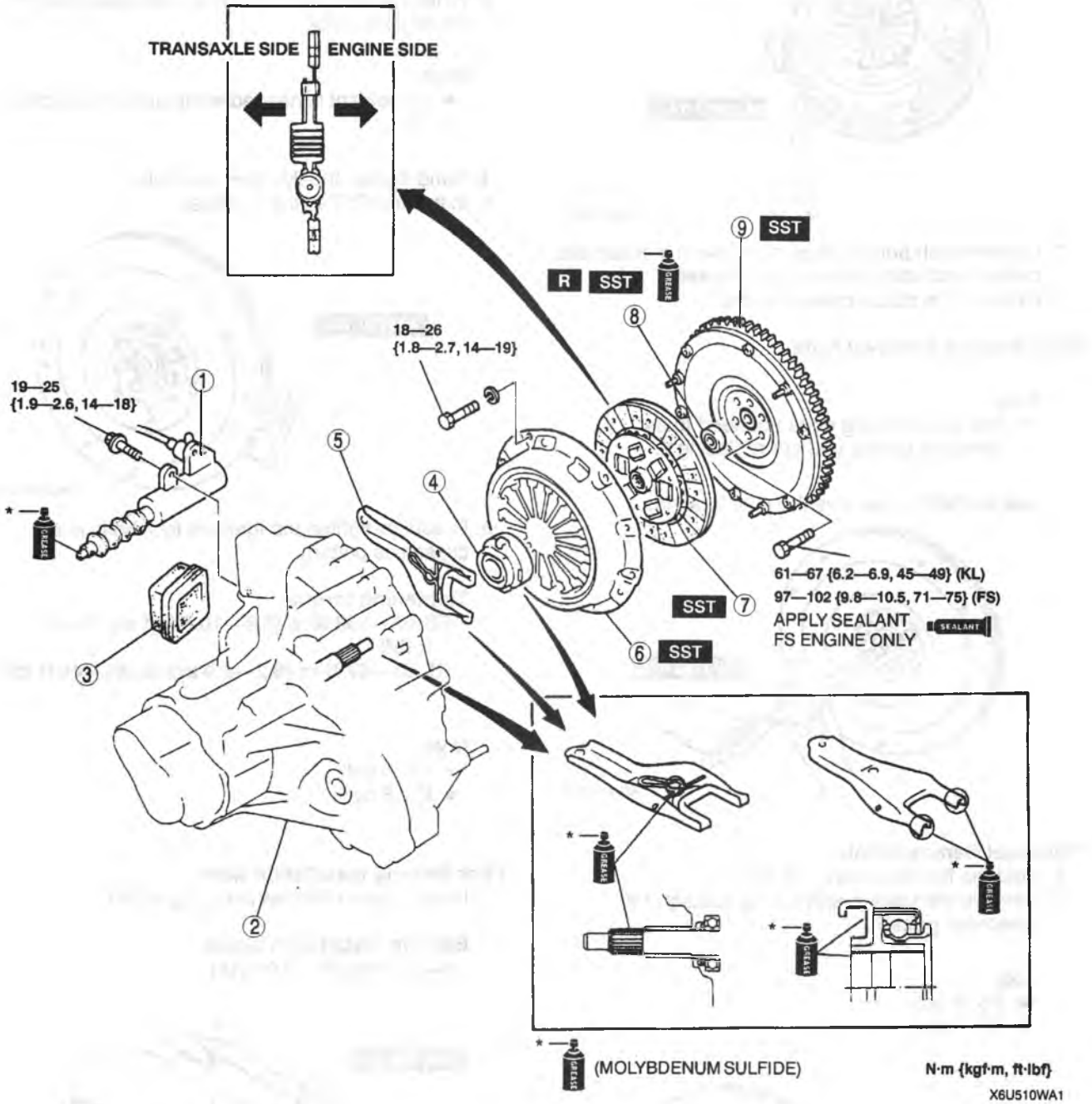
W6U510WA7

1	Boot
2	Push rod
3	Piston and cap
4	Return spring
5	Bleeder cap
6	Bleeder screw
7	Release cylinder body

CLUTCH UNIT REMOVAL/INSTALLATION

Z6U051016000W01

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.

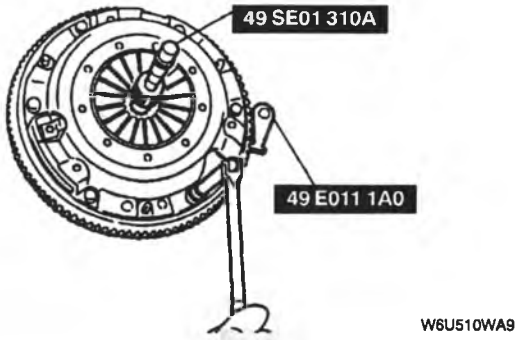


1	Clutch release cylinder
2	Manual transaxle (See 05-15-4 MANUAL TRANSAXLE REMOVAL/INSTALLATION)
3	Boot
4	Clutch release collar
5	Clutch release fork
6	Clutch cover (See 05-10-8 Clutch Cover Removal Note) (See 05-10-9 Clutch Cover Installation Note)

7	Clutch disc (See 05-10-9 Clutch Disc Installation Note)
8	Pilot bearing (See 05-10-8 Pilot Bearing Removal Note) (See 05-10-8 Pilot Bearing Installation Note)
9	Flywheel (See 05-10-8 Flywheel Removal Note) (See 05-10-8 Flywheel Installation Note)

Clutch Cover Removal Note

1. Install the **SST**.

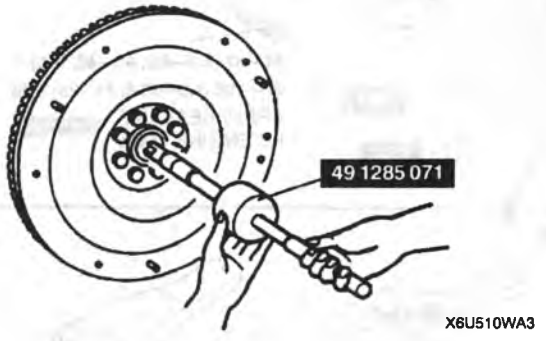


2. Loosen each bolt one turn at a time in a crisscross pattern until spring tension is released.
3. Remove the clutch cover and disc.

Pilot Bearing Removal Note

Note
- The pilot bearing does not need to be removed unless you are replacing it.

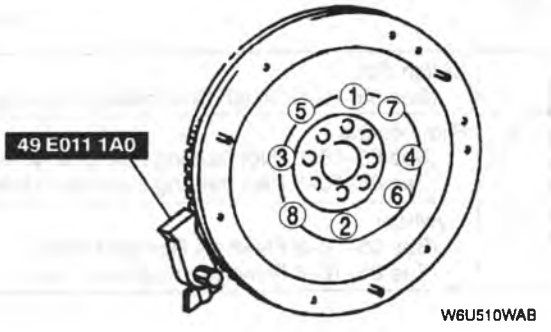
1. Use the **SST** to remove the pilot bearing.



Flywheel Removal Note

1. Hold the flywheel using the **SST**.
2. Remove the bolts evenly and gradually in a crisscross pattern.

Note
- FS: 6 bolt
- KL: 8 bolt



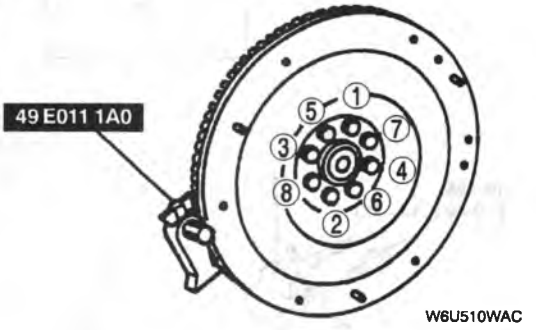
3. Remove the flywheel.

Flywheel Installation Note

1. Install the flywheel to the crankshaft.
2. When reusing the bolts, clean and apply sealant to the threads. (FS)

Note
- No sealant is needed when using new bolts. (FS)

3. Hand-tighten the flywheel lock bolts.
4. Install the **SST** to the flywheel.



5. Gradually tighten the flywheel lock bolts in a crisscross pattern.

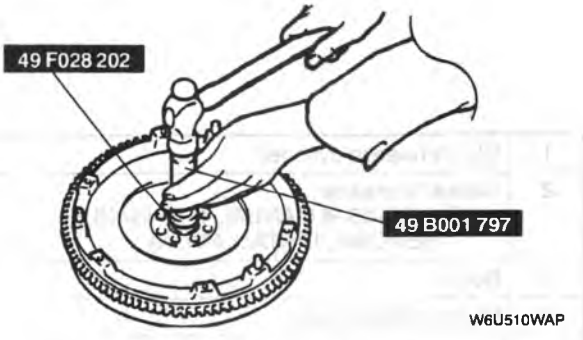
Tightening torque
FS:97—102 N·m {9.8—10.5 kgf·m, 71—75 ft·lbf}
KL:61—67 N·m {6.2—6.9 kgf·m, 45—49 ft·lbf}

Note
- FS: 6 bolt
- KL: 8 bolt

Pilot Bearing Installation Note

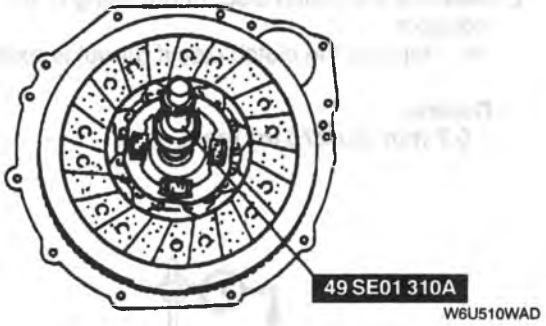
1. Install a new pilot bearing using a **SST**.

Bearing installation depth
0—0.4 mm {0—0.015 in}



Clutch Disc Installation Note

1. Hold the clutch disc position using the **SST**.

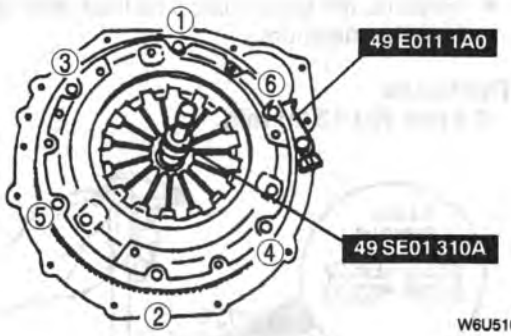


W6U510WAD

Clutch Cover Installation Note

1. Install the **SSTs**.
2. Tighten the bolts evenly and gradually in a crisscross pattern.

Tightening torque
18—26 N·m {1.8—2.7 kgf·m, 14—19 ft·lbf}



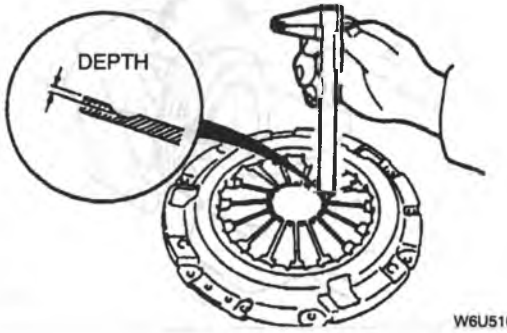
W6U510WAE

CLUTCH COVER INSPECTION

Z6U051016410W01

1. Measure the wear of the diaphragm spring fingers.

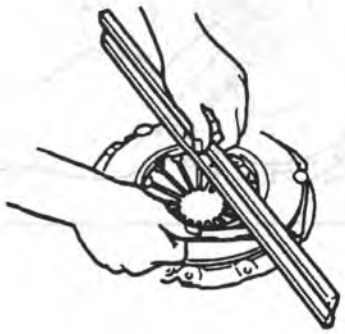
Depth
0.6 mm {0.0236 in} max.



W6U510WAF

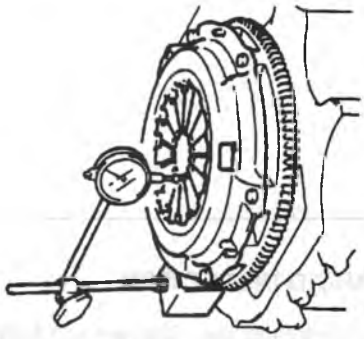
2. Measure the flatness of the pressure plate using a straight edge and a feeler gauge.
   - Replace the clutch cover if not as specified.

Maximum clearance
0.5 mm {0.020 in}


W6U510WAG

3. When checking the diaphragm spring fingers, mount a dial indicator on the cylinder block.
4. Rotate the flywheel and check for misaligned diaphragm spring fingers.
   - Replace the clutch cover if not as specified.

Misalignment
0.6 mm {0.0236 in} max.

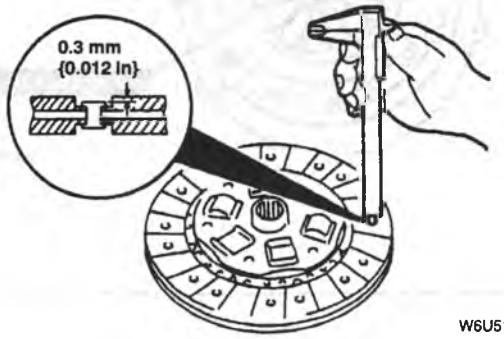

W6U510WAH

CLUTCH DISC INSPECTION

Z6U051016460W01

1. Using vernier calipers, measure the thickness of the lining at a rivet head on both sides.
   - Replace the clutch disc if its thickness is less than the minimum.

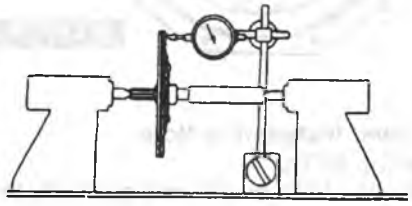
Thickness
0.3 mm {0.012 in} min.



W6U510WAJ

2. Measure the clutch disc runout using a dial indicator.
   - Replace the clutch disc if runout is excessive.

Runout
0.7 mm {0.0276 in} max.



W6U510WAK

CLUTCH RELEASE COLLAR INSPECTION

Z6U051016510W01

Caution
- **Cleaning the clutch release collar with cleaning fluids or a steam cleaner can wash the grease out of the sealed bearing.**

1. Turn the collar while applying force in the axial direction.
   - If the collar sticks or has excessive resistance, replace it.

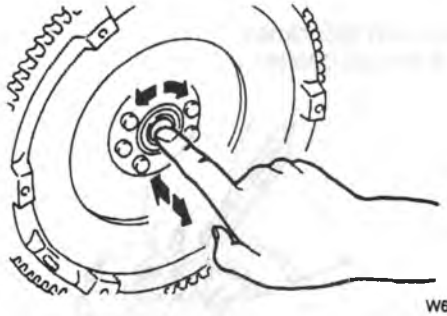


W6U510WAL

PILOT BEARING INSPECTION

Z6U051011501W01

1. Without removing the pilot bearing from the flywheel, turn the bearing while applying force in the axial direction.
   - If the bearing sticks or has excessive resistance, replace it.



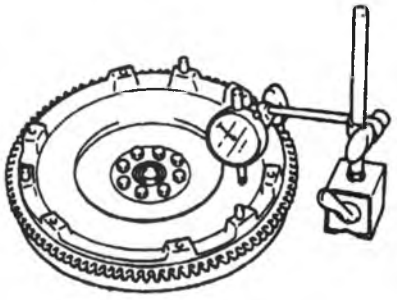
W6U510WAM

FLYWHEEL INSPECTION

Z6U051011500W01

1. Install a dial gauge on the cylinder block.
2. Measure the flywheel runout using a dial indicator.
   - Replace the flywheel if runout is excessive.

Runout
0.2 mm {0.008 in} max.



W6U510WAN

05-15 MANUAL TRANSAXLE

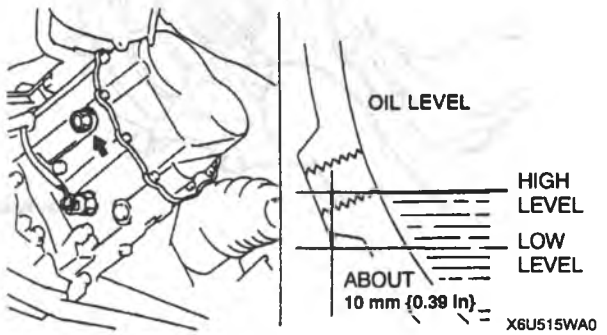
TRANSAXLE OIL INSPECTION 05-15-1
TRANSAXLE OIL REPLACEMENT 05-15-1
OIL SEAL (DIFFERENTIAL)
REPLACEMENT 05-15-2
VEHICLE SPEEDOMETER SENSOR
INSPECTION 05-15-2
VEHICLE SPEEDOMETER SENSOR
REMOVAL/INSTALLATION 05-15-3
MANUAL TRANSAXLE
REMOVAL/INSTALLATION 05-15-4
Engine Mount Member Removal
Note 05-15-7
Transaxle Removal Note 05-15-7
Transaxle Installation Note 05-15-7
Engine Mount Member Installation
Note 05-15-7

TRANSAXLE OIL INSPECTION

1. Park the vehicle on level ground.
2. Remove the oil level plug and washer.
3. Verify that the oil is near the bottom of the plug port.
   - If the oil level is lower than the low level, add the specified type of oil to the bottom of the plug port through the oil level plug hole.

Specified oil grade
API Service GL-4 or GL-5
Specified oil viscosity
All-season: SAE 75W-90
Above 10 °C {50 °F}: SAE 80W-90

Z6U051527001W01



X6U515WA0

4. Install a new washer and the oil level plug.

Tightening torque
40—58 N·m {4.0—6.0 kgf·m, 29—43 ft·lbf}

TRANSAXLE OIL REPLACEMENT

1. Remove the drain plug and washer.
2. Drain the oil into a suitable container.
3. Install a new washer and the drain plug.

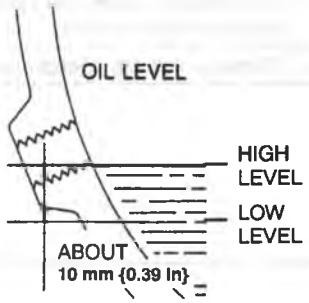
Tightening torque
40—58 N·m {4.0—6.0 kgf·m, 29—43 ft·lbf}

4. Remove the oil level plug with washer and add the specified amount and type of oil through the oil level plug hole until the level reaches the bottom of the oil level plug hole.

Specified oil grade
API Service GL-4 or GL-5
Specified oil viscosity
All-season: SAE 75W-90
Above 10 °C {50 °F}: SAE 80W-90

Z6U051527001W02

Capacity (Approximate quantity)
2.7 L {2.9 US qt, 2.4 Imp qt}



X6U515WA1

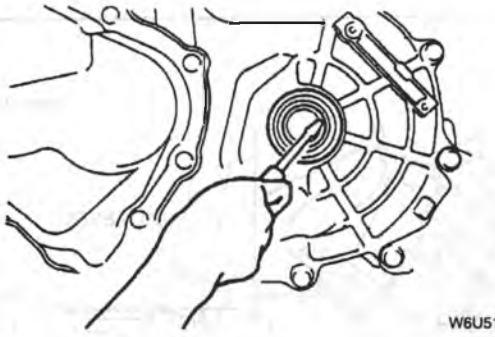
5. Install a new washer and the oil level plug.

Tightening torque
40—58 N·m {4.0—6.0 kgf·m, 29—43 ft·lbf}

OIL SEAL (DIFFERENTIAL) REPLACEMENT

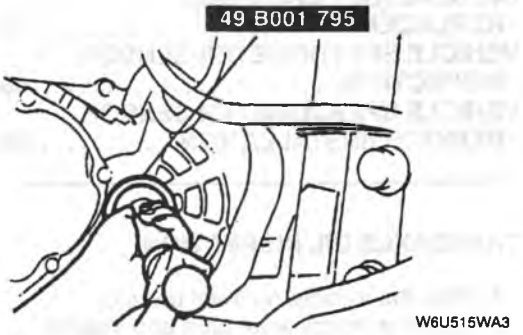
Z6U051527165W01

1. On level ground, jack up the vehicle and support it evenly on safety stands.
2. Drain the oil from the transaxle.
3. Remove the front wheels and splash shields.
4. Separate the drive shaft and joint shaft from the transaxle. (See 03-13-7 DRIVE SHAFT REMOVAL/INSTALLATION.) (See 03-13-2 JOINT SHAFT REMOVAL/INSTALLATION.)
5. Remove the oil seals using a screwdriver.



W6U515WA2

6. Using the **SST** and a hammer, tap each new oil seal in evenly until the **SST** contacts the transaxle case.



W6U515WA3

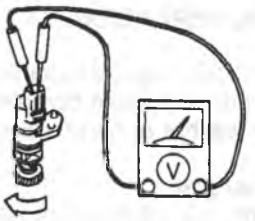
7. Coat the lip of each oil seal with transaxle oil.
8. Insert the drive shaft and joint shaft to the transaxle. (See 03-13-7 DRIVE SHAFT REMOVAL/INSTALLATION.) (See 03-13-2 JOINT SHAFT REMOVAL/INSTALLATION.)
9. Install the wheels and tires. (See 02-10-1 PRECAUTION (SUSPENSION).)
10. Install the splash shields.
11. Add the specified amount and type of oil. (See 05-15-1 TRANSAXLE OIL REPLACEMENT.)

VEHICLE SPEEDOMETER SENSOR INSPECTION

Z6U051517400W01

1. Remove the vehicle speedometer sensor.
2. Measure voltage between terminals of the vehicle speedometer sensor while the gear is turning.

Meter needle	Action
Moves slightly under 5 V	Inspect wiring harness between instrument cluster and vehicle speedometer sensor.
Does not move	Replace vehicle speedometer sensor.



W6U515WA4

3. Install the vehicle speedometer sensor. (See 05-15-3 VEHICLE SPEEDOMETER SENSOR REMOVAL/INSTALLATION.)

VEHICLE SPEEDOMETER SENSOR REMOVAL/INSTALLATION

Z6U051517400W02

1. Disconnect the negative battery cable.
2. Remove the air cleaner component, battery and battery box.
3. Disconnect the vehicle speedometer sensor connector.
4. Remove the vehicle speedometer sensor.
5. Apply transaxle oil to a new O-ring and install it on a new vehicle speedometer sensor.
6. Install the vehicle speedometer sensor.

Tightening torque
7.9—11.2 N·m {80—115 kgf·cm, 69.5—99.8 in·lbf}

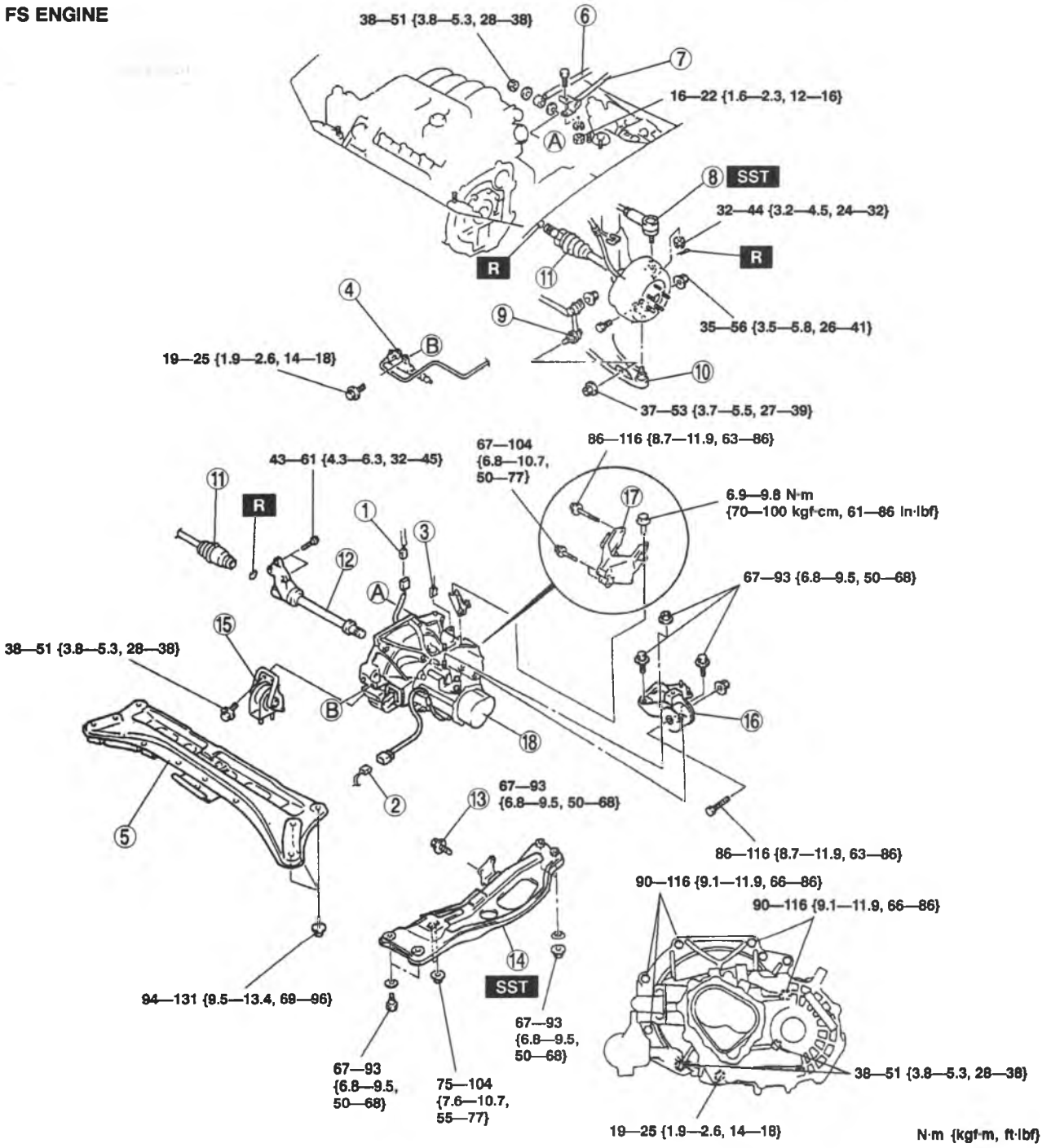
7. Connect the vehicle speedometer sensor connector.
8. Install the battery, battery box and air cleaner component.
9. Connect the negative battery cable.

MANUAL TRANSAXLE REMOVAL/INSTALLATION

Z6U051501029W01

1. Remove the battery, and battery box.
2. Remove the fresh air duct and air cleaner component.
3. Remove the wheels and tires. (See 02-10-1 PRECAUTION (SUSPENSION).)
4. Remove the splash shields.
5. Drain the transaxle oil into a container.
6. Remove the starter for FS engine. (See 01-19-2 STARTER REMOVAL/INSTALLATION.)
7. Remove in the order indicated in the table.
8. Install in the reverse order of removal.
9. Add the specified amount of the specified transaxle oil. (See 05-15-1 TRANSAXLE OIL REPLACEMENT.)
10. Warm up the engine and transaxle, inspect for oil leakage, and inspect the transaxle operation.

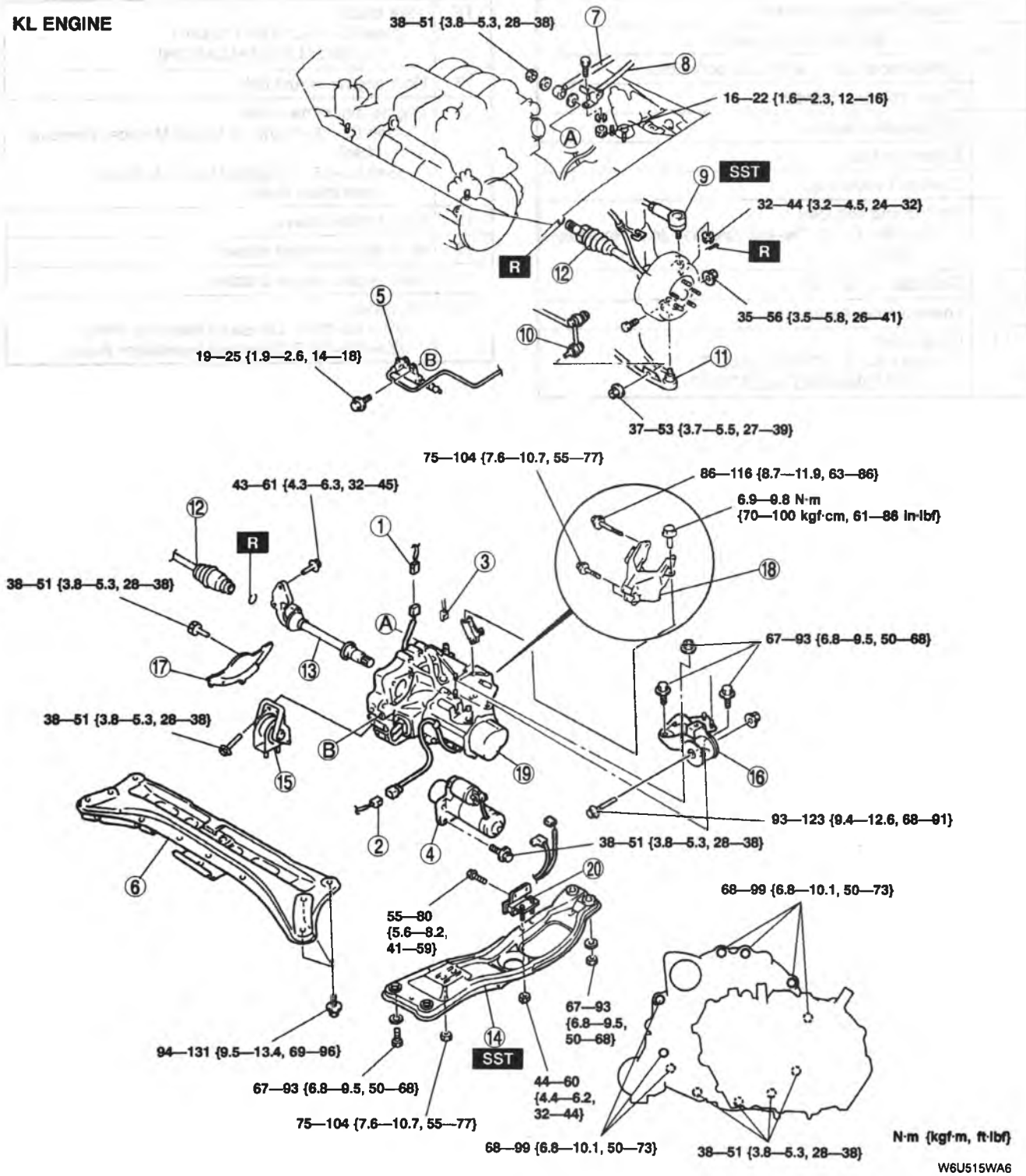
FS ENGINE



W6U515WA5

1	Neutral switch connector
2	Back-up light switch connector
3	Vehicle speedometer sensor connector
4	Clutch release cylinder
5	Transverse member
6	Extension bar
7	Change control rod
8	Tie-rod end ball joint (See 06-12-10 Tie-rod End Ball Joint Removal Note)
9	Stabilizer control link
10	Lower arm ball joint
11	Drive shaft (See 03-13-7 DRIVE SHAFT REMOVAL/INSTALLATION)
12	Joint shaft (See 03-13-2 JOINT SHAFT REMOVAL/INSTALLATION)
13	No.5 engine mount bolt
14	Engine mount member (See 05-15-7 Engine Mount Member Removal Note) (See 05-15-7 Engine Mount Member Installation Note)
15	No.2 engine mount
16	No.4 engine mount rubber
17	No.1 engine mount bracket
18	Transaxle (See 05-15-7 Transaxle Removal Note) (See 05-15-7 Transaxle Installation Note)

KL ENGINE



1	Neutral switch connector
2	Back-up light switch connector
3	Vehicle speedometer sensor connector
4	Starter (See 01-19-2 STARTER REMOVAL/INSTALLATION)
5	Clutch release cylinder
6	Transverse member

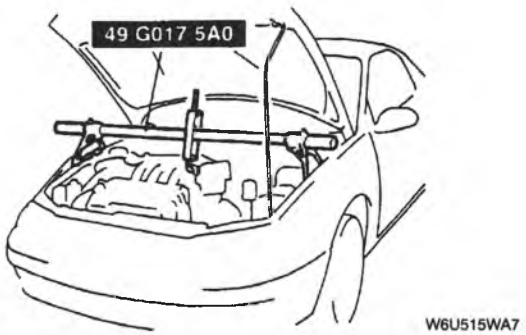
7	Extension bar
8	Change control rod
9	Tie-rod end ball joint (See 06-12-10 Tie-rod End Ball Joint Removal Note)
10	Stabilizer control link
11	Lower arm ball joint

12	Drive shaft (See 03-13-7 DRIVE SHAFT REMOVAL/INSTALLATION)
13	Joint shaft (See 03-13-2 JOINT SHAFT REMOVAL/INSTALLATION)
14	Engine mount member (See 05-15-7 Engine Mount Member Removal Note) (See 05-15-7 Engine Mount Member Installation Note)
15	No.2 engine mount
16	No.4 engine mount rubber
17	Under cover
18	No.1 engine mount bracket
19	Transaxle (See 05-15-7 Transaxle Removal Note) (See 05-15-7 Transaxle Installation Note)
20	No.5 engine mount

Engine Mount Member Removal Note

Caution
- **To prevent damage to the body, insert a rag into the gap between the fender and body when installing the SST.**

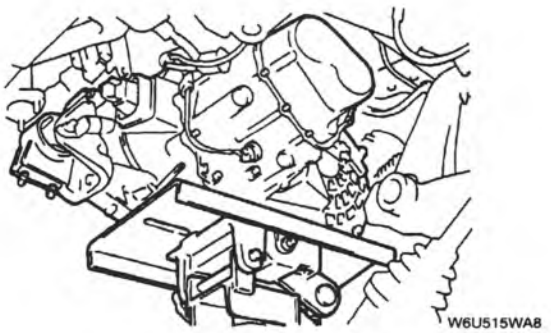
1. Support the engine using the **SST** before removing the engine mount member.
2. Remove the engine mount member.



W6U515WA7

Transaxle Removal Note

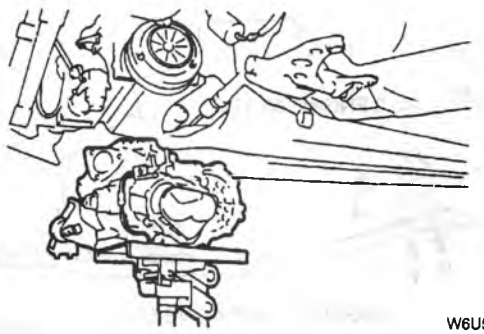
1. Loosen the **SST** (49 G017 5A0) and lean the engine toward the transaxle.
2. Support the transaxle on a jack.


W6U515WA8

3. Remove the transaxle mounting bolts.
4. Remove the transaxle.

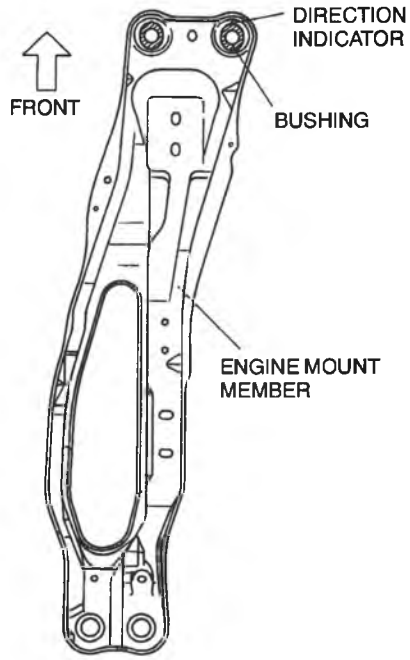
Transaxle Installation Note

1. Set the transaxle on a jack and lift into place.
2. Install the transaxle mounting bolts.


W6U515WA9

Engine Mount Member Installation Note

1. Position the direction indicator on engine mount member bushings facing toward the front side, and install the bushings onto the engine mount member.



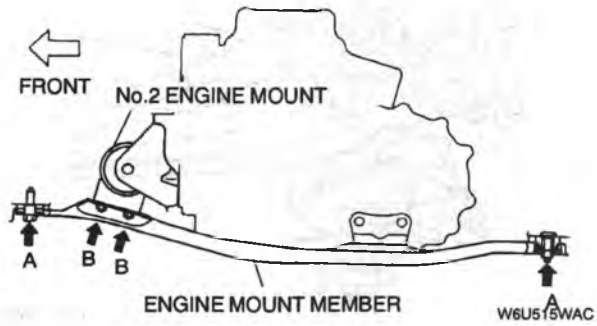
W6U515WAB

2. To install the engine mount member, put the No.2 engine mount stud bolts through the engine mount member installation holes.
3. Install the engine mount member bolts A and nuts A.

Tightening torque
A: 67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}

4. Loosely tighten the No.2 engine mount nuts B.
5. Remove the **SST** (49 G017 5A0).
6. Tighten the No.2 engine mount nuts B.

Tightening torque
B: 75—104 N·m {7.6—10.7 kgf·m, 55—77 ft·lbf}



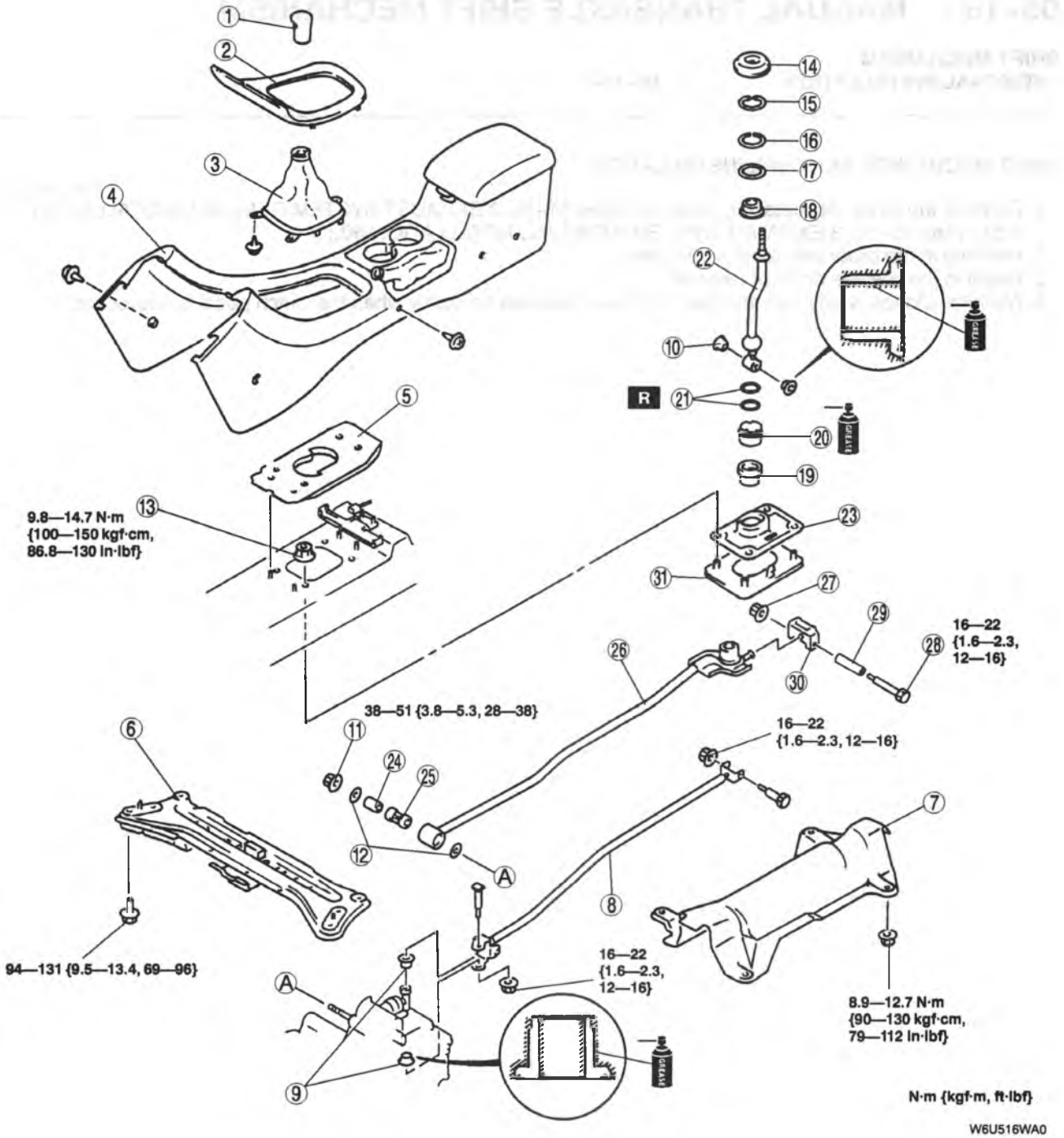
05-16 MANUAL TRANSAXLE SHIFT MECHANISM

SHIFT MECHANISM
REMOVAL/INSTALLATION 05-16-1

SHIFT MECHANISM REMOVAL/INSTALLATION

Z6U051646010W01

1. Remove the three way catalytic converter. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION [FS].) (See 01-15-3 EXHAUST SYSTEM REMOVAL/INSTALLATION [KL].)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.
4. After installation, verify that the gear shift lever operates smoothly when the clutch pedal is depressed.



1	Shift knob
2	Front console
3	Boot
4	Rear console
5	Insulator
6	Transverse member
7	Heat insulator
8	Change control rod
9	Bushing
10	Bushing
11	Nut
12	Washer

13	Nut
14	Boot
15	Retaining ring
16	Spacer
17	Compression ring
18	Upper ball seat
19	Boot
20	Lower ball seat
21	O-ring
22	Gear shift lever
23	Seal rubber
24	Pipe

25	Bushing
26	Extension bar
27	Nut
28	Bolt

29	Spacer
30	Rubber mount
31	Base plate

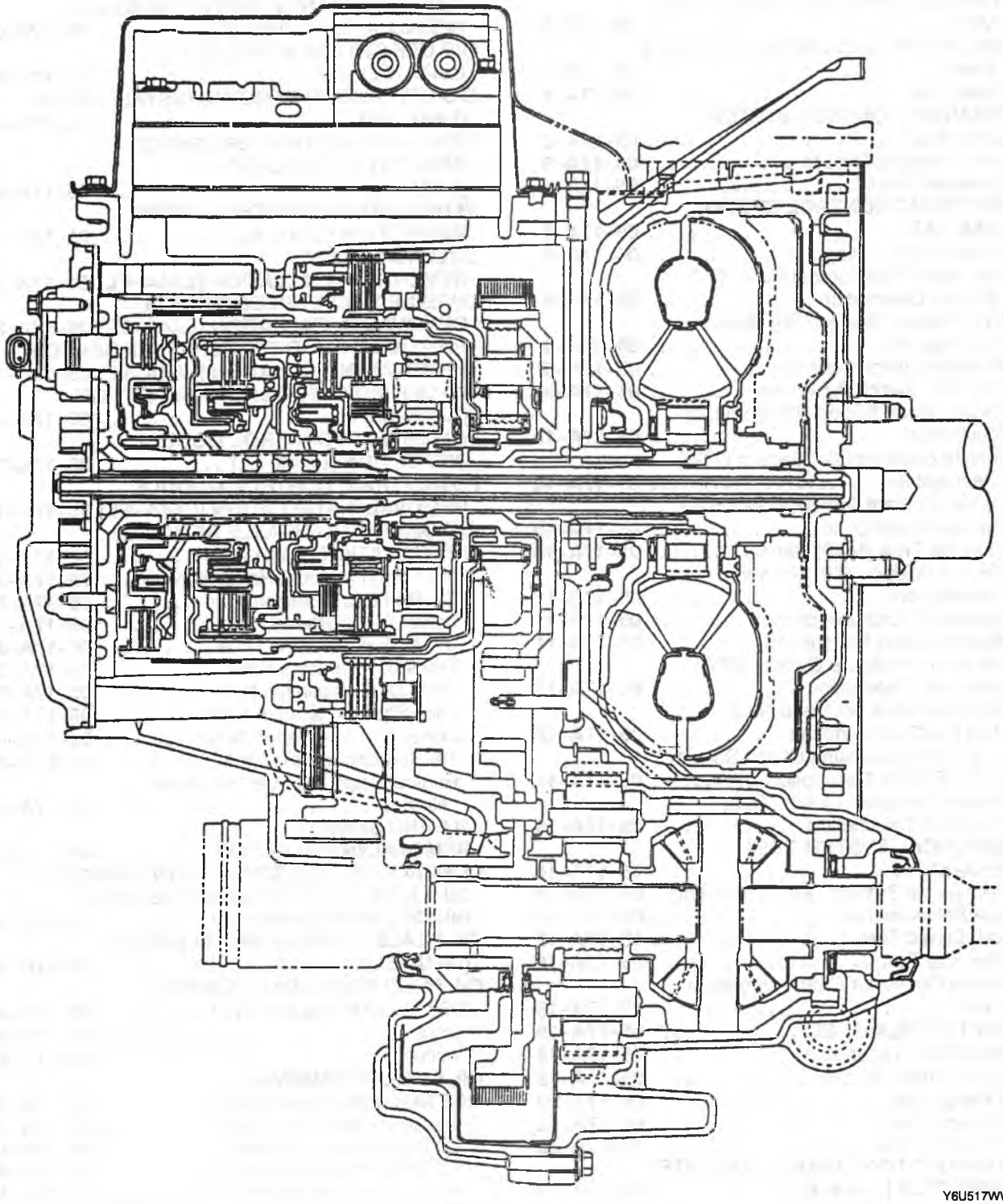
05-17A AUTOMATIC TRANSAXLE [LA4A-EL]

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POWERTRAIN SYSTEM [LA4A-EL]

Z6U051701030W05

Automatic Transaxle Cross-Sectional View



Y6U517WWZ

Gear Position and Operation of Feature Parts

Position/ Range	Mode	Gear	Engine braking effect	2/4 band	Reverse clutch	Direct clutch	Foward clutch	Forward one-way clutch		Coasting clutch	Low/reverse clutch	Low one-way clutch	
								Drive	Coast			Drive	Coasting
P	—	—	—										
R	—	Reverse gear	Yes		×						×		
N	—	—	—										
D	O/D OFF*2 SW OFF	First gear	No				×	×	⊗			×	⊗
		Second gear	No	×			×	×	⊗				
		Third gear	No			×	×	×	⊗				
		Fourth gear	Yes	×		×	☆	⊗					
	O/D OFF*2 SW ON	First gear	No				×	×	—	×		×	⊗
		Second gear	Yes	×			×	×	—	×		⊗	⊗
		Third gear	Yes			×	×	×	—	×		⊗	⊗
		*1Fourth gear	Yes	×		×	☆	⊗	⊗			⊗	⊗
2	—	Second gear	Yes	×			×	×	—	×		⊗	⊗
		*1Third gear	Yes			×	×	×	—	—		⊗	⊗
		*1Fourth gear	Yes	×		×	☆	⊗	⊗			⊗	⊗
1	—	First gear	Yes				×	×	—	×	×	×	—
		*1Second gear	Yes	×			×	×	—	×		⊗	⊗

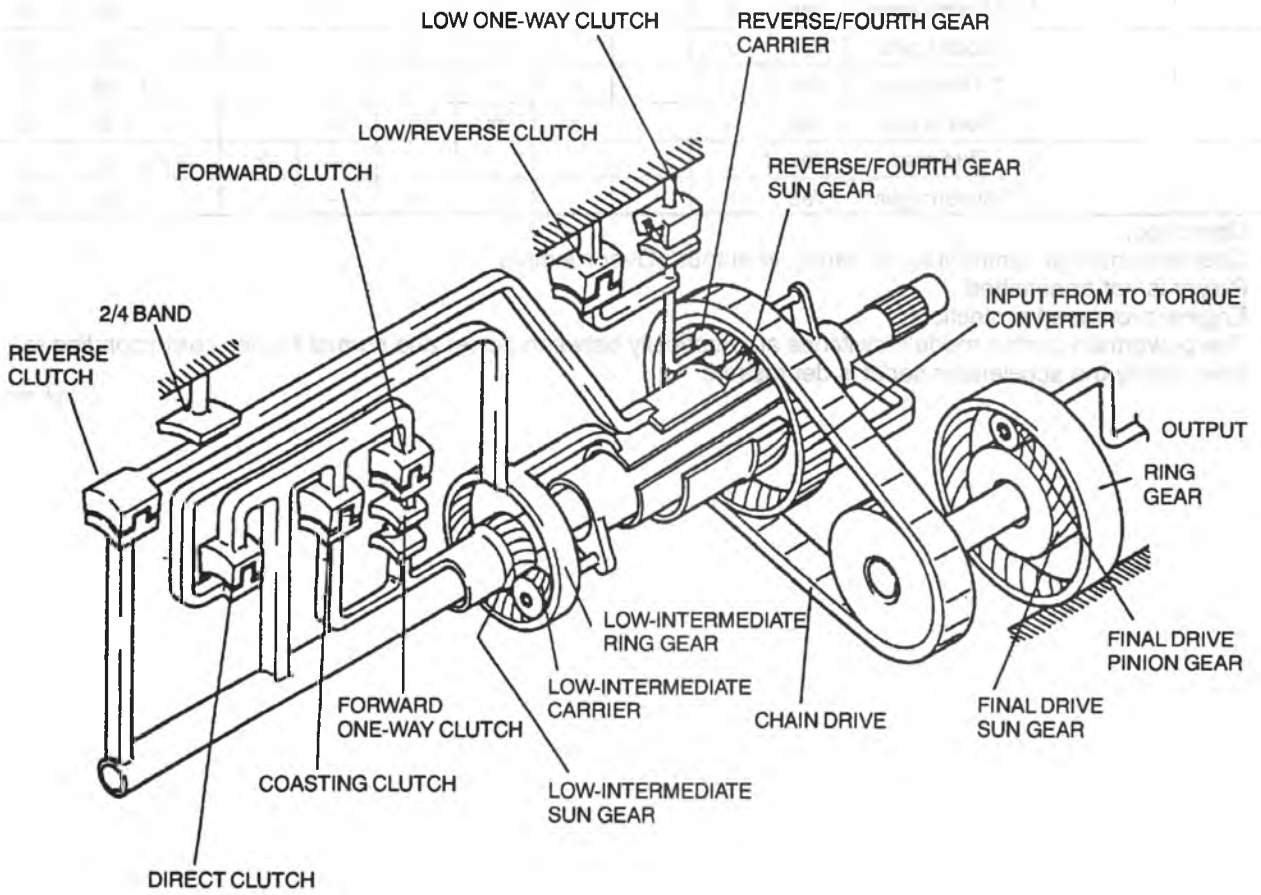
×: Operating.
⊗: Operating but not contributing to transaxle output. (Over running)
☆: Power is not transmitted.
*1 : Engine overspeed protection.
*2: The powertrain control module switches automatically between power and normal modes corresponding to how rapidly the accelerator pedal is depressed.

Y6U517WVZ

Powerflow
Component descriptions

Component	Function
2/4 band	Fixed reverse/fourth gear sun gear
Reverse clutch	Connects input shaft and reverse/fourth gear sun gear
Direct clutch	Connects input shaft and low-intermediate ring gear
Forward clutch	Connects input shaft and forward one-way clutch
Forward one-way clutch	Frees (or fixes) clockwise (or counterclockwise) rotation of low-intermediate sun gear from input shaft
Coasting clutch	Connects input shaft and low-intermediate sun gear
Low/reverse clutch	Fixes reverse/fourth gear carrier
Low one-way clutch	Frees (or fixes) clockwise (or counterclockwise) rotation of reverse/4th carrier
Planetary gearsets	Connects input shaft and drive sprocket
Chain drive	Connects planetary gearsets and final drive
Parking lock	Fixes driven sprocket
Final drive	Connects drive chain and differential

Note
- All directions of rotation are viewed from the oil pump



Y6U517WUZ

HYDRAULIC CONTROL SYSTEM [LA4A-EL]

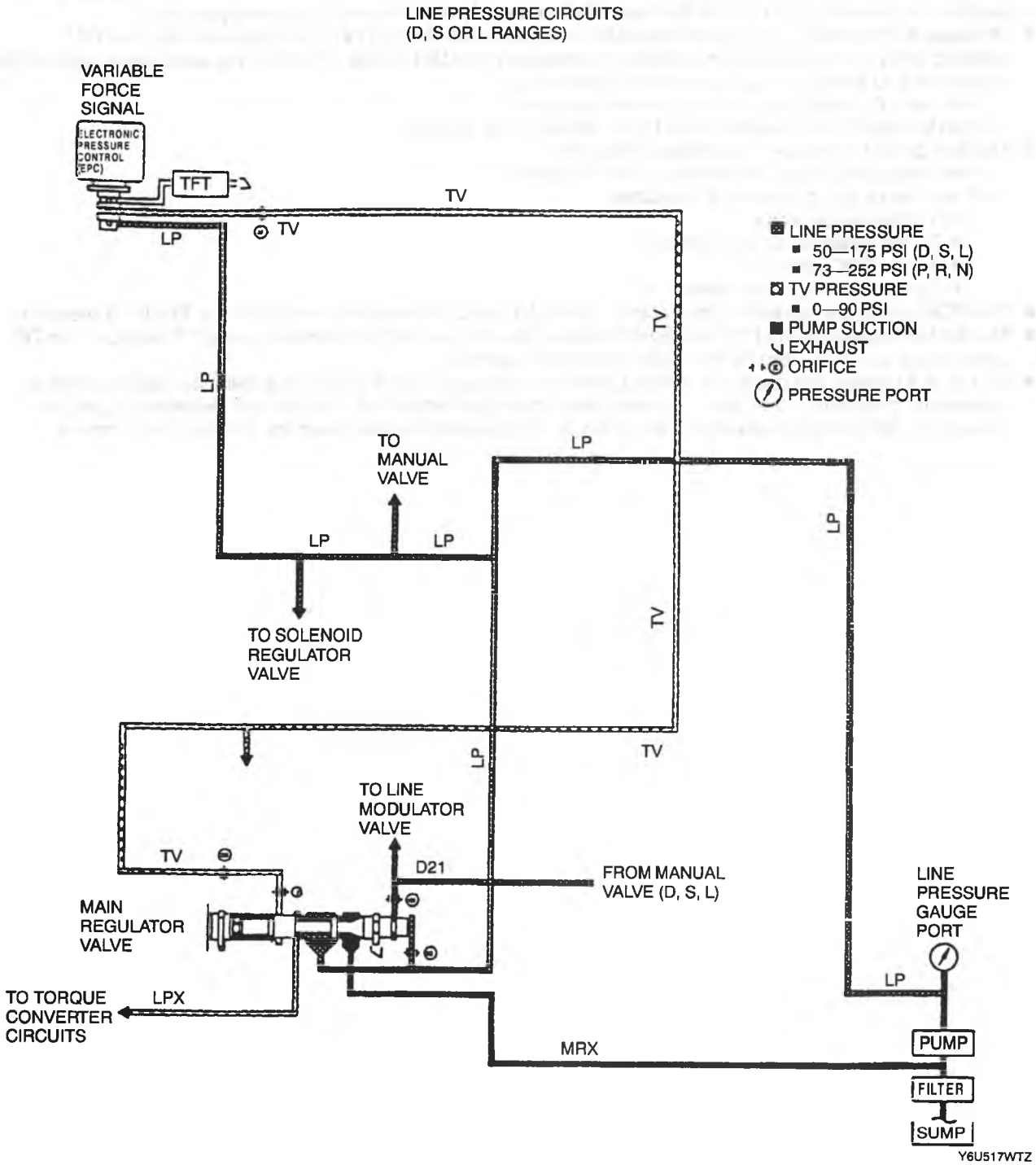
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Line Pressure Circuits

- The LA4A-EL transaxle has hydraulic circuits to provide filtered fluid under line pressure to the other hydraulic circuits. The PCM has control of line pressure, using the EPC (Electronic Pressure Control) solenoid. This results in a precise control of shift feel and efficient use of pressure for component operation.
- Changes in the position of the main regulator valve are controlled by **TV** circuit pressure from the EPC solenoid and by the presence or absence of pressure in the **D21** circuit. The main regulator valve controls the amount of fluid exiting the **LP** circuit in two directions;
  - —Into the **LPX** circuit for torque converter operation
  - —Into the **MRX** (recirculation) circuit that returns to the oil pump
- The flow of fluid in the **LP** circuit follows this path:
  - —From the sump (through the filter) to the oil pump
  - —From the oil pump in several directions:
    - To the manual valve
    - To the solenoid regulator valve
    - To the EPC solenoid
    - To the main regulator valve
- The PCM varies the current of the electrical circuit for the EPC solenoid in order to vary **TV** circuit pressure.
- The fluid exhausted at the EPC solenoid flows over the Transaxle Fluid Temperature (TFT) sensor. The TFT sensor input signal is used by the PCM for transaxle control.
- In D, 2 or 1 ranges, the presence of fluid under line pressure in the **D21** circuit at the main regulator valve causes line pressure to operate in a lower pressure range than in Park, Neutral and Reverse ranges. The absence of **D21** circuit pressure in Park, Neutral, and Reverse ranges allows for a higher line pressure.

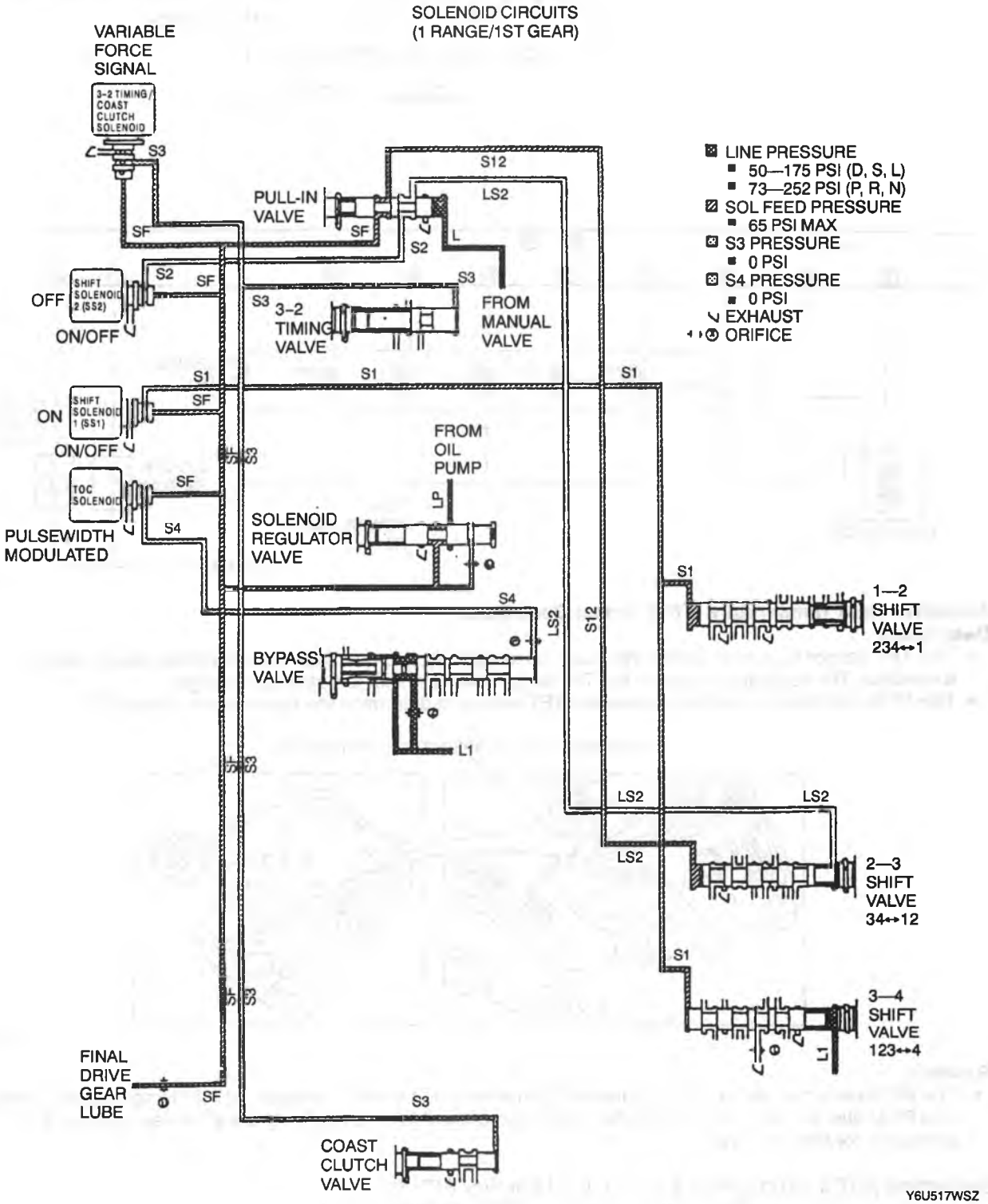
EPC solenoid control

- At a low current, the **TV** circuit pressure will be higher, resulting in high line pressure.
- At a high current, the **TV** circuit pressure will be lower, resulting in lower line pressure.
- In a fail-safe mode, maximum **TV** circuit pressure will be present in maximum line pressure.



Solenoid Circuit
Overview

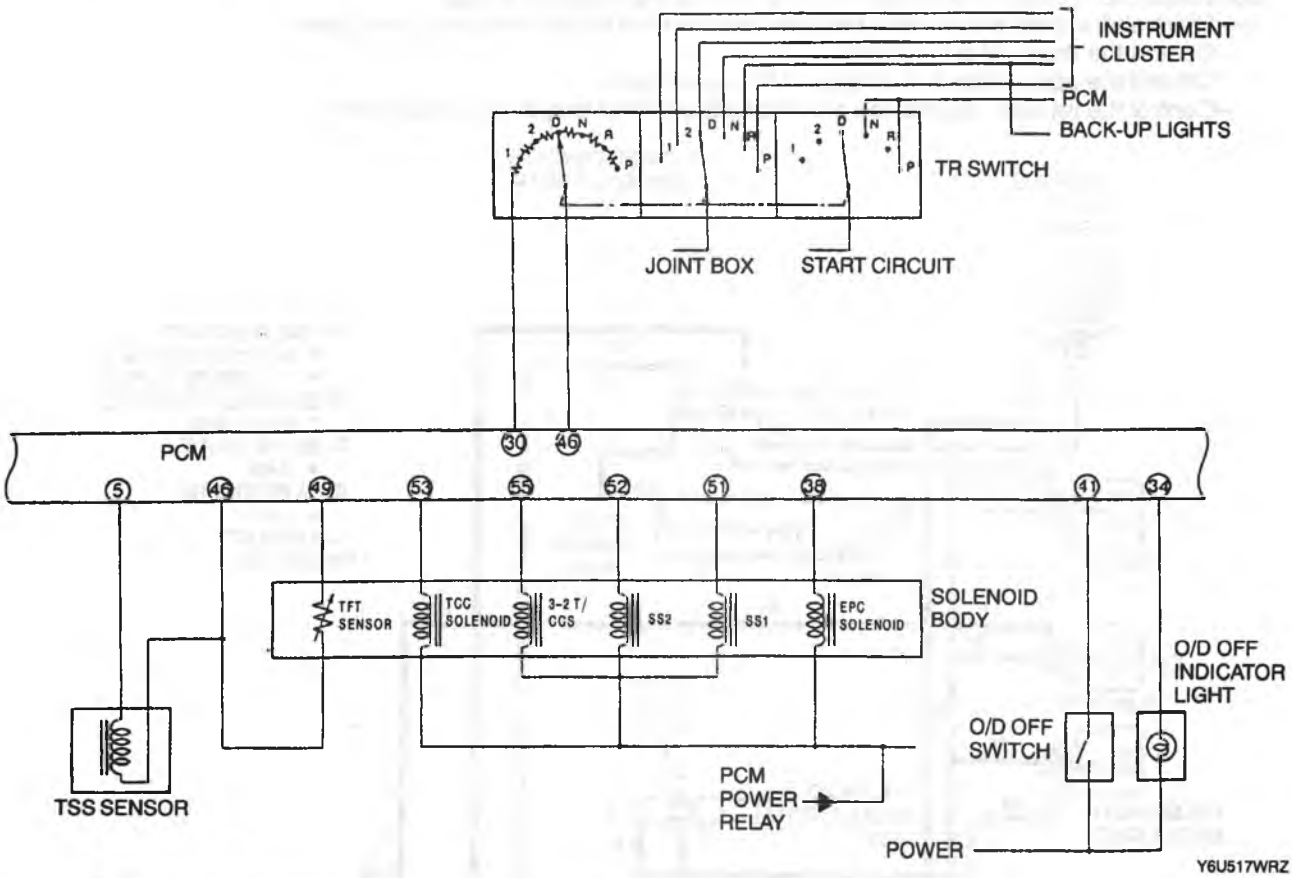
- The LA4A-EL transaxle has hydraulic circuits to control the scheduling of shifts. The PCM has control of four solenoids (SS1, SS2, 3—2 T/CSS, and TCC) to do the following things:
  - —Move shift valves to provide transaxle operation in 1st, 2nd, third and fourth gear
  - —Control the timing of a 3—2 shift
  - —Control the application and release of the coast clutch
  - —Control the release, application and modulation of the torque converter clutch



ELECTRONIC CONTROL SYSTEM [LA4A-EL]

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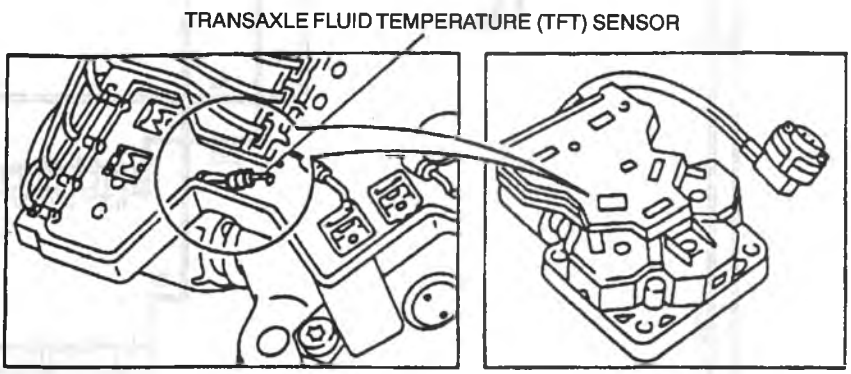
System Wiring Diagram



Transaxle Fluid Temperature (TFT) Sensor Description

Description

- The TFT sensor is located on the transaxle solenoid body. It is a temperature-sensitive device called a thermistor. The resistance value of the TFT sensor will vary with temperature change.
- The PCM monitors the voltage across the TFT sensor to determine the temperature of the ATF.



Function

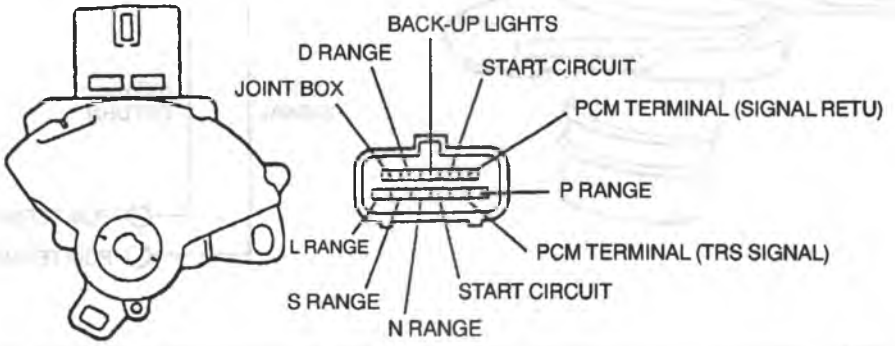
- The PCM uses this signal to determine shift scheduling and control pressure for cold temperatures operation. The PCM also inhibits torque converter clutch operation at low transaxle temperatures and adjusts EPC pressures for temperature.

Symptoms (DTCs :P0712, P0713, P1711, P1713 and/or P1718)

- Improper torque converter clutch operation and EPC pressure control.

Transmission Range (TR) Sensor Description
Description

- The PCM sends a voltage signal to the TR sensor. The TR sensor incorporates a series of step down resistors which act as a voltage divider. The PCM monitors this voltage which corresponds to the position of the selector lever (P,R,N,D,2,1).
- The TR sensor is located on the top of the transaxle. The TR sensor also contains the neutral/start and backup light circuits.
- This sensor also contains contacts for the gear position display in the instrument cluster.



Function

- Determines desired gear and line pressure.

Symptoms (DTCs: P0707, P0708 and/or P1705)

- Harsh engagements and firm shift feel. Engine may not crank. May downshift to a lower gear. 2GR or 3GR operation. Transaxle not indicating the proper gear. No 4GR operation. No 1GR (1range). 3GR in 1 range. Illuminate MIL (except P1705).

Stoplight Switch Description
Description

- The stoplight switch inputs a voltage signal to the PCM when the brakes are applied. The switch is closed when the brakes are applied and open when they are released.

Function

- Disengages the torque converter clutch when brake is applied.

Symptoms (DTC :P1703)
Failed "ON"

- The torque converter clutch will not engage at less the 1/3 throttle.

Failed "OFF" or not connected

- The torque converter clutch will not disengage when brake is applied.

O/D OFF Switch Description
Description

- The O/D OFF switch is a momentary contact switch. When the O/D OFF switch is pressed, a signal is sent to the PCM.

Function

- The PCM then energizes the O/D OFF indicator lamp and engages or disengages 4GR operation and provides coast braking in 2GR and 3GR.

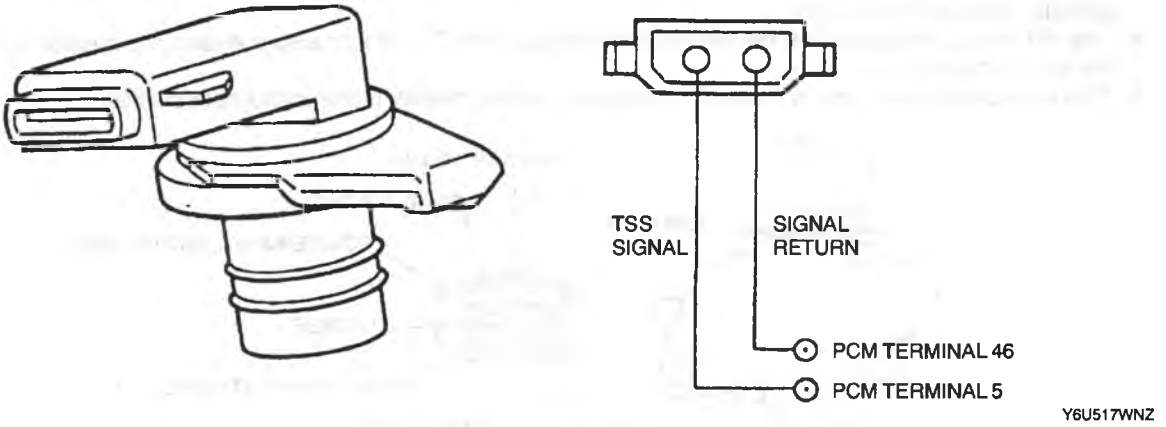
Symptoms (DTC :P1783 during KOER)
Failed "ON"

- Vehicle will not upshift/downshift automatically, coasting clutch engages in 2GR and 3GR.

Failed "OFF"

- No modification to the shift pattern.

Turbine Shaft Speed (TSS) Sensor Description
Description
- A TSS is a magnetic pickup that sends a signal to the PCM that indicates transaxle turbine shaft input speed.



Function
- Provides converter turbine speed information for torque converter clutch control strategy. Also used in determining static EPC pressure setting during shifts.

Symptoms (DTC :P0715)
- No torque converter clutch engagements, harsh shifts. No fourth gear operation.
- Engine braking in 2GR and 3GR. Illuminate MIL.

Vehicle Speedometer Sensor (VSS) Description
Description
- The VSS is a magnetic pickup that sends a signal to the PCM. This VSS signal tells the PCM the vehicle speed.

Function
- Used to determine shift scheduling and EPC pressure control.

Symptoms (DTCs :P0500, P0503 and/or P1501)
- Firm shirt feel, abnormal schedules, unexpected downshifts may occur at close throttle.
- No 4GR operation. Engine parking in 2nd and 3rd gear. No torque converter clutch application.
- Illuminate MIL (P0500) and flush O/D OFF indicator (P0503).

Engine Coolant Temperature (ECT) Sensor Description
Description
- The ECT sensor detects the temperature of the engine coolant and supplies the information to the PCM.

Function
- ECT is used to control torque converter clutch operation. (HOT operation)

Symptoms
- Torque converter clutch will always be "OFF", resulting in reduced fuel economy.

Mass Air Flow (MAF) Sensor
Description
- The sensor directly measures the mass of the air flowing into the engine.
- The sensor output is a D.C. (analog) signal ranging from about 0.5 volts to 50 volts used by the PCM to calculate the injector pulse width.
- For transaxle strategies, this sensor is used for EPC pressure control, shift and torque converter clutch scheduling.

Function
- Line pressure control, shift and torque converter clutch scheduling.

Symptoms
- Incorrect shift schedule, line pressure high or low, incorrect torque converter clutch engagement scheduling and symptoms similar to a TP sensor malfunction.

Throttle Position (TP) Sensor Description
Description
- The TP sensor is a potentiometer mounted on the throttle body. The TP sensor detects the position of the throttle plate and sends this information to the PCM as a varing voltage signal.
- If a malfunction occurs in the TP circuit, the PCM will recognize that the TP sensor signal is out of specification. The PCM operates the LA4A-EL at high pressure transaxle damage.

Function
- Shift scheduling, EPC pressure control and torque converter clutch control.

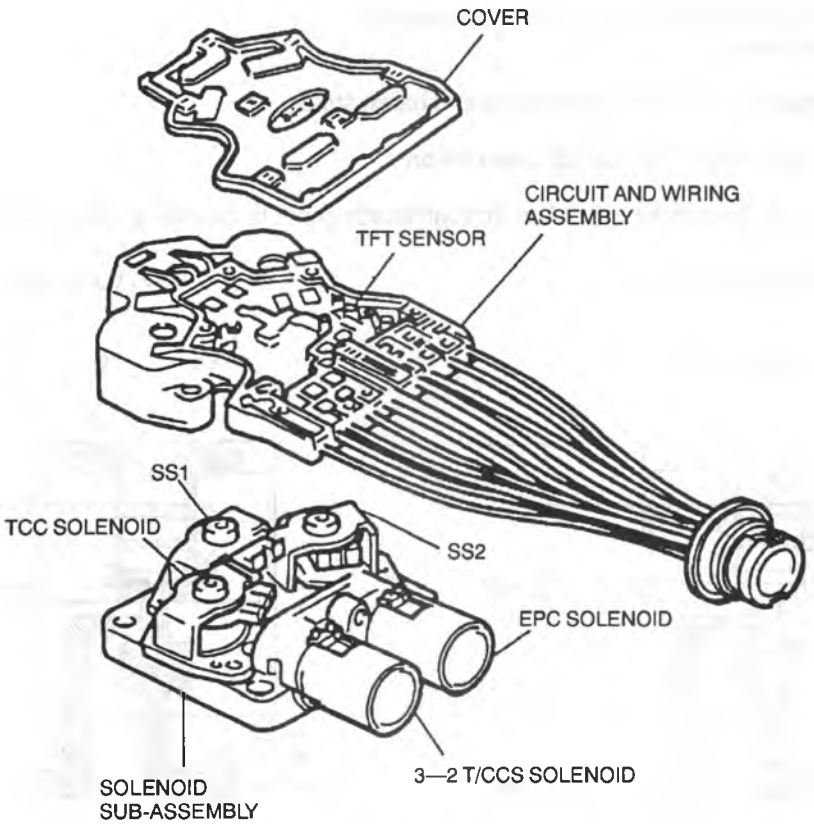
Symptoms
- Harsh engagements, firm shift feel, abnormal shift schedule, torque converter clutch does not engage, torque converter clutch cycling. Flash Malfunction Indicator Light (MIL).

Magnetic Clutch Description
Function
- The PCM adjusts EPC pressure when A/C compressor clutch is engaged to compensate for the additional load on the engine.

Symptoms
Failed "ON"
- Line pressure slightly low with A/C off.

Failed "OFF"
- Line pressure slightly high with A/C off.

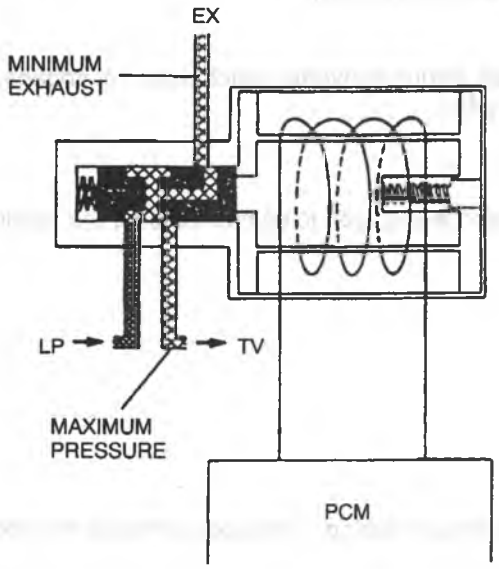
Solenoid Body Description
Description
- The PCM controls the operation of the LA4A-EL transaxle through wiring to the solenoid body mounted on the control valve body.
- The solenoid body contains the following:
  - —Transaxle Fluid Temperature (TFT) Sensor.
  - —Electronic Pressure Control (EPC) Solenoid.
  - —Shift Solenoid No.1 (SS1)
  - —Shift Solenoid No.2 (SS2)
  - —Torque Converter Clutch (TCC) Solenoid
  - —3—2 Timing/Coasting Clutch Solenoid (3—2T/CCS)



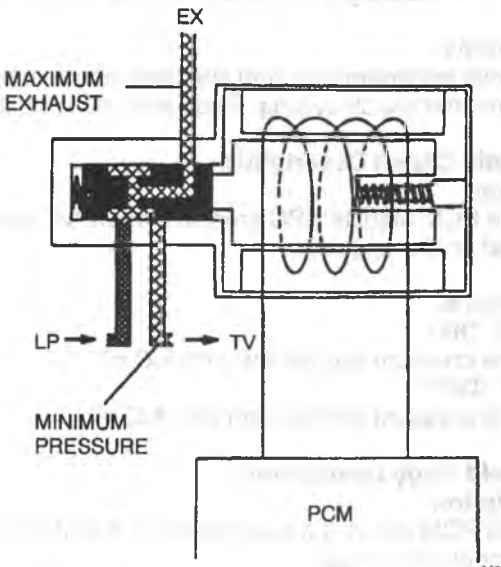
Electronic Pressure Control (EPC) Solenoid Description
Description

- The EPC solenoid is a variable force style solenoid. This type solenoid is an electro-hydraulic actuator combining a solenoid and a regulating valve.
- EPC solenoid regulates line pressure. This is controlled by producing a resisting pressure to the main regulator circuit. The LP pressure controls clutch application pressures.

EPC SOLENOID AT ZERO CURRENT



EPC SOLENOID AT HIGH CURRENT



Y6U517WLZ

Function

- Regulates line pressure.

Symptoms (DTCs :P1746 and/or P1747)

- Flash O/D OFF indicator (P1746) and illuminate MIL (P1747).

Failed "ON"

- Minimum EPC pressure (minimum trans-torque capacity).
- May flash Hold indicator.

Failed "OFF"

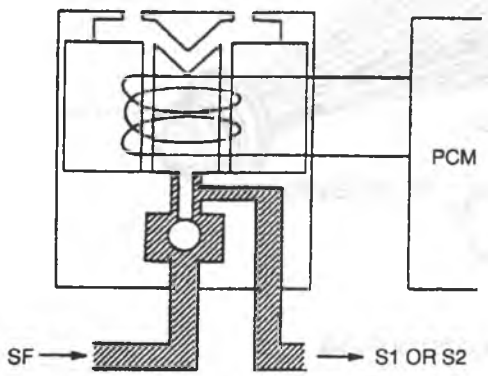
- Maximum EPC pressure, harsh engagements and harsh shifts.

Shift Solenoids No.1 and No.2 (SS1,SS2) Description
Description

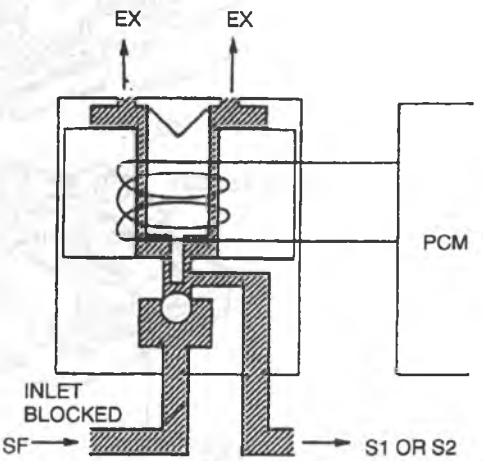
- SS1 and SS2 provide gear selection of first through fourth gears by providing ON/OFF pressure control to the shift valves.

SHIFT SOLENOID-ON

EXHAUST BLOCKED



SHIFT SOLENOID-OFF



Y6U517WKZ

Function
- Gear selection

Symptoms (DTCs: P0731, P0732, P0733, P0734, P0750, P0751, P0755 and/or P0756)
- Improper gear selection depending on failure mode and manual lever position. Refer to shift solenoid failure modes.
- Flash O/D OFF indicator (P073, P0732, P0733, P0734) and illuminate MIL (P0751, P0755, P0756)

Shift solenoid failure modes
Shift solenoid failure "ALWAYS ON"
- Failed ON due to PCM and/or vehicle wiring problems, and/or solenoid electrically stuck in the on position, and/or hydraulically or mechanically stuck in the on position.

SS1 ALWAYS ON			
PGM GEAR COMMANDED	SELECTOR LEVER POSITION		
	D	2	1**
	ACTUAL GEAR OBTAINED		
1	1	1	1
2	1	1	1
3	4	4	4
4	4	—	—
	ALSO NO REVERSE		

SS2 ALWAYS ON			
PGM GEAR COMMANDED	SELECTOR LEVER POSITION		
	D	2	1**
	ACTUAL GEAR OBTAINED		
1	1	1	1
2	2	2	3
3	2	2	3
4	1	—	—

**When a select operation occurs above a calibrated speed the transmission will not downshift from the higher gear until the vehicle speed drops below this calibrated speed.

Shift solenoid failure "ALWAYS OFF"
- Failed OFF due to PCM and/or vehicle wiring concerns, and/or solenoid electrically stuck in the off position, and/or hydraulically or mechanically stuck in the off position.

SS1 ALWAYS OFF			
PGM GEAR COMMANDED	SELECTOR LEVER POSITION		
	D	2	1**
	ACTUAL GEAR OBTAINED		
1	2	2	2
2	2	2	2
3	3	3	3
4	3	—	—

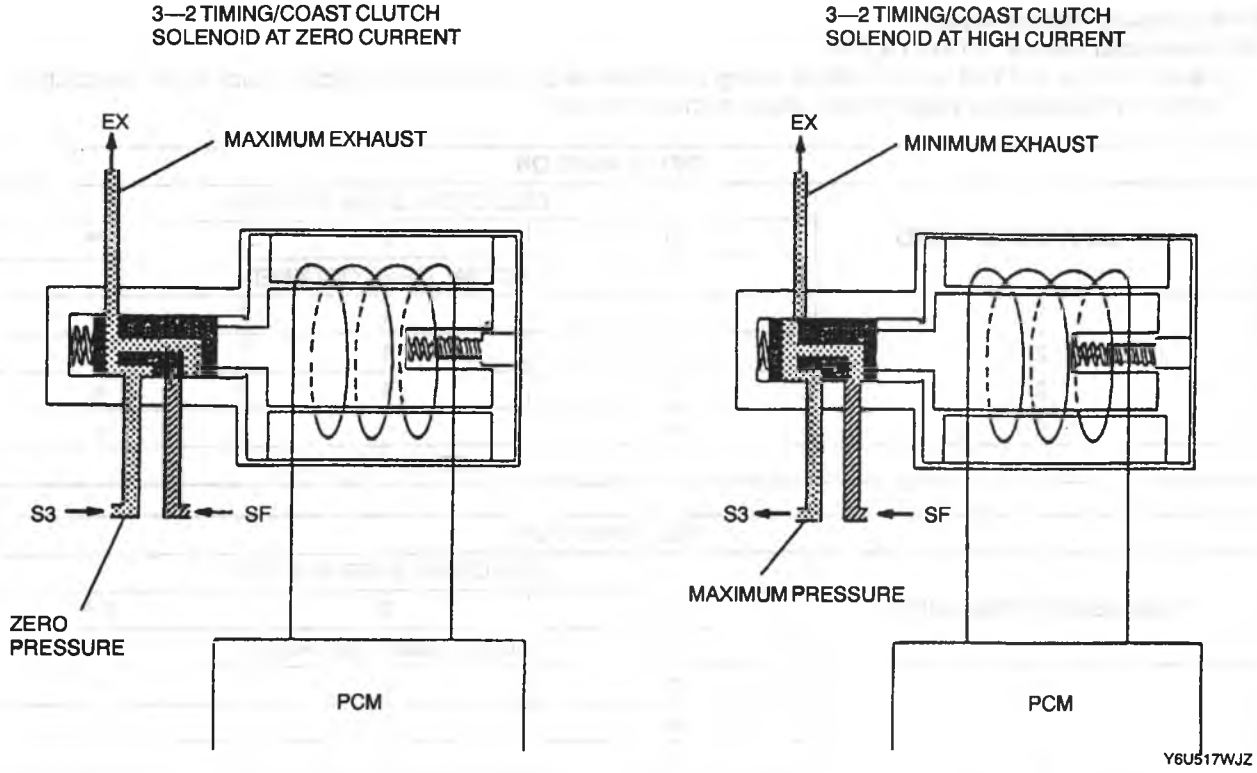
SS2 ALWAYS ON			
PGM GEAR COMMANDED	SELECTOR LEVER POSITION		
	D	2	1**
	ACTUAL GEAR OBTAINED		
1	4	4	1
2	3	3	1
3	3	3	2
4	4	—	—

**When a select operation occurs above a calibrated speed the transmission will not downshift from the higher gear until the vehicle speed drops below this calibrated speed.

3—2 Timing/Coasting Clutch Solenoid (3—2T/CCS) Description

Description

- The 3—2T/CCS is a variable force solenoid. This type of solenoid is an electro-hydraulic actuator combining a solenoid and a regulating valve.
- It supplies pressure to the S3 circuit to control the release of the direct clutch during a 3—2 downshift. This solenoid also regulates the pressure in the S3 circuit to control the application and release of the coasting clutch.



Function

- Use to control the application and release of the coasting clutch and the release timing of the direct clutch.

Symptoms (DTCs :P1788 and/or P1789)

- Flash O/D OFF indicator

Failed "ON"

- No engine braking (except 4GR), extend 3—2 downshifts or 4—2 downshifts with higher than expected engine rpm.

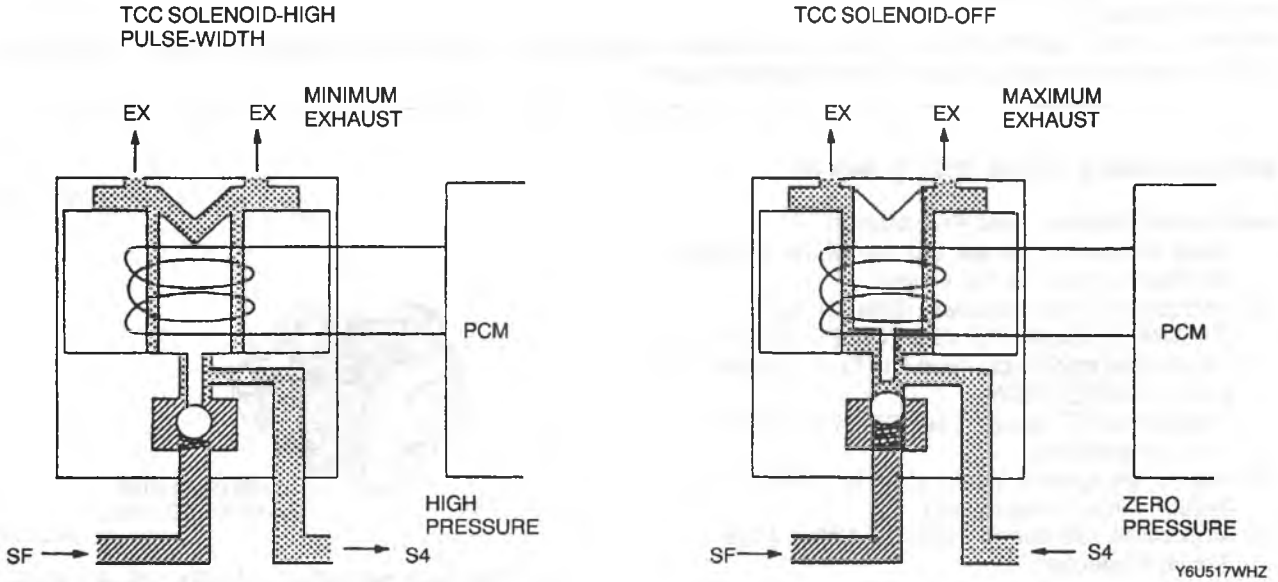
Failed "OFF"

- Engine braking in 2GR and 3GR, firm or flared 3—2 downshifts. Harsh 4—3 downshifts.

Torque Converter Clutch (TCC) Solenoid Description

Description

- The TCC solenoid is a pulse width modulating style solenoid. This type solenoid is used to control the engagement and release of the torque converter clutch.
- By modulating the pulse width of the TCC solenoid, the pressure in the S4 circuit varies modulation of the engagement and release of the bypass clutch in the torque converter.



Function

- Used to apply and release the torque converter clutch.

Symptoms (DTCs: P0743, P1742, P1743 and/or P1744)

- Illuminate MIL (P0743, P1742, P1744) and flash O/D OFF indicator (P1743).

Failed "ON"

- Engine stalls in 2GR (2 range). Engine lugging, poor performance at low engine speed, harsh shifts.

Failed "OFF"

- Poor fuel economy, overheating, torque converter clutch will not engage.
- Firm shift feel.

Solenoid valve operation chart

- The following solenoid operation chart shows normal solenoid operation for given operation mode.

Transaxle range selector lever position	PCM commanded gear	SS1	SS2	3—2T/CCS	TCC
P	—	OFF	ON	—	OFF
R	—	OFF	ON	—	*
N	—	OFF	ON	—	OFF
D (O/D)					
D	1	ON	ON	—	*
D	2	OFF	ON	—	**
D	3	OFF	OFF	—	**
D	4	ON	OFF	ON	**
D (O/D)					
D	1	ON	ON	ON	*
D	2	OFF	ON	OFF	**
D	3	OFF	OFF	OFF	**
2	2	OFF	ON	OFF	**
2***	3***	OFF	OFF	OFF	
1	1	ON	ON	OFF	**

Transaxle range selector lever position	PCM commanded gear	SS1	SS2	3—2T/CCS	TCC
1***	2	OFF	ON	OFF	**
1***	3	OFF	OFF	OFF	**

*Not allowed by hydraulics
**PCM commanded
***When a select operation occurs above a calibrated speed, the transaxle will not downshift from the higher gear until the vehicle speed falls below this calibrated speed

MECHANICAL SYSTEM TEST [LA4A-EL]

Mechanical System Test Preparation

1. Apply the parking brake and use wheel chocks at the front and rear of the wheels.
2. Inspect the engine coolant. (See 01-12-1 ENGINE COOLANT LEVEL INSPECTION.)
3. Inspect the engine oil. (See 01-11-1 ENGINE OIL LEVEL INSPECTION.)
4. Inspect the ATF levels. (See 05-17A-23 ATF Level Inspection.)
5. Inspect the ignition timing. (See 01-10A-17 Ignition Timing Inspection.)
6. Inspect the idle speed. (See 01-10A-17 Idle Speed Inspection.)

Line Pressure Test

This test measures line pressure as a means of checking the hydraulic components and inspecting for oil leakage.

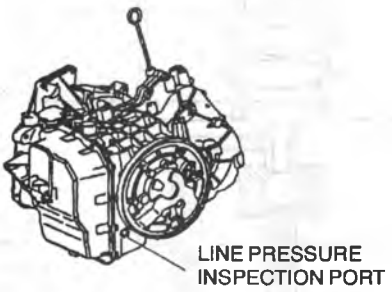
1. Engine idling.
   (1) Perform mechanical system test preparation. (See 05-17A-16 Mechanical System Test Preparation.)

Warning

- **Removing the inspection port bolt when the ATF is hot can be dangerous. Hot ATF could come out of the opening and cause severe burns. Before removing the inspection port bolt, allow the ATF to cool.**

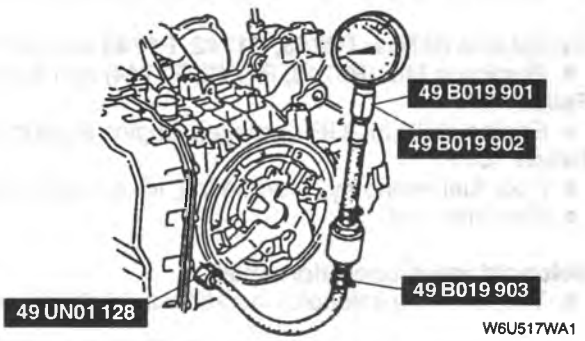
   (2) Remove the inspection port bolt shown in the figure.

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   (3) Connect the **SSTs** (49 UN01 128, 49 B019 901, and 49 B019 903) to the line pressure inspection port.



W6U517WA1

   (4) Start the engine.
   (5) While depressing the brake pedal, move the selector lever to each range position and record line pressure at engine idle.
   (6) Compare pressure values recorded to values specified in following table.
   (7) Turn the engine off.

Specification

Position/Range	LINE PRESSURE SPECIFICATIONS (kPa {kgf/cm^2, psi})
	IDLE
P, N	470—530 {4.81—5.41, 68—77}
R	470—530 {4.81—5.41, 68—77}
D	330—370 {3.34—3.75, 47—53}
2	330—370 {3.34—3.75, 47—53}
1	330—370 {3.34—3.75, 47—53}

2. Engine stall speed.

Caution
- **Perform the Line Pressure Test at engine idle prior to performing the test at engine stall. If line pressure is low at idle, do not perform the test at engine stall or further transaxle damage will occur.**

(1) Replace the **SST** (49 B019 901) to the **SST** (49 B019 902).
(2) Start the engine.
(3) Shift the selector lever to R position.

Caution
- **Do not maintain WOT in any gear range for more than 5 seconds or transaxle damage will occur.**

(4) Firmly depress the foot brake with the left foot, and gently depress the accelerator pedal to floor (WOT) with the right foot.
(5) When the engine speed no longer increases, record line pressure and release the accelerator.
(6) Shift the selector to N position and let the engine idle for 1 minute or more to cool the ATF.
(7) Perform stall tests for the remaining ranges in the same manner.
   ① D range
   ② 2 range
   ③ 1 range
(8) Compare results with line pressure specifications in table.

Specification

Position/Range	LINE PRESSURE SPECIFICATIONS (kPa {kgf/cm^2, psi})
	STALL
P, N	—
R	1,790—2,020 {18.21—20.66, 259—294}
D	1,158—1,269 {11.80—12.93, 168—184}
2	1,158—1,269 {11.80—12.93, 168—184}
1	1,158—1,269 {11.80—12.93, 168—184}

(9) Shift the selector lever to P position.
(10) Turn off the engine.
(11) Remove the **SSTs** and install a new square head plug in the inspection port.

Tightening torque
23—25 N·m {2.3—2.6 kgf·m, 17—18 ft·lbf}

Evaluation of line pressure test

Line pressure	Possible cause
Low pressure in all ranges	Fluid level low Restricted inlet filter Control valve body, solenoid body or accumulator body is loose Excessive leakage in pump, case, control bodies Sticking main regulator valve Damaged inlet tube seal or inlet filter Damaged gaskets, separator plate
High pressure in all ranges	Problem with main regulator valve, solenoid body and wiring harness

Stall Speed Test
This test is performed to determine if there is slippage at the friction elements or malfunction of the hydraulic components.

Caution
- **Perform the Line Pressure Test at engine idle prior to performing the test at engine stall. If line pressure is low at idle, do not perform the test at engine stall or further transaxle damage will occur.**

1. Perform mechanical system test preparation. (See 05-17A-16 Mechanical System Test Preparation.)
2. Connect a tachometer.
3. Start the engine.

4. Shift the selector lever to D range.

Caution
- **Do not maintain WOT in any gear range for more than 5 seconds or transaxle damage will occur.**
- **If engine speed recorded by the tachometer exceeds maximum specified rpm, release accelerator pedal immediately. Clutch or band slippage is indicator.**

5. Firmly depress the brake pedal with the left foot, and then gradually depress the accelerator pedal to floor (WOT) with the right.
6. When the engine speed no longer increases, quickly read the engine speed and release the accelerator.
7. Shift the selector to N position and let the engine idle for 1 minute or more to cool the ATF.
8. Perform a stall test of R position in the same manner.

Engine stall speed
D, 2, 1 range: 2,000—2,500 rpm
R position: 1,700—2,500 rpm

Evaluation of stall test

Condition		Possible cause
Above specification	In D range	Forward clutch Forward one-way clutch Low one-way clutch
	In R position	Reverse clutch Low and reverse clutch
Below specification		Engine Torque converter one-way clutch

9. Turn off the engine.

Time Lag Test
This test measures time lag when checking the hydraulic components and the friction elements.
1. Perform mechanical system test preparation. (See 05-17A-16 Mechanical System Test Preparation.)
2. Start the engine.
3. Warm up the engine until the ATF reaches 66—77 °C {150—170 °F}.
4. After normal operating temperature is reached, shift the selector from N position to D range.
5. Use a stopwatch to measure the time it takes from shifting until engagement is felt. Make three measurements for each test and average the results.
6. Perform the test for the following shifts in the same manner.
   - N position → R position

Time lag
N → D range ... below approx. 1.0 second
N → R position ... below approx. 1.0 second

Evaluation of time lag test

Condition		Possible Cause
N → D shift	Above specification	Insufficient line pressure Forward clutch slippage Forward one-way clutch slippage Low one-way clutch slippage
	Below specification	Forward accumulator not operating properly Excessive line pressure
N → R shift	Above specification	Insufficient line pressure Low/reverse clutch slippage Reverse clutch slippage
	Below specification	Low/reverse accumulator not operating properly Excessive line pressure

7. Turn off the engine.

Torque Converter Clutch Operation Test

This test verifies that the torque converter clutch control system and the torque converter are operating properly.

1. Perform mechanical system test preparation. (See 05-17A-16 Mechanical System Test Preparation.)
2. Perform the on-board diagnostic test. (See 01-02A-8 FOREWORD [FS].) If DTC P0743 is retrieved, repair it. (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL].)

   Warning
   - **Doing this test alone can be dangerous. You could have an accident if you are looking at the manual or devices while driving, which may result in death or injury. Always have another person in the vehicle with you to read the manual or devices while you drive.**

3. Warm up the engine to normal operating temperature by driving the vehicle at highway speeds for approximately 15 minutes in D range.
4. After normal operating temperature is reached, maintain a constant vehicle speed of about 80 km/h {50 mph}, and tap the brake pedal with the left foot.
5. Engine rpm should increase when the brake pedal is tapped, and decrease about 5 seconds after the brake pedal is released. If this does not occur, refer to Torque Converter Operation Concern in 05-03A-7 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [LA4A-EL].
6. If the vehicle stalls in D range at engine idle with the vehicle stopped, move the selector lever to the 1 range. If the vehicle stalls, the cause may be the converter control valve in the oil pump. Service as required. If the vehicle does not stall in the 1 range, refer to DTC troubleshooting in 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL].

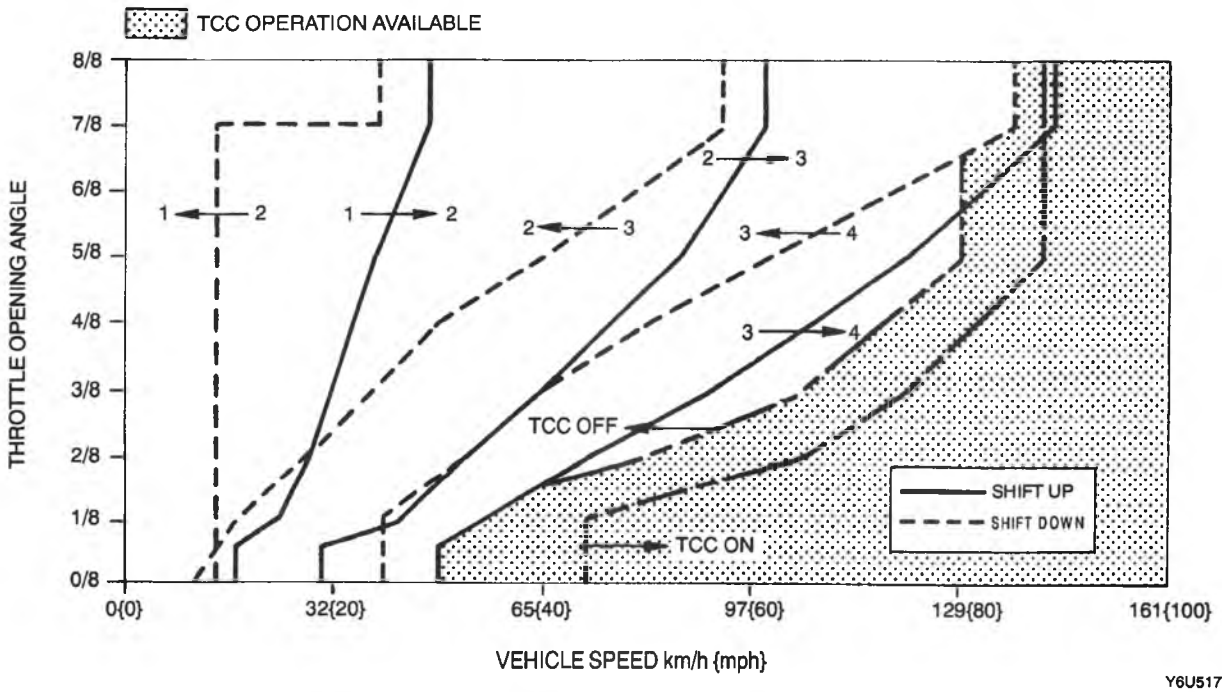
ROAD TEST [LA4A-EL]

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Road Test Preparation

1. Inspect the engine coolant. (See 01-12-1 ENGINE COOLANT LEVEL INSPECTION.)
2. Inspect the engine oil. (See 01-11-1 ENGINE OIL LEVEL INSPECTION.)
3. Inspect the ATF level. (See 05-17A-23 ATF Level Inspection.)
4. Inspect the ignition timing. (See 01-10A-17 Ignition Timing Inspection.)
5. Inspect the idle speed. (See 01-10A-17 Idle Speed Inspection.)
6. Bring the engine and transaxle up to normal operating temperature.

Typical Shift Diagram



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D Range Test

- Perform road test preparation. (See 05-17A-19 Road Test Preparation.)

D range (O/D OFF switch OFF)

Note

- The power mode or the normal mode is automatically selected by the powertrain control module.

1. Shift the selector lever to D range.
2. Accelerate the vehicle with half and wide open throttle.
3. Verify that 1→2, 2→3, and 3→4 upshifts and downshifts are obtained. The shift points must be as shown in the D range (O/D OFF switch OFF) shift point.
4. Drive the vehicle in fourth, third, and second gears and verify that kickdown occurs for 4→3, 3→2, 3→1, 2→1, and that the shift points are as shown in the D range (O/D OFF switch OFF) shift point.
5. Decelerate the vehicle and verify that the engine braking effect is felt in fourth and third gears.
6. Drive the vehicle and verify that torque converter clutch operation is obtained. (only for normal mode)

D range (O/D OFF switch ON)

1. Shift the selector lever to D range, and set the O/D OFF switch to ON.
2. Accelerate the vehicle with the throttle half open.
3. Verify that 1→2 and 2→3 upshifts and downshifts are obtained. The shift points must be as shown in the D range (O/D OFF switch ON) shift point.
4. Drive the vehicle in third and second gears and verify that kickdown occurs for 3→2, 2→1, and that the shift points are as shown in the D range (O/D OFF switch ON) shift point.
5. Decelerate the vehicle and verify that the engine braking effect is felt in third gear.
6. Drive the vehicle and verify that torque converter clutch operation is obtained. (only for normal mode)

Shift point

Range	O/D OFF switch position	Mode	Throttle condition	Shift	Vehicle speed (km/h {mph})
D	O/D OFF switch OFF	POWER	Wide open throttle	1GR→2GR	47—51 {29—32}
				2GR→3GR	97—103 {60—64}
				3GR→4GR	142—150 {88—93}
			Half throttle	1GR→2GR	34—46 {21—29}
				2GR→3GR	71—88 {44—55}
				3GR→4GR	125—141 {77—88}
			Closed throttle position	4GR→3GR	39—41 {24—26}
				3GR→1GR	13—16 {8—10}
			Kickdown	4GR→3GR	133—141 {82—88}
				3GR→2GR	89—95 {55—59}
				2GR→1GR	38—40 {23—25}
		NORMAL	Wide open throttle	1GR→2GR	47—51 {29—32}
				2GR→3GR	97—103 {60—64}
				3GR→4GR	142—150 {88—93}
				TCC ON (4GR)	141—148 {87—92}
			Half throttle	1GR→2GR	33—38 {20—24}
				2GR→3GR	68—82 {42—51}
				3GR→4GR	94—117 {58—73}
				TCC ON (4GR)	82—95 {75—88}
			Closed throttle position	4GR→3GR	39—41 {24—26}
				3GR→1GR	13—16 {8—10}
			Kickdown	4GR→3GR	133—141 {82—88}
				3GR→2GR	89—95 {55—59}
				2GR→1GR	38—40 {23—25}
	O/D OFF switch ON	POWER	Wide open throttle	1GR→2GR	47—51 {29—32}
				2GR→3GR	97—103 {60—64}
			Half throttle	1GR→2GR	34—46 {21—29}
				2GR→3GR	71—88 {44—55}
			Closed throttle position	3GR→1GR	13—16 {8—10}
			Kickdown	3GR→2GR	89—95 {55—59}
				2GR→1GR	38—40 {23—25}
		NORMAL	Wide open throttle	1GR→2GR	47—51 {29—32}
				2GR→3GR	97—103 {60—64}
			Half throttle	1GR→2GR	33—38 {20—24}
				2GR→3GR	68—82 {42—51}
			Closed throttle position	3GR→1GR	13—16 {8—10}
			Kickdown	3GR→2GR	89—95 {55—59}
				2GR→1GR	38—40 {23—25}

2 Range Test

1. Perform road test preparation. (See 05-17A-19 Road Test Preparation.)
2. Shift the selector lever to 2 range.
3. Accelerate the vehicle with half and wide open throttle, and verify that second gear is held.
4. Decelerate the vehicle and verify that engine breaking effect is felt.

Shift point

Range Mode	Throttle condition	Shift	Vehicle speed km/h {mph}
2	—	4GR→3GR	147—150 {91—93}
		3GR→2GR	103—109 {64—68}

1 Range Test

1. Perform road test preparation. (See 05-17A-19 Road Test Preparation.)
2. Shift the selector lever to the 1 range.
3. Accelerate the vehicle with half and wide open throttle, and verify that first gear is held.
4. Decelerate the vehicle and verify that the engine breaking effect is felt.

Shift point

Range Mode	Throttle condition	Shift	Vehicle speed km/h {mph}
1	—	2GR→1GR	47—50 {29—31}

P Position Test

- Shift into P position on a gentle slope, release the brake, and verify that the vehicle does not roll.

AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION [LA4A-EL]

Z6U051719001W03

ATF Condition Inspection

One way of determining whether the transaxle should be disassembled is by noting:

1. If the ATF is muddy or varnished.
2. If the ATF smells strange or unusual.

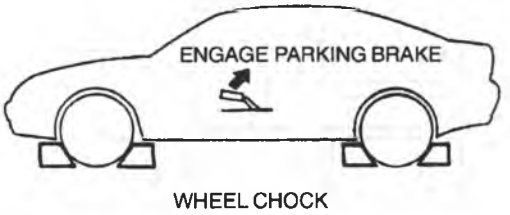
ATF Condition

Condition			Possible cause
Clear dark red		Normal	—
Light red (pink)		Contaminated with water	• Broken oil cooler inside of radiator • Poor breather hose installation By water contamination, problem could be occurring to parts inside the transaxle. If necessary, exchange transaxle.
Reddish brown	Has burnt smell and metal specs are found	Deteriorated ATF	Defective powertrain components inside of transaxle. Specs cause wide range of problems by plugging oil pipe, control valve body, and oil cooler in radiator. • When large amounts of metal specs are found, overhaul transaxle and look for defective parts. If necessary, replace transaxle. • Implement flushing operation as there is a possibility that specks have plugged up oil pipe and/or oil cooler inside of radiator.
	Has no burnt smell	Normal	Discoloration by oxidation

ATF Level Inspection

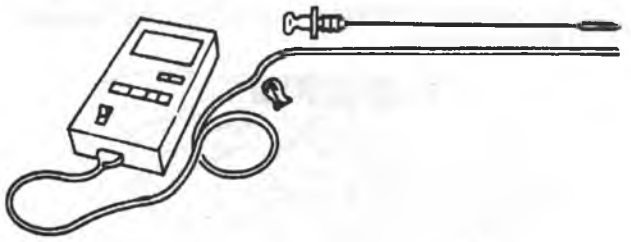
Caution
- **The ATF amount varies according to ATF's temperature. Therefore, when checking the ATF level or replacing the ATF, use a thermometer to measure the temperature, then adjust the ATF amount to the specified level according to the specified temperature.**

1. Park the vehicle on level ground.
2. Apply the parking brake and position wheel chocks securely to prevent the vehicle from rolling.



W6U517WCW

3. Adjust the thermistor probe to the same length as the dipstick and hold the probe with a paper holder. Insert into the filler tube and measure the temperature.



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4. Warm up the engine until the ATF reaches **66—77 °C {150—170 °F}**.

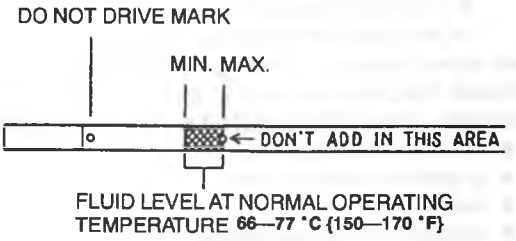
Caution
- **Do not warm the transaxle by performing stalls. This will damage the torque converter.**

5. While depressing the brake pedal, shift the selector lever to each range (P—1), pausing momentarily in each range.
6. Shift back to P position.

Note
- If the ATF level is too high or too low when hot, the cause of the following problems are shown on the next page.

ATF level	Condition	Possible cause
Too low	Line pressure is lower than the specification	Air in transaxle oil passage due to slipping or damaged clutch mechanism
Too high	ATF is hot	ATF deteriorated due to slipping clutch or stuck valve

7. Ensure that the ATF level is between max. and min.



W6U517WA4

ATF type
ATF M-III or equivalent (e.g. Mercon®)

AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [LA4A-EL]

Z6U051719001W04

Warning
- **When the transaxle and ATF are hot, they could cause severe burns. Turn off the engine and wait until they are cool before changing the ATF.**

1. Remove the dipstick.
2. Remove the drain plug.
3. Clear the sealant residue from the bolt hole.
4. Install a drain plug.

Tightening torque
15—35 N·m {1.5—3.6 kgf·m, 11—26 ft·lbf}

5. Add the specified type of ATF through the oil filler tube, until ATF level reaches lower notch of dipstick.

ATF type
ATF M-III or equivalent (e.g. Mercon®)

6. Install the dipstick.
7. Verify the ATF level. (See 05-17A-23 ATF Level Inspection.)

ELECTRICAL SYSTEM TEST [LA4A-EL]

Z6U051701030W10

Transaxle Tester Instruction

The transaxle tester allows a technician to operate the electrical portion of the transaxle independent of the vehicle electronics to determine specific transaxle concerns. Use of the transaxle tester is divided into five steps.

1. Preliminary testing and diagnosis.
2. Installing the transaxle tester.
3. Static testing-engine OFF.
4. Dynamic testing-engine running.
5. Removing the transaxle tester and clearing Diagnostic Trouble Codes (DTCs).

Preliminary testing and diagnosis

Before any diagnostic testing is done on a vehicle, some preliminary checks must be performed, as outlined below. Be sure to write down your findings, especially any DTC, for future reference.

1. Verify customer's concern
   - upshift
   - downshift
   - coasting
   - engagement
   - noise/vibration

   (1) If noise/vibration, check for dependencies:
   - engine speed dependent
   - vehicle speed dependent
   - shift dependent
   - gear dependent
   - range dependent
   - temperature dependent
2. Vehicle at normal operating temperature.
3. Inspect fluid level and condition.
4. Visually inspect the vehicle for the following items:
   - vehicle modifications
   - electronic add-on items
   - leaks
   - proper linkage adjustments
5. Inspect Service Bulletins and on-line repair information.
6. Perform vehicle on-board diagnosis test. (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL].)

Transaxle tester installation

Installing the transaxle tester at the solenoid body connector allows the separation of the vehicle electronics from the transaxle electronics. Disconnecting the normal vehicle electronics will set additional DTCs and cause firm shifts. (Disconnecting the transaxle connector defaults the transaxle to maximum line pressure).

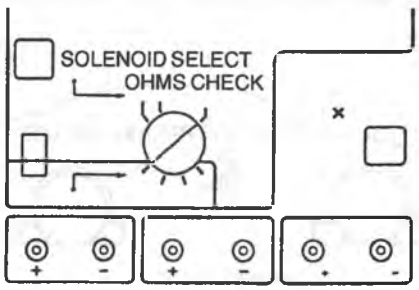
Note

- During tester usage, additional DTCs may be set.Therefore, it is important that all DTCs are erased after repairs have been made. To verify elimination of all DTCs, rerun the On-Board Diagnostic Test. (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL].)

Caution

- **Do not attempt to pry off connectors with a screwdriver. This will damage the connector and could result in transaxle problems.**

1. Disconnect the emission harness at the transaxle connector and at the TSS connector on the oil pump body in the LH wheel arch.
2. Turn the tester solenoid select dial to the "OHMS CHECK" position.

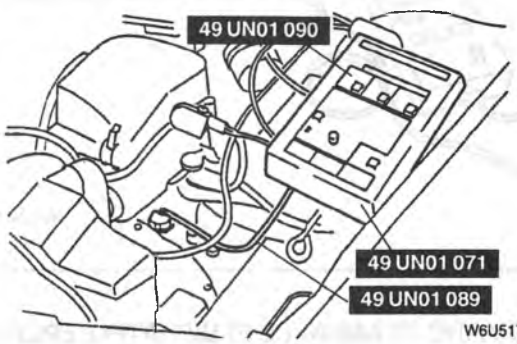


W6U517WA5

Caution

- **Route all cables away from heat sources.**

3. Install the **SST** (Transaxle overlay) onto tester. Connect the **SST** (Transaxle diagnostic harness) to the transaxle tester and then to the appropriate solenoid body connector and turbine shaft speed (TSS) connector.



W6U517WA6

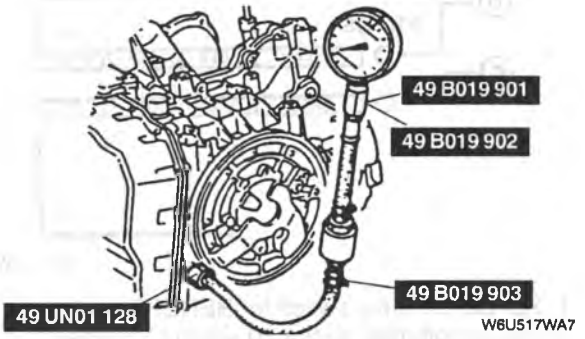
Caution

- **Route all gauge lines away from heat sources.**

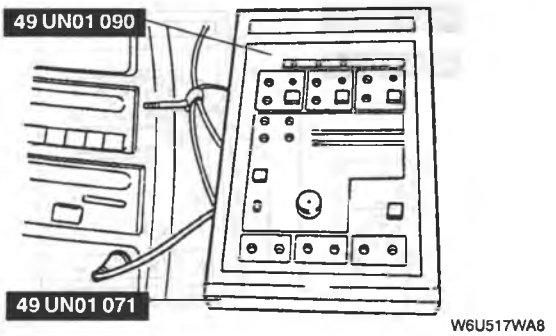
Warning

- **Removing the line pressure inspection port bolt when the ATF is hot can be dangerous. Hot ATF can come out of the opening and cause severe burns. Before removing the line pressure inspection port bolt, allow the ATF to cool.**

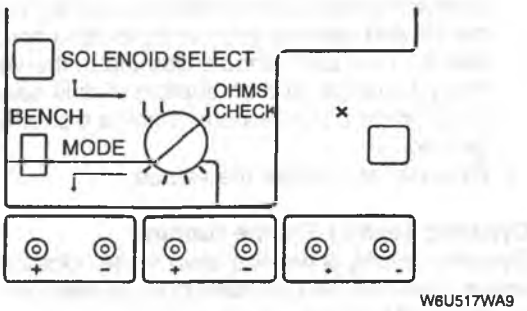
4. Remove the line pressure inspection port plug then connect the **SSTs**.



5. Plug the transaxle tester power supply plug into the cigarette lighter socket. At this time, all LED's should illuminate for a short period and then turn off. This is the tester's internal circuit inspection.



6. Set the Bench/Drive switch to "BENCH" mode.



Static Testing-Engine "OFF"

Static testing procedures allow for shop testing of the transaxle in the vehicle or on the bench. Completion of these tests prove out the transaxle electronically.

Caution

- **For resistance checks, be sure that the tester solenoid select dial is set to the "OHMS CHECK" position or the ohmmeter may be damaged.**

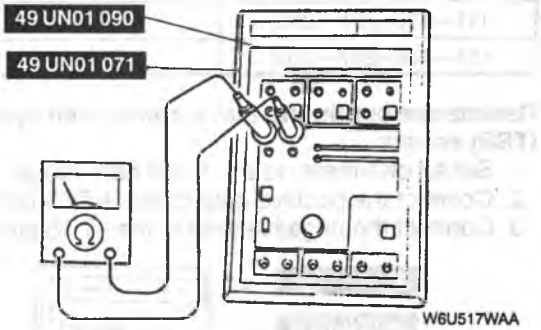
Resistance/continuity tests

- Using a volt-ohmmeter and the transaxle tester, perform the Pinpoint Tests as indicated in "On Board Diagnostics" (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL].) based on the DTC which were displayed.
- Perform repairs as indicated by the Pinpoint Tests. (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL].) Always retest and road test the vehicle after a repair. (See 05-17A-19 ROAD TEST [LA4A-EL].)

Resistance/continuity test-solenoids

Solenoids (Electronic pressure control (EPC), Shift solenoid No.1 (SS1), Shift solenoid No.2 (SS2), TCC, 3-2 Timing/coasting clutch solenoid (3-2T/CCS)

1. Set an ohmmeter to the 0—100 ohm range.
2. Connect the positive lead of the ohmmeter to the appropriate VPWR jack for the solenoid being tested.
3. Connect the negative lead of the ohmmeter to the appropriate solenoid (EPC, SS1, SS2, TCC, 3-2T/CCS) jack.

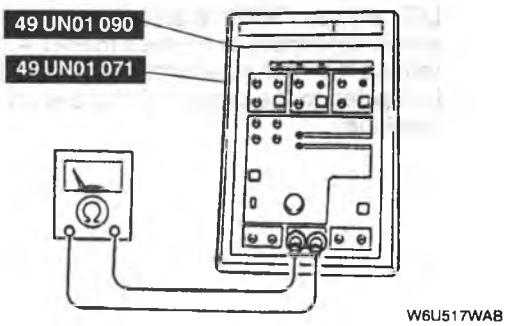


4. Record the resistance.
5. Refer to the chart below for the values.
   - If out of specified range, refer to the following DTC troubleshooting. (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL].)

SOLENOID	SOLENOID RESISTANCE (Ω)
SS1	12—22
SS2	12—22
TCC	12.5—19.0
EPC	3.7—5.92
3-2T/CCS	3.7—5.92

Resistance/continuity test-transaxle fluid temperature (TFT) sensor

1. Set an ohmmeter to the 1,000 ohm range.
2. Connect the positive lead to the + TFT jack.
3. Connect the negative lead to the - TFT jack.

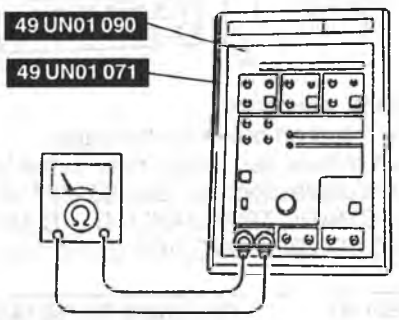


4. Record the resistance. Resistance will vary with temperature.
5. Refer to the chart below for the valves.
   - If out of specified range, refer to the DTC troubleshooting. (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL].)

Temperature °C {°F}	Resistance kΩ
-40— -20 {-40— -4}	967—284
-19— -1 {-3—31}	284—100
0—20 {32—68}	100—37
21—40 {70—104}	37—16
41—70 {105—158}	16—5
71—90 {159—194}	5—2.7
91—110 {195—230}	2.7—1.5
111—130 {231—266}	1.5—0.8
131—150 {267—302}	0.8—0.54

Resistance/continuity test-turbine shaft speed (TSS) sensor

1. Set an ohmmeter to the 1,000 ohm range.
2. Connect the positive lead to the +TSS jack.
3. Connect the negative lead to the -TSS jack.

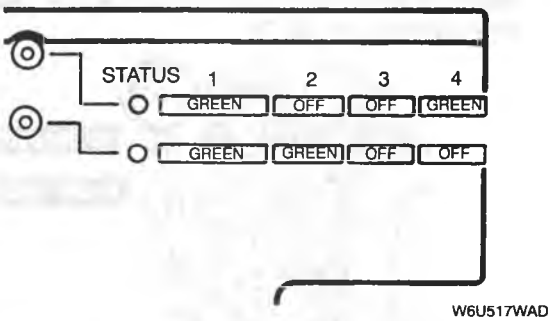


W6U517WAC

4. Record the resistance.
5. TSS should be **140—290 ohm**.
   - If out of specified range, refer to the DTC troubleshooting. (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL].)

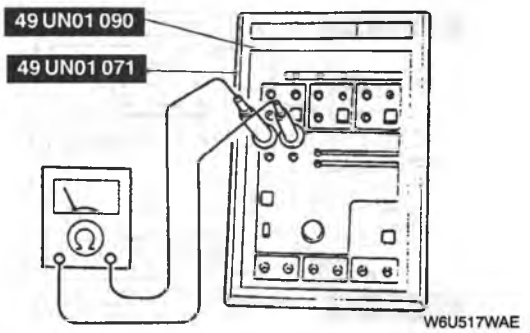
Voltage test-solenoids

Note
- LED will turn "GREEN" when solenoid activates and turn "OFF" when deactivated. LED will turn "RED" if an activated solenoid/harness is shorted to BAT+. LED will remain "OFF" if an activated solenoid/harness is shorted to the ground or there is no continuity.



W6U517WAD

1. Set Bench/Drive switch to "BENCH" mode.
2. Set an voltmeter to the 20 volt D.C. range.
3. Connect the voltmeter positive lead to the appropriate solenoid VPWR jack.
4. Connect voltmeter negative lead to the appropriate solenoid jack.



W6U517WAE

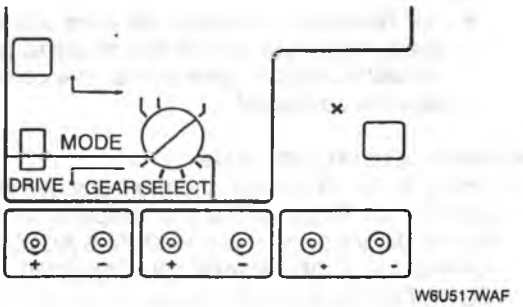
5. Using the voltmeter, inspect for voltage across each solenoid by activating the solenoid switch. Select the appropriate solenoid with the rotary switch and depress the corresponding solenoid switch. The "LED" should illuminate, the voltage should change, and an audible click is heard. If "LED" does not illuminate, there is a short to the ground.
6. Observe and record the values.

Dynamic Testing-Engine running

Dynamic testing is the final step in the transaxle tester usage. It allows the transaxle to be proven out electronically and hydraulically.

Preliminary set up

1. Set the Bench/Drive switch to DRIVE mode.
2. Rotate the GEAR SELECT dial on tester to the "1" position.



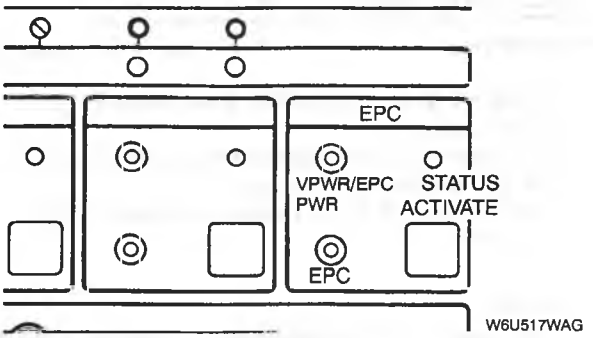
W6U517WAF

3. Set parking brake and confirm vehicle is in PARK.
4. Start the engine.

Electrical pressure control (EPC) solenoid

Caution
- **Do not attempt to keep the EPC switch depressed (minimum line pressure) and stall the transaxle (holding the vehicle with the brake while depressing the throttle with the transaxle in gear). Transaxle will be damaged.**

1. Observe the line pressure. Record the value. Line pressure should raise to maximum. If not, see 05-03A-7 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [LA4A-EL] or DTC troubleshooting concerning the EPC solenoid. (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL].)
2. Depress the EPC switch. Line pressure should drop to a minimum value. Record the value. If not, see 05-03A-7 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING [LA4A-EL] or DTC troubleshooting. (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL].)

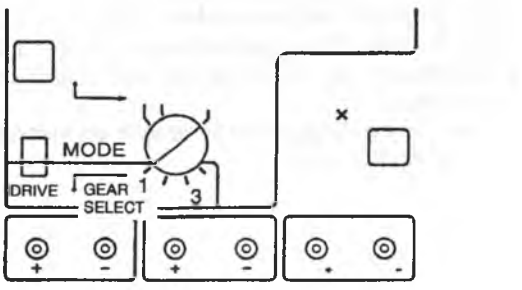


W6U517WAG

Transaxle engagement

Note
- Engagement will be harsh and line pressure will be at maximum regardless of the EPC switch during reverse check.

1. Verify that the Bench/Drive switch is in "DRIVE" mode.



W6U517WAH

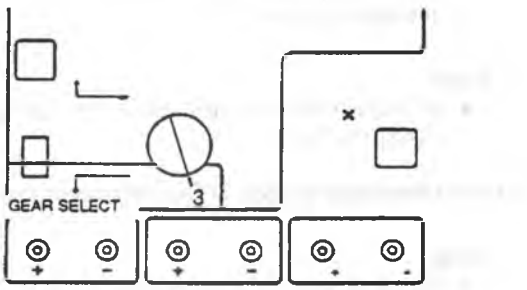
2. Turn GEAR SELECT dial from 1 to 3/R.
   (1) Move the selector lever from PARK to REVERSE.
   - Did vehicle shift into REVERSE?
   - Was engagement harsh?

   (2) Move the selector lever from REVERSE to PARK.
3. Turn GEAR SELECT dial to 1.
   (1) Depress EPC switch. Line pressure should drop to idle pressure.
   (2) While holding the EPC switch down, move the selector lever from PARK to DRIVE.
   - Did the vehicle shift into DRIVE?
   - Was engagement smooth?

   (3) Move the selector lever from DRIVE to PARK.
   (4) Release EPC switch. Pressure should return to maximum.
   (5) With the EPC switch released, repeat steps 3-(2) and (3). Engagement should be firm.

Upshift downshift

Note
- GEAR SELECT dial must be in "3/R" to get REVERSE gear.



W6U517WAJ

- Upshifts and downshifts will be FIRM during this procedure.
- Pressure gauges may be removed from the vehicle during these tests.
- These tests should be performed on the road. If they are performed on the hoist, the technician may not feel all of the shifts when they are engaged.
- LED's will turn "green" when solenoids are activated and turn "off" when deactivated. Refer to the appropriate overlay for the proper status/shift sequence of the shift solenoids during upshift and downshift.

Caution
- **Selector lever must be in the D range position or internal damage could result. Do not shift to 2 or 1 range position.**

1. Verify that the GEAR SELECT dial is in "1" position. Move the selector lever into the D range. Depress the 3-2 timing/coasting clutch solenoid (3-2 T/CCS) button and accelerate the vehicle. If there is no vehicle movement, inspect the forward one-way clutch. If movement occurs, proceed to step 2 and continue diagnosis.
2. Move the selector lever into D range and accelerate to **23 km/h {14 mph}**. Select second gear by rotating the GEAR SELECT dial to "2" position.
   - Did the vehicle upshift to second gear?
   - Did the appropriate shift solenoids activate/deactivate?

3. Accelerate to **40 km/h {25 mph}** and select "3" position.
   - Did the vehicle upshift to third gear?
   - Did the appropriate shift solenoids activate/deactivate?
4. Accelerate to **56—72 km/h {35—45 mph}** and select "4" position.
   - Did the vehicle upshift to fourth gear?
   - Did the appropriate shift solenoids activate/deactivate?

Caution
- **The vehicle speed must be below 56 km/h {35 mph} before shifting the select lever to "1" position, or the transaxle could overrun.**

5. Reverse the order to downshift.
   - Did the vehicle downshift from 4 to 3, 3 to 2, and 2 to 1?
   - Did the appropriate shift solenoids activate/deactivate?

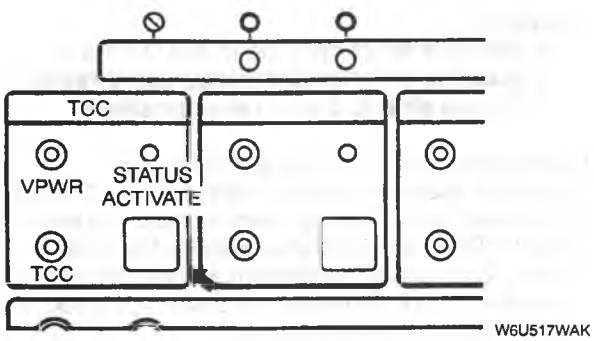
Note
- 4-3 downshift will be harsh when using the transaxle tester.

Torque converter clutch (TCC) engagement

Note
- This test should be performed on the road. If it is performed on a hoist, a technician may not feel the torque converter clutch engage.

Caution
- **Do not depress the TCC switch with the transaxle in gear and the vehicle at a stop. Converter clutch may damage.**

1. Accelerate and shift the vehicle up into third gear by using the tester (See 05-17A-27 Upshift downshift.). Hold the speed steady and depress the TCC switch.
   - Did the torque converter engage?
   - Did the engine speed drop?
   - Did the TCC solenoid activate?



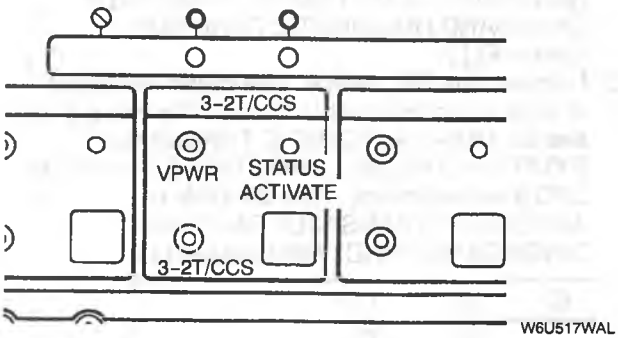
W6U517WAK

2. Release the TCC switch.
   - Did the TCC solenoid deactivate?
   - Did the TCC release?
   - Did the engine speed increase?

3-2 timing/coasting clutch (3-2T/CCS) engagement

Note
- This test should be performed on the road. If it is performed on the hoist, a technician may not feel the 3-2 timing/coasting clutching disengage.

1. Accelerate and upshift the vehicle into third gear. Go to closed throttle. Depress the 3-2T/CCS switch.
   - Did the 3-2 timing/coasting clutch disengage?
   - Did the 3-2T/CCS solenoid deactivate (light on)?



W6U517WAL

2. Press lightly on the throttle, then release the 3-2T/CCS switch.
   - Did the 3-2 timing/coasting clutch engage?
   - Did engine braking occur?
   - Did the 3-2 T/CCS solenoid activate (light off)?

Note
- Coast clutch engagement at closed throttle will be harsh.

Turbine shaft speed (TSS) sensor inspection

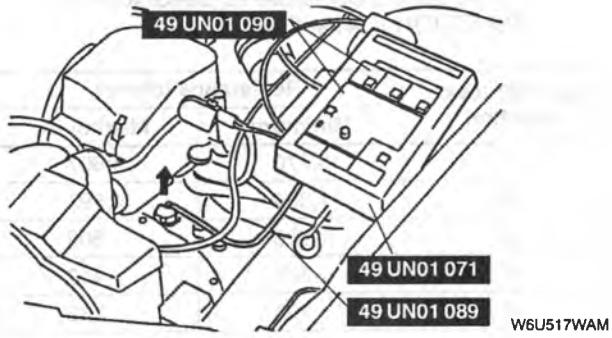
Note
- This test may be performed on the hoist or on the road.

1. Set a voltmeter to 20 volt A.C.
   (1) Connect the positive lead to the (+) TSS jack.
   (2) Connect the negative lead to the (-) TSS jack.
2. Slowly accelerate the vehicle speed and monitor voltmeter.
   - Did the voltage increase with an increase in vehicle speed?

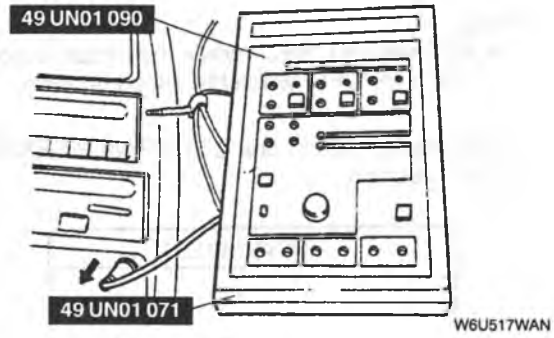
Removing the transaxle tester and clearing diagnostic trouble code (DTC)

Caution
- **Do not attempt to pry off connectors with a screwdriver. This will cause damage to connector and could result in a transaxle problem.**

1. Disconnect the **SSTs** from the transaxle connector and TSS connector.



2. Reinstall the emission harnesses. Verify the connections by pulling up on the harness.
3. Disconnect the transaxle tester power lead from the vehicle.



4. Erase all DTCs.(See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL].)
5. Rerun the On-Board Diagnostic Test.(See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL].)
6. Based on the transaxle tester results, proceed to the appropriate segment of this section for transaxle or electrical/wiring service.
7. Repeat the test with the transaxle tester to confirm repair.

Transaxle Range Switch Instruction

The transaxle tester allows the technician to operate the electrical portion of the transaxle range (TR) switch. The tester usage is divided into five steps.

1. Preliminary testing and diagnosis.
2. Installing the transaxle tester.
3. Testing the TR switch.
4. Testing the Park/Neutral and backup circuits.
5. Removing the transaxle tester and clearing DTCs.

Preliminary testing and diagnosis

Before any diagnostic testing is carried out on vehicle, some preliminary checks must be performed, as outlined below. Be sure to write down findings, especially any DTCs found, for future reference.

1. Verify that TR switch is properly adjusted in NEUTRAL.
2. Verify customer concern (e.g. when does concern occur?):
   - upshift
   - downshift
   - coasting
   - engagement
3. If concern involves noise or vibration, verify if it relates to any of the following:
   - engine speed
   - vehicle speed
   - shift
   - gear
   - range
   - temperature
4. Vehicle must be at normal operating temperature.
5. Inspect transaxle fluid level and condition.
6. Inspect for the following items:
   - vehicle modifications
   - electronic add-on items
   - leaks
   - proper linkage adjustments
   - Perform vehicle On-Board Diagnosis Test. (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL].)

Transaxle tester installation

Installing the transaxle tester at the TR switch connector results the separation of the TR switch from the vehicle electronics.

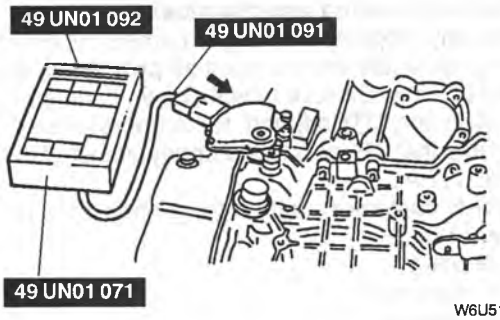
Note
- During tester usage, additional DTCs may be set. Therefore, it is important that all DTCs are erased after repairs have been made. To verify the elimination of all DTCs, rerun the On-Board Diagnosis Test.

Caution
- **Do not attempt to pry off connectors with a screwdriver. This may damage the connector and could result in a transaxle problem.**

1. Disconnect the emission harness at transaxle range (TR) switch connector.

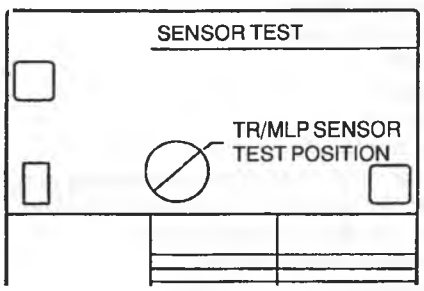
Caution
- **Route all cables away from heat sources.**

2. Set the two-way switch in the down position. Install the **SSTs** (TR/MLP overlay, MLPS harness adapter) onto the tester. Connect the interface cable (cable I.D. "D") to the transaxle tester and then to the TR switch connector.



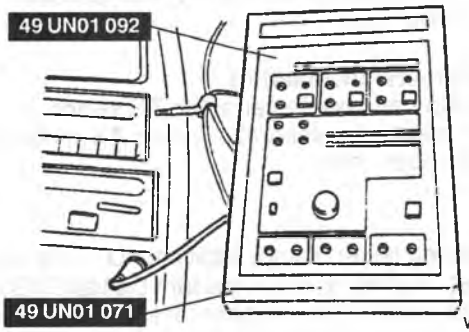
W6U517WAP

3. Turn the test select dial to the "TR/MLP SENSOR TEST" position.



W6U517WAQ

4. Plug the transaxle tester power supply plug into the cigarette lighter socket. At this time, all LED's should illuminate for a short period and then turn off. This is the tester's internal circuit inspection.



W6U517WAR

Testing the TR switch

Static testing procedures allow for shop testing of the TR switch on the vehicle or on the bench. Completion of these tests prove out the TR switch electronically.

Caution

- **For resistance checks, be sure that the test select dial is set to the "TR/MLP SENSOR TEST" position or the ohmmeter may be damaged.**

Note

- Using a digital volt-ohmmeter and the transaxle tester, perform the DTC troubleshooting as indicated on the DTCs which were displayed. (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL].)
- Perform repairs as indicated by the pinpoint test. Always erase all DTCs, retest resistance test-TR switch and road test the vehicle after a repair.

Resistance test TR switch

1. Set the ohmmeter to the 5,000 ohm range.
2. Connect the positive lead of the ohmmeter to the TR/MLP jack.
3. Connect the negative lead of the ohmmeter to the SIGRTN jack.
4. Record the resistance at each position while moving the selector lever to each range position.
5. Refer to the chart below for values.
   - If out of specified range, perform the DTC troubleshooting. (See 05-02A-6 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION [LA4A-EL].)

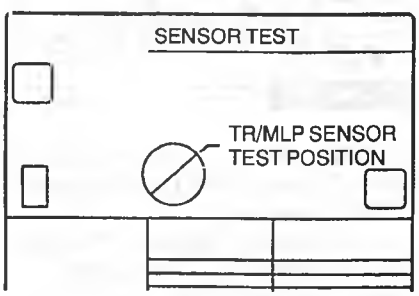
Selector lever position	Resistance (ohms)	
	Minimum	Maximum
P	3,770	4,607
R	1,304	1,593
N	660	806
D	361	442
2	190	232
1	78	95

Park/neutral, backup light and optional circuit voltage tests

Note

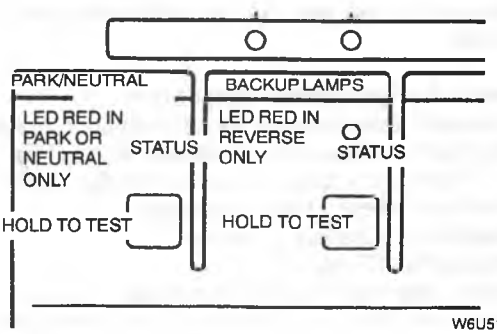
- LED will turn "RED" when the circuit is closed and turn "OFF" when the circuit is open.

1. Verify the test select dial is in "TR/MLP SENSOR TEST" position.



W6U517WAS

2. Press and hold each test button while moving the selector lever through each range position.
3. Monitor each "LED".



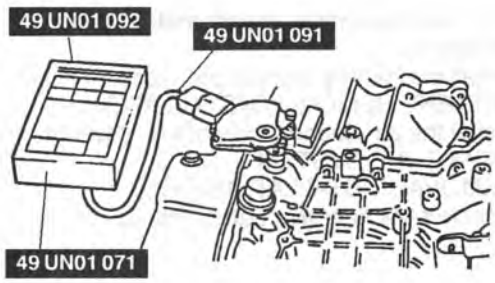
W6U517WAT

4. The status "LED" should indicate "RED" only in the indicated position. Refer to the overlay.
5. If the LED does not indicate "RED" in the desired position, or indicates "RED" in another position, first verify the TR switch alignment and then retest. If the switch fails, then replace.

Removing the transaxle tester and clearing diagnostic trouble code (DTC)

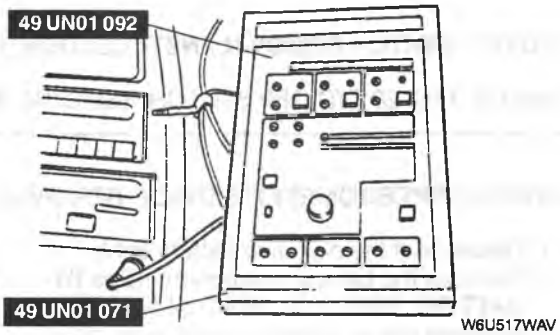
Caution
- **Do not attempt to pry off connectors with a screwdriver. This will damage the connector and could result in a transaxle problem.**

1. Disconnect the transaxle tester from the transaxle range (TR) switch connector.



W6U517WAU

2. Reinstall the emission harness. Verify the connection by pulling up on the harness.
3. Disconnect the transaxle tester power lead from vehicle.



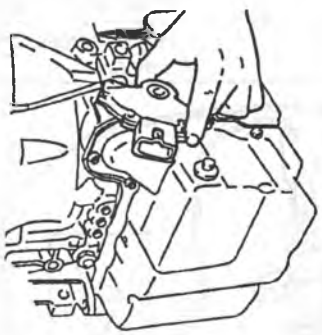
W6U517WAV

4. Erase all DTCs. (See 01-02A-8 FOREWORD [FS].)
5. Rerun the on-board diagnostic test.
6. Verify repair.

TRANSAXLE RANGE SWITCH REMOVAL/INSTALLATION [LA4A-EL]

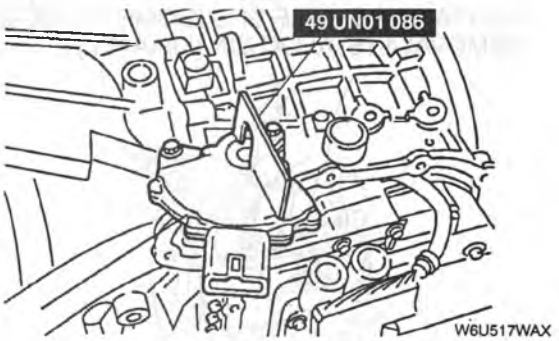
Z6U051719440W04

1. Disconnect the negative battery cable.
2. Remove the battery component. (See 01-17-1 BATTERY REMOVAL/INSTALLATION.)
3. Remove the fresh-air duct, air cleaner component. (See 01-13A-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
4. Disconnect the transaxle range switch connector.
5. Remove the transaxle range switch.


W6U517WAW

6. Shift the transaxle into N position.
7. Install the transaxle range switch on the manual lever shaft.
8. Hand tighten the two mounting bolts.
9. Use the **SST** to align the switch on the shaft and case.
10. Tighten the two mounting bolts.

Tightening torque
11—13 N·m {112—133 kgf·cm, 97—115 in·lbf}



W6U517WAX

11. Connect the transaxle range switch connector.
12. Install the air cleaner component, fresh-air duct. (See 01-13A-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
13. Install the battery component. (See 01-17-1 BATTERY REMOVAL/INSTALLATION.)
14. Connect the negative battery cable.

O/D OFF SWITCH INSPECTION [LA4A-EL]

Z6U051746040W03

(See 05-17B-22 O/D OFF SWITCH INSPECTION [GF4A-EL].)

O/D OFF SWITCH REMOVAL/INSTALLATION [LA4A-EL]

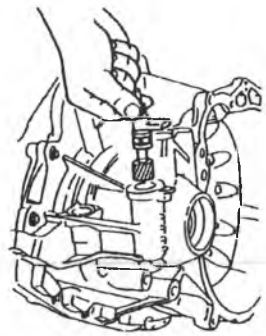
Z6U051746040W04

(See 05-17B-23 O/D OFF SWITCH REMOVAL/INSTALLATION [GF4A-EL].)

VEHICLE SPEEDOMETER SENSOR REMOVAL/INSTALLATION [LA4A-EL]

Z6U051717400W03

1. Disconnect the negative battery cable.
2. Remove the battery component. (See 01-17-1 BATTERY REMOVAL/INSTALLATION.)
3. Remove the air cleaner component. (See 01-13A-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
4. Disconnect the vehicle speedometer sensor connector.
5. Remove the vehicle speedometer sensor.



W6U517WFA

6. Apply ATF to a new O-ring and install it on a new vehicle speedometer sensor.
7. Install the vehicle speedometer sensor.

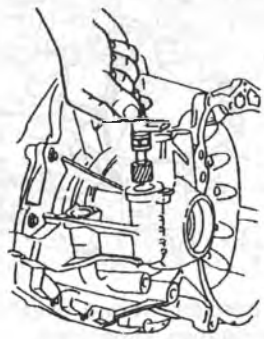
Tightening torque
5.0—6.0 N·m {50—61 kgf·cm, 44—53 in·lbf}

8. Connect the vehicle speedometer sensor connector.
9. Install the battery component. (See 01-17-1 BATTERY REMOVAL/INSTALLATION.)
10. Install the air cleaner component. (See 01-13A-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
11. Connect the negative battery cable.

VEHICLE SPEEDOMETER SENSOR INSPECTION [LA4A-EL]

Z6U051717400W04

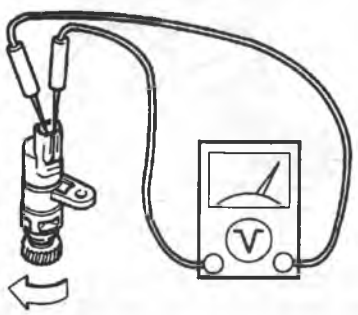
1. Remove the vehicle speedometer sensor. (See 05-17A-32 VEHICLE SPEEDOMETER SENSOR REMOVAL/INSTALLATION [LA4A-EL].)



W6U517WFA

2. Measure the voltage between terminals of the vehicle speedometer sensor while rotating the drive gear by hand.

Meter needle	Action
Moves slightly under 5 V	Repair wiring harness (Instrument cluster—Vehicle speedometer sensor)
Does not move	Replace vehicle speedometer sensor



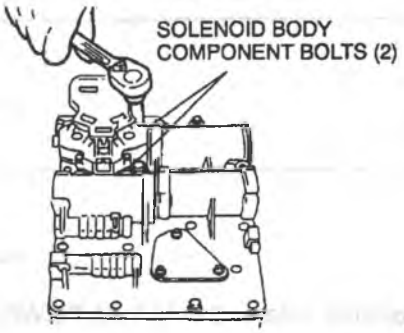
W6U517WDH

3. Install the vehicle speedometer sensor. (See 05-17A-32 VEHICLE SPEEDOMETER SENSOR REMOVAL/INSTALLATION [LA4A-EL].)

SOLENOID BODY REMOVAL/INSTALLATION [LA4A-EL]

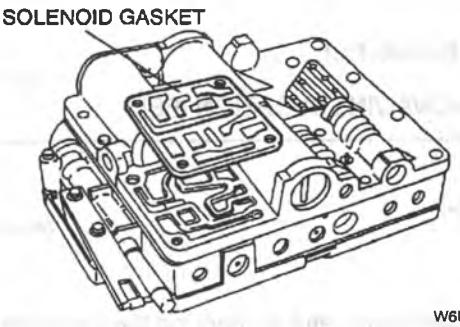
Z6U051721105W01

1. Remove the control valve body. (See 05-17A-42 CONTROL VALVE BODY AND THERMOSTATIC OIL LEVEL CONTROL VALVE REMOVAL/INSTALLATION [LA4A-EL].)
2. Remove the solenoid body component.



W6U517WFC

3. Remove the solenoid gasket from the accumulator body. Discard the solenoid gasket.

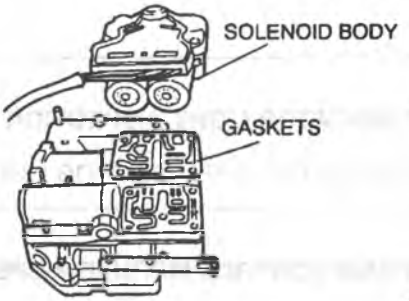


W6U517WFD

4. Install the solenoid body and a new gasket on the accumulator body with the bolts.

Note

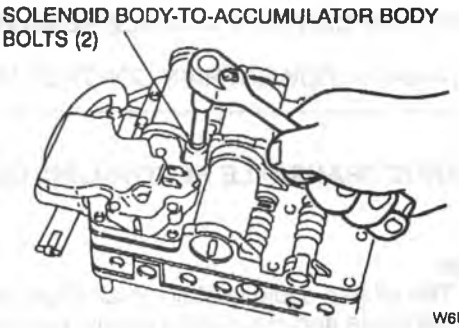
- Match the solenoid body gasket to the passages.



W6U517EFE

5. Tighten the bolts.

Tightening torque
10 N·m {1.1 kgf·m, 8 ft·lbf}



W6U517WFF

6. Install the control valve body. (See 05-17A-42 CONTROL VALVE BODY AND THERMOSTATIC OIL LEVEL CONTROL VALVE REMOVAL/INSTALLATION [LA4A-EL].)
7. Carry out the time lag test and line pressure test. (See 05-17A-16 MECHANICAL SYSTEM TEST [LA4A-EL].)
8. Carry out the road test. (See 05-17A-19 ROAD TEST [LA4A-EL].)

TURBINE SHAFT SPEED SENSOR REMOVAL/INSTALLATION [LA4A-EL]

Z6U051701027W01

1. Disconnect the negative battery cable.
2. Remove the wheel and tire. (driver's side.)
3. Remove the splash shield.
4. Disconnect the turbine shaft speed sensor connector.
5. Remove the turbine shaft speed sensor.
6. Apply ATF to a new O-ring and install it on a new turbine shaft speed sensor.
7. Install the turbine shaft speed sensor.

Tightening torque
12.1—13.9 N·m {123—142 kgf·cm, 107—123 in·lbf}

8. Connect the turbine shaft speed sensor connector.
9. Install the splash shield.
10. Install the wheel and tire. (driver's side)
11. Connect the negative battery cable.

TRANSAXLE FLUID TEMPERATURE SENSOR REMOVAL/INSTALLATION [LA4A-EL]

Z6U051719010W03

Note
- Transaxle fluid temperature sensor (TFT) and solenoid valve are together as one unit, and are installed to the solenoid body. (See 05-17A-33 SOLENOID BODY REMOVAL/INSTALLATION [LA4A-EL] procedure.)

O/D OFF INDICATOR LIGHT INSPECTION [LA4A-EL]

Z6U051755480W02

(See 05-17B-31 O/D OFF INDICATOR LIGHT INSPECTION [GF4A-EL].)

POWERTRAIN CONTROL MODULE INSPECTION [LA4A-EL]

Z6U051718880W03

Note
- For **PID/DATA Monitor and Record** or **Terminal voltage** inspection, refer to 01-40A-15 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [FS].

POWERTRAIN CONTROL MODULE REMOVAL/INSTALLATION [LA4A-EL]

Z6U051718880W04

(See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS].)

AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [LA4A-EL]

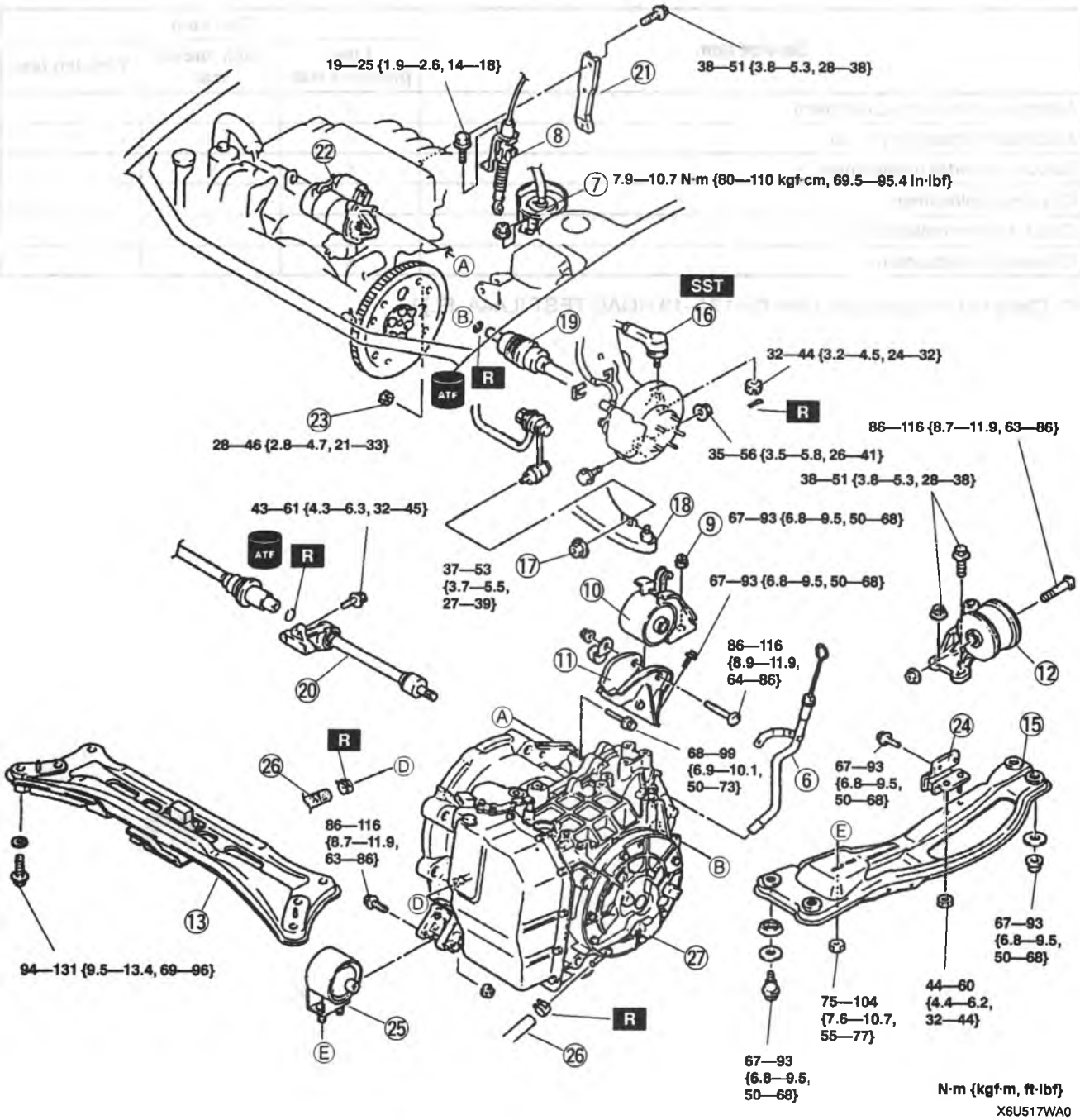
Z6U051719090W02

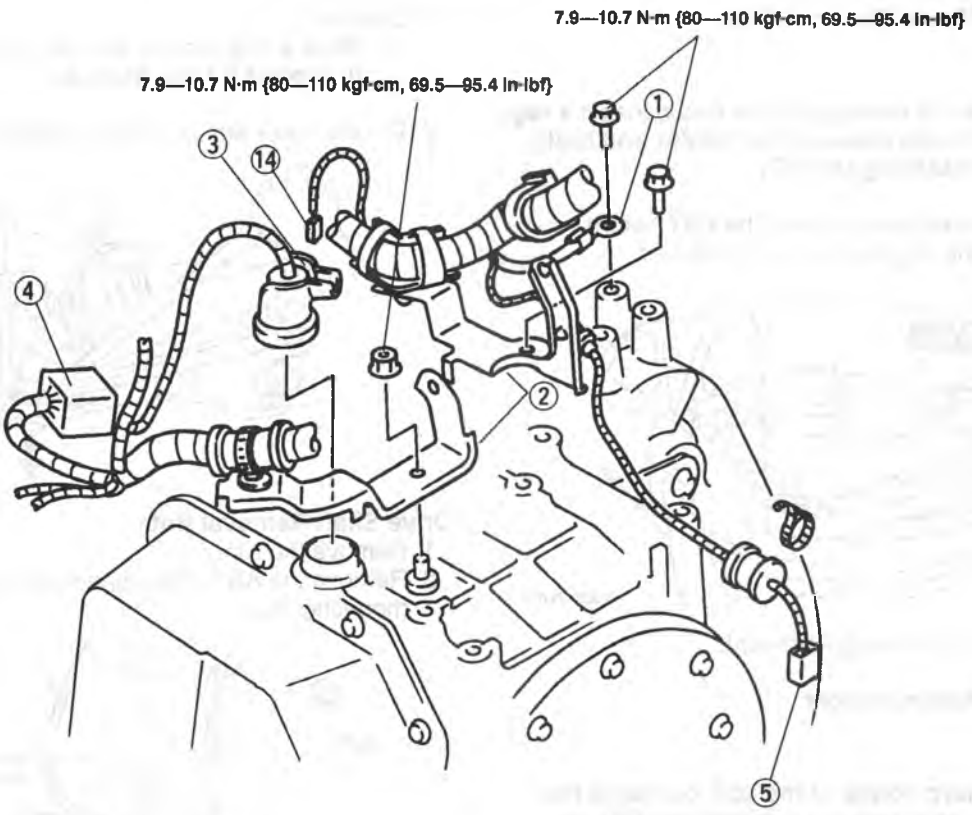
Note
- The oil pan could contain small chips, shavings, and other particles useful in checking the condition of the transaxle and diagnosing certain problems. To ensure that all foreign particles stay in the oil pan, make sure that the transaxle is never tipped completely over while the oil pan is still installed.

1. Disconnect the negative battery cable.
2. Drain the ATF into a container. (See 05-17A-23 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [LA4A-EL].)
3. Remove the battery component. (See 01-17-1 BATTERY REMOVAL/INSTALLATION.)
4. Remove the fresh-air duct, air cleaner component. (See 01-13A-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
5. Remove the front wheel and tire.
6. Remove the splash shield.
7. Remove in the order indicated in the table.
8. After removal, remove the oil pan to check the condition of the transaxle.
9. Install in the reverse order of removal.
10. Install the splash shield.
11. Install the wheel and tire.
12. Install the fresh-air duct, air cleaner component. (See 01-13A-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
13. Install the battery component. (See 01-17-1 BATTERY REMOVAL/INSTALLATION.)
14. Fill the transaxle with the specified ATF after installation. (See 05-17A-23 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [LA4A-EL].)
15. Inspect for leakage of ATF from all connecting points.
16. Connect the negative battery cable.
17. Inspect the operation of the transaxle range switch. (See 05-17A-24 ELECTRICAL SYSTEM TEST [LA4A-EL].)
18. Inspect the operation of the selector lever. (See 05-18-1 SELECTOR LEVER INSPECTION.)
19. Carry out the mechanical system test. (See 05-17A-16 MECHANICAL SYSTEM TEST [LA4A-EL].)

Service item	Test item		
	Line pressure test	Stall speed test	Time lag test
Automatic transaxle replacement	×		
Automatic transaxle overhaul	×	×	×
Torque converter replacement	×	×	
Oil pump replacement	×		
Clutch system replacement	×		
Differential replacement	×		

20. Carry out the road test. (See 05-17A-19 ROAD TEST [LA4A-EL].)


19—25 {1.9—2.6, 14—18}
38—51 {3.8—5.3, 28—38}
7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}
SST
32—44 {3.2—4.5, 24—32}
28—46 {2.8—4.7, 21—33}
35—56 {3.5—5.8, 26—41}
86—116 {8.7—11.9, 63—86}
38—51 {3.8—5.3, 28—38}
43—61 {4.3—6.3, 32—45}
67—93 {6.8—9.5, 50—68}
37—53 {3.7—5.5, 27—39}
67—93 {6.8—9.5, 50—68}
86—116 {8.9—11.9, 64—86}
68—99 {6.9—10.1, 50—73}
67—93 {6.8—9.5, 50—68}
86—116 {8.7—11.9, 63—86}
94—131 {9.5—13.4, 69—96}
75—104 {7.6—10.7, 55—77}
44—60 {4.4—6.2, 32—44}
67—93 {6.8—9.5, 50—68}
67—93 {6.8—9.5, 50—68}
N·m {kgf·m, ft·lbf}
X6U517WA0



1	Ground
2	Bracket
3	Solenoid body connector
4	Transaxle range switch connector
5	Turbine shaft speed sensor connector
6	Oil filler tube
7	Fuel filter mounting nut
8	Selector cable
9	No.1 engine mount nut
10	No.1 engine mount rubber
11	No.1 engine mount bracket
12	No.4 engine mount (See 05-17A-38 No.4 Engine Mount Removal Note)
13	Transverse member
14	Vehicle speedometer sensor connector
15	Engine mount member (See 05-17A-40 Engine Mount Member Installation Note)
16	Tie-rod end (See 05-17A-38 Tie-Rod End Removal Note) (See 05-17A-40 Tie-Rod End Installation Note)

17	Stabilizer control link
18	Lower arm (See 05-17A-38 Lower Arm Removal Note) (See 05-17A-40 Lower Arm Installation Note)
19	Drive shaft (See 05-17A-38 Drive Shaft Removal Note) (See 03-13-3 Clip Installation Note)
20	Joint shaft (See 05-17A-40 Joint Shaft Installation Note)
21	Intake manifold bracket
22	Starter
23	Torque converter nut
24	No.5 engine mount
25	No.2 engine mount
26	Oil hose (See 05-17A-48 OIL COOLER REMOVAL/INSTALLATION [LA4A-EL])
27	Transaxle (See 05-17A-39 Transaxle Removal Note) (See 05-17A-39 Transaxle Installation Note)

No.4 Engine Mount Removal Note

Caution
- **To prevent damage to the body, insert a rag into the gap between the fender and body, when installing the SST.**

1. Support the engine by using the **SST** before removing the engine mounting member.

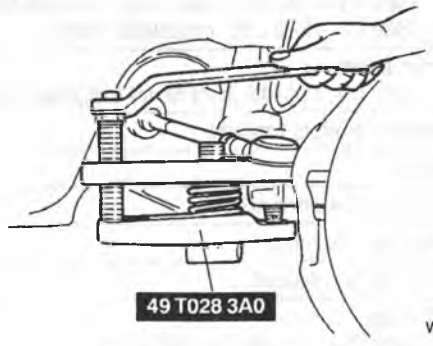


2. Remove the No.4 engine mount.

Tie-Rod End Removal Note

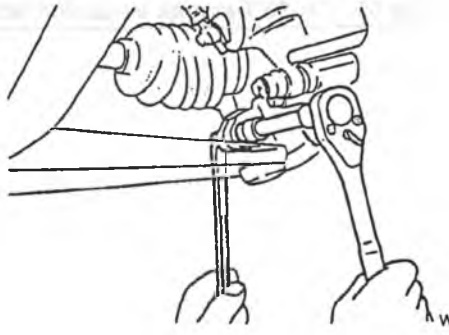
Caution
- **The sharp edges of the SST can slice the tie-rod end dust boot. Install the SST so that the sharp edges are between the dust boot and the tie rod.**

1. Remove the cotter pin and nut.
2. Disconnect the tie rod end from the knuckle by using the **SST**.



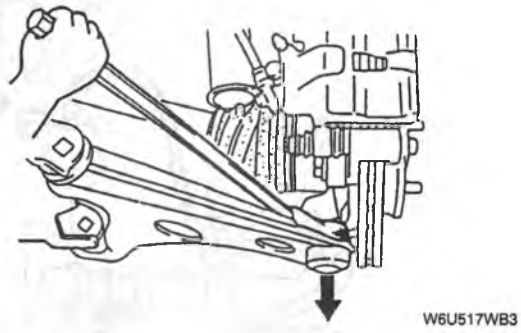
Lower Arm Removal Note

1. Remove the clinch bolt from the lower arm ball joint.



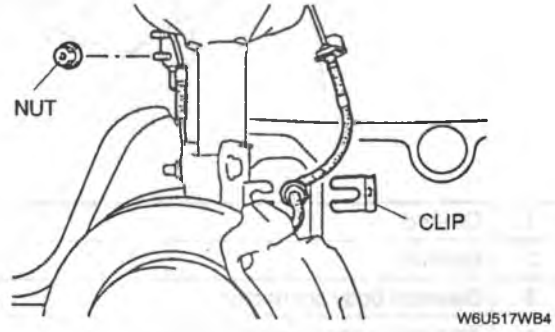
Caution
- **Wrap a rag around the ball joint dust boot to protect it from damage.**

2. Pry the lower arm out of the knuckle.

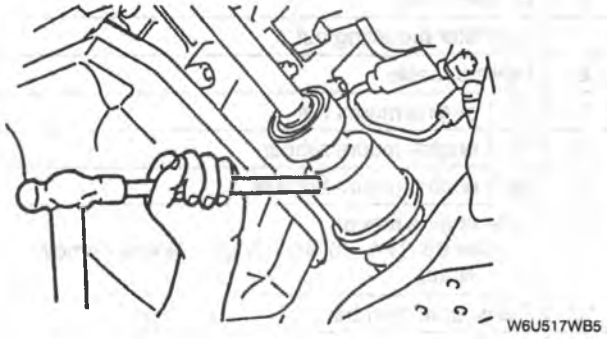


Drive Shaft Removal Note

1. Remove the clip.
2. Remove the ABS wheel speed sensor harness mounting nuts.



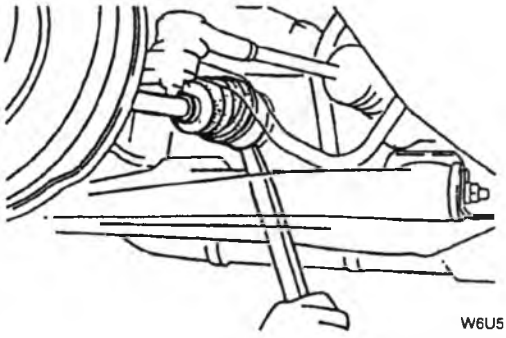
3. Separate the driver side drive shaft from the joint shaft by using a brass bar and a hammer.



Caution
- **The sharp edges of the drive shaft snap ring can slice or puncture the oil seal. Be careful when removing the drive shaft from the transaxle.**

Note
- Do not pry on the seal surface.

4. Separate the passenger side drive shaft from the transaxle by prying with a bar inserted between the outer ring and the transaxle, as shown in the figure.

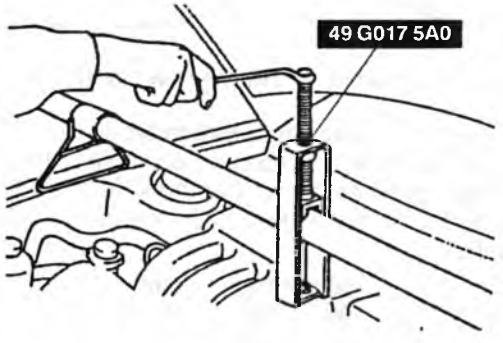

W6U517WB6

5. Suspend the drive shaft with a rope.

Transaxle Removal Note

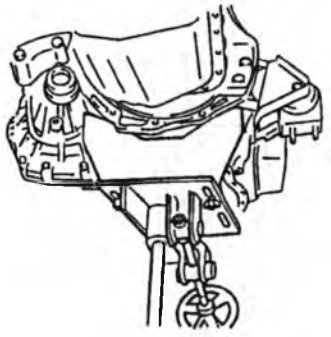
Warning
- **Do not allow the transaxle to fall from the jack.**
- **Verify that the transaxle is securely supported by the jack. If the transaxle should fall, serious injury or death and damage to the vehicle could result. Before removing the transaxle, make sure that the jack is securely supporting it.**

1. Loosen the **SST** (engine support) and lean the engine toward the transaxle.



W6U517WB7

2. Support the transaxle on a jack.

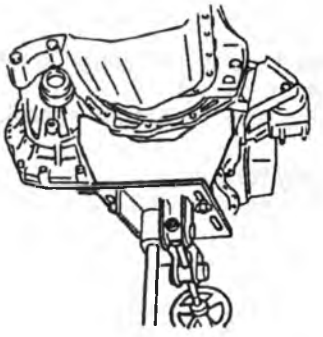

W6U517WB8

3. Remove the transaxle mounting bolts.
4. Remove the transaxle.

Transaxle Installation Note

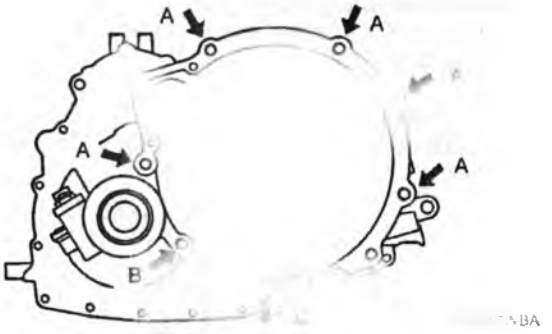
Warning
- **Do not allow the transaxle to fall from the jack.**
- **Verify that the transaxle is securely supported by the jack. If the transaxle should fall, serious injury or death and damage to the vehicle could result. Before removing the transaxle, make sure that the jack is securely supporting it.**

1. Set the transaxle on a jack and lift it into place.


W6U517WB9

2. Install the transaxle mounting bolts.

Tightening torque
A: 90—116 N·m
{9.1—11.9 kgf·m, 66—86 ft·lbf}
B: 38—51 N·m {3.8—5.3 kgf·m, 28—38 ft·lbf}
C: 19—25 N·m {1.9—2.6 kgf·m, 14—18 ft·lbf}



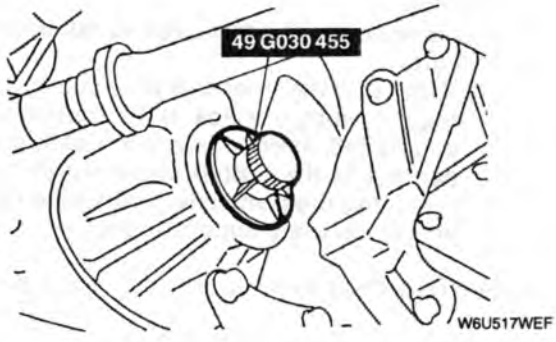
3. Install the torque converter nuts.

Tightening torque
28—46 N·m {2.8—4.7 kgf·m, 21—33 ft·lbf}

4. Hand tighten the No.4 engine mount nuts.

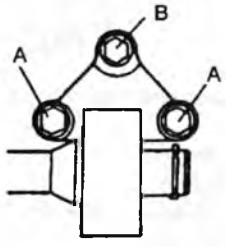
Joint Shaft Installation Note

1. Remove the **SST** from the transaxle case.



2. Verify that there is no damage to the oil seal.
3. Hand tighten bolts A.
4. Tighten the bolts A, B to the specified torque.

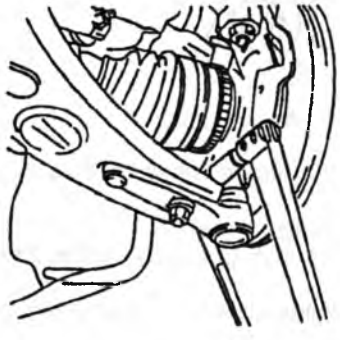
Tightening torque
43—61 N·m {4.3—6.3 kgf·m, 32—45 ft·lbf}



Lower Arm Installation Note

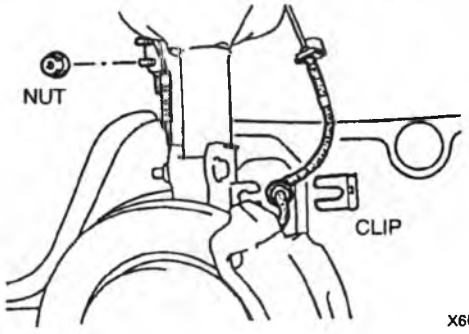
1. Connect the lower arm to the knuckle and tighten the clinch bolt.

Tightening torque
37—53 N·m {3.7—5.5 kgf·m, 27—39 ft·lbf}



2. Install the ABS wheel speed sensor harness mounting nuts.

Tightening torque
7.9—10.7 N·m
{80—110 kgf·cm, 69.5—95.4 in·lbf}

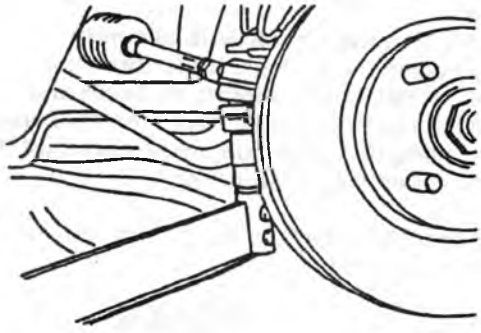


3. Install the clip.

Tie-Rod End Installation Note

1. Install the locknut.

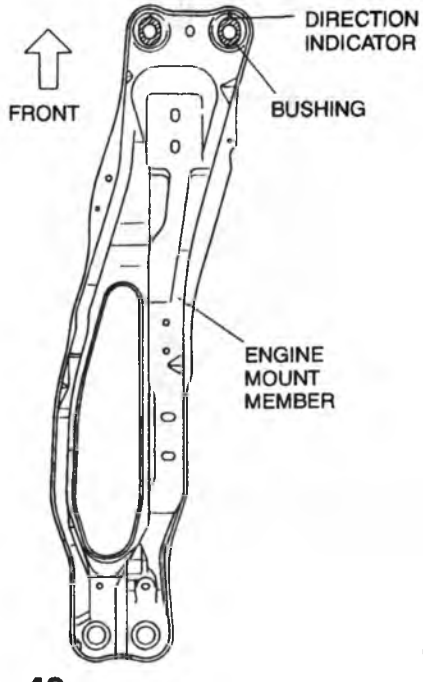
Tightening torque
32—44 N·m {3.2—4.5 kgf·m, 24—32 ft·lbf}



2. Secure the locknut by using a new cotter pin.

Engine Mount Member Installation Note

1. Position the direction indicator on engine mount member bushings facing toward the front side, and install the bushings onto the engine mount member.

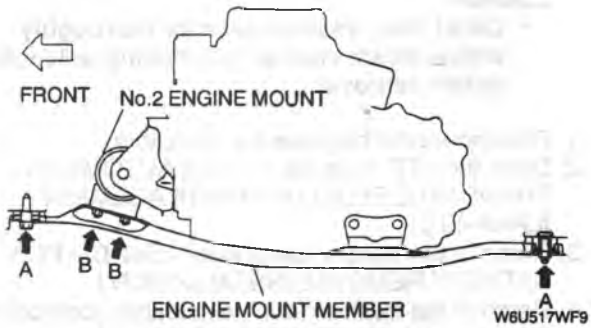


2. To install the engine mount member, put the No.2 engine mount stud bolts through the engine mount member installation holes.
3. Install the engine mount member bolts A and nuts A.

Tightening torque
A: 67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}

4. Loosely tighten the No.2 engine mount nuts B.
5. Remove the **SST** (engine support).
6. Tighten the No.2 engine mount nuts B.

Tightening torque
B: 75—104 N·m {7.6—10.7 kgf·m, 55—77 ft·lbf}



2/4 BAND SERVO REMOVAL/INSTALLATION

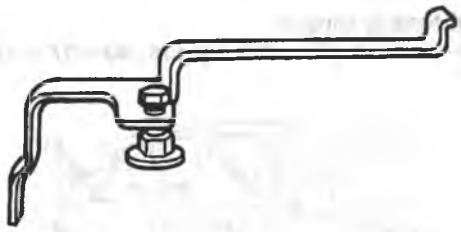
Z6U051719210W01

Caution
- **Servicing the 2/4 band servo in the vehicle is only recommended in the event of a leak. If servicing is required due to a servo problem, it is necessary to remove and disassemble the transaxle to inspect the 2/4 band component and direct clutch for damage.**

1. Raise and support the vehicle.
2. Remove the splash shield.

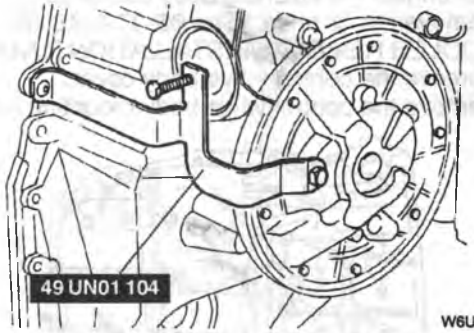
Warning
- **The servo cover is under high spring pressure.**

3. Install a nut with an integral washer onto the forcing bolt of the servo cover remover/replacer tool with a permanent thread sealer. This nut and washer will aid in the installation of the cover.



W6U517WBJ

4. Install the **SST** and compress the servo cover component.



W6U517WBK

5. Remove the servo cover retaining ring and release the tension on the servo cover component slowly.
6. After releasing all of the tension on the servo cover component, remove the **SST**.
7. Remove the servo cover component, 2/4 servo piston and return spring.
8. Lubricate the 2/4 servo piston, servo cover, servo cover seal, and servo case bore using ATF or petroleum jelly to aid in the installation and prevent cutting of the seal.
9. Install the 2/4 servo piston and return spring into the transaxle case.
10. Install the **SST**.
11. Tighten the center screw to compress the 2/4 servo into the bore.

Note
- If the cover will not seat deep enough in the bore to install the servo cover retaining ring, a blunt punch may be used with a small hammer. Gently tap the cover around the outer edge with the punch until the snap ring groove is fully exposed.

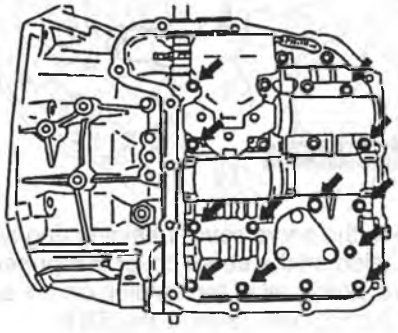
12. Install the servo cover retaining ring into transaxle case.
13. Remove the **SST**.
14. Lower the vehicle. Inspect the fluid level prior to road testing.

CONTROL VALVE BODY AND THERMOSTATIC OIL LEVEL CONTROL VALVE REMOVAL/INSTALLATION [LA4A-EL]

Z6U051721100W02

Caution
- **Clean the transaxle exterior thoroughly with a steam cleaner or cleaning solvents before removal.**

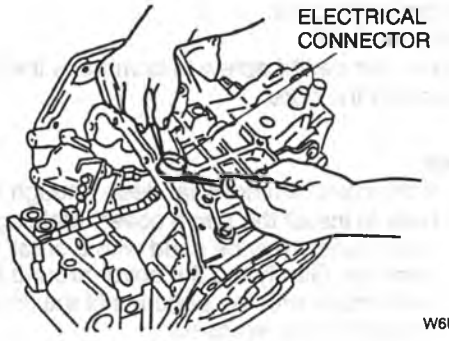
1. Disconnect the negative battery cable.
2. Drain the ATF. (See 05-17A-23 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [LA4A-EL].)
3. Remove the battery component. (See 01-17-1 BATTERY REMOVAL/INSTALLATION.)
4. Remove the fresh-air duct, air cleaner component. (See 01-13A-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
5. Remove the wheel and tire.
6. Remove the splash shield.
7. Disconnect the transaxle range (TR) switch connector.
8. Disconnect the solenoid body connector.
9. Remove the oil hose. (See 05-17A-48 OIL COOLER REMOVAL/INSTALLATION [LA4A-EL].)
10. Remove the control valve body cover.
11. Remove the control valve body mounting bolts.



W6U517WBL

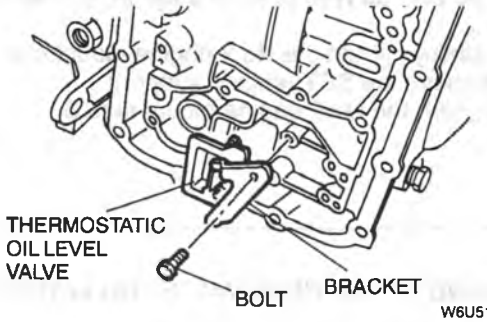
Caution
- **Do not pull off the connector wires or use a hammer on the connector.**

12. Remove the control valve body component.



W6U517WCR

13. If the thermostatic oil level control valve must be removed, remove the bolt and the bracket. Pull the thermostatic oil level control valve straight out of the transaxle case.



W6U517WBM

14. If the thermostatic oil level control valve was removed, insert it into the transaxle case and install the bracket and bolt.

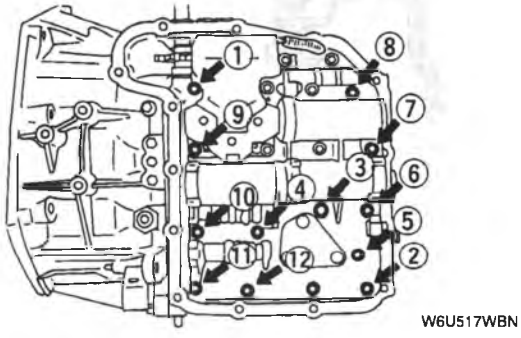
Tightening torque
11—13 N·m {112—133 kgf·cm, 97—115 in·lbf}

15. Install a new O-ring on the solenoid electrical connector and lightly coat the O-ring with petroleum jelly.

Caution
- **Do not pull wires or damage connector body.**

16. Place the control valve body slightly away from the transaxle case and push the solenoid body connector into its bore.
17. Align the Z-link in the manual valve.
18. Install the 12 mounting bolts. Tighten the mounting bolts in the sequence shown.

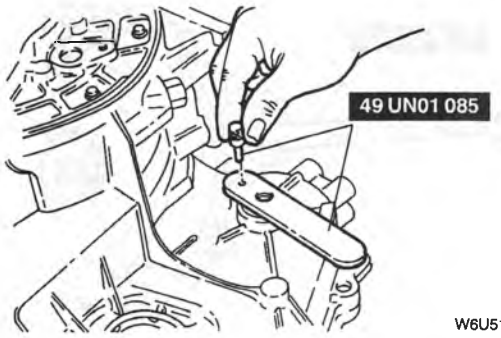
Tightening torque
9—11 N·m {92—112 kgf·cm, 80—97 in·lbf}



W6U517WBN

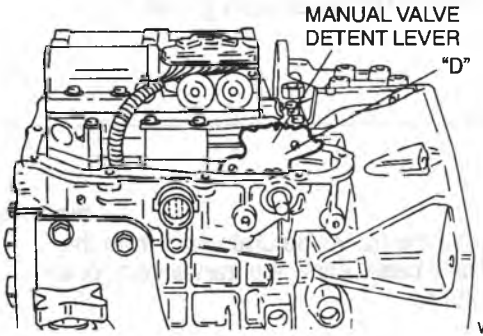
19. Loosen the nut on the ball stud for the manual valve detent actuating rod.
20. Remove the manual lever control shaft outer lever.

21. Use the **SST** to move the shaft to the D range position and install the pin to hold the tool in position.



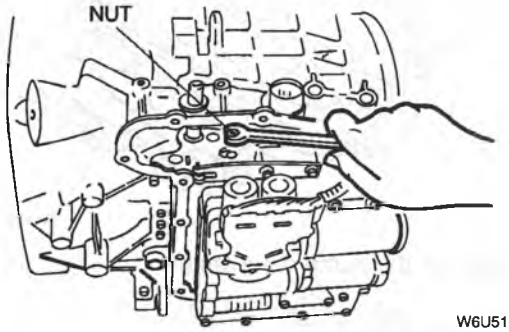
W6U517WBP

22. Move the manual valve detent lever to the D range position.



W6U517WBQ

23. Loosen the nut on the ball stud for the manual valve detent lever actuating rod component.



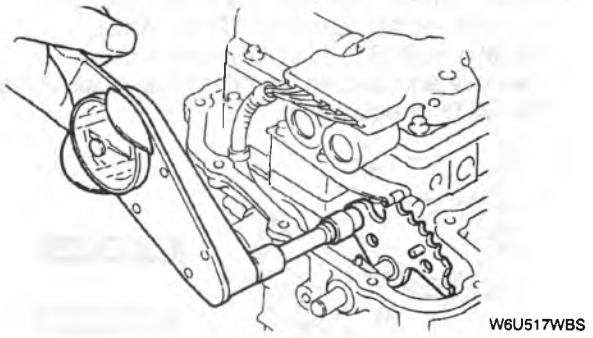
W6U517WBR

24. Initially tighten the nut on the ball. Remove the shifter pin.
25. Rotate the **SST** until the socket can be installed on the nut. Tighten the manual valve detent lever ball stud nut.

Tightening torque
11—13 N·m {112—133 kgf·cm, 97—115 in·lbf}

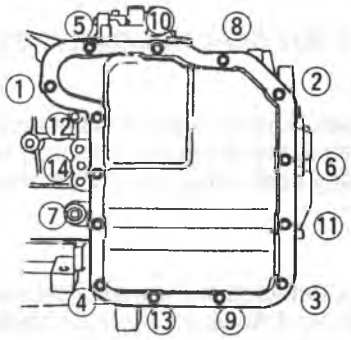
26. Remove the pin and **SST**.
27. Install the manual control lever component and bolt.

Tightening torque
24—30 N·m {2.4—3.1 kgf·m, 18—22 ft·lbf}


W6U517WBS

28. Install the control valve body cover gasket on the case. Install the cover to the case.
29. Install the fourteen mounting bolts in the sequence shown.

Tightening torque
14—18 N·m {143—184 kgf·cm, 124—159 in·lbf}



W6U517WBT

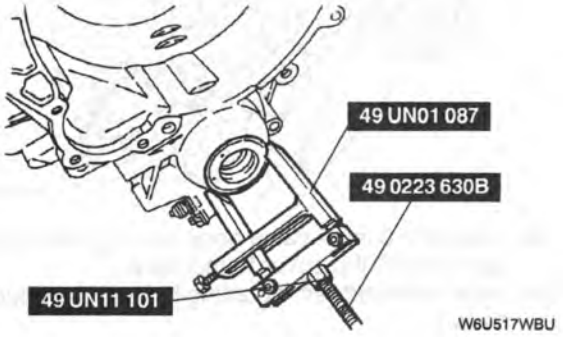
Caution
- **If reusing the hose clamp, position it in the original location on the hose and squeeze the clamp lightly with large pliers to ensure a tight fit.**

30. Install the oil hose. (See 05-17A-48 OIL COOLER REMOVAL/INSTALLATION [LA4A-EL].)
31. Connect the solenoid body connector.
32. Connect the TR switch connector.
33. Install the splash shield.
34. Install the wheel and tire.
35. Install the fresh-air duct, air cleaner component. (See 01-13A-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
36. Install the battery component. (See 01-17-1 BATTERY REMOVAL/INSTALLATION.)
37. Fill the transaxle with the specified ATF after installation. (See 05-17A-23 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [LA4A-EL].)
38. Inspect for leakage of ATF from all connecting points.
39. Connect the negative battery cable.
40. Carry out the mechanical system test. (See 05-17A-16 MECHANICAL SYSTEM TEST [LA4A-EL].)
41. Carry out the road test. (See 05-17A-19 ROAD TEST [LA4A-EL].)

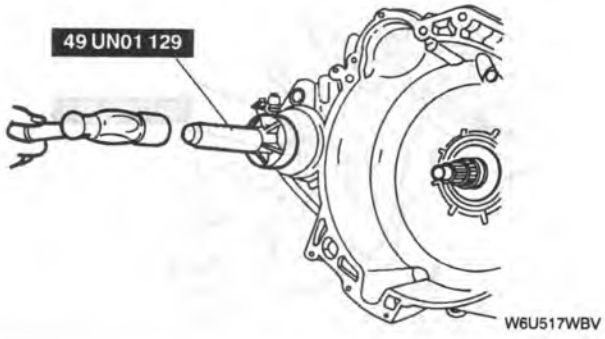
OIL SEALS REMOVAL/INSTALLATION [LA4A-EL]

Z6U051719240W02

1. Remove the drive shaft and joint shaft. (See 05-17A-34 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [LA4A-EL].)
2. Remove and discard the differential seals using the **SSTs** or equivalent.



3. Apply a thin coat of petroleum jelly on the outside and the lip of the new differential seals.
4. Use the **SST** to tap in new differential seals.



5. Install the drive shaft and joint shaft. (See 05-17A-34 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [LA4A-EL].)

OIL PUMP BODY SEAL REMOVAL/INSTALLATION [LA4A-EL]

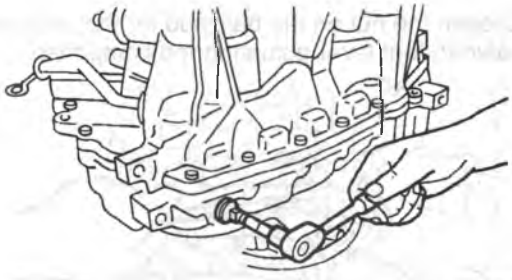
Z6U051719220W01

Issue
In some cases, fluid will leak from the pump-to-case interface area of the transaxle. This may be caused by the pump body seal being rolled or pinched during installation.

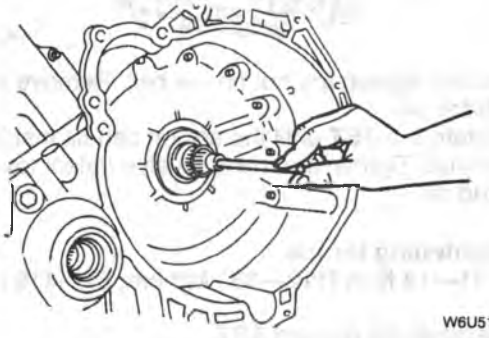
Action
If fluid leak is detected in the pump-to-case interface area, refer to the following service procedure to replace the pump body seal.

Caution
- **This procedure does not require complete teardown of the transaxle and should only be used for leak concerns. If replacement of the pump body or pump support is required, the transaxle must be disassembled and reassembled. The components will be misaligned if this repair is performed while the transaxle is still in the vehicle.**

1. Remove the transaxle. (See 05-17A-34 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [LA4A-EL].)
2. Remove the torque converter and drain from the transaxle.
3. Remove the transaxle drain plug from the transaxle case. Allow the transaxle to drain completely.



4. Remove the pump drive shaft.

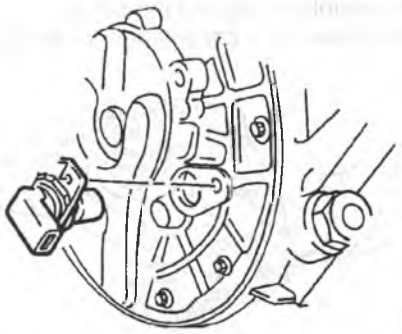


5. Position the transaxle with the pump facing up and remove the TSS sensor mounting bolt.



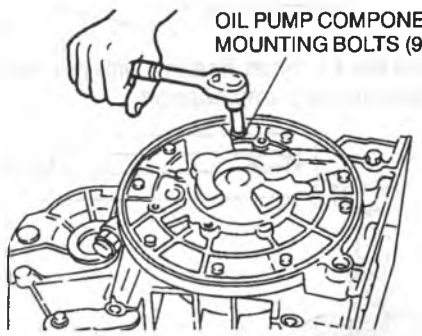
W6U517WBY

6. Separate the turbine shaft speed (TSS) sensor from the pump.



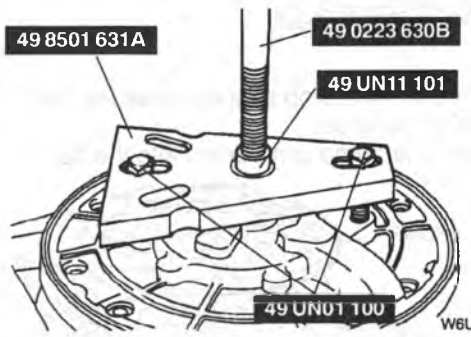
W6U517WBZ

7. Remove the nine (9) pump mounting bolts.



W6U517WC0

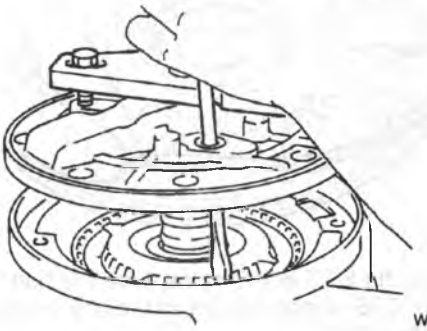
8. Install the **SSTs** on the pump.



W6U517WC1

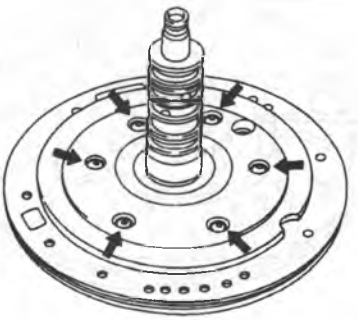
9. Install a large screwdriver through the TSS sensor hole. Do not locate the screwdriver on the reverse clutch hub tabs.

10. Remove the pump while holding the components into the case with the screwdriver. Remove the #1 thrust bearing. This bearing may be attached to the pump support or on the reverse clutch hub.



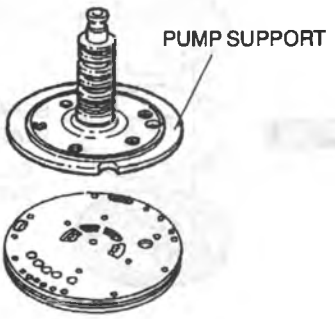
W6U517WC2

11. Remove the pump support mounting bolts.



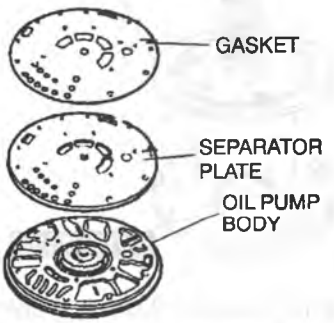
W6U517WC3

12. Remove the pump support.



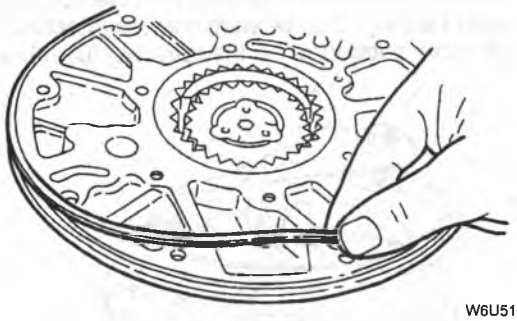
W6U517WC4

13. Remove the pump-to-case gasket and separator plate and discard the gasket.

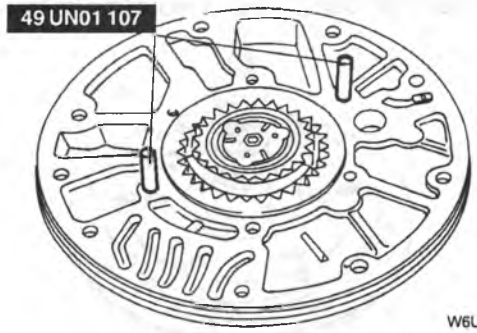


W6U517WC5

14. Remove the pump seal and discard it.

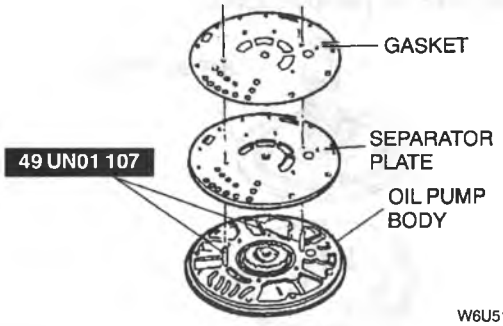

W6U517WC6

15. Install the **SST** in the holes. Use the bolt hole next to the TSS sensor hole and the bolt hole opposite it for the **SST**.



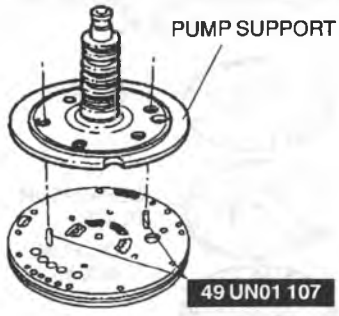
W6U517WC7

16. Install the separator plate and new gasket.



W6U517WC8

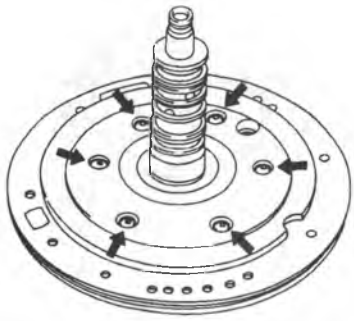
17. Install the pump support.



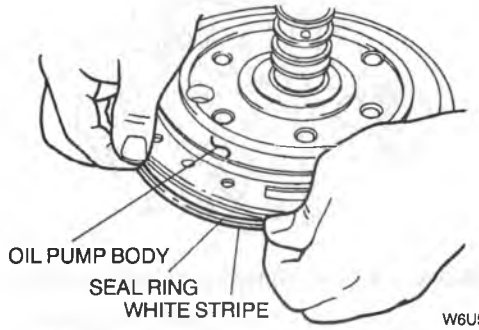
W6U517WC9

18. Install four (4) mounting bolts and tighten the bolts to **13 N·m {1.3 kgf·m, 10 ft·lbf}**.

19. Remove the **SST** and install and torque the remaining six (6) bolts to **13 N·m {1.3 kgf·m, 10 ft·lbf}**.

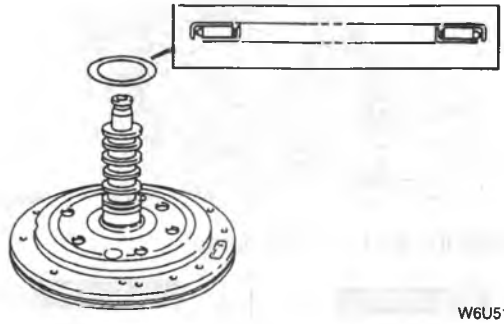

W6U517WCA

20. Install the new pump seal. Ensure that the white stripe is visible all around the pump.
21. Visually inspect the case flange for damage or burrs.

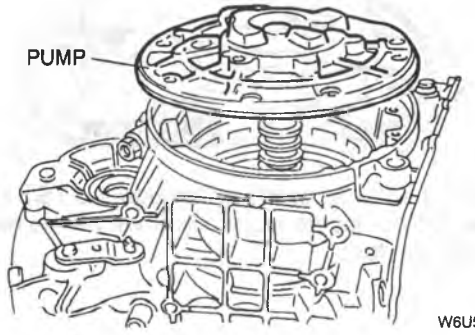


W6U517WCB

22. Lubricate the #1 thrust bearing with petroleum jelly and install on the pump support.

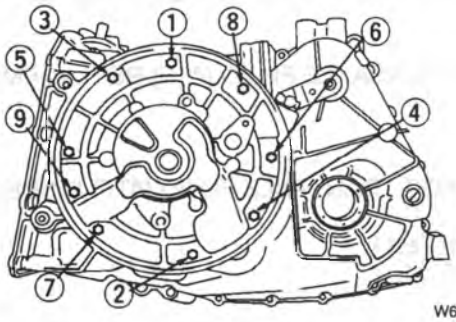

W6U517WCC

23. Lubricate the pump support seals and the pump bore in the case.
24. Lower the pump component into the case.



W6U517WCD

25. Install the nine (9) pump mounting bolts and torque to **13 N·m {1.3 kgf·m, 10 ft·lbf}** in sequence shown.



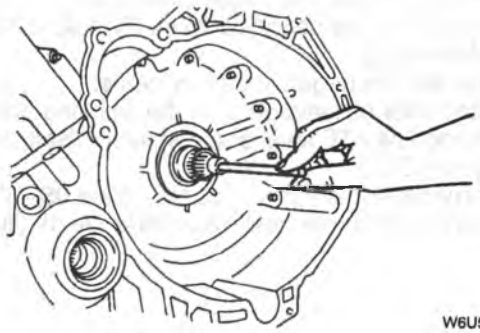
W6U517WCE

26. Install the turbine shaft speed (TSS) sensor and mounting bolts and tighten to **13 N·m {1.3 kgf·m, 10 ft·lbf}**.



W6U517WCF

27. Install the pump drive shaft.
28. Install the torque converter into the transaxle.
29. Install the transaxle. (See 05-17A-34 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [LA4A-EL].)

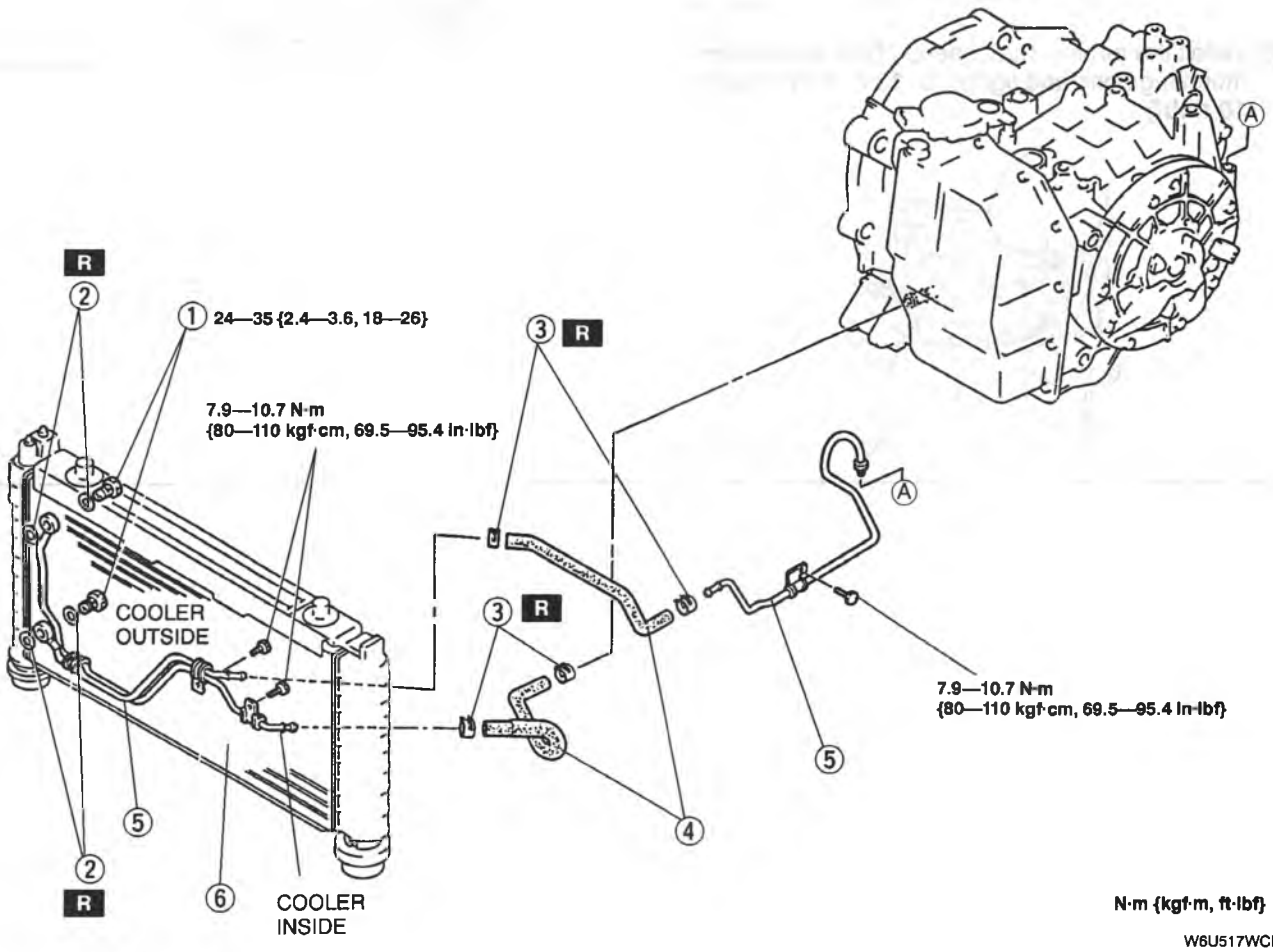


W6U517WCG

OIL COOLER REMOVAL/INSTALLATION [LA4A-EL]

Z6U051719900W02

1. Disconnect the negative battery cable.
2. Drain the ATF. (See 05-17A-23 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [LA4A-EL].)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.
5. Add ATF to the specified level. (See 05-17A-23 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [LA4A-EL].)
6. Connect the negative battery cable.
7. Inspect for oil leakage from the oil pipes and oil hoses.
8. Inspect the ATF level and condition. (See 05-17A-22 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION [LA4A-EL].)
9. Carry out the line pressure test. (See 05-17A-16 Line Pressure Test.)
10. Carry out the road test. (See 05-17A-19 ROAD TEST [LA4A-EL].)



1	Connector bolts
2	Washers
3	Hose clamp (See 05-17A-49 Hose Clamp Installation Note)
4	Oil hose (See 05-17A-49 Oil Hose Installation Note)

5	Oil pipe (See 05-17A-49 Oil Pipe Installation Note)
6	Radiator (See 05-17A-49 Radiator Installation Note)

Radiator Installation Note

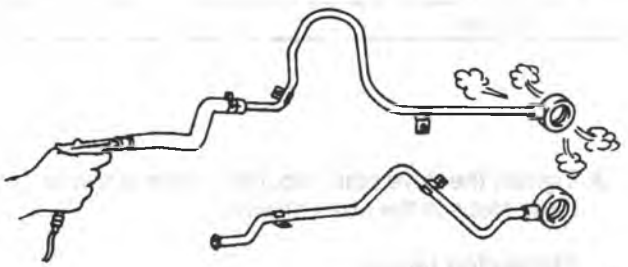
1. The automatic transaxle oil cooler flushing must be performed whenever a transaxle is removed for service to remove existing fluid which may be contaminated and to prevent contamination of new fluid. The flushing must be performed after installation of the overhauled replacement of the transaxle.
2. Follow the instruction in the manufacture's publication for flushing the automatic transaxle oil cooler.

Oil Pipe Installation Note

Note

- In order to prevent ATF leakage, replace the hose. When any damages are found inside or outside of the hose, especially on areas contacting with pipes.

- Apply compressed air to the cooler-side pipe opening, and blow any remaining dust and foreign material from the cooler pipes. Compressed air should be applied for no less than one minute.

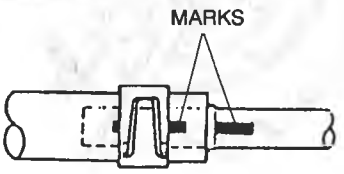


W6U517WCJ

Oil Hose Installation Note

Radiator side

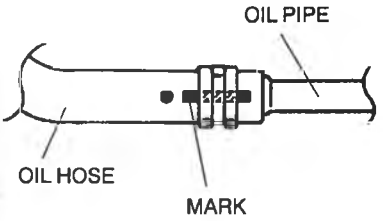
- Align the marks, and slide the oil hose onto the oil pipe until it is fully seated as shown.



W6U517WCK

Transaxle side

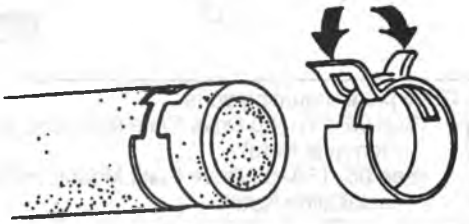
- Position the marking on the oil hose side facing up and install it.



W6U517WCL

Hose Clamp Installation Note

- Install the hose clamp onto the hose. If reusing the hose, install a new hose clamp exactly onto the mark left by the previous hose clamp.

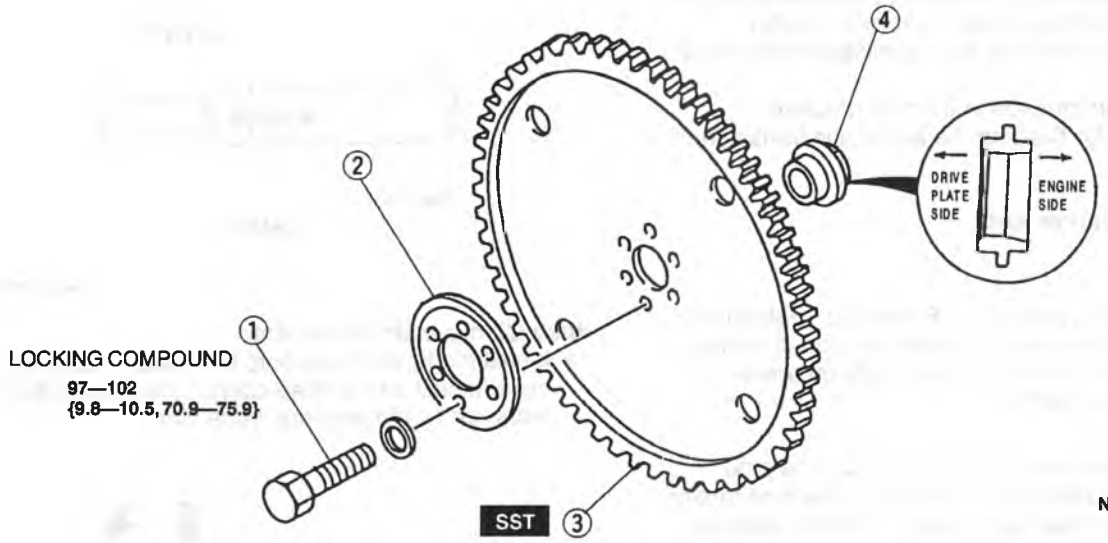


W6U517WCM

DRIVE PLATE REMOVAL/INSTALLATION [LA4A-EL]

Z6U051719020W02

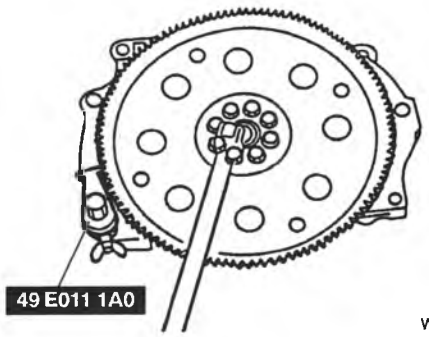
1. Remove in the order indicated in the table.
2. install in the reverse order of removal.



1	Drive plate mounting bolts (See 05-17A-50 Drive Plate Mounting Bolts Removal Note) (See 05-17A-50 Drive Plate Mounting Bolts Installation Note)
2	Backing plate
3	Drive plate
4	Adapter

Drive Plate Mounting Bolts Removal Note

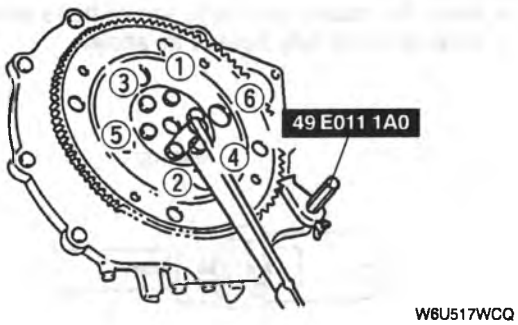
1. Set the **SST** or equivalent against the drive plate.
2. Remove the bolts and the drive plate.



Drive Plate Mounting Bolts Installation Note

1. Remove any old locking compound from the bolt threads and bolt holes, and apply new locking compound to the bolt threads.
2. Set the **SST** or equivalent against the drive plate.
3. Tighten the drive plate mounting bolts in two or three steps in the order shown.

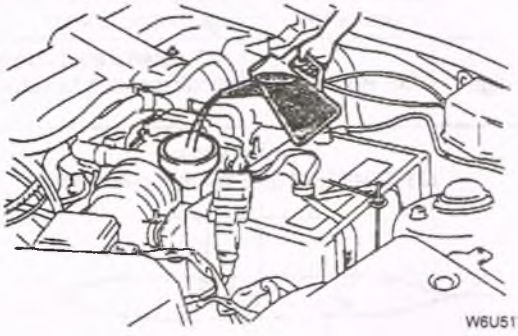
Tightening torque
97—102 N·m {9.8—10.5 kgf·m, 70.9—75.9 ft·lbf}



Tightening torque
40—53 N·m {4.0—5.5 kgf·m, 29—39 ft·lbf}

5. Add the specified type of ATF through the oil filler tube until ATF level reaches lower notch of dipstick.

ATF type
M-III or equivalent (e.g. Dexron®III/Mercon®)


W6U517WD0

6. Install the dipstick.
7. Verify the ATF level. (See 05-17B-20 ATF Level Inspection.)

O/D OFF SWITCH INSPECTION [GF4A-EL]

Z6U051746040W01

Inspection of Operation

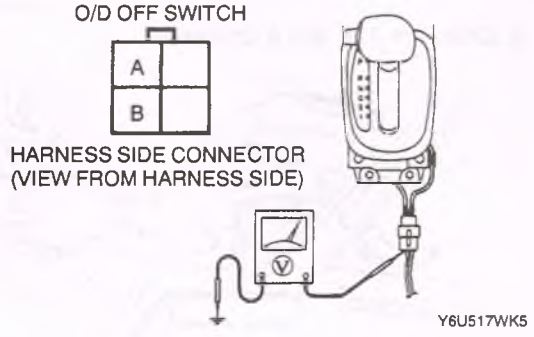
1. Turn the ignition switch on.
2. Verify that the O/D OFF indicator is not illuminated. Press the O/D OFF switch and verify that the O/D OFF indicator light illuminates.
   - If not as specified, inspect the terminal voltage of the O/D OFF switch.

Inspection of Voltage

1. Remove the front console. (See 09-17-5 FRONT CONSOLE REMOVAL/INSTALLATION.)
2. Turn the ignition switch on.
3. Measure voltage at the O/D OFF switch connector terminals.
   - If not as specified, inspect the continuity of the O/D OFF switch.

Position	Connector terminal	
	A	B
OFF (Normal) (V)	B+	0
ON (Depressed) (V)	0	0

(V) :Voltage



Y6U517WK5

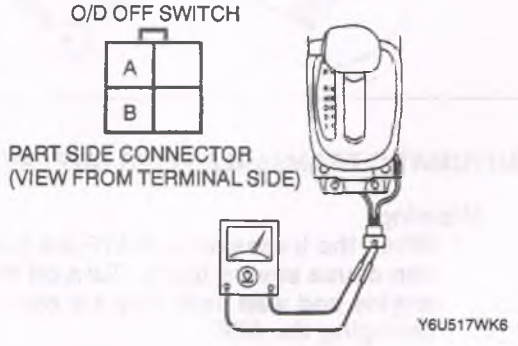
Inspection of Continuity

1. Disconnect the negative battery cable.
2. Disconnect the O/D OFF switch connector.
3. Inspect continuity of the switch.
   - If not as specified, replace the selector lever knob component. (See 05-17B-23 O/D OFF SWITCH REMOVAL/INSTALLATION [GF4A-EL].)

○—○ : Continuity

Position	Terminal	
	A	B
OFF (Normal)		
ON (Depressed)	○	○

W6U517WF4



Y6U517WK6

4. If the switch is OK, inspect the wiring harness. (O/D OFF switch—powertrain control module, O/D OFF switch—Body ground.)
5. Install the front console. (See 09-17-5 FRONT CONSOLE REMOVAL/INSTALLATION.)
6. Connect the negative battery cable.

O/D OFF SWITCH REMOVAL/INSTALLATION [GF4A-EL]

Z6U051746040W02

1. Disconnect the negative battery cable.
2. Remove the front console. (See 09-17-5 FRONT CONSOLE REMOVAL/INSTALLATION.)
3. Remove the indicator panel installation screws. (See 05-18-6 SELECTOR LEVER DISASSEMBLY/ASSEMBLY.)
4. Disconnect the connector and remove the O/D OFF switch terminals.
5. Remove the selector lever knob component.
6. Install a new selector lever knob component.

Tightening torque
2.0—2.9 N·m {20—30 kgf·cm, 18—26 in·lbf}

7. Install the O/D OFF switch terminals and connect the connector.
8. Install the indicator panel installation screws. (See 05-18-6 SELECTOR LEVER DISASSEMBLY/ASSEMBLY.)
9. Install the front console. (See 09-17-5 FRONT CONSOLE REMOVAL/INSTALLATION.)
10. Connect the negative battery cable.

TRANSAXLE RANGE SWITCH INSPECTION [GF4A-EL]

Z6U051719440W01

Note
- Input signal of the TR switch can be inspected with the NGS tester. (See 01-40B-21 PCM Inspection Using the SST (NGS Tester).)

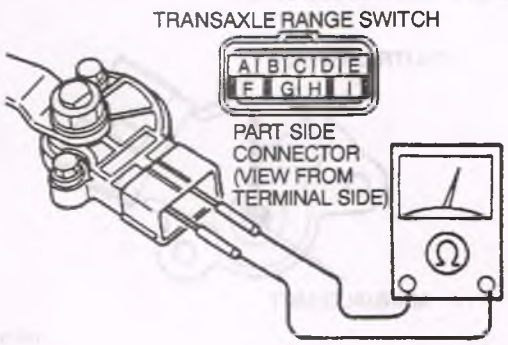
Operation inspection
1. Verify that the starter operates only with the ignition switch at the START position and the selector lever in P and N positions.
2. Verify that the back-up lights illuminate when shifted to R position with the ignition switch in the ON position.
   - If not as specified, inspect the transaxle range switch.

Continuity inspection
1. Disconnect the negative battery cable.
2. Remove the resonance chamber, fresh-air duct, and air cleaner component. (See 01-13B-4 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [KL].)
3. Disconnect the transaxle range switch connector.
4. Inspect continuity of the transaxle range switch.
   - If not as specified, replace or adjust the transaxle range switch.

○—○ : Continuity

Position/ Range	Connector terminal								
	A	B	C	D	E	F	G	H	I
P	○				○				
						○			○
R	○			○					
N	○							○	
						○			○
D	○	○							
2	○						○		
1	○		○						

W6U517WF5



Y6U517WK7

5. Connect the transaxle range switch connector.
6. Install the air cleaner component, fresh-air duct, and resonance chamber. (See 01-13B-4 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [KL].)
7. Connect the negative battery cable.

SOLENOID VALVES INSPECTION [GF4A-EL]

Z6U051721280W01

Gear Shift Pattern Under Solenoid Valve Failure

☆ : ON stuck ★ : OFF stuck

Shift Pattern				Failed Part		
				Shift A	Shift B	Shift C
2	2	3	4	☆		
1	1	3	3	★		
1	2	2	2		☆	
3	4	3	4		★	
1	2	4	4			☆
1	2	3	3			★
2	2	2	2	☆	☆	
4	4	3	4	☆	★	
2	2	4	4	☆		☆
2	2	3	3	☆		★
1	1	1	1	☆	☆	
3	3	3	3	★	★	
1	1	3	3	★		☆
1	1	3	3	★		★
1	2	2	2		☆	☆
1	2	2	2		☆	★
3	4	4	4		★	☆
3	3	3	3		★	★
2	2	2	2	☆	☆	☆
2	2	2	2	☆	☆	★
4	4	4	4	☆	★	☆
3	3	3	3	☆	★	★
1	1	1	1	★	☆	☆
1	1	1	1	★	☆	★
3	3	3	3	★	★	☆
3	3	3	3	★	★	★
1	2	3	4	No Failure		

Resistance Inspection (on-vehicle)

1. Disconnect the negative battery cable.
2. Connect the **SST** (104 pin Breakout Box) to the PCM harness with PCM disconnected.
3. Measure the resistance between the following terminals of the **SST**.
   - If not as specified, inspect the ground, then perform resistance inspection (OFF-vehicle)

ATF temperature: -40—160 °C {-40—320 °F}

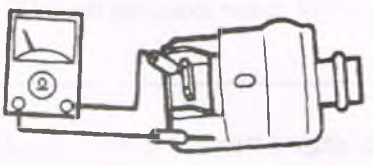
Terminal	Solenoid valve	Resistance (Ω)
27-91	Shift solenoid A	11—27
1-91	Shift solenoid B	11—27
70-91	Shift solenoid C	11—27
82-91	Torque converter clutch control	11—27
28-91	3-2 timing	11—27
81-91	Pressure control	9—18

4. Connect the negative battery cable.

Resistance Inspection (Off-Vehicle)

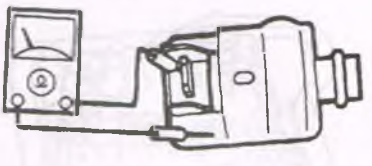
1. Remove the control valve body. (See 05-17B-40 CONTROL VALVE BODY REMOVAL/INSTALLATION [GF4A-EL].)
2. Remove the solenoid valve(s).
3. Measure the resistance of each solenoid valve individually.
   - If not as specified, replace the solenoid valve.
   - If the solenoid valve is okay, inspect the wiring harness. (Solenoid valve—Coupler component)

Resistance
Shift solenoid A, B, C, TCC control solenoid valve, and 3—2 timing solenoid valve : 11—27 Ω



YMU517WAT

Resistance
Pressure control solenoid : 9—18 Ω

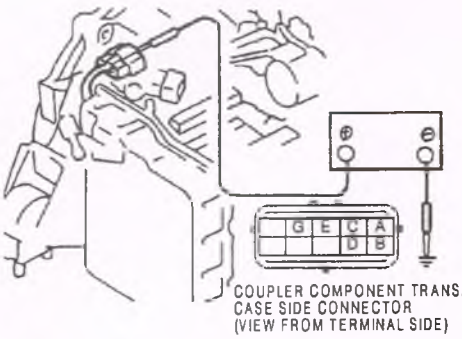


YMU517WAT

4. Install the solenoid valve(s).
5. Install the control valve body. (See 05-17B-40 CONTROL VALVE BODY REMOVAL/INSTALLATION [GF4A-EL].)

Inspection of Operation

1. Disconnect the negative battery cable.
2. Disconnect the coupler component.
3. Apply battery voltage to each terminal.



COUPLER COMPONENT TRANSAXLE CASE SIDE CONNECTOR (VIEW FROM TERMINAL SIDE)

Y6U517WKA

4. Verify that each control valve operates with a "click".
   - If the "click" is not heard, replace the solenoid valve.

Inspection of Output Duty
Pressure control solenoid

1. Connect the (+) terminal of a dwell meter to terminal 81 at the powertrain control module and the (-) terminal to a ground. Set the dwell meter selector to the 4 cylinder position.
2. Apply parking brake and use wheel chocks at the front and rear of the wheels.
3. Start the engine.
4. Depress the brake pedal firmly.
5. Shift the selector lever to D range.

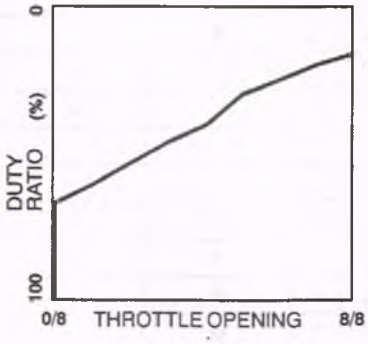
Caution

- **If the accelerator pedal is depressed for longer then 5 seconds while the brake pedal is depressed, the transaxle could be damaged. Therefore, perform Step 6 within 5 seconds of each other.**

Note

- The dwell meter indicates the OFF duty ratio.

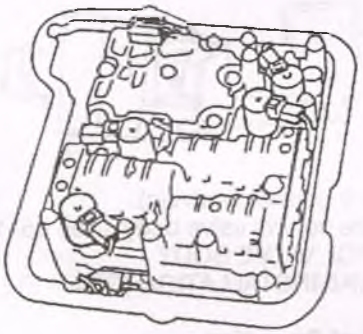
6. Depress the accelerator pedal slowly and verify that the duty ratio changes as shown in the graph.
   - If not as specified, inspect the powertrain control module (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL].) and pressure control solenoid. (See 05-17B-29 Resistance Inspection (on-vehicle).)



SOLENOID VALVE REMOVAL/INSTALLATION [GF4A-EL]

Z6U051721280W02

1. Remove the control valve body. (See 05-17B-40 CONTROL VALVE BODY REMOVAL/INSTALLATION [GF4A-EL].)
2. Remove the solenoid valve(s).



3. Apply ATF to a new O-ring and install it on the solenoid valve.
4. Install the solenoid valve in the control valve body.

Tightening torque
6.5—7.8 N·m {66—80 kgf·cm, 58—69 in·lbf}

5. Install the control valve body. (See 05-17B-40 CONTROL VALVE BODY REMOVAL/INSTALLATION [GF4A-EL].)
6. Carry out the time lag test and line pressure test. (See 05-17B-13 MECHANICAL SYSTEM TEST [GF4A-EL].)
7. Carry out the road test. (See 05-17B-16 ROAD TEST [GF4A-EL].)

O/D OFF INDICATOR LIGHT INSPECTION [GF4A-EL]

Z6U051755480W01

Inspection of Operation

1. Turn the ignition switch from OFF to ON.

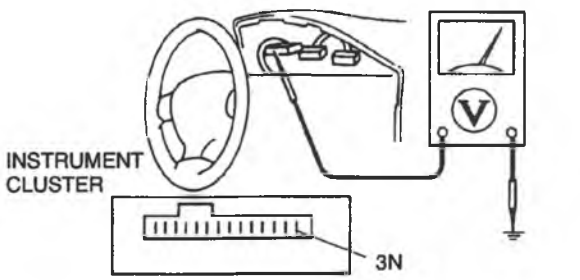
Note
- The O/D OFF indicator light will illuminate if a malfunction exists in any of the EC-AT system components.

2. Verify that the O/D OFF indicator light is not illuminated.
3. Press the switch and verify that the O/D OFF indicator illuminates.
   - If the O/D OFF switch function is not as specified, after checking the O/D OFF switch (See 05-17B-22 O/D OFF SWITCH INSPECTION [GF4A-EL].), check the terminal voltage of the O/D OFF indicator light.

Inspection of Voltage

1. Remove the instrument cluster. (See 09-22-1 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
2. Turn the ignition switch on.
3. Measure voltage between terminal 3N and a ground.

Voltage	Action
B+	Go to next step
Other	• Replace METER fuse • Repair wiring harness (METER fuse—Instrument cluster)

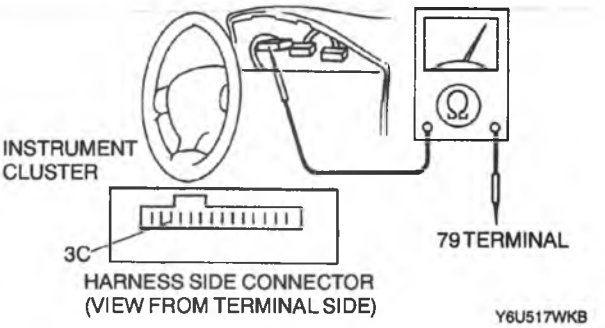


Y6U517WKC

Inspection of Continuity

1. Disconnect the negative battery cable.
2. Disconnect the instrument cluster connector.
3. Inspect continuity between terminal 3C and powertrain control module terminal 79.
   - If not as specified, inspect the wiring harness (instrument cluster—powertrain control module).
   - If it is as specified, go to the next step.

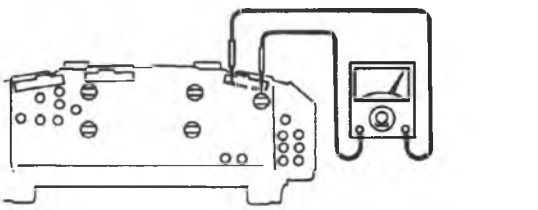
Terminals	Continuity
3C—79	Yes



Y6U517WKB

4. Inspect continuity between terminals 3N and 3C.
   - If not as specified, replace the instrument cluster or bulb.

Terminals	Continuity
3N—3C	Yes



W6U517WDT

5. Install the instrument cluster. (See 09-22-1 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
6. Connect the negative battery cable.

POWERTRAIN CONTROL MODULE INSPECTION [GF4A-EL]

Z6U051718880W01

Note

- For **PID/DATA Monitor and Record**, refer to 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL].
- For Terminal Voltage Inspection, refer to 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL].

POWERTRAIN CONTROL MODULE REMOVAL/INSTALLATION [GF4A-EL]

Z6U051718880W02

(See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)

AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [GF4A-EL]

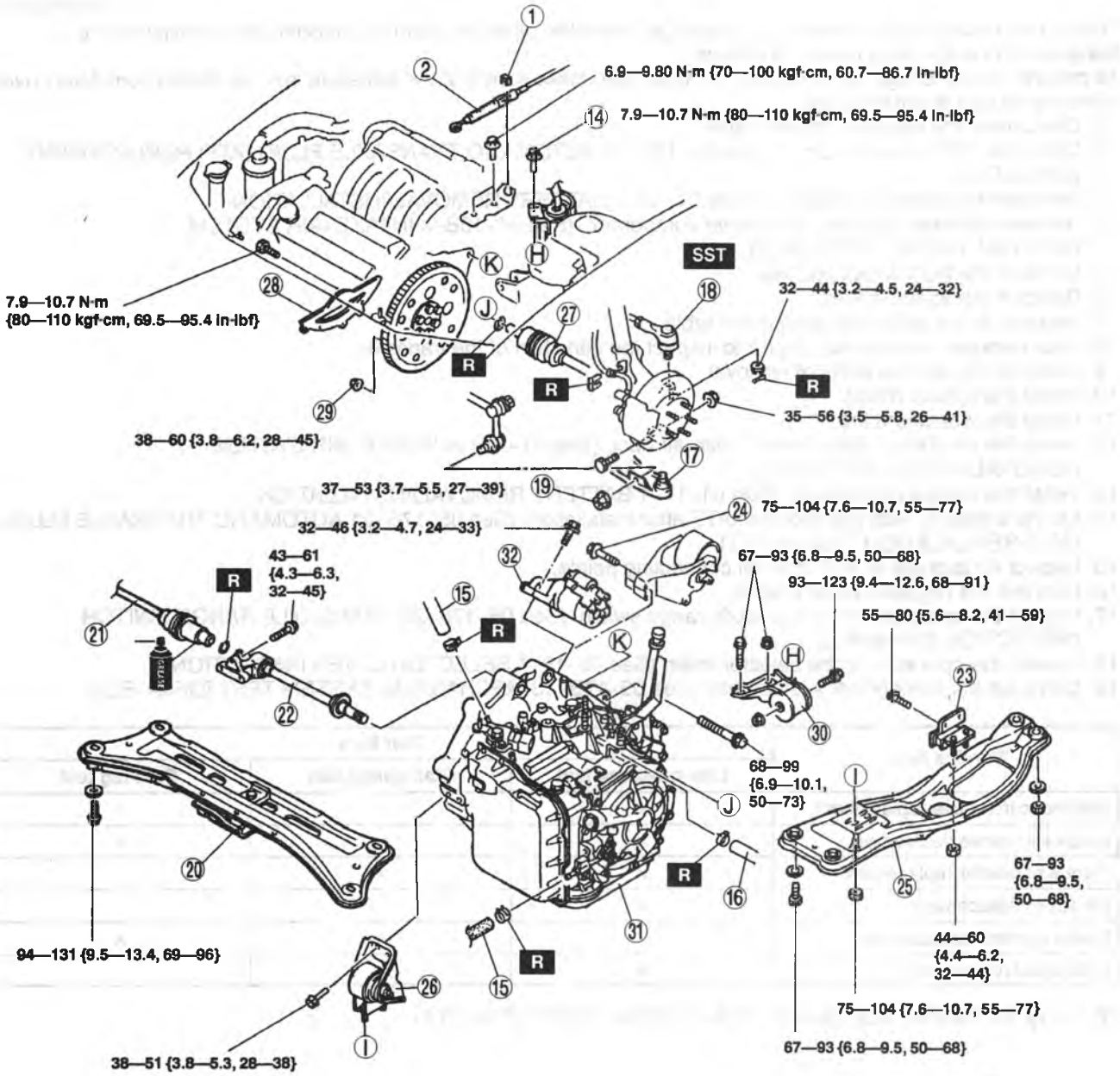
Z6U051719090W01

The oil pan could contain small chips, shavings, and other particles useful in checking the condition of the transaxle and diagnosing certain problems.
To ensure that all foreign particles stay in the oil pan, make sure that the transaxle is never tipped completely over while the oil pan is still installed.

1. Disconnect the negative battery cable.
2. Drain the ATF into a container. (See 05-17B-21 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [GF4A-EL].)
3. Remove the battery component. (See 01-17-1 BATTERY REMOVAL/INSTALLATION.)
4. Remove the fresh-air duct, air cleaner component. (See 01-13B-4 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [KL].)
5. Remove the front wheel and tire.
6. Remove the splash shield.
7. Remove in the order indicated in the table.
8. After removal, remove the oil pan to inspect the condition of the transaxle.
9. Install in the reverse order of removal.
10. Install the splash shield.
11. Install the wheel and tire.
12. Install the air cleaner component, fresh-air duct. (See 01-13B-4 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [KL].)
13. Install the battery component. (See 01-17-1 BATTERY REMOVAL/INSTALLATION.)
14. Fill the transaxle with the specified ATF after installation. (See 05-17B-21 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [GF4A-EL].)
15. Inspect for leakage of ATF from all connecting points.
16. Connect the negative battery cable.
17. Inspect the operation of the transaxle range switch. (See 05-17B-23 TRANSAXLE RANGE SWITCH INSPECTION [GF4A-EL].)
18. Inspect the operation of the selector lever. (See 05-18-1 SELECTOR LEVER INSPECTION.)
19. Carry out the mechanical system test. (See 05-17B-13 MECHANICAL SYSTEM TEST [GF4A-EL].)

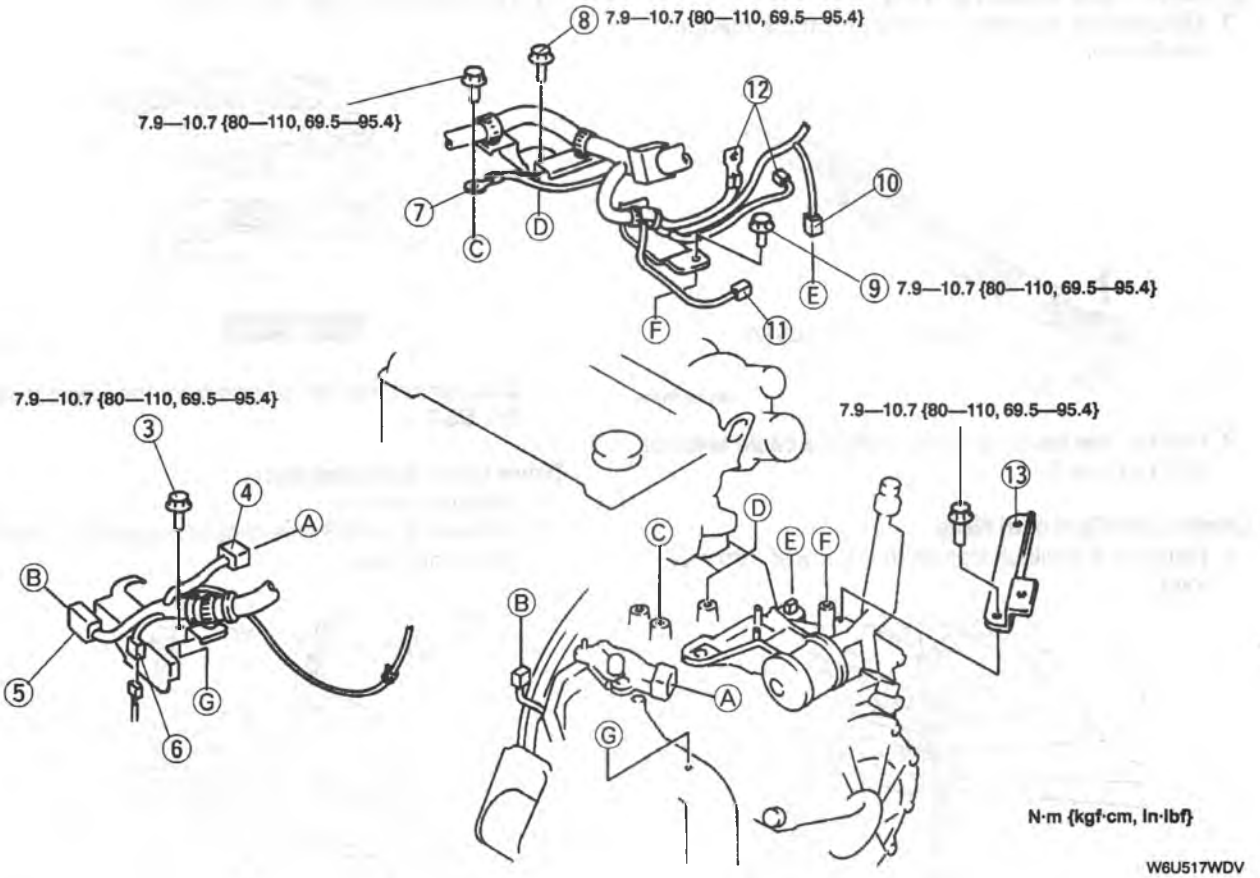
Service item	Test item		
	Line pressure test	Stall speed test	Time lag test
Automatic transaxle replacement	×		
Automatic transaxle overhaul	×	×	×
Torque converter replacement	×	×	
Oil pump replacement	×		
Clutch system replacement	×		×
Differential replacement	×		

20. Carry out the road test. (See 05-17B-16 ROAD TEST [GF4A-EL].)



N·m {kgf·m, ft·lbf}

Y6U517WKD

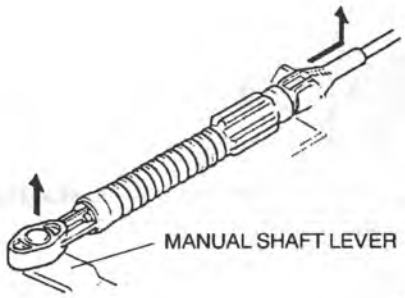


1	Clip
2	Selector cable (See 05-17B-36 Selector Cable Removal Note) (See 05-17B-40 Selector Cable Installation Note)
3	Bolt
4	Transaxle range switch connector
5	Solenoid valve connector
6	Oxygen sensor connector
7	Ground
8	Bolt
9	Bolt
10	Vehicle speedometer sensor connector
11	Input/turbine speed sensor connector
12	Starter harness
13	Engine mount stay
14	Fuel filter mounting bolts
15	Oil hose (See 05-17B-42 OIL COOLER REMOVAL/INSTALLATION [GF4A-EL])
16	Breather hose (See 05-17B-39 Breather Hose Installation Note)
17	Lower arm (See 05-17B-36 Lower Arm Removal Note) (See 05-17B-39 Lower Arm Installation Note)
18	Tie-rod end (See 05-17B-36 Tie-Rod End Removal Note) (See 05-17B-39 Tie-Rod End Installation Note)

19	Stabilizer control link nut
20	Transverse member
21	Drive shaft (See 05-17B-36 Drive Shaft Removal Note) (See 03-13-8 Drive Shaft Installation Note)
22	Joint shaft (See 05-17B-39 Joint Shaft Installation Note)
23	No.5 engine mount rubber
24	No.1 engine mount bolts (See 05-17B-39 No.1 Engine Mount Bolts Installation Note)
25	Engine mount member (See 05-17B-37 Engine Mount Member Removal Note) (See 05-17B-38 Engine Mount Member Installation Note)
26	No.2 engine mount
27	Drive shaft (See 05-17B-36 Drive Shaft Removal Note) (See 03-13-3 Clip Installation Note)
28	Undercover
29	Torque converter nuts (See 05-17B-37 Torque Converter Nuts Removal Note)
30	No.4 engine mount
31	Transaxle (See 05-17B-37 Transaxle Removal Note) (See 05-17B-38 Transaxle Installation Note)
32	Starter

Selector Cable Removal Note

1. Disconnect the selector cable from the manual shaft lever.

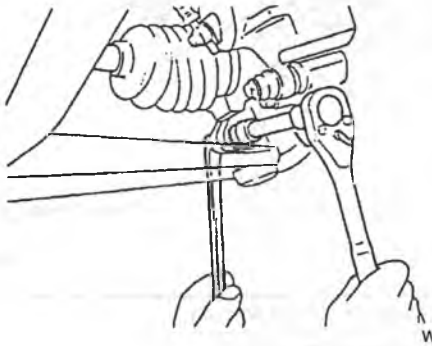


W6U517WDW

2. Pull out the selector cable from the cable bracket and remove it.

Lower Arm Removal Note

1. Remove the clinch bolt from the lower arm ball joint.

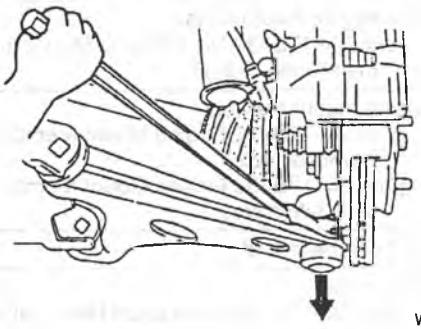


W6U517WDX

Caution

- **Wrap a rag around the ball joint dust boot to protect it from damage.**

2. Pry the lower arm out of the knuckle.



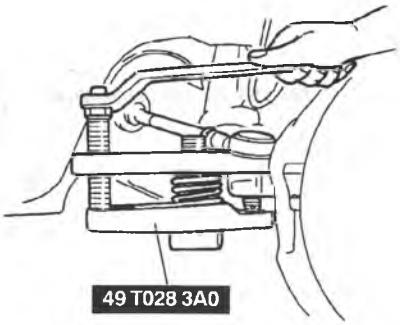
W6U517WDY

Tie-Rod End Removal Note

Caution

- **The sharp edges of the SST can slice the tie-rod end dust boot. Install the SST so that the sharp edges are between the dust boot and the knuckle.**

1. Remove the cotter pin and nut.

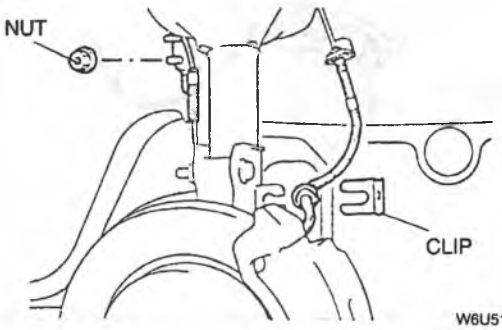


W6U517WDZ

2. Disconnect the tie-rod end from the knuckle using the **SST**.

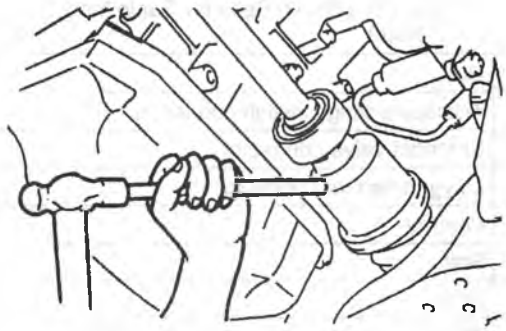
Drive Shaft Removal Note

1. Remove the clip.
2. Remove the ABS wheel-speed sensor harness mounting nuts.



W6U517WE0

3. Separate the driver side drive shaft from the joint shaft by using a brass bar and a hammer.

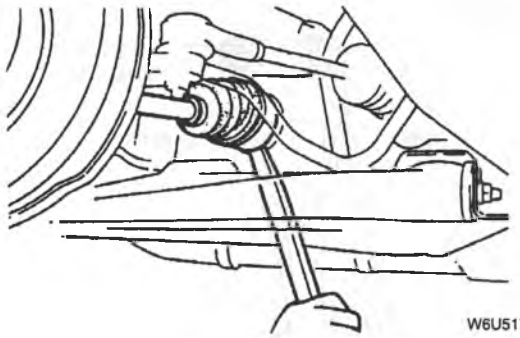


W6U517WE1

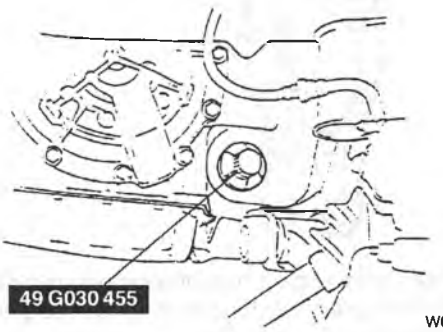
Caution

- **The sharp edges of the drive shaft snap ring can slice or puncture the oil seal. Be careful when removing the drive shaft from the transaxle.**

4. Separate the passenger side drive shaft from the transaxle by prying with a bar inserted between the outer ring and the transaxle, as shown in the figure.


W6U517WE2

5. Suspend the drive shaft with a rope.
6. Install the **SST** into the transaxle to hold the side gear.



W6U517WE3

Engine Mount Member Removal Note

Caution
- **To prevent damage to the body, insert a rag into the gap between the fender and body, when installing the SST.**

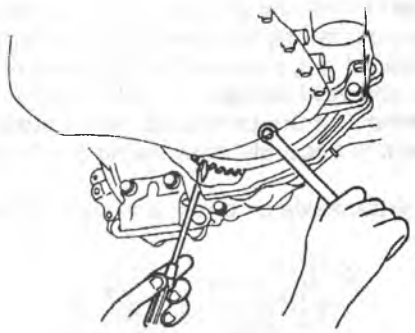
1. Support the engine by using the **SST** before removing the engine mounting member.



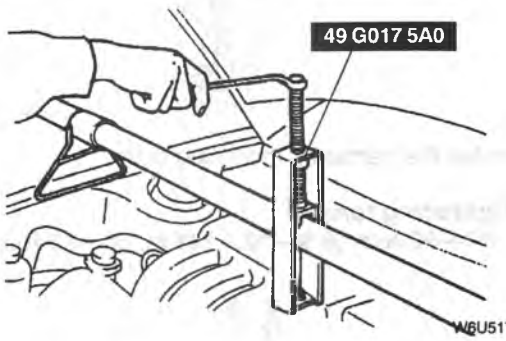
W6U517WE4

2. Remove the engine mounting member.

Torque Converter Nuts Removal Note
Hold the drive plate and remove the torque converter nuts.


W6U517WE5

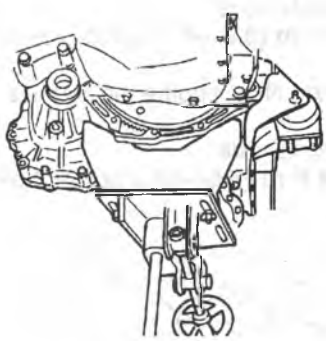
Transaxle Removal Note
1. Loosen the **SST** (engine support) and lean the engine toward the transaxle.



W6U517WE6

Warning
- **Verify that the transaxle is securely supported by the jack. If the transaxle should fall, serious injury, death or damage to the vehicle could result. Before removing the transaxle, make sure that the jack is securely supporting the transaxle.**

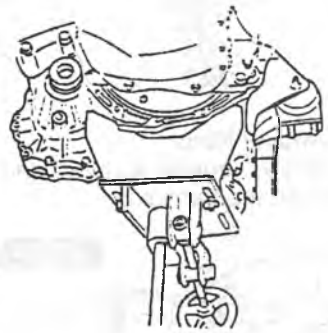
2. Support the transaxle on a jack.
3. Remove the transaxle mounting bolts.
4. Remove the transaxle.


W6U517WE7

Transaxle Installation Note

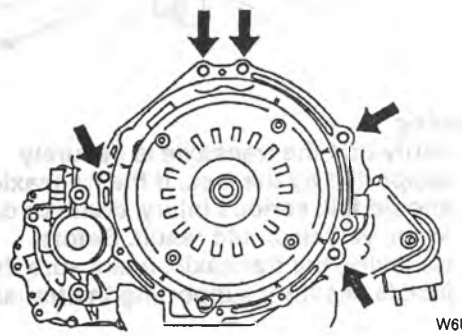
Warning
- **Verify that the transaxle is securely supported by the jack. If the transaxle should fall, serious injury, death or damage to the vehicle could result. Before removing the transaxle, make sure that the jack is securely supporting the transaxle.**

1. Set the transaxle on a jack and lift it into place.


W6U517WE8

2. Install the transaxle mounting bolts.

Tightening torque
68—99 N·m {6.9—10.1 kgf·m, 50—73 ft·lbf}

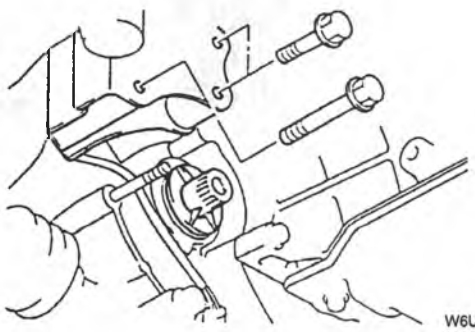

W6U517WE9

3. Install the torque converter nuts.

Tightening torque
38—60 N·m {3.8—6.2 kgf·m, 28—45 ft·lbf}

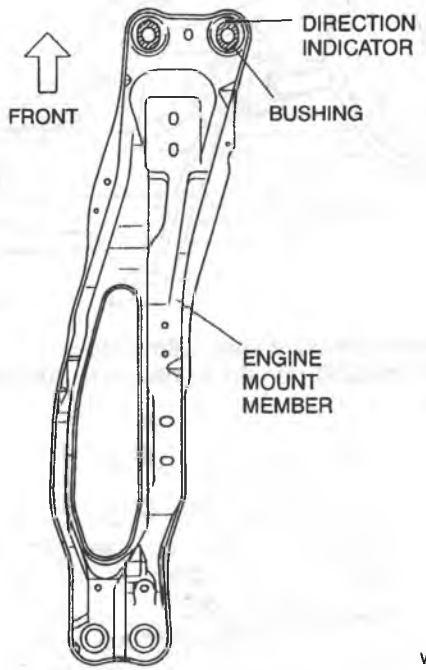
4. Hand tighten No.4 engine mount nuts.

Tightening torque
75—104 N·m {7.6—10.7 kgf·m, 55—77 ft·lbf}


W6U517WEA

Engine Mount Member Installation Note

1. Position the direction indicator on engine mount member bushings facing toward the front side, and install the bushings onto the engine mount member.



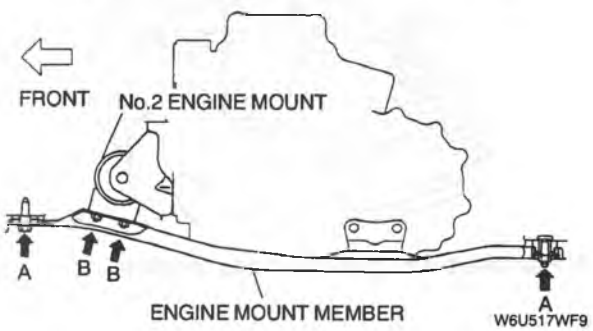
W6U517WF8

2. To install the engine mount member, put the No.2 engine mount stud bolts through the engine mount member installation holes.
3. Install the engine mount member bolts A and nuts A.

Tightening torque
A: 67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}

4. Loosely tighten the No.2 engine mount nuts B.
5. Remove the **SST** (engine support).
6. Tighten the No.2 engine mount nuts B.

Tightening torque
B: 75—104 N·m {7.6—10.7 kgf·m, 55—77 ft·lbf}



W6U517WF9

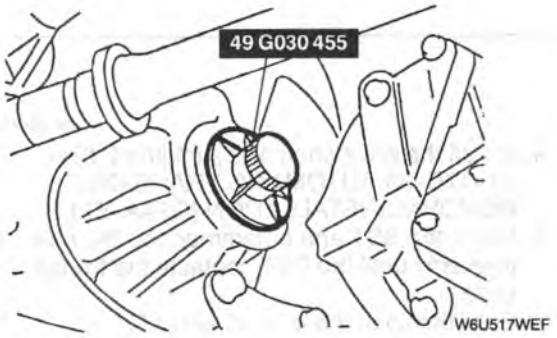
No.1 Engine Mount Bolts Installation Note

Caution
- **Align the transaxle bolt holes and the engine mount exactly. Any misalignment can result in bolts and bolt holes becoming damaged or stripped during installation.**

1. Use the **SST** (engine support) to make sure the transaxle bolt holes and No.1 engine mount align.
2. Tighten the bolts to the specified torque.

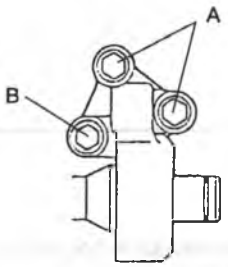
Joint Shaft Installation Note

1. Remove the **SST** from the transaxle case.



2. Verify that there is no damage to the oil seal.
3. Hand tighten bolts A.
4. Tighten the bolts A, B to the specified torque.

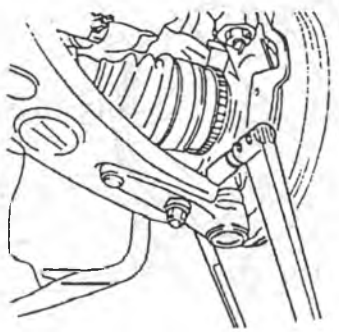
Tightening torque
43—61 N·m {4.3—6.3 kgf·m, 32—45 ft·lbf}



Lower Arm Installation Note

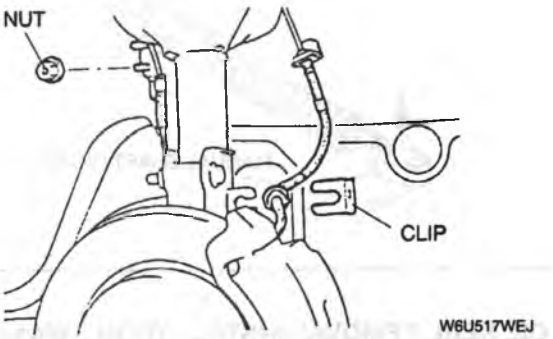
1. Connect the lower arm to the knuckle and tighten the clinch bolt.

Tightening torque
44—58 N·m {4.4—6.0 kgf·m, 32—43 ft·lbf}



2. Install the ABS wheel-speed sensor harness mounting nuts.

Tightening torque
7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}

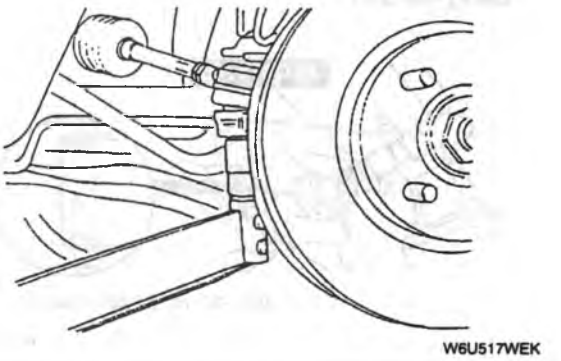


3. Install the clip.

Tie-Rod End Installation Note

1. Install the locknut.

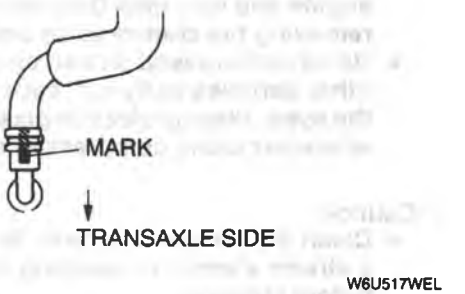
Tightening torque
43—56 N·m {4.3—5.8 kgf·m, 32—41 ft·lbf}



2. Secure the locknut by using a new cotter pin.

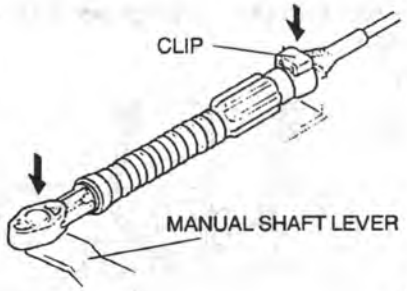
Breather Hose Installation Note

- Position the marking on the oil hose side facing up and install it.



Selector Cable Installation Note

1. Install the selector cable to the cable bracket.
2. Install the clip to the selector cable.



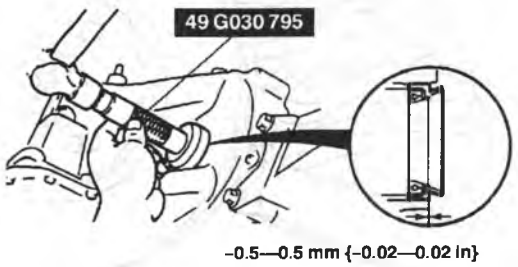
W6U517WEM

3. Connect the selector cable to the manual shaft lever.

OIL SEAL REMOVAL/INSTALLATION [GF4A-EL]

Z6U051719240W01

1. Remove the drive shaft and joint shaft. (See 05-17B-33 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [GF4A-EL].)
2. Remove and discard the oil seal by using a screwdriver.
3. Tap the new oil seal into the transaxle case by using the **SST**.



W6U517WEN

4. Install the drive shaft and joint shaft. (See 05-17B-33 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION [GF4A-EL].)
5. Using the **SST** and a hammer, tap the new oil seal in evenly until the **SST** contacts the transaxle case.
6. Coat the lip of the oil seal with ATF.

CONTROL VALVE BODY REMOVAL/INSTALLATION [GF4A-EL]

Z6U051721100W01

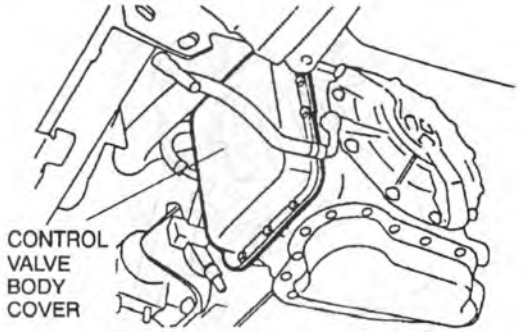
Warning

- **When the transaxle and ATF are hot, they can cause severe burns. Turn off the engine and wait until they are cool before removing the control valve body.**
- **Using compressed air can cause dirt and other particles to fly out, causing injury to the eyes. Wear protective glasses whenever using compressed air.**

Caution

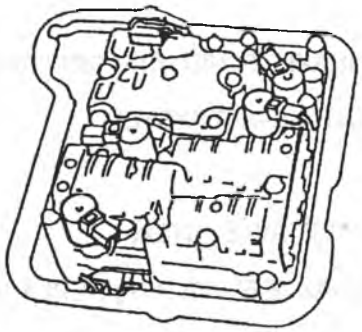
- **Clean the transaxle exterior throughly with a stream cleaner or cleaning solvents before removal.**
- **If any old sealant gets into the transaxle during installation of the oil pan, trouble may occur in the transaxle case and oil pan. Clean with cleaning fluids.**

1. Clean the transaxle exterior thoroughly with a steam cleaner or cleaning solvents.
2. Disconnect the negative battery cable.
3. Drain the ATF and engine coolant into separate containers.
4. Remove the splash shield.
5. Remove the oil cooler hose. (See 05-17B-42 OIL COOLER REMOVAL/INSTALLATION [GF4A-EL].)
6. Remove the radiator hose. (See 01-12-4 RADIATOR REMOVAL/INSTALLATION.)
7. Remove the control valve body cover and gasket.



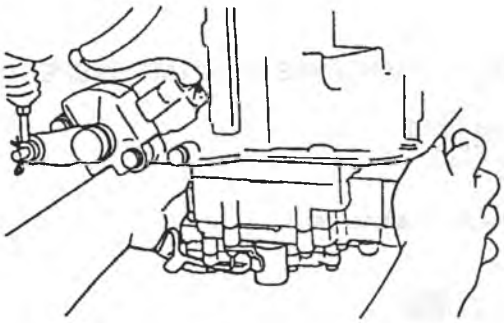
W6U517WEP

8. Disconnect the solenoid connectors and transaxle fluid temperature sensor connector.



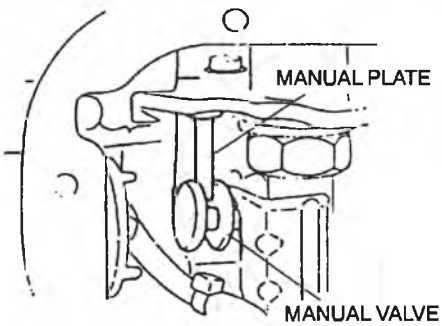
W6U517WEQ

9. Remove the control valve body component.



W6U517WER

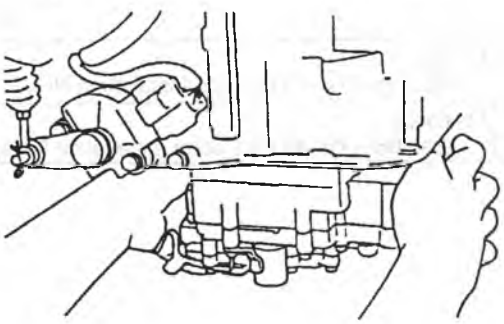
10. Align the manual plate and the manual valve.



W6U517WES

11. Install the control valve body component.

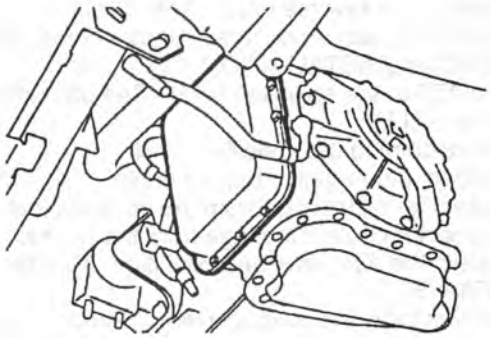
Tightening torque
10.8—14.7 N·m {110—150 kgf·cm, 95.5—130.2 in·lbf}



W6U517WET

12. Match the harness colors and connect the solenoid connectors and transaxle fluid temperature sensor connector.
13. Install a new gasket and the control valve body cover.

Tightening torque
8.4—10.7 N·m {85—110 kgf·cm, 73.7—95.4 in·lbf}



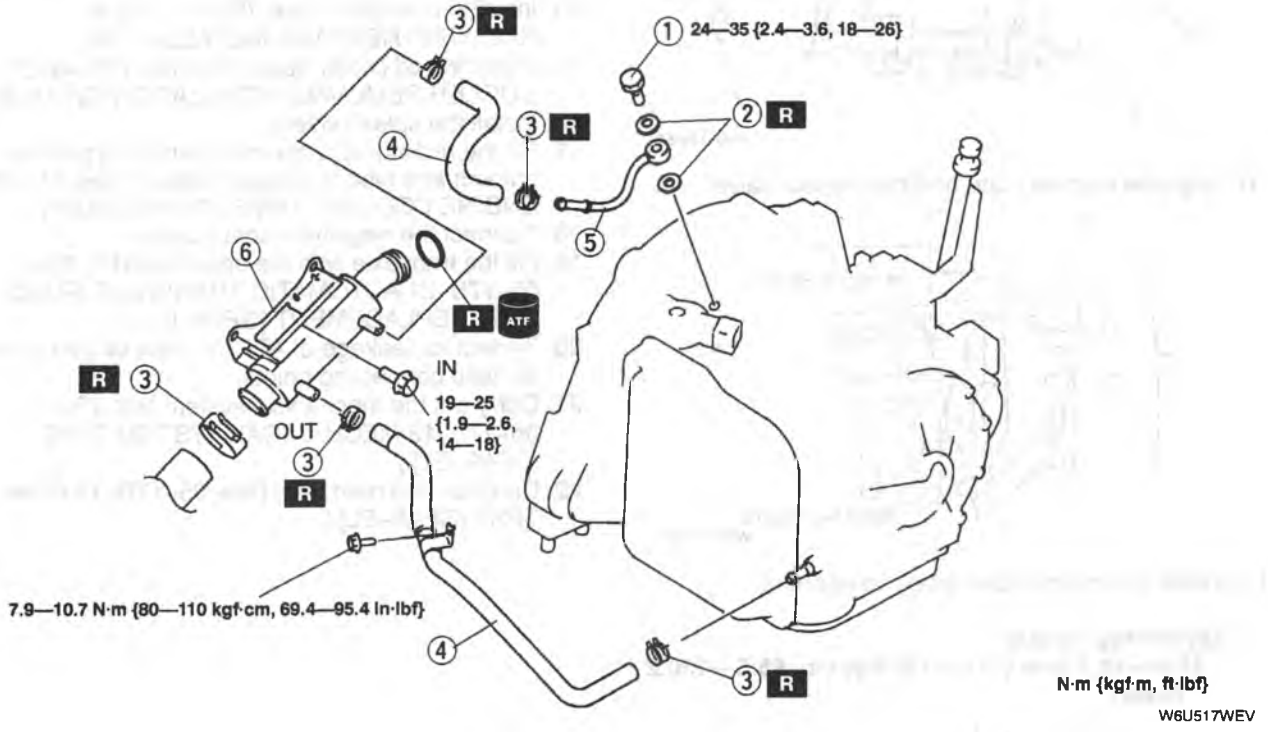
W6U517WEU

14. Install the radiator hose. (See 01-12-4 RADIATOR REMOVAL/INSTALLATION.)
15. Install the oil cooler hose. (See 05-17B-42 OIL COOLER REMOVAL/INSTALLATION [GF4A-EL].)
16. Install the splash shield.
17. Fill the radiator and reservoir with the specified amount and type of engine coolant. (See 01-12-1 ENGINE COOLANT LEVEL INSPECTION.)
18. Connect the negative battery cable.
19. Fill the transaxle with the specified ATF. (See 05-17B-21 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [GF4A-EL].)
20. Inspect for leakage of ATF from the oil pan or the oil hose connecting points.
21. Carry out the mechanical system test. (See 05-17B-13 MECHANICAL SYSTEM TEST [GF4A-EL].)
22. Carry out the road test. (See 05-17B-16 ROAD TEST [GF4A-EL].)

OIL COOLER REMOVAL/INSTALLATION [GF4A-EL]

Z6U051719900W01

1. Disconnect the negative battery cable.
2. Drain the coolant into a container.
3. Drain the ATF into a container. (See 05-17B-21 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [GF4A-EL].)
4. Remove the fresh-air duct, air cleaner component. (See 01-13B-4 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [KL].)
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.
7. Install the fresh-air duct, air cleaner component. (See 01-13B-4 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [KL].)
8. Add ATF to the specified level. (See 05-17B-21 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT [GF4A-EL].)
9. Add coolant to the specified level.
10. Connect the negative battery cable.
11. Inspect for oil leakage from the oil pipes and oil hoses.
12. Inspect for coolant leakage from the hoses.
13. Inspect the ATF level and condition. (See 05-17B-20 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION [GF4A-EL].)
14. Carry out the line pressure test. (See 05-17B-13 Line Pressure Test.)
15. Carry out the road test. (See 05-17B-16 ROAD TEST [GF4A-EL].)



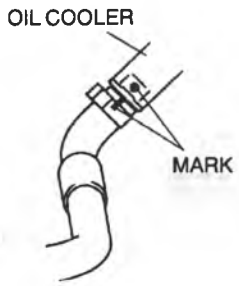
W6U517WEV

1	Connector bolt
2	Washers
3	Hose clamp (See 05-17B-43 Hose Clamp Installation Note)
4	Oil hose (See 05-17B-43 Oil Hose Installation Note)

5	Oil pipe (See 05-17B-43 Oil Pipe Installation Note)
6	Oil cooler (See 05-17B-43 Oil Cooler Installation Note)

Oil Cooler Installation Note

1. Automatic transaxle oil cooler flushing must be performed whenever a transaxle is removed for service to remove existing fluid which may be contaminated and to prevent contamination of new fluid. The flushing must be performed after installing the overhauled transaxle.
2. Follow the manufacture's instructions for flushing the automatic transaxle oil cooler.
3. Align the marks, and slide the oil hose onto the oil pipe until it is full seated as shown.



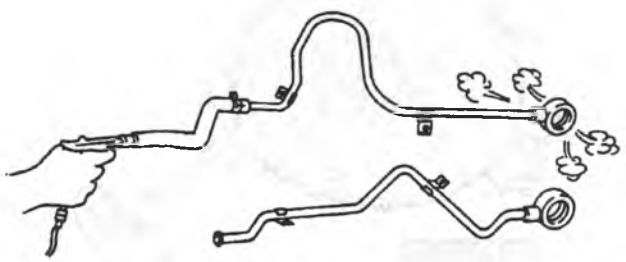
W6U517WEW

Oil Pipe Installation Note

Note

- In order to prevent ATF leakage, replace the hose. When any damages are found inside or outside of the hose, especially on areas contacting pipes.

- Apply compressed air to the cooler-side pipe opening, and blow any remaining dust and foreign material from the cooler pipes. Compressed air should be applied for no less than one minute.

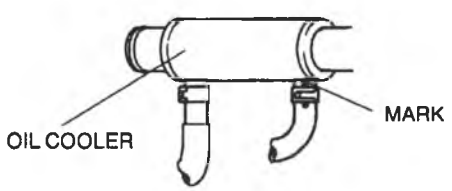


W6U517WF7

Oil Hose Installation Note

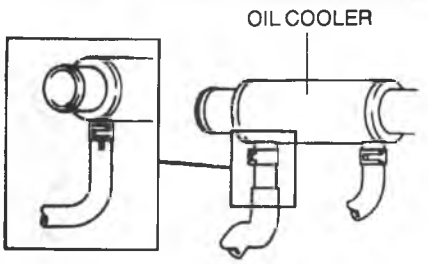
Oil cooler side

1. Position the marking on the oil hose side facing up and install it.



W6U517WEX

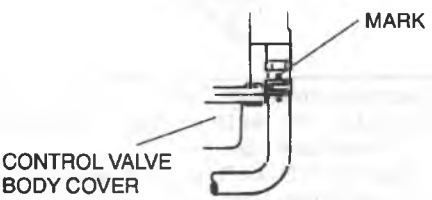
2. Position the marking on the oil hose side so that it faces the radiator and install it.



W6U517WF6

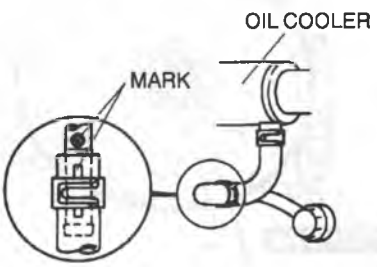
Transaxle side

1. Position the marking on the oil hose side facing up and install it.



W6U517WEY

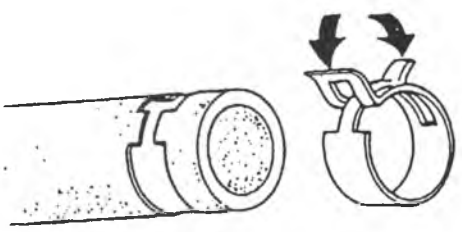
2. Align the marks, and slide the oil hose onto oil pipe until it is fully seated as shown.



W6U517WEZ

Hose Clamp Installation Note

1. Install the hose clamp onto the hose. If reusing the hose, install the new hose clamp exactly onto the mark left by the previous hose clamp.



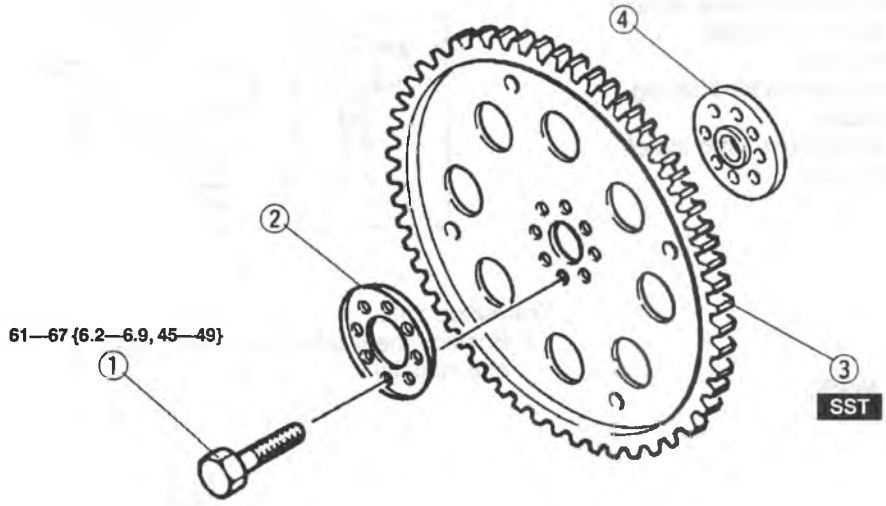
W6U517WF0

2. Verify that the hose clamp does not interfere with any other parts.

DRIVE PLATE REMOVAL/INSTALLATION [GF4A-EL]

Z6U051719020W01

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



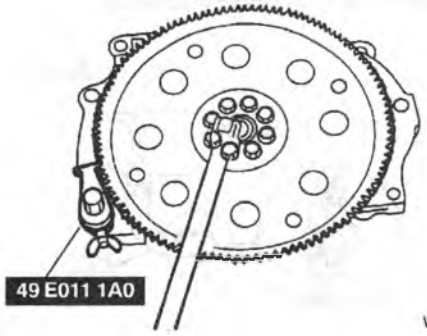
N·m {kgf·m, ft·lbf}

W6U517WF1

1	Drive plate mounting bolts (See 05-17B-44 Drive Plate Mounting Bolts Removal Note) (See 05-17B-44 Drive Plate Mounting Bolts Installation Note)
2	Backing plate
3	Drive plate
4	Adapter

Drive Plate Mounting Bolts Removal Note

1. Set the **SST** or equivalent against the drive plate.
2. Remove the bolts and the drive plate.

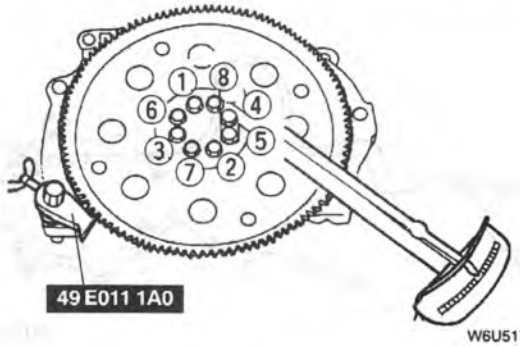


W6U517WF2

Drive Plate Mounting Bolts Installation Note

1. Set the **SST** or equivalent against the drive plate.
2. Tighten the drive plate mounting bolts in two or three steps in the order shown.

Tightening torque
61—67 N·m {6.2—6.9 kgf·m, 45—49 ft·lbf}



W6U517WF3

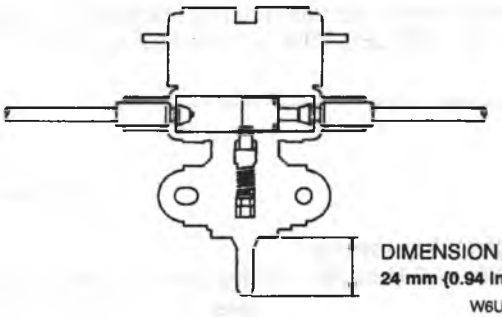
05-18 AUTOMATIC TRANSAXLE SHIFT MECHANISM

INTERLOCK CABLE INSPECTION 05-18-1
SELECTOR LEVER INSPECTION 05-18-1
SELECTOR LEVER ADJUSTMENT 05-18-2
INDICATOR PANEL ADJUSTMENT 05-18-2
SELECTOR LEVER AND CABLE
REMOVAL/INSTALLATION 05-18-2
Indicator Panel Removal Note **05-18-4**
Selector Lever Removal Note **05-18-4**
Selector Cable Removal Note **05-18-4**
Interlock Cable Installation Note **05-18-4**
Selector Cable Installation Note **05-18-5**
Selector Lever Installation Note **05-18-5**
Indicator Panel Installation Note **05-18-5**
SELECTOR LEVER
DISASSEMBLY/ASSEMBLY 05-18-6
Connector Disassembly Note **05-18-7**
Indicator Panel Assembly Note **05-18-7**

INTERLOCK CABLE INSPECTION

Z6U051846300W01

1. Remove the interlock cable and lock unit.
2. With the slider pin protrusion (dimension A) as specified below, verify that the interlock cable moves freely in the lock unit.
   - If not as specified, replace the interlock cable.



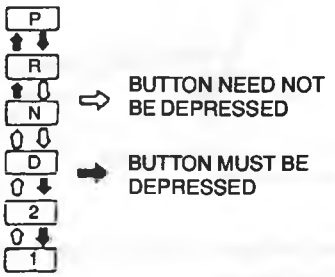
W6U518WA0

3. Install the interlock cable and lock unit. (See 05-18-2 SELECTOR LEVER AND CABLE REMOVAL/INSTALLATION.)

SELECTOR LEVER INSPECTION

Z6U051846102W01

1. Turn the ignition switch to ON position. (engine is off.)
2. With the brake pedal depressed, verify that there is a "click" at each range when shifted in the pattern shown.
3. Verify that the selector lever can only be shifted as shown.
4. Verify that the position of the selector lever and the indicator are aligned.
   - If not as specified, adjust the indicator panel. (See 05-18-2 INDICATOR PANEL ADJUSTMENT.)



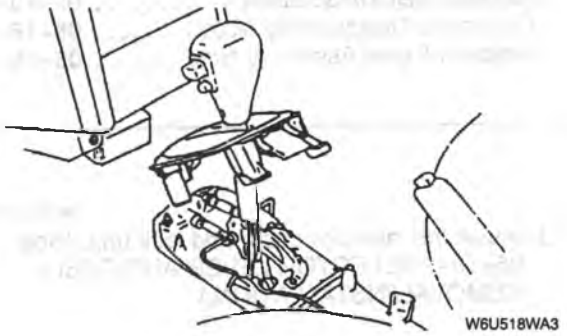
W6U518WA1

5. Start the engine.
6. Verify that the vehicle operates in each selected range.

SELECTOR LEVER ADJUSTMENT

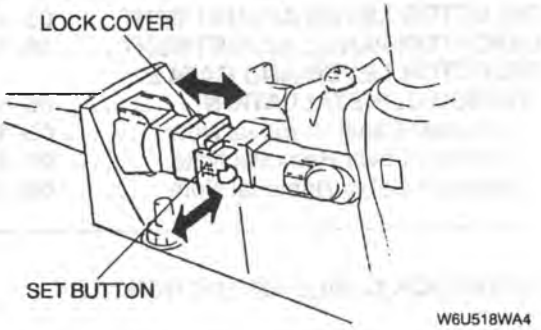
Z6U051846102W02

1. Remove the front console. (See 09-17-5 FRONT CONSOLE REMOVAL/INSTALLATION.)
2. Shift the selector lever to P position (KL), or D range (FS).
3. Remove the indicator screws and lift up the indicator panel.



W6U518WA3

4. Slide the lock cover.
5. Disconnect the set button.
6. Shift the selector lever to P position (KL), or D range (FS).
7. Connect the set button.
8. Slide the lock cover to lock the set button.



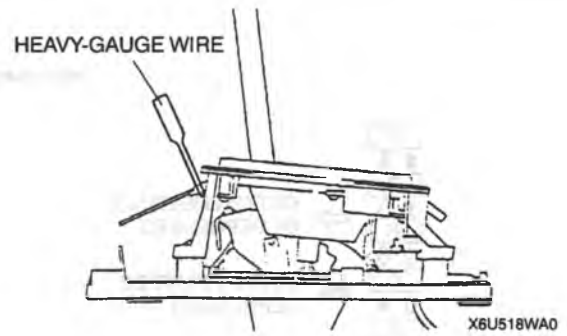
W6U518WA4

9. Install and adjust the indicator panel. (See 05-18-6 SELECTOR LEVER DISASSEMBLY/ASSEMBLY.)
10. Install the front console. (See 09-17-5 FRONT CONSOLE REMOVAL/INSTALLATION.)
11. Verify correct operation of the selector lever. (See 05-18-1 SELECTOR LEVER INSPECTION.)

INDICATOR PANEL ADJUSTMENT

Z6U051846102W03

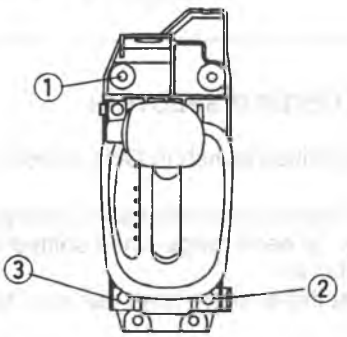
1. Loosen the indicator panel screws.
2. Shift the selector lever to P position.
3. Align the alignment screws in the slider with the holes in the indicator panel. Install heavy-gauge wire to hold the slider.



X6U518WA0

4. Tighten the indicator panel screws in the order shown in the figure.

Tightening torque
2.0—2.9 N·m {20—30 kgf·cm, 18—26 in·lbf}



W6U518WA6

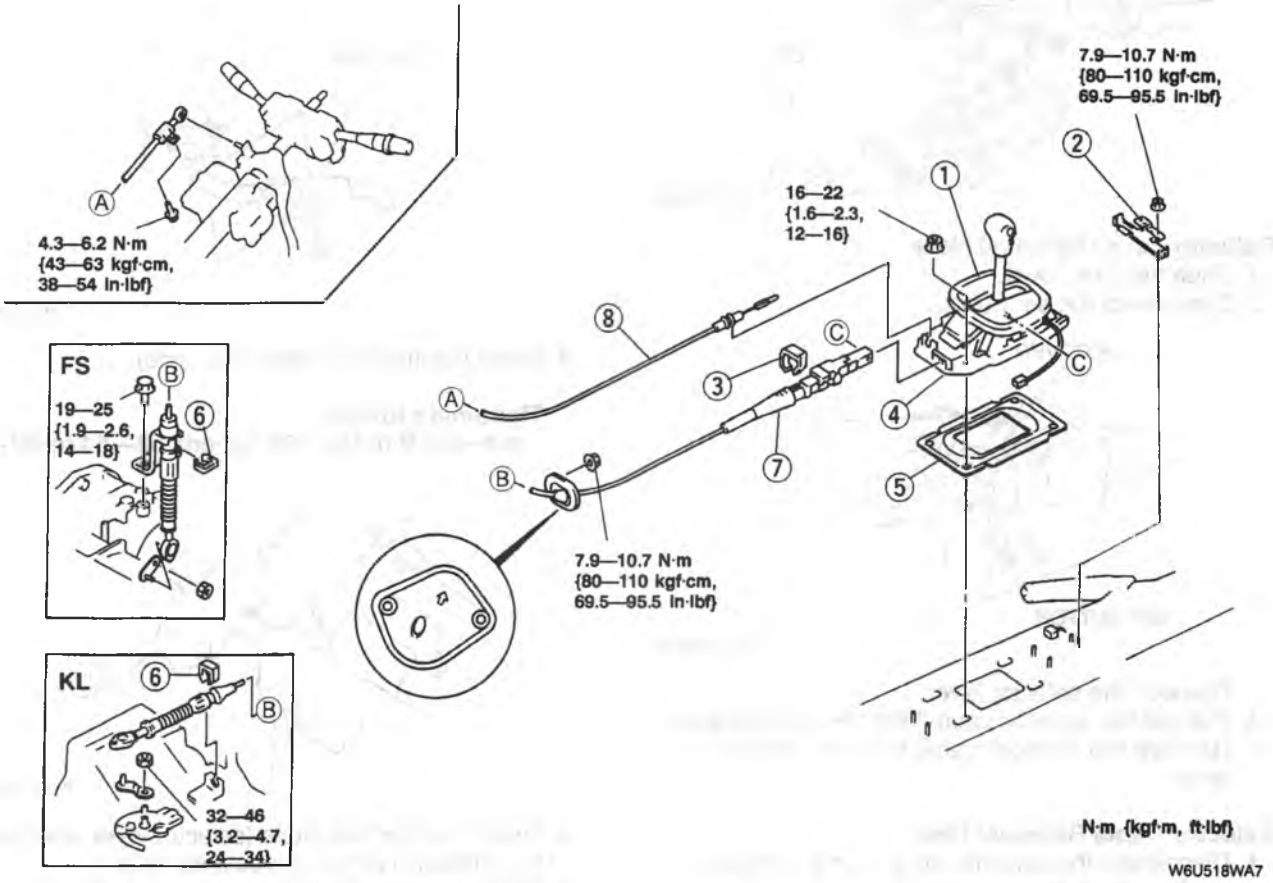
5. Remove the heavy gauge wire.
6. Verify that the selector lever properly aligns with the indicator in each range.

SELECTOR LEVER AND CABLE REMOVAL/INSTALLATION

Z6U051846102W04

1. Disconnect the negative battery cable.
2. Remove the steering column cover. (See 06-12-5 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
3. Remove the side panel. (See 09-17-7 SIDE PANEL REMOVAL/INSTALLATION.)
4. Remove the lower panel. (See 09-17-7 LOWER PANEL REMOVAL/INSTALLATION.)
5. Remove the front console. (See 09-17-5 FRONT CONSOLE REMOVAL/INSTALLATION.)
6. Remove the heater unit. (See 07-11-13 HEATER UNIT REMOVAL/INSTALLATION.)
7. Remove the SAS control module bracket. (See 08-10-16 SAS CONTROL MODULE BRACKET REMOVAL/INSTALLATION.)
8. Remove in the order indicated in the table.
9. Install in the reverse order of removal.
10. Install the SAS control module bracket. (See 08-10-16 SAS CONTROL MODULE BRACKET REMOVAL/INSTALLATION.)

11. Install the heater unit. (See 07-11-13 HEATER UNIT REMOVAL/INSTALLATION.)
12. Install the front console. (See 09-17-5 FRONT CONSOLE REMOVAL/INSTALLATION.)
13. Install the lower panel. (See 09-17-7 LOWER PANEL REMOVAL/INSTALLATION.)
14. Install the side panel. (See 09-17-7 SIDE PANEL REMOVAL/INSTALLATION.)
15. Install the steering column cover. (See 06-12-5 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
16. Connect the negative battery cable.

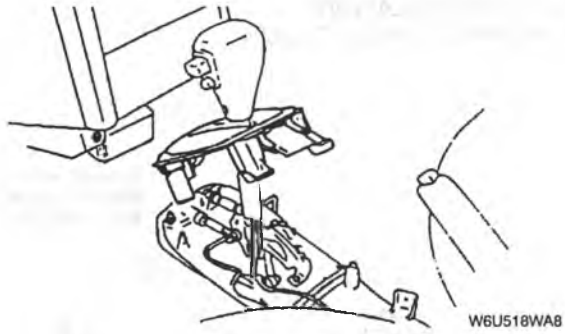


1	Indicator panel (See 05-18-4 Indicator Panel Removal Note) (See 05-18-5 Indicator Panel Installation Note)
2	Bracket
3	Clip
4	Selector lever (See 05-18-4 Selector Lever Removal Note) (See 05-18-5 Selector Lever Installation Note) (See 05-18-6 SELECTOR LEVER DISASSEMBLY/ASSEMBLY) (See 05-18-1 SELECTOR LEVER INSPECTION)

5	Insulator
6	Clip
7	Selector cable (See 05-18-4 Selector Cable Removal Note) (See 05-18-5 Selector Cable Installation Note)
8	Interlock cable (See 05-18-4 Interlock Cable Installation Note)

Indicator Panel Removal Note

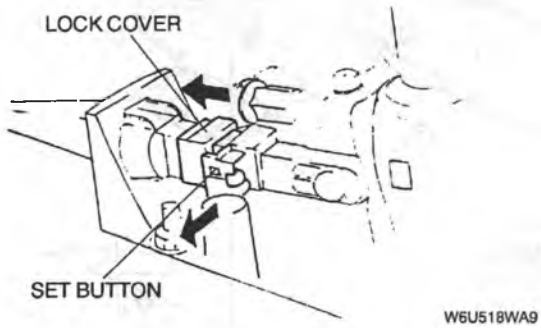
1. Remove the indicator screws and lift up the indicator panel.



W6U518WA8

Selector Lever Removal Note

1. Slide the lock cover.
2. Disconnect the set button.

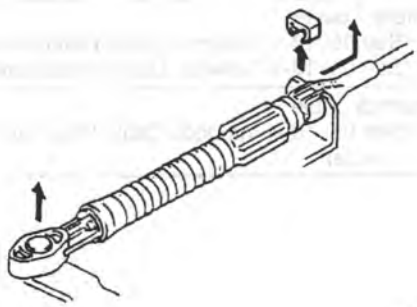


W6U518WA9

3. Remove the selector lever.
4. Pull out the selector cable from the selector lever.
5. Remove the interlock cable from the selector lever.

Selector Cable Removal Note

1. Disconnect the selector cable from the manual shaft lever on the transaxle.
2. Pull out the selector cable from the cable bracket and remove it.

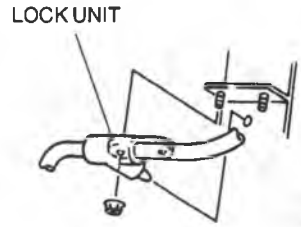


W6U518WAA

Interlock Cable Installation Note

1. Verify that the ignition switch is in LOCK position, and shift the selector lever in P position.
2. Install the lock unit.

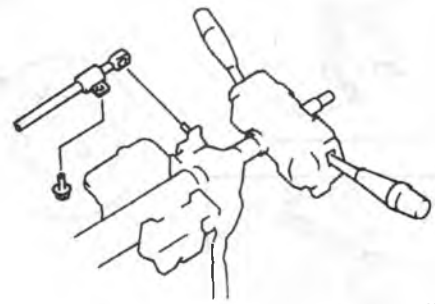
Tightening torque
4.3—6.2 N·m {43—63 kgf·cm, 38—54 in·lbf}



W6U518WAB

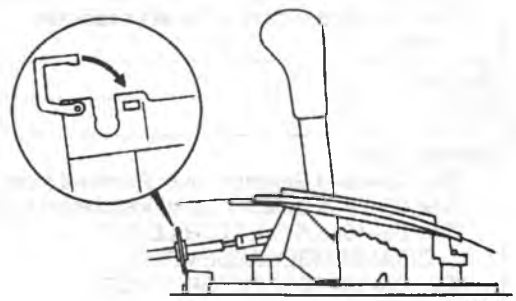
3. Install the interlock cable. (key side)

Tightening torque
4.3—6.2 N·m {43—63 kgf·cm, 38—54 in·lbf}



W6U518WAC

4. Install the interlock cable (selector lever side) onto the interlock cam on the selector lever.
5. Fit the interlock cable in the U-groove in the selector lever base plate.



W6U518WAD

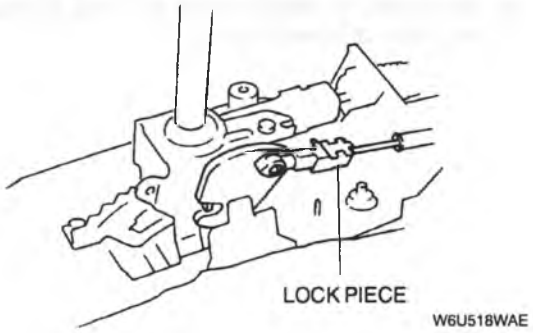
Caution

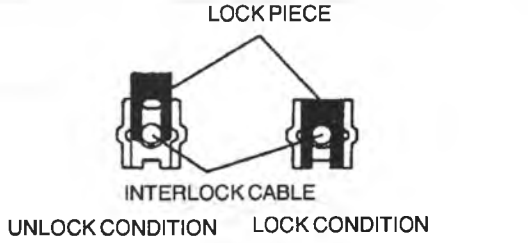
- **Applying load to the interlock cable while pressing the lock piece in can affect lock unit operation.**

Note

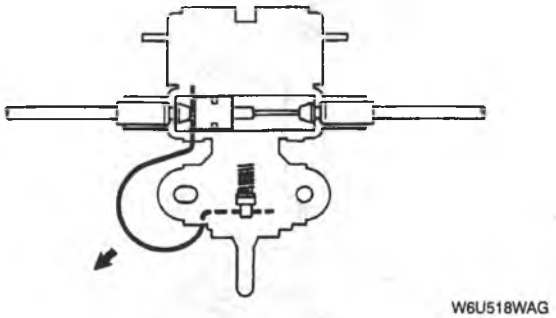
- Step 6 and 7 are for the interlock cable replacement only.

6. Press the lock piece in until it is locked.





7. Remove the lock unit lock pin in the order shown in the figure.

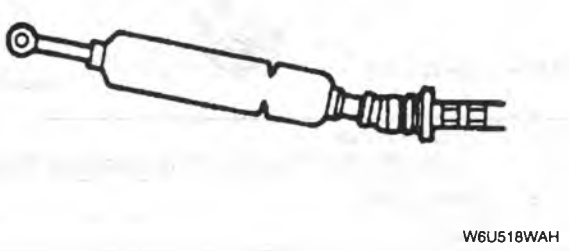


Selector Cable Installation Note

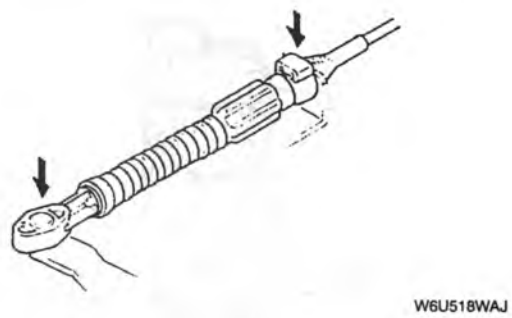
1. Shift the selector lever and manual shaft to P position (KL), or D range (FS).

Caution

- **Bending the selector cable in the manner shown in the figure will damage the cable and cause it to become loose during shifting. When handling and installing the selector cable, hold it straight.**



2. Install the selector cable to the cable bracket.
3. Install the clip to the selector cable.
4. Connect the selector cable to the manual shaft lever on the transaxle.

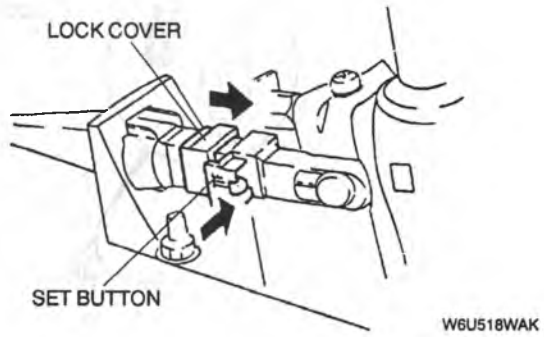


Selector Lever Installation Note

1. Install the selector lever.
2. Install the selector cable to the selector lever.

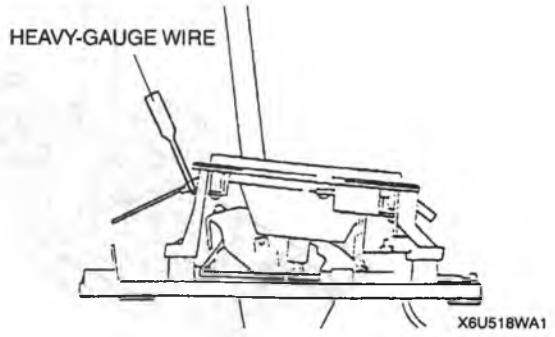
Tightening torque
16—22 N·m {1.6—2.3 kgf·m, 12—16 ft·lbf}

3. Shift the selector lever to P position (KL), or D range (FS).
4. Connect the set button.
5. Slide the lock cover and lock the set button.



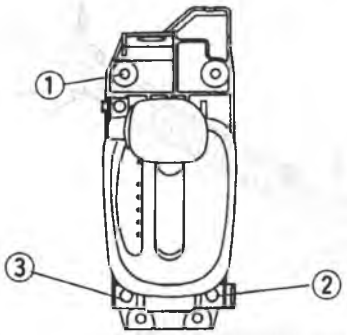
Indicator Panel Installation Note

1. Shift the selector lever to P position.
2. Align the alignment screws in the slider with the holes in the indicator panel. Install heavy-gauge wire to hold the slider.



3. Tighten the indicator panel screws in the order shown in the figure.

Tightening torque
2.0—2.9 N·m {20—30 kgf·cm, 18—26 in·lbf}



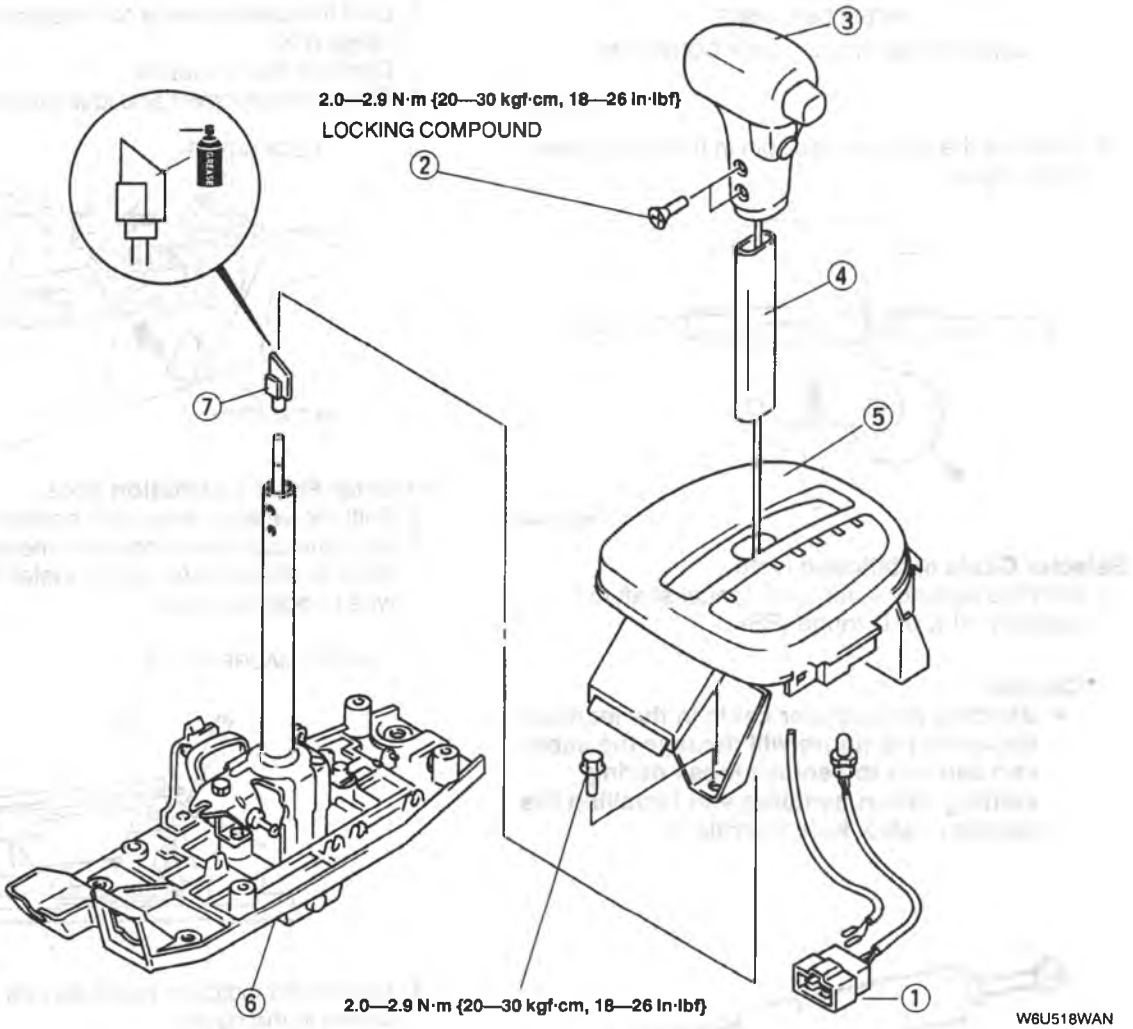
W6U518WAM

4. Remove the heavy gauge wire.
5. Verify that the selector lever properly aligns with the indicator in each range.

SELECTOR LEVER DISASSEMBLY/ASSEMBLY

Z6U051846102W05

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



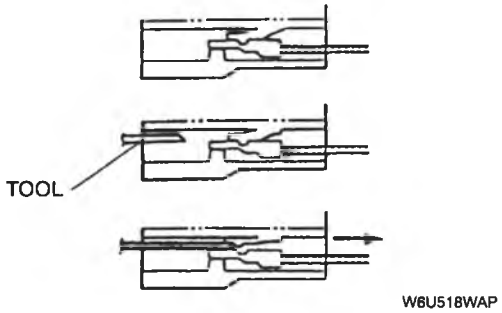
W6U518WAN

1	Connector (See 05-18-7 Connector Disassembly Note)
2	Screws
3	Selector lever knob
4	Cover

5	Indicator panel (See 05-18-7 Indicator Panel Assembly Note)
6	Selector lever
7	Cam

Connector Disassembly Note

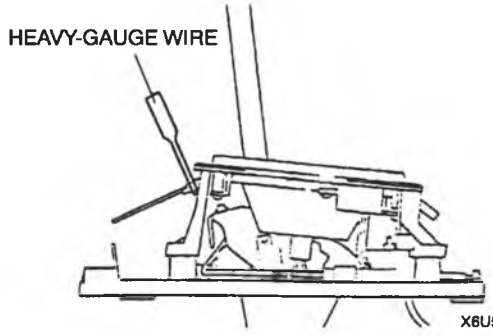
1. Insert a tool from the terminal side of the connector, and lift up the terminal locking tab.
2. Pull the terminal out of the connector.



W6U518WAP

Indicator Panel Assembly Note

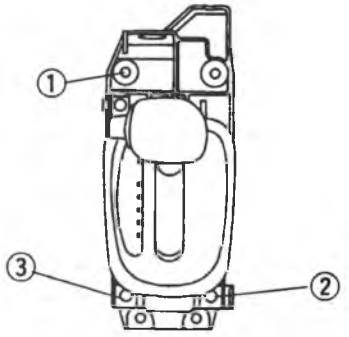
1. Shift the selector lever to P position.
2. Align the alignment screws in the slider with the holes in the indicator panel. Install heavy-gauge wire to hold the slider.



X6U518WA2

3. Temporarily install the indicator panel to the selector lever bracket.
4. Tighten the indicator panel screws in the order shown in the figure.

Tightening torque
2.0—2.9 N·m {20—30 kgf·cm, 18—26 in·lbf}



W6U518WAR

5. Remove the heavy gauge wire.
6. Verify that the selector lever properly aligns with the indicator panel in all ranges and positions.

05-50 TECHNICAL DATA

TRANSMISSION/TRANSAXLE TECHNICAL DATA 05-50-1
TRANSMISSION/TRANSAXLE TIGHTENING TORQUE 05-50-2

TRANSMISSION/TRANSAXLE TECHNICAL DATA

Z6U055001024W01

Item			Engine	
			FS	KL
CLUTCH				
Transaxle type			**G25M-R**	
Clutch pedal				
Height		(mm {in})	194—202 {7.64—7.95} (with carpet)	
Free play		(mm {in})	5.0—14.0 {0.20—0.55}	
Distance to carpet when clutch fully disengaged (mm {in})		Minimum	38 {1.50} (with carpet)	
Clutch disc				
Facing thickness (mm {in})		Flywheel side	3.5 {0.14}	
		Pressure plate side	3.8 {0.15}	
Clutch fluid				
Type			SAE J1703, FMVSS116 DOT-3	
MANUAL TRANSAXLE				
Transaxle type			**G25M-R**	
Oil	Grade		API service GL-4 or GL-5	
	Viscosity	All season	SAE 75W-90	
		Above 10 °C {50 °F}	SAE 80W-90	
	Capacity (Approximate quantity)	(L {US qt, Imp qt})	2.7 {2.9, 2.4}	
AUTOMATIC TRANSAXLE				
Transaxle type			**LA4A-EL**	**GF4A-EL**
Line pressure (kPa {kgf/cm^2, psi})	D, 2, 1	Idle	330—370 {3.34—3.75, 47—53}	420—530 {4.2—5.5, 60—78}
		Stall	1,158—1,269 {11.80—12.93, 168—184}	1,100—1,170 {11.2—12.0, 160—170}
	R	Idle	470—530 {4.81—5.41, 68—77}	730—1,010 {7.4—10.3, 110—146}
		Stall	1,790—2,020 {18.21—20.66, 259—294}	1,910—2,020 {19.4—20.7, 276—294}
	P, N	Idle	470—530 {4.81—5.41, 68—77}	—
Engine stall speed (rpm)	D, 2, 1		2,000—2,500	2,000—2,500
	R		1,700—2,500	2,000—2,500
Time lag (second)	N-D		Below approx. 1.0	Below approx. 0.9
	N-R		Below approx. 1.0	Below approx. 1.1

Item			Engine	
			FS	KL
Transaxle fluid temperature (TFT) sensor (kΩ)	0—20 °C {32—68 °F}		100—37	—
	20 °C {68 °F}		—	2.441—2.894
	21—40 °C {69—104 °F}		37—16	—
	40 °C {104 °F}		—	1.193—1.374
	41—70 °C {105—158 °F}		16—5	—
	60 °C {140 °F}		—	0.6284—0.7084
	71—90 °C {159—194 °F}		5—2.7	—
	80 °C {176 °F}		—	0.3527—0.3865
	91—110 °C {195—230 °F}		2.7—1.5	—
	100 °C {212 °F}		—	0.2091—0.2245
	111—130 °C {231—266 °F}		1.5—0.8	—
	120 °C {248 °F}		—	0.1301—0.1372
	131—150 °C {267—302 °F}		0.8—0.54	—
	130 °C {266 °F}		—	0.1044—0.1090
Turbine shaft speed sensor (TSS) (Ω)			140—290	—
Input/turbine speed sensor (Ω)		ATF temperature: -40—160 °C {-40—320 °F}	—	235—604
Solenoid valves (Ω)	Shift solenoid No.1 (SS1)		12—22	—
	Shift solenoid No.2 (SS2)		12—22	—
	TCC		12.5—19.0	—
	Electronic pressure control (EPC)		3.7—5.92	—
	3-2 timing/coasting clutch solenoid (3-2T/CCS)		3.7—5.92	—
	Shift solenoid A		—	11—27
	Shift solenoid B		—	11—27
	Shift solenoid C		—	11—27
	TCC control		—	11—27
	3-2 timing		—	11—27
	Pressure control solenoid		—	9—18
Automatic transaxle fluid (ATF)	Type		ATF M-III or equivalent (e.g. Mercon®)	ATF M-III or equivalent (e.g. Dexron®III/Mercon®)
	Capacity (Approximate quantity)	(L {US qt, Imp qt})	8.3 {8.8, 7.3}	8.0 {8.5, 7.0}

TRANSMISSION/TRANSAXLE TIGHTENING TORQUE

Z6U055001024W02

Item	Tightening torque (N·m {kgf·m, ft·lbf})
CLUTCH	
Clutch master cylinder bleeder screw	5.9—8.8 N·m {60—90 kgf·cm, 53—78in·lbf}
Clutch master cylinder	19—25 {1.9—2.6, 14—18}
Clutch pipe	12.8—21.5 N·m {130—220 kgf·cm, 113—190 in·lbf}
Clutch pedal height adjustment bolt	13.8—17.6 N·m {140—180 kgf·cm, 122—156 in·lbf}
Clutch pedal	19—25 {1.9—2.6, 14—18}
Clutch release cylinder	19—25 {1.9—2.6, 14—18}
Clutch release cylinder bleeder screw	5.9—8.8 N·m {60—90 kgf·cm, 53—78 in·lbf}
Clutch cover	18—26 {1.8—2.7, 14—19}

Item			Tightening torque (N·m {kgf·m, ft·lbf})
Flywheel	KL		61—67 {6.2—6.9, 45—49}
	FS		97—102 {9.8—10.5, 71—75}
MANUAL TRANSAXLE			
Oil level plug			40—58 {4.0—6.0, 29—43}
Drain plug			40—58 {4.0—6.0, 29—43}
Vehicle speedometer sensor			7.9—11.2 N·m {80—115 kgf·cm, 69.5—99.8 in·lbf}
Extension bar			38—51 {3.8—5.3, 28—38}
Change control rod			16—22 {1.6—2.3, 12—16}
Tie-rod end ball joint			32—44 {3.2—4.5, 24—32}
Lower arm ball joint			35—56 {3.5—5.8, 26—41}
Clutch release cylinder			19—25 {1.9—2.6, 14—18}
Stabilizer control link			37—53 {3.7—5.5, 27—39}
Joint shaft			43—61 {4.3—6.3, 32—45}
No.2 engine mount			38—51 {3.8—5.3, 28—38}
Transverse member			94—131 {9.5—13.4, 69—96}
Engine mount member	No.2 engine mount side		75—104 {7.6—10.7, 55—77}
	Except for No.2 engine mount side		67—93 {6.8—9.5, 50—68}
No.1 engine mount bracket	Engine side		67—104 {6.8—10.7, 50—77}
	Mount rubber side		86—116 {8.7—11.9, 63—86}
	Stay		6.9—9.8 N·m {70—100 kgf·cm, 61—86 in·lbf}
No.4 engine mount rubber	Transaxle side		67—93 {6.8—9.5, 50—68}
	Bracket side	FS	86—116 {8.7—11.9, 63—86}
		KL	93—123 {9.4—12.6, 68—91}
Manual transaxle (FS)	Cylinder block side		90—116 {9.1—11.9, 66—86}
	Oil pan upper block upper side		38—51 {3.8—5.3, 28—38}
	Oil pan upper block lower side		19—25 {1.9—2.6, 14—18}
Manual transaxle (KL)	ϕ12mm		68—99 {6.8—10.1, 50—73}
	ϕ10mm		38—51 {3.8—5.3, 28—38}
No.5 engine mount (KL)			55—80 {5.6—8.2, 41—59}
MANUAL TRANSAXLE SHIFT MECHANISM			
Base plate			9.8—14.7 N·m {100—150 kgf·cm, 86.8—130 in·lbf}
Transverse member			94—131 {9.5—13.4, 69—96}
Extension bar			38—51 {3.8—5.3, 28—38}
Change control rod			16—22 {1.6—2.3, 12—16}
Rubber mount			16—22 {1.6—2.3, 12—16}
AUTOMATIC TRANSAXLE			
Square head plug	LA4A-EL		23—25 {2.3—2.6, 17—18}
	GF4A-EL		5.0—9.8 N·m {50—110 kgf·cm, 44—86 in·lbf}
Drain plug	LA4A-EL		15—35 {1.5—3.6, 11—26}
	GF4A-EL		40—53 {4.0—5.5, 29—39}
O/D off switch			2.0—2.9 N·m {20—30 kgf·cm, 18—26 in·lbf}
Transaxle range switch	LA4A-EL		11—13 N·m {112—133 kgf·cm, 97—115 in·lbf}
	GF4A-EL		7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}
Manual shaft	GF4A-EL		32—46 {3.2—4.7, 24—33}
Transaxle fluid temperature sensor	GF4A-EL		6.5—7.8 N·m {66—80 kgf·cm, 58—69 in·lbf}
Speedometer sensor	LA4A-EL		5.0—6.0 N·m {50—61 kgf·cm, 44—53 in·lbf}
Input/turbine speed sensor	GF4A-EL		7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}
Vehicle speedometer sensor	GF4A-EL		7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}

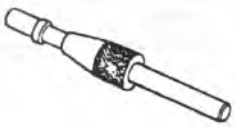
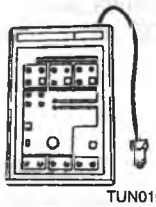
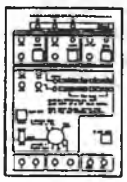
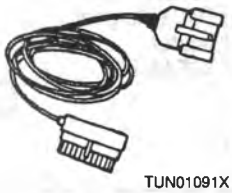
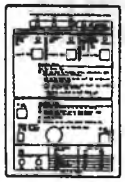
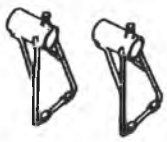
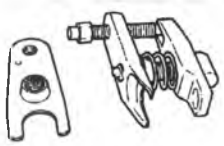
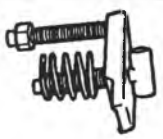
Item			Tightening torque (N·m {kgf·m, ft·lbf})
Turbine shaft speed sensor	LA4A-EL		12.1—13.9 N·m {123—142 kgf·cm, 107—123 in·lbf}
Solenoid valve	GF4A-EL		6.5—7.8 N·m {66—80 kgf·cm, 58—69 in·lbf}
Undercover	GF4A-EL		7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}
Torque converter	LA4A-EL		28—46 {2.8—4.7, 21—33}
	GF4A-EL		38—60 {3.8—6.2, 28—45}
Joint shaft			43—61 {4.3—6.3, 32—45}
Tie-rod end ball joint			32—44 {3.2—4.5, 24—32}
Lower arm ball joint			35—56 {3.5—5.8, 26—41}
Stabilizer control link			37—53 {3.7—5.5, 27—39}
Transverse member			94—131 {9.5—13.4, 69—96}
Engine mount member	No.2 engine mount side		75—104 {7.6—10.7, 55—77}
	Except for No.2 engine mount side		67—93 {6.8—9.5, 50—68}
No.5 engine mount	Engine side	LA4A-EL	67—93 {6.8—9.5, 50—68}
		GF4A-EL	55—80 {5.6—8.2, 41—59}
	Engine mount member side		44—60 {4.4—6.2, 32—44}
Starter	LA4A-EL		68—99 {6.9—10.1, 50—73}
	GF4A-EL		32—46 {3.2—4.7, 24—33}
No.1 engine mount bracket	LA4A-EL		67—93 {6.8—9.5, 50—68}
	GF4A-EL		75—104 {7.6—10.7, 55—77}
No.1 engine mount	Rubber side		86—116 {8.9—11.9, 64—86}
	Bracket side		67—93 {6.8—9.5, 50—68}
No.4 engine mount	Rubber side	LA4A-EL	86—116 {8.7—11.9, 63—86}
		GF4A-EL	93—123 {9.4—12.6, 68—91}
	Transaxle side	LA4A-EL	38—51 {3.8—5.3, 28—38}
		GF4A-EL	67—93 {6.8—9.5, 50—68}
No.2 engine mount	LA4A-EL		86—116 {8.7—11.9, 63—86}
	GF4A-EL		38—51 {3.8—5.3, 28—38}
Automatic transaxle	A	LA4A-EL	90—116 {9.1—11.9, 66—86}
	B		38—51 {3.8—5.3, 28—38}
	C		19—25 {1.9—2.6, 14—18}
	—	GF4A-EL	68—99 {6.9—10.1, 50—73}
Control valve body	LA4A-EL		9—11 N·m {92—112 kgf·cm, 80—97 in·lbf}
	GF4A-EL		10.8—14.7 N·m {110—150 kgf·cm, 95.5—130.2 in·lbf}
Control valve body cover	LA4A-EL		14—18 N·m {143—184 kgf·cm, 124—159 in·lbf}
	GF4A-EL		8.4—10.7 N·m {85—110 kgf·cm, 73.7—95.4 in·lbf}
Oil pump	LA4A-EL		13 {1.3, 10}
Oil cooler			24—35 {2.4—3.6, 18—26}
Drive plate	LA4A-EL		97—102 {9.8—10.5, 70.9—75.9}
	GF4A-EL		61—67 {6.2—6.9, 45—49}
AUTOMATIC TRANSAXLE SHIFT MECHANISM			
Selector lever			16—22 {1.6—2.3, 12—16}
Interlock cable			4.3—6.2 N·m {43—63 kgf·cm, 38—54 in·lbf}
Selector cable	FS		19—25 {1.9—2.6, 14—18}
	KL		32—46 {3.2—4.7, 24—34}

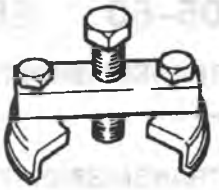
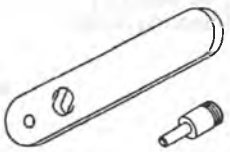
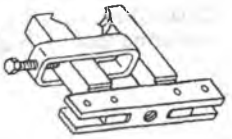
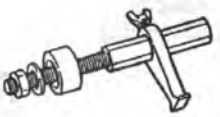
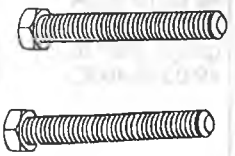
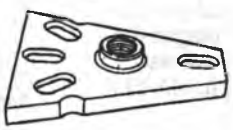
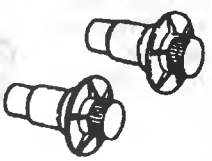
05-60 SERVICE TOOLS

TRANSMISSION/TRANSAXLE SST ... 05-60-1

TRANSMISSION/TRANSAXLE SST

Z6U056001024W01

49 0259 770B Flare wrench nut  T0259770B	49 SE01 310A Clutch disc centering tool  TSE01310A	49 1285 071 Bearing puller  T1285071X
49 B001 795 Oil seal installer  TB001795X	49 UN01 128 Adapter (LA4A-EL)  TUN01128X	49 0378 400C Oil pressure gauge set  T0378400B
49 B019 902A Oil pressure gauge (Part of 49 0378 400C)  TB019902X	49 B019 903 Hose (Part of 49 0378 400C)  TB019903X	49 B019 901B Oil pressure gauge  TB019901X
49 UN01 086 MLPS alignment tool (LA4A-EL)  TUN01086X	49 UN01 071 Transaxle tester (LA4A-EL)  TUN01071X	49 UN01 089 LA4A-EL diagnostic harness (LA4A-EL)  TUN01089X
49 UN01 090 LA4A-EL overlay (LA4A-EL)  TUN01090X	49 UN01 091 MLPS harness adapter (LA4A-EL)  TUN01091X	49 UN01 092 MLPS overlay (LA4A-EL)  TUN01092X
49 G017 5A0 Engine support  TG0175A0X	49 G017 503 Hook (Part of 49 G017 5A0)  TG017503X	49 G017 501 Bar (Part of 49 G017 5A0)  TG017501X
49 G017 502 Support (Part of 49 G017 5A0)  TG017502X	49 T028 3A0 Ball joint puller set  TT0283A0X	49 T028 303 Body (Part of 49 T028 3A0)  TT028303X

49 T028 304 Attachment (Part of 49 T028 3A0)  TT028304X	49 UN01 104 Servo cover remover/replac er (LA4A-EL)  TUN01104X	49 UN01 105 Servo piston rod selector (LA4A-EL)  TUN01105X
49 UN01 085 Shifter shaft alignment tool (LA4A-EL)  TUN01085X	49 UN01 087 Converter seal remover (LA4A-EL)  TUN01087X	49 0223 630B Rear shaft puller (LA4A-EL)  T0223630B
49 UN11 101 Threaded adapter (LA4A-EL)  TUN11101X	49 E011 1A0 Ring gear brake set  TE0111A0X	49 E011 103 Shaft (Part of 49 E011 1A0)  TE011103X
49 E011 104 Collar (Part of 49 E011 1A0)  TE011104X	49 E011 105 Stopper (Part of 49 E011 1A0)  TE011105X	49 UN01 100 Oil pump remover bolts  TUN01100X
49 8501 631A Attachment (LA4A-EL)  T8501631A	49 T088 0A0 NGS set  TT0880A0X	49 T088 010K or later Program Card (V9.0)  TT088010E
49 F028 202 Bush installer  TF028202X	49 G030 455 Diff. side gear holder (GF4A-EL)  TG030455X	49 G030 795 Oil seal installer (GF4A-EL)  TG030795X
49 G030 797 Handle (Part of 49 G030 795) (GF4A-EL)  TG030797X	49 G030 796 Body (Part of 49 G030 795) (GF4A-EL)  TG030796X	

STEERING

06
SECTION

GENERAL PROCEDURES 06-10
ENGINE SPEED SENSING POWER STEERING 06-12
TECHNICAL DATA 06-50
SERVICE TOOLS 06-60

06-10 GENERAL PROCEDURES

PRECAUTION (STEERING) 06-10-1

PRECAUTION (STEERING)

Z6U061001034W01

Wheels and tires removal/installation

- The removal and installation procedures for the wheels and tires are not mentioned in this section. When a wheel is removed, tighten it to **89—117 N·m {9.0—12.0 kgf·m, 65.1—86.7 ft·lbf}**.

Power steering components removal/installation

- If any power steering fluid line has been disconnected at anytime during the procedure, add ATF M-III or equivalent (e.g. DexronIII/Mercon®), bleed the fluid lines, and inspect for leakage after the procedure has been completed.

Connectors disconnection/connection

- Disconnect the negative battery cable before doing any work that requires handling of connectors. Connect the negative battery cable only after the work is completed.

06-12 ENGINE SPEED SENSING POWER STEERING

AIR BLEEDING 06-12-1
POWER STEERING FLUID INSPECTION 06-12-1
Fluid Level Inspection 06-12-1
Fluid Leakage Inspection 06-12-1
Fluid Pressure Inspection 06-12-2
STEERING WHEEL AND COLUMN INSPECTION 06-12-3
Steering Wheel Play Inspection 06-12-3
Steering Wheel Looseness Inspection 06-12-3
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AIR BLEEDING

Z6U061201036W01

1. Inspect the fluid level. (See 06-12-1 Fluid Level Inspection.)
2. Jack up the front of the vehicle and support it on safety stands.
3. Turn the steering wheel fully to the left and right several times with the engine not running.
4. Inspect the fluid level again. If it has dropped, add fluid.
5. Repeat steps 3 and 4 until the fluid level stabilizes.
6. Lower the vehicle.
7. Start the engine and let it idle.
8. Turn the steering wheel fully to the left and right several times.
9. Verify that the fluid is not foamy and that the fluid level has not dropped.
10. Add fluid if necessary and repeat steps 8 and 9.

POWER STEERING FLUID INSPECTION

Z6U061232040W01

Fluid Level Inspection

- Inspect the power steering fluid level. Add fluid to the specified level if necessary.

Fluid specification
ATF M-III or equivalent (e.g. DexronIII/Mercon®)

Fluid Leakage Inspection

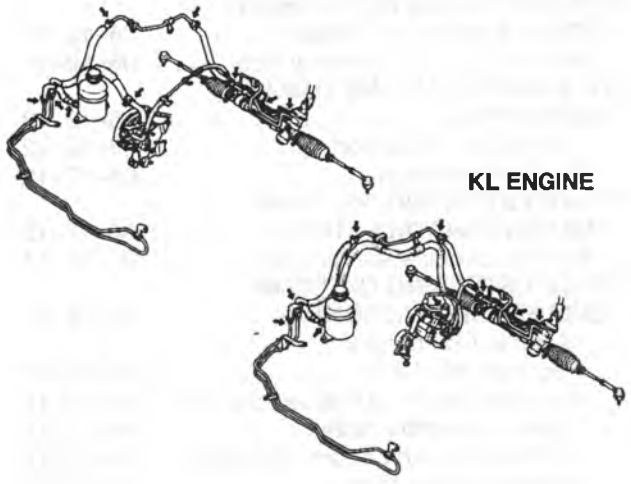
Caution
- **To prevent damage to the steering system, do not keep the steering wheel in the fully turned position for more than 5 seconds.**

1. Start the engine and let it idle. Turn the steering wheel fully to the left and right to apply fluid pressure.

Note
- The points where fluid leakage may occur are indicated in the figure.

2. Inspect for fluid leakage.

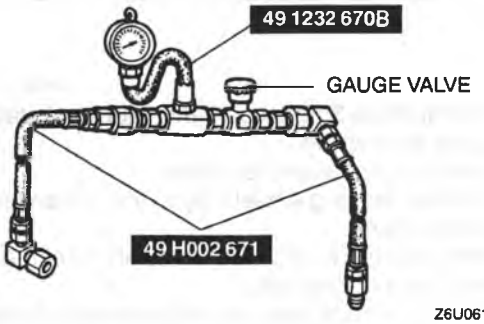
FS ENGINE



W6U612WA0

Fluid Pressure Inspection

1. Set the **SSTs** as shown in the figure.

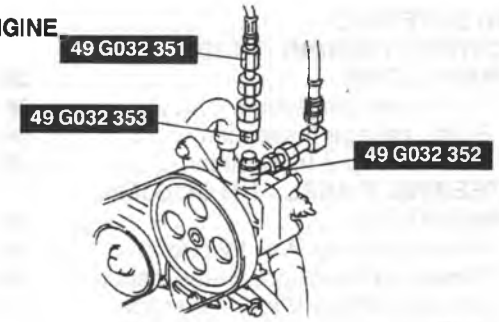


Z6U0612W108

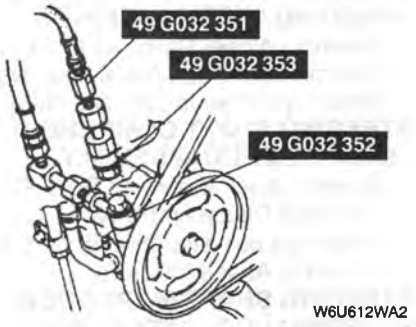
Tightening torque
40—49 N·m {4.0—5.0 kgf·m, 29—36 ft·lbf}

2. Disconnect the pressure pipe from the oil pump, and connect the **SSTs**.

FS ENGINE



KL ENGINE



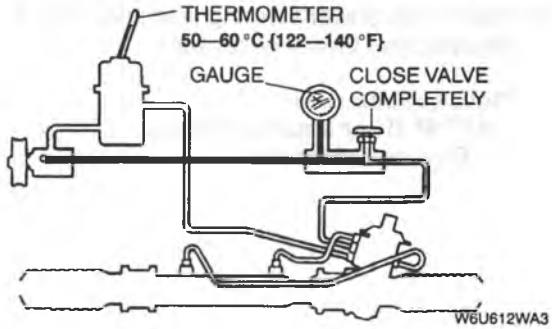
W6U612WA2

3. Bleed the air from the system.
4. Open the gauge valve fully. Start the engine and turn the steering wheel fully left and right to raise the fluid temperature to **50—60 °C {122—140 °F}**.

Caution
- **If the valve is left closed for more than 5 seconds, the fluid temperature will increase excessively and adversely affect the oil pump.**

5. Close the gauge valve completely. Increase the engine speed to **1,000—1,500 rpm** and measure the fluid pressure generated by the oil pump.
   - If the pressure is not within the specification, repair or replace the oil pump component.

Oil pump fluid pressure
FS engine: 7.9—8.3 MPa {80—85 kgf/cm², 1,138—1,208 psi}
KL engine: 8.4—8.8 MPa {85—90 kgf/cm², 1,209—1,279 psi}

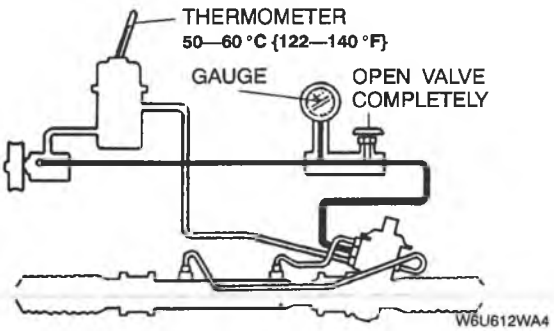


W6U612WA3

Caution
- **If the steering wheel is kept in the fully turned position for more than 5 seconds, the fluid temperature will rise excessively and adversely affect the oil pump.**

6. Open the gauge valve fully and increase the engine speed to **1,000—1,500 rpm**.
7. Turn the steering wheel fully to the left and right, then measure the fluid pressure generated at the gear housing.
   - If the pressure is not within the specification, repair or replace the steering gear component.

Gear housing fluid pressure
FS engine: 7.9—8.3 MPa {80—85 kgf/cm², 1,138—1,208 psi}
KL engine: 8.4—8.8 MPa {85—90 kgf/cm², 1,209—1,279 psi}



8. Remove the gauge set. Install and tighten the pressure pipe to the specified torque.

Tightening torque
24—29 N·m {2.4—3.0 kgf·m, 18—21 ft·lbf}

9. Bleed the air from the system. (See 06-12-1 AIR BLEEDING.)

06

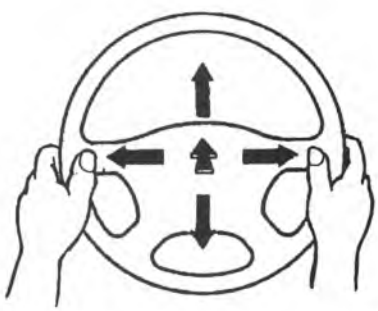
STEERING WHEEL AND COLUMN INSPECTION

Z6U061232010W01

Steering Wheel Play Inspection
1. With the wheels in the straight-ahead position, gently turn the steering wheel to the left and right and verify that the play is within the specification.
   - If the play exceeds the specification, either the steering joints are worn or the backlash of the steering gear is excessive. Correct if necessary.

Play
0—30 mm {0—1.18 in}

Steering Wheel Looseness Inspection
1. Move the steering wheel as shown in the figure to inspect for column bearing wear, steering shaft joint play, steering wheel looseness, and column looseness.
   - If there is looseness, correct if necessary.

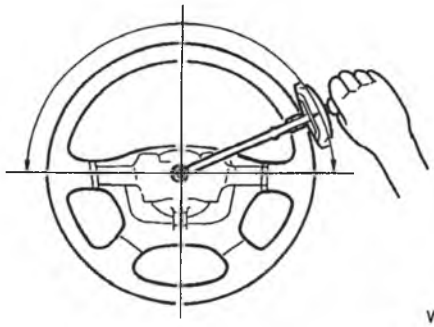


Steering Wheel Effort Inspection
1. Inspect the following points:
   a. Tire size and tire pressure
   b. Fluid level
   c. Drive belt deflection
2. With the vehicle on a hard, level surface, put the wheels in the straight-ahead position.
3. Start the engine and warm the power steering fluid to **50—60 °C {122—140 °F}**.

Warning
- **See 08-10 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION for removal/installation of the air bag module after inspection.**

4. Remove the air bag module.
5. Measure the steering wheel effort using a torque wrench.
   - If not within the specification, note the following:
   a. Air in system
   b. Fluid leakage at hose or connectors
   c. Function of oil pump and steering gear

Steering wheel effort
7.8 N·m {80 kgf·cm, 69 in·lbf} max.



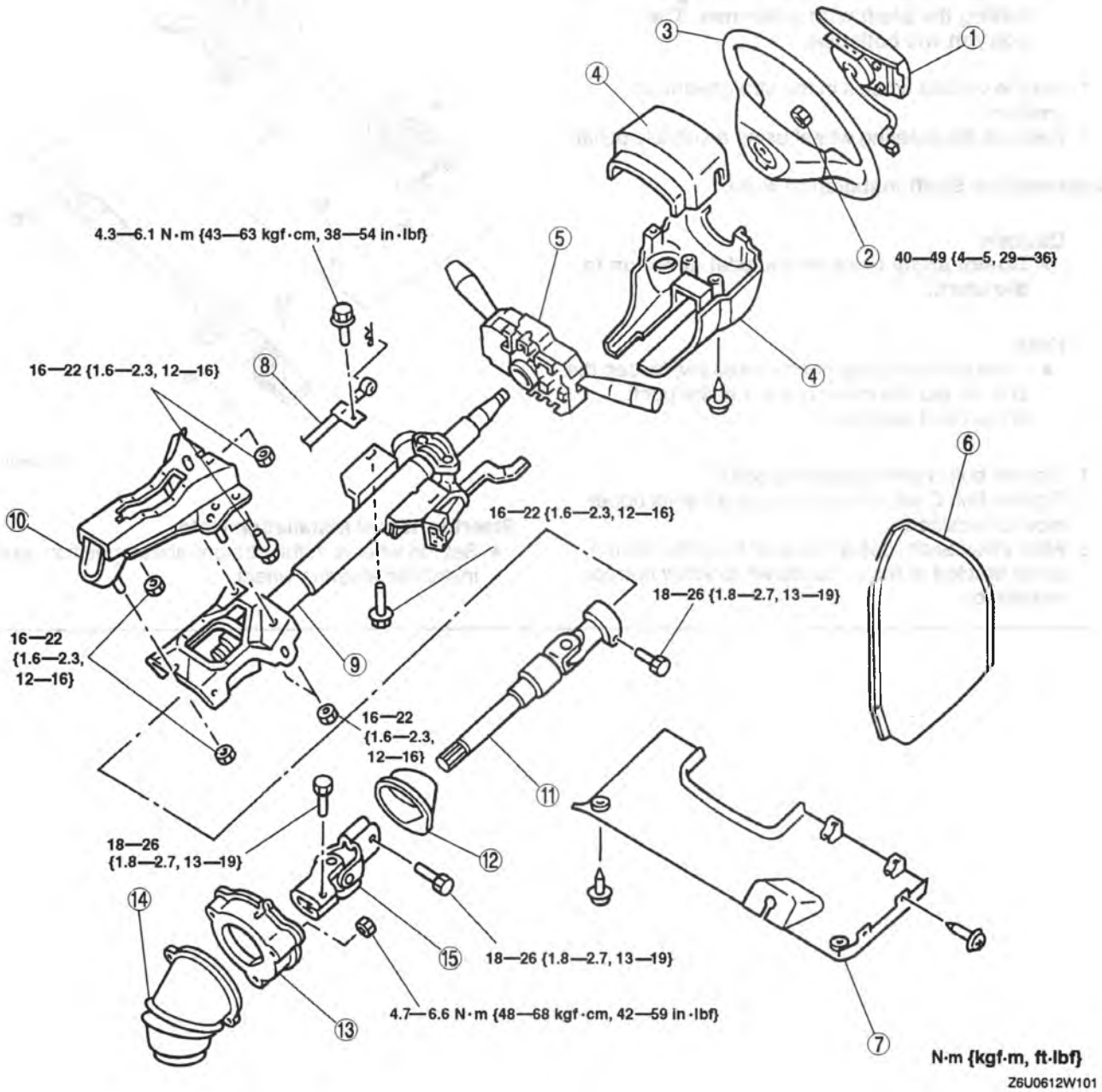
W6U612WA6

Note
- To determine whether the steering effort is satisfactory, perform the inspection on another vehicle of the same model and under the same conditions, and compare the results.
- The steering wheel effort varies with conditions as indicated below.
  a. Dry or wet road conditions and asphalt or concrete roads.
  b. Tire conditions, including tire wear and tire pressure.
  c. Tire brand.

STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION

Z6U061232010W02

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



Z6U0612W101

1	Air bag module (See 08-10-10 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION)
2	Locknut
3	Steering wheel (See 06-12-6 Steering Wheel Removal Note) (See 06-12-6 Steering Wheel Installation Note)
4	Column cover
5	Combination switch
6	Side panel (See 09-17-7 SIDE PANEL REMOVAL/INSTALLATION)

7	Lower panel
8	Key interlock cable (ATX)
9	Steering shaft component
10	Bracket
11	Intermediate shaft (See 06-12-6 Intermediate Shaft Installation Note)
12	Shaft seal
13	Set plate
14	Dust cover
15	Universal joint

Steering Wheel Removal Note

Caution
- **Do not try to remove the steering wheel by hitting the shaft with a hammer. The column will collapse.**

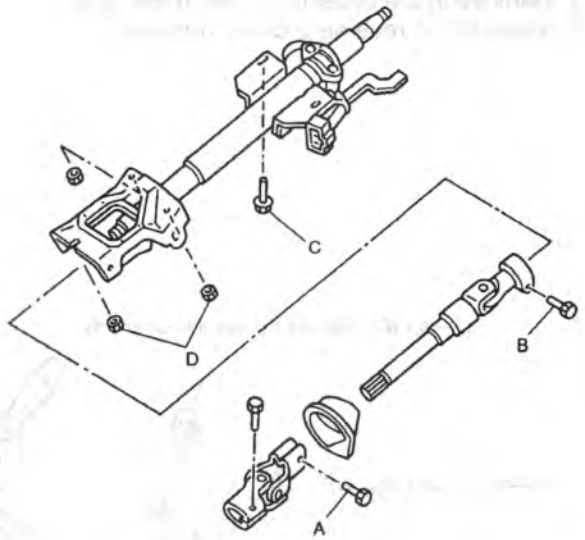
1. Set the vehicle wheels in the straight-ahead position.
2. Remove the steering wheel using a suitable puller.

Intermediate Shaft Installation Note

Caution
- **Do not apply force in the axial direction to the shaft.**

Note
- If the tilt lever does not move easily, loosen the D nuts, tap the lower bracket at the point shown and retighten.

1. Tighten bolt A after tightening bolt B.
2. Tighten bolt C with the steering shaft at its upper most tilt position.
3. After installation, use a hammer to lightly tap the lower bracket at the point shown to verify correct installation.



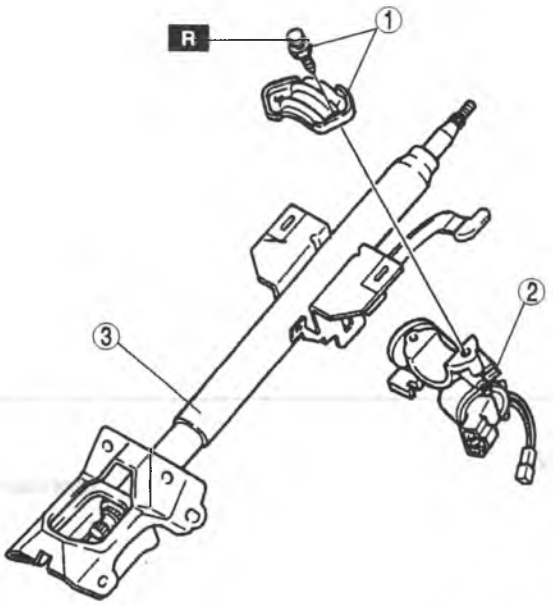
Z6U0612W102

Steering Wheel Installation Note
- Set the wheels in the straight-ahead position, and install the steering wheel.

STEERING SHAFT COMPONENT DISASSEMBLY/ASSEMBLY

Z6U061232100W01

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of removal.

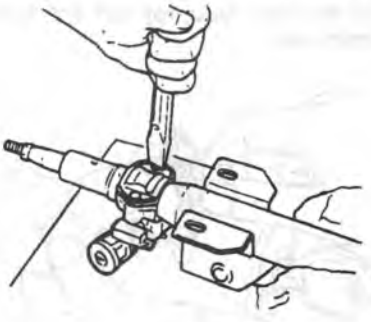


W6U612WA9

1	Steering lock mounting bolts and bracket (See 06-12-7 Steering Lock Mounting Bolts And Bracket Disassembly Note) (See 06-12-7 Steering Lock Mounting Bolts And Bracket Assembly Note)
2	Steering lock component
3	Steering shaft component

Steering Lock Mounting Bolts And Bracket Disassembly Note

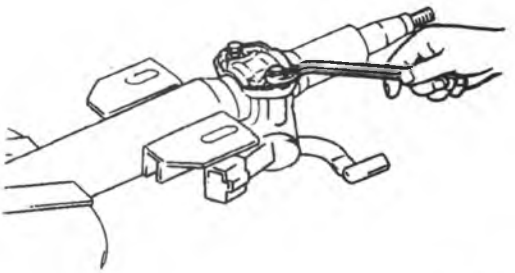
1. Make a groove in the heads of the steering lock mounting bolts using a chisel and a hammer.
2. Remove the bolts using a screwdriver.
3. Disassemble the steering lock component.



W6U612WAA

Steering Lock Mounting Bolts And Bracket Assembly Note

1. Assemble the steering lock component.
2. Put the key into the steering lock component and verify that the lock operates correctly.
3. Install new steering lock mounting bolts.
4. Tighten the bolts until the heads break off.



W6U612WAB

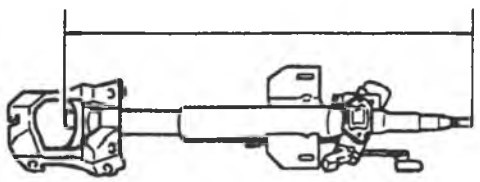
STEERING SHAFT INSPECTION

Z6U061232100W02

- Inspect for the following and replace the steering shaft component if necessary.

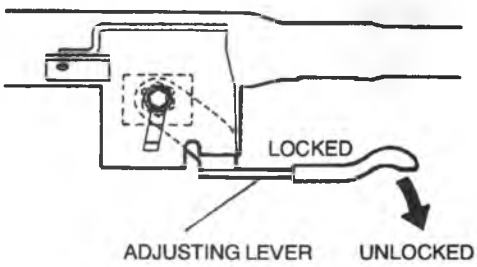
1. Column bearing rotates smoothly and there is no damage.
2. Steering shaft length is within the specification.

Length
515.4—517.4 mm {20.30—20.37 in}



W6U612WAC

3. Tilt operation
   (1) Verify that the adjusting lever moves smoothly from unlock position to lock position.
   (2) Verify that the steering shaft is fixed firmly when the adjusting lever is locked.

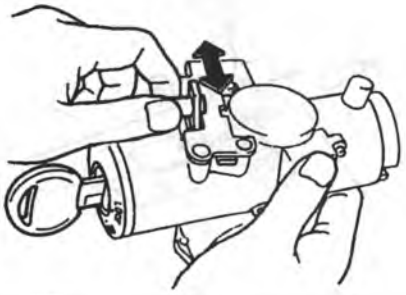


W6U612WAD

STEERING LOCK (ATX MODEL) INSPECTION

Z6U061275990W01

1. Verify that the cable connector does not move when the key is in the LOCK position and that it moves freely with the key in other positions.
   - If not as described, replace the steering lock component.



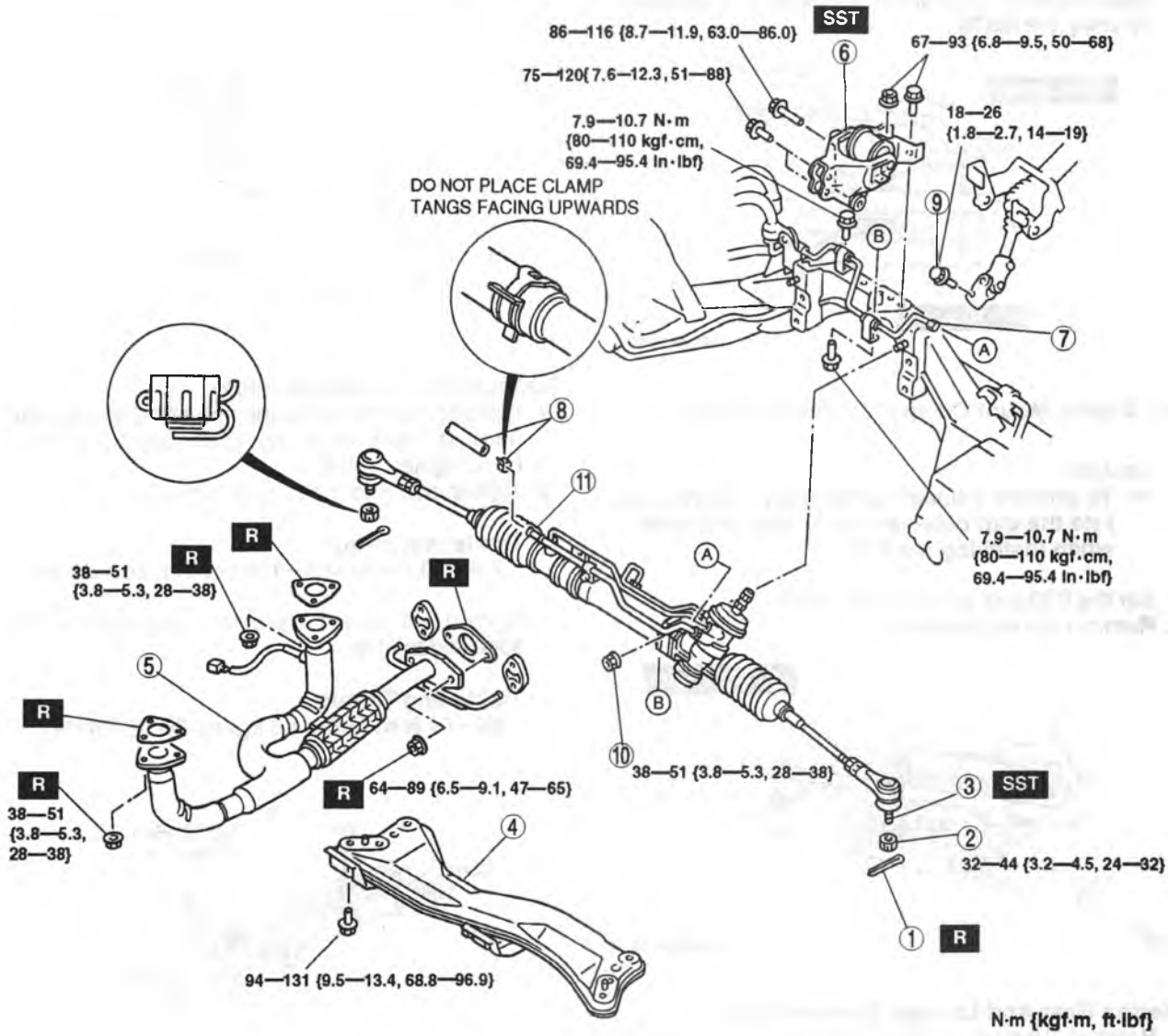
W6U612WAE

STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION

Z6U061232960W01

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.

3. After installation, inspect the toe-in. (See 02-11-1 FRONT WHEEL ALIGNMENT.)



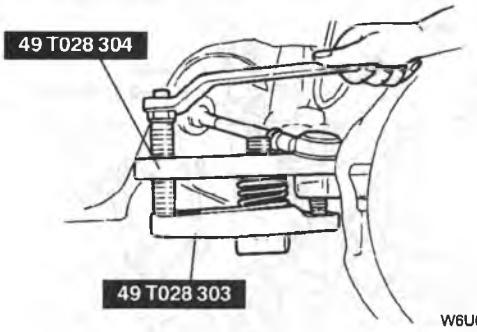
Z6U0612W103

1	Cotter pin
2	Nut
3	Tie-rod end ball joint (See 06-12-10 Tie-rod End Ball Joint Removal Note)
4	Transverse member
5	Front exhaust pipe (KL engine)
6	No.1 engine mount component (See 06-12-10 No.1 Engine Mount Component Removal Note)
7	Pressure pipe (See 06-12-10 Pressure Pipe Installation Note)

8	Return hose and clamp
9	Bolt (intermediate shaft) (See 06-12-10 Bolt (Intermediate Shaft) Installation Note)
10	Mounting bracket nut and bolt (See 06-12-10 Mounting Bracket Nut And Bolt Installation Note)
11	Steering gear and linkage (See 06-12-10 Steering Gear And Linkage Removal Note)

Tie-rod End Ball Joint Removal Note

1. Remove the tie rod nut.
2. Separate the tie-rod end from the steering knuckle by using the **SSTs**.



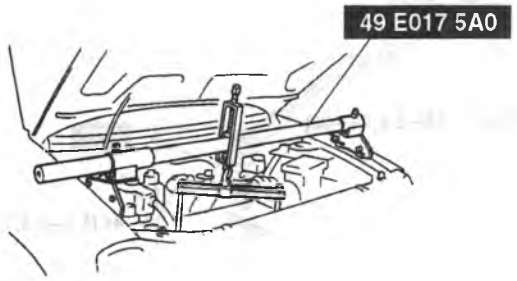
W6U612WAF

No.1 Engine Mount Component Removal Note

Caution

- **To prevent damage to the body, insert a rag into the gap between the fender and body, when installing the SST.**

1. Set the **SSTs** as shown in the figure.
2. Remove the engine mount.



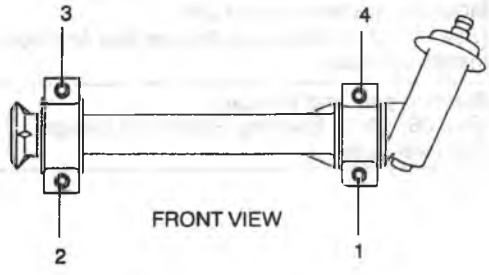
Z6U0612W109

Steering Gear And Linkage Removal Note

- Remove the steering gear and linkage by pulling it from the right side.

Mounting Bracket Nut And Bolt Installation Note

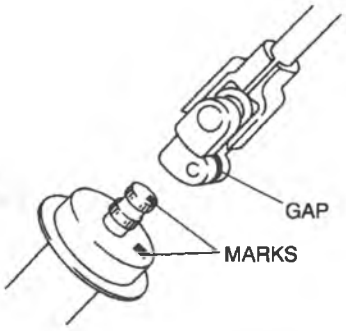
1. Loosely tighten nuts 4 and 3.
2. Tighten the mounting bracket nuts and bolts to the specified torque in the order shown.



W6U612WAH

Bolt (Intermediate Shaft) Installation Note

- Align the marks and install the intermediate shaft and bolt.



W6U612WAJ

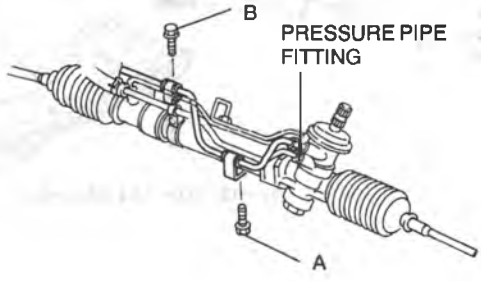
Pressure Pipe Installation Note

1. Hand-tighten the pressure pipe fitting to the gear housing, being careful not to damage the O-ring.
2. Hand-tighten bolt A.
3. Tighten bolt B to the specified torque.

Tightening torque
7.9—10.7 N·m {80—110 kgf·cm, 70—95 in·lbf}

4. Tighten bolt A and the pressure pipe fitting to the specified torque.

Tightening Torque
35—44 N·m {3.5—4.5 kgf·m, 26—32 ft·lbf}

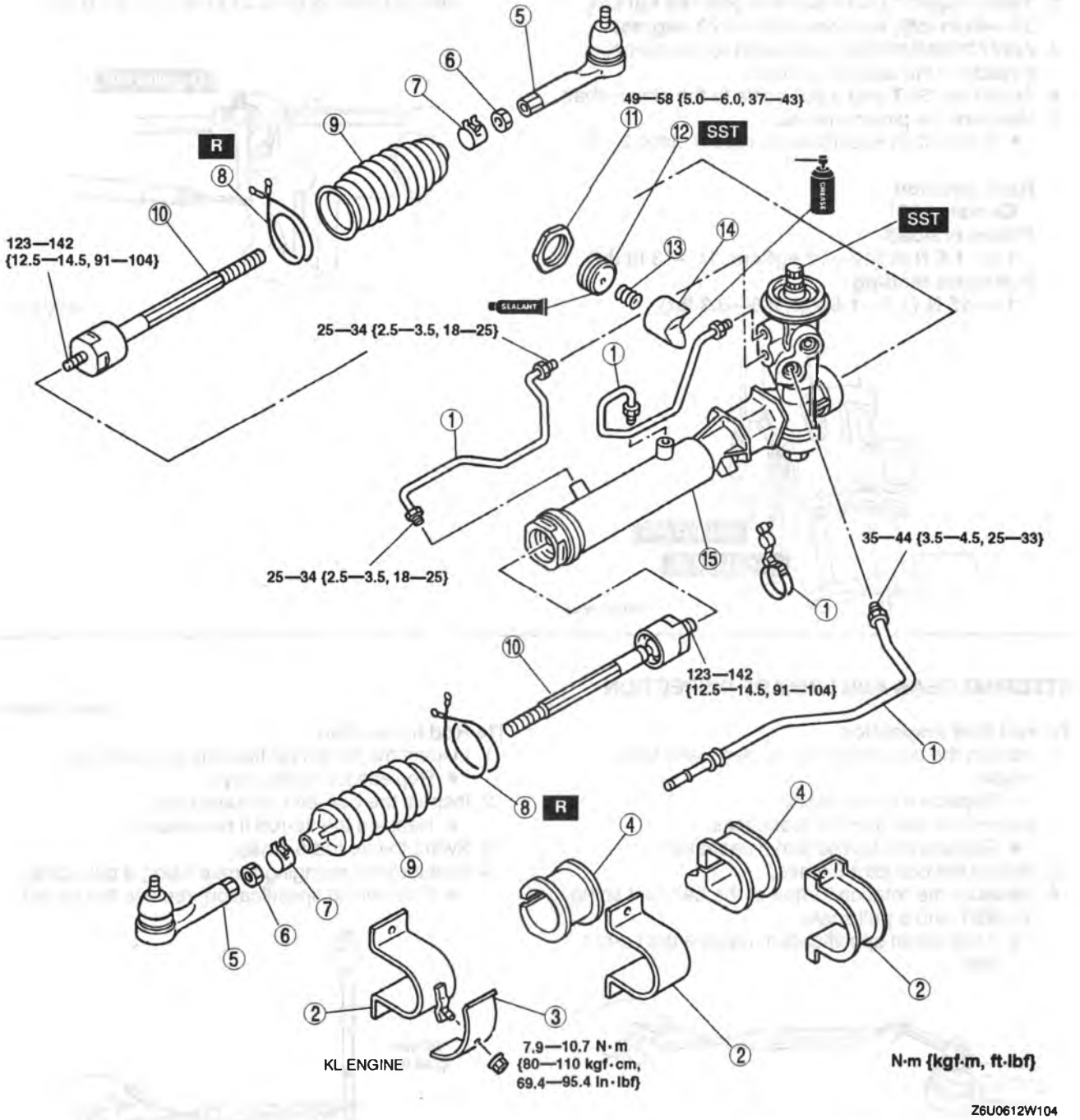


W6U612WAK

STEERING GEAR AND LINKAGE DISASSEMBLY/ASSEMBLY

Z6U061232960W02

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of removal.



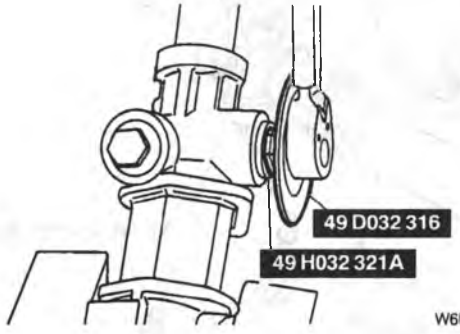
1	Oil pipe and pipe clip
2	Mounting bracket
3	Heat insulator (KL engine)
4	Mounting rubber
5	Tie-rod end
6	Locknut (tie-rod end)
7	Clamp
8	Boot wire

9	Boot
10	Tie rod
11	Locknut (adjusting cover)
12	Adjusting cover (See 06-12-12 Adjusting Cover Assembly Note)
13	Spring
14	Pressure pad
15	Steering gear component

Adjusting Cover Assembly Note

1. Set the rack in the center position.
2. Tighten the adjusting cover to **9.8 N·m {100 kgf·cm, 87 in·lbf}**, then loosen it.
3. Tighten again to **4.4—5.4 N·m {45—55 kgf·cm, 39—48 in·lbf}**, and then return it **20 degrees**.
4. Apply thread-locking compound to the exposed threads of the adjusting cover.
5. Attach the **SST** and a pull scale to the pinion shaft.
6. Measure the pinion preload.
   - If not within specification, repeat steps 2—6.

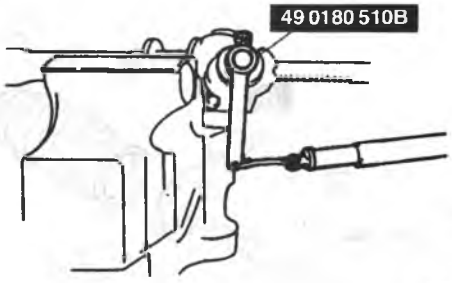
Rack position
Center ±90°
Pinion preload
1.2—1.5 N·m {12—16 kgf·cm, 11—13 in·lbf}
Pull scale reading
12—15 N {1.2—1.6 kgf, 2.8—3.3 lbf}



W6U612WAM

7. Tighten the locknut while holding the adjusting cover using the **SST**.

Tightening torque
49—58 N·m {5.0—6.0 kgf·m, 37—43 ft·lbf}



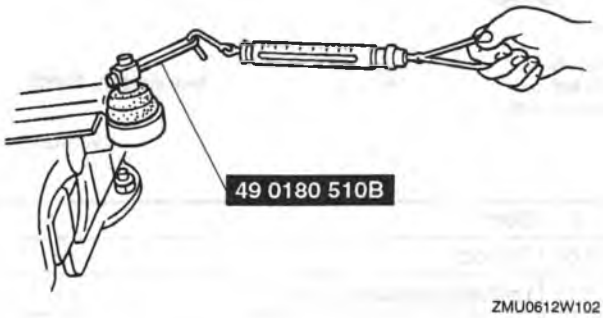
W6U612WAN

STEERING GEAR AND LINKAGE INSPECTION

Z6U061232960W03

Tie-rod End Inspection

1. Inspect the tie-rod end for damage and boot cracks.
   - Replace it if necessary.
2. Inspect the ball joint for looseness.
   - Replace the tie-rod end if necessary.
3. Rotate the ball joint 5 times.
4. Measure the rotation torque of the ball joint using the **SST** and a pull scale.
   - If not within specification, replace the tie-rod end.

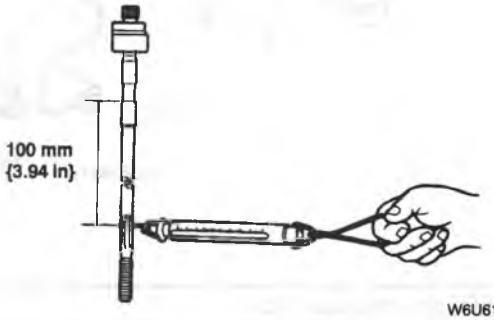


ZMU0612W102

Rotation torque
0.3—2.9 N·m {3—30 kgf·cm, 2.6—26 in·lbf}
Pull scale reading
3—29 N {0.3—3 kgf, 0.7—6.6 lbf}

Tie Rod Inspection

1. Inspect the tie rod for bending and damage.
   - Replace it if necessary.
2. Inspect the ball joint for looseness.
   - Replace the tie-rod if necessary.
3. Swing the tie rod 5 times.
4. Measure the swinging torque using a pull scale.
   - If not within specification, replace the tie rod.



W6U612WAQ

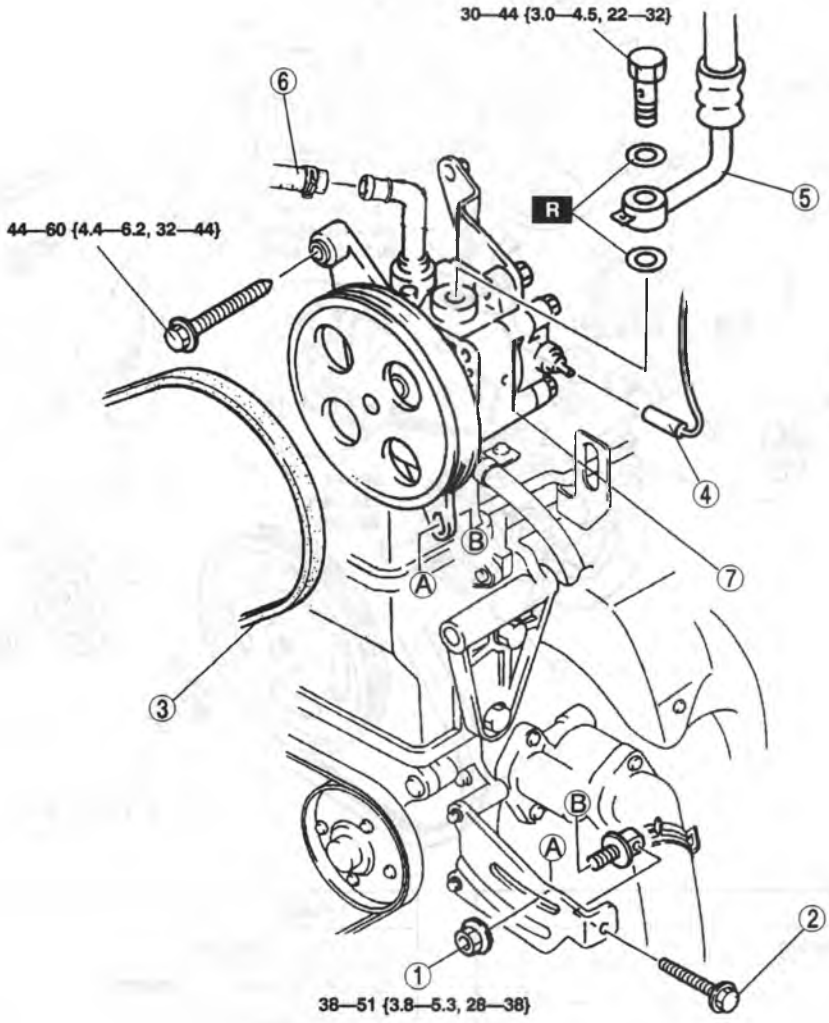
Swinging torque
0.1—3.4 N·m {1—35 kgf·cm, 0.9—30 in·lbf}
Pull scale reading
0.7—21 N {0.07—2.2 kgf, 0.16—4.8 lbf}

POWER STEERING OIL PUMP REMOVAL/INSTALLATION

Z6U061232650W01

1. Remove the transverse member (KL engine).
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.
4. Adjust the drive belt. (See 01-10A-2 DRIVE BELT ADJUSTMENT [FS].) (See 01-10B-2 DRIVE BELT ADJUSTMENT [KL].)

FS ENGINE

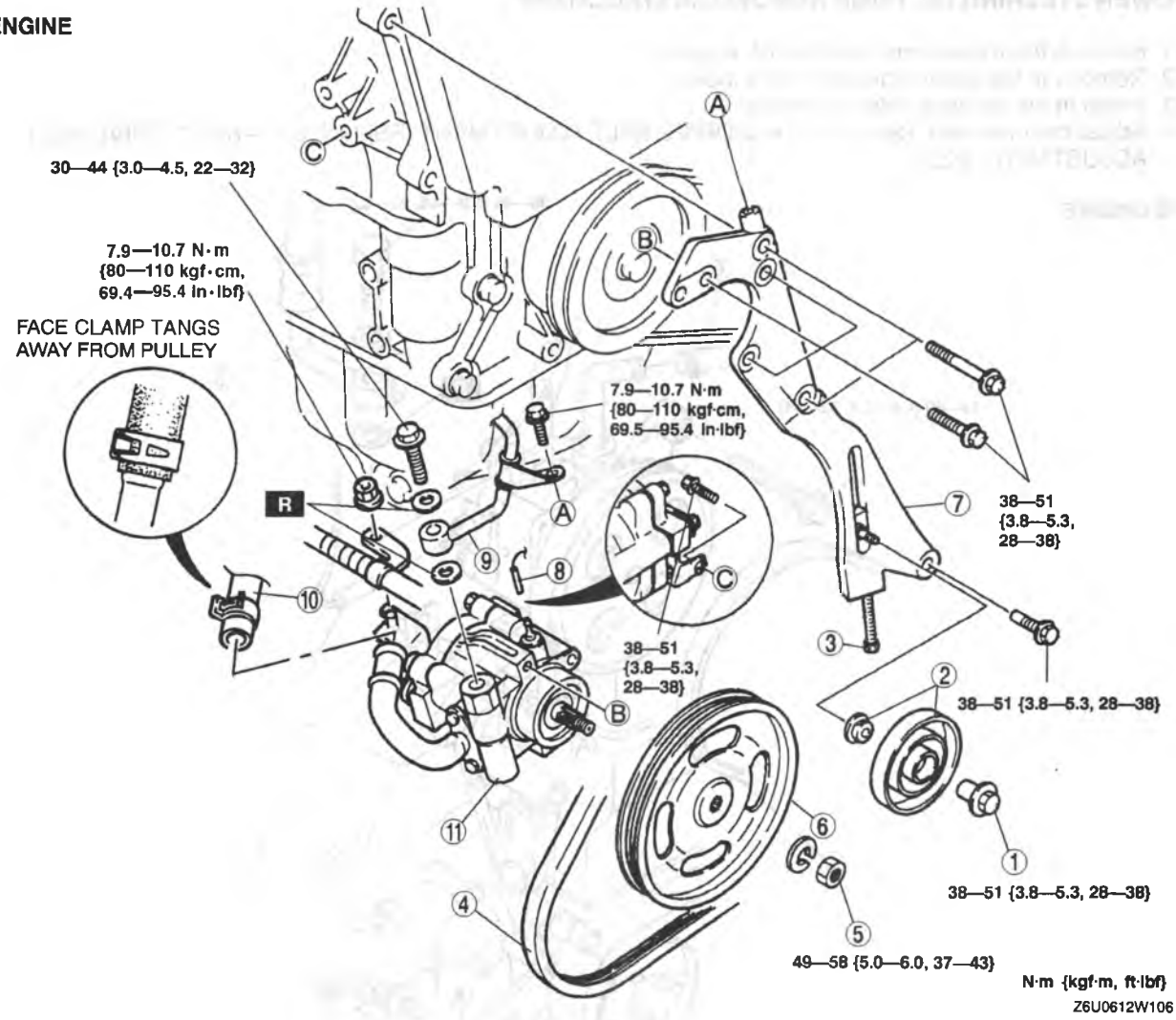


N·m {kgf·m, ft·lbf}

W6U612WAS

1	Flange nut
2	Adjusting bolt
3	Drive belt
4	Pressure switch connector
5	Pressure pipe
6	Return hose
7	Power steering oil pump and bracket

KL ENGINE

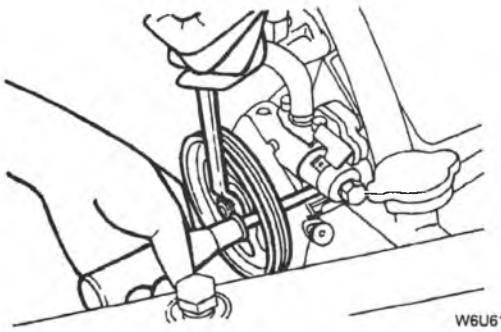


1	Locknut
2	Idler pulley and bearing
3	Adjusting bolt
4	Drive belt
5	Nut (See 06-12-14 Nut Removal/Installation Note)

6	Pulley
7	Pump bracket
8	PSP switch connector
9	Pressure pipe
10	Return hose
11	Power steering oil pump

Nut Removal/Installation Note

- Insert a screwdriver through a hole in the pulley, and while holding the pulley, loosen or tighten the nut.



POWER STEERING OIL PUMP DISASSEMBLY/ASSEMBLY

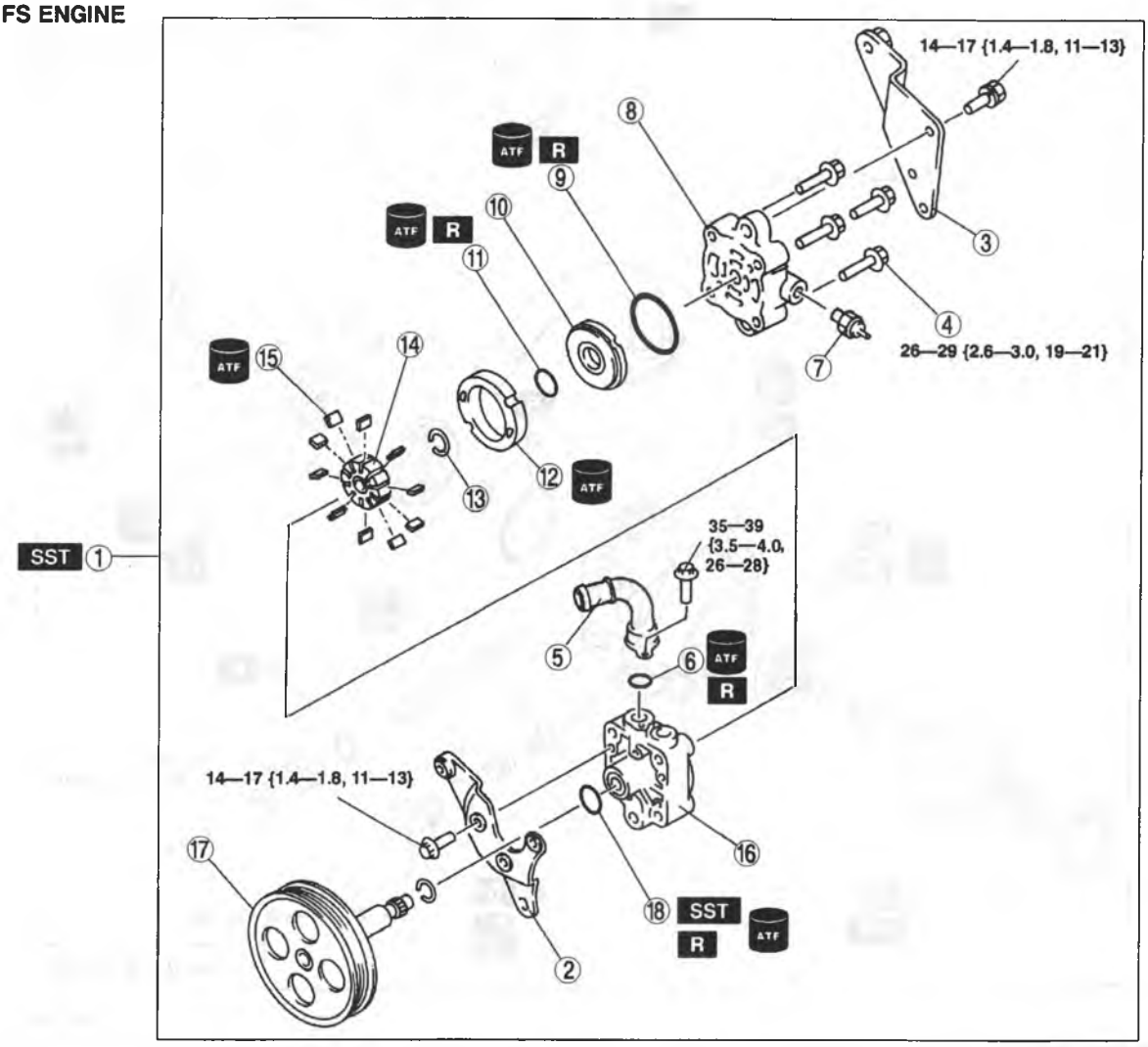
Z6U061232650W02

Note

- The following procedure is for replacement of the O-rings, the shaft, and the front pump body only. Replace the oil pump component if other repairs are necessary.

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

FS ENGINE

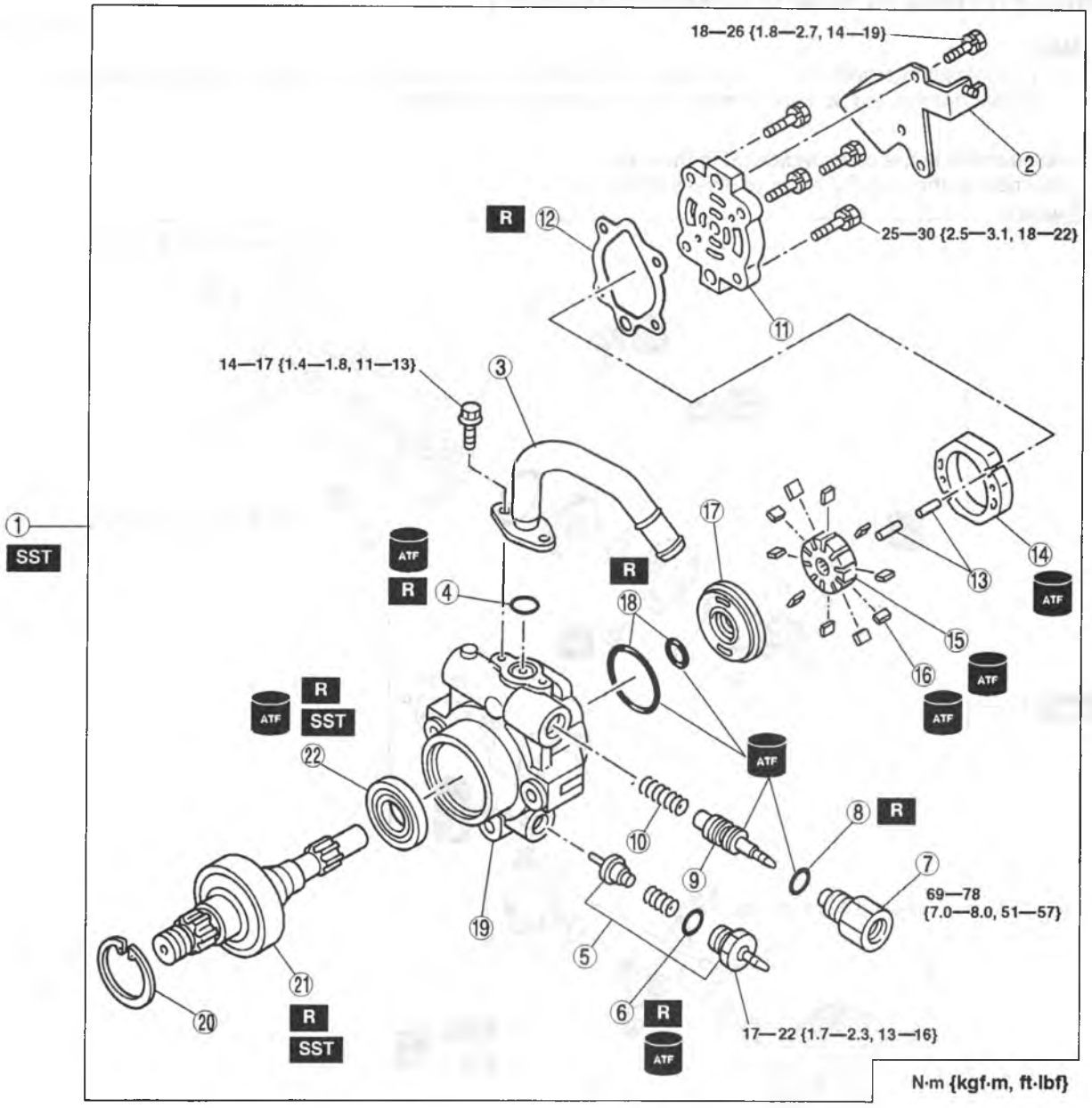


N·m {kgf·m, ft·lbf}

Z6U0612W107

1	Oil pump component (See 06-12-17 Oil Pump Component Disassembly Note)
2	Front bracket
3	Rear bracket
4	Bolt
5	Suction pipe
6	O-ring
7	PSP switch component
8	Rear pump body (See 06-12-17 Rear Pump Body Assembly Note)
9	O-ring
10	Side plate
11	O-ring

12	Cam ring (See 06-12-17 Cam Ring Assembly Note)
13	Backup ring
14	Rotor
15	Blade (See 06-12-17 Blade Assembly Note)
16	Front pump body
17	Shaft component
18	Oil seal (See 06-12-17 Oil Seal Assembly Note)



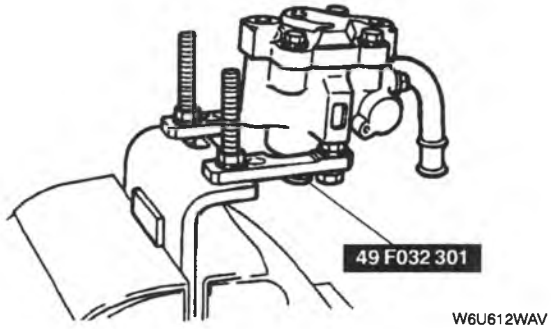
Z6U0612W105

1	Oil pump component (See 06-12-17 Oil Pump Component Disassembly Note)
2	Bracket
3	Suction pipe
4	O-ring
5	PSP switch component
6	O-ring
7	Connector
8	O-ring
9	Control valve
10	Spring
11	Rear Pump body (See 06-12-17 Rear Pump Body Assembly Note)
12	Gasket

13	Pin
14	Cam ring (See 06-12-17 Cam Ring Assembly Note)
15	Rotor
16	Blade (See 06-12-17 Blade Assembly Note)
17	Side plate
18	O-ring
19	Front Pump body
20	Snap ring
21	Shaft and bearing (See 06-12-17 Shaft And Bearing Disassembly Note) (See 06-12-17 Shaft And Bearing Assembly Note)
22	Oil seal (See 06-12-17 Oil Seal Assembly Note)

Oil Pump Component Disassembly Note

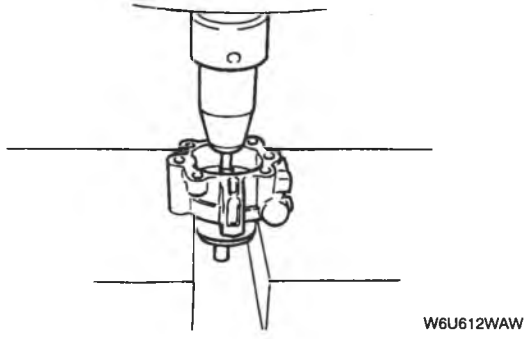
- Install the pump to the **SST** and hold the pump and **SST** in a vise.



W6U612WAV

Shaft And Bearing Disassembly Note

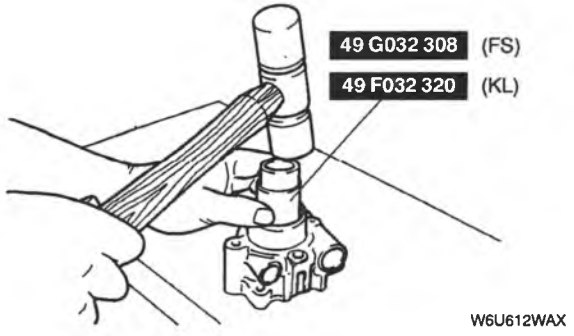
- Disassemble the shaft and bearing using a press.



W6U612WAW

Oil Seal Assembly Note

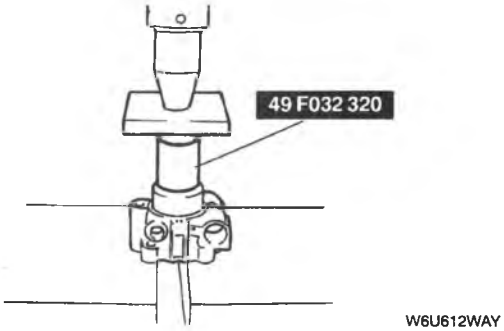
- Tap the oil seal into the front pump body using the **SST**.



W6U612WAX

Shaft And Bearing Assembly Note

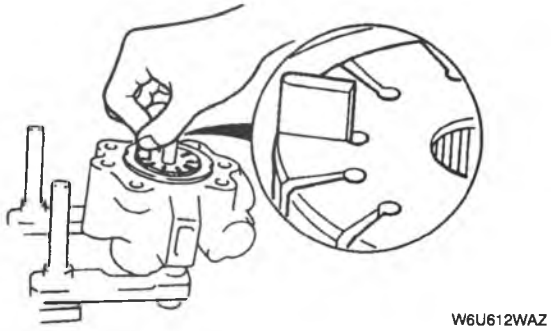
- Press the shaft and bearing into the front pump body using the **SST**.



W6U612WAY

Blade Assembly Note

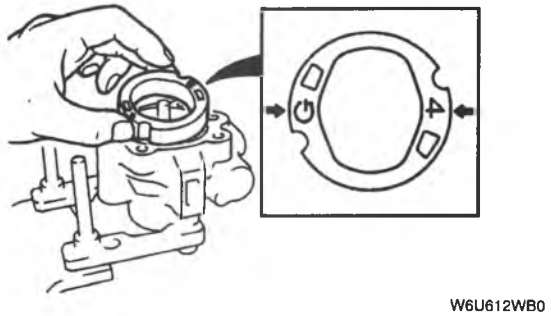
- Place the blades in the rotor with the rounded edges contacting the cam.



W6U612WAZ

Cam Ring Assembly Note

- Install the cam ring in the front pump body with the mark facing upward.



W6U612WB0

Rear Pump Body Assembly Note

- After installing the rear pump body, manually turn the shaft to verify that it rotates smoothly.

06-50 TECHNICAL DATA

STEERING TECHNICAL DATA ..... 06-50-1 STEERING TIGHTENING TORQUE 06-50-2

STEERING TECHNICAL DATA

Z6U065001034W01

Item		Specification
ENGINE SPEED SENSING POWER STEERING		
STEERING WHEEL		
Steering wheel play	(mm {in})	0—30 {0—1.18}
Steering wheel effort	(N·m {kgf·cm, in·lbf})	7.8 {80, 69} max.
STEERING SHAFT AND JOINT		
Shaft length	(mm {in})	515.4—517.4 {20.30—20.37}
POWER STEERING SYSTEM		
Power steering fluid	Type	ATF M-III or equivalent (e.g. DexronIII/Mercon®)
	Capacity (approximate quantity) (L {US qt, Imp qt})	0.95 {1.00, 0.84} (FS, MTX), 1.15 {1.22, 1.01} (FS, ATX), 1.35 {1.43, 1.19} (KL)

STEERING TIGHTENING TORQUE

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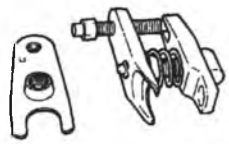
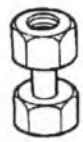
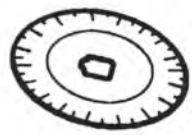
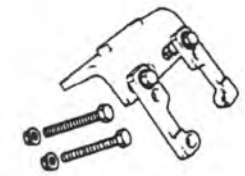
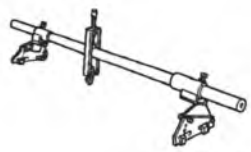
Item		Tightening torque (N·m {kgf·m, ft·lbf})
GENERAL PROCEDURES		
Wheel nut		89—117 {9—12, 65.1—86.7}
ENGINE SPEED SENSING POWER STEERING		
Steering wheel		40—49 {4—5, 29—36}
Steering shaft bracket		16—22 {1.6—2.3, 12—16}
Steering shaft		16—22 {1.6—2.3, 12—16}
Intermediate shaft		18—26 {1.8—2.7, 14—19}
Universal joint		18—26 {1.8—2.7, 14—19}
Set plate		4.7—6.6 N·m {48—68 kgf·cm, 42—59 in·lbf}
No.1 engine mount to crossmember		67—93 {6.8—9.5, 50—68}
No.1 engine mount to bracket		86—116 {8.7—11.9, 63.0—86.0
No.1 engine mount bracket to engine		75—120 {7.6—12.3, 51—88}
Intermediate shaft bolt		18—26 {1.8—2.7, 14—19}
Pressure pipe bracket		7.9—10.7 N·m {80—110 kgf·cm, 69.4—95.4 in·lbf}
Tie-rod end ball joint		32—44 {3.2—4.5, 24—32}
Steering gear bracket		38—51 {3.8—5.3, 28—38}
Transverse member		94—131 {9.5—13.4, 68.8—96.9}
Front exhaust pipe to engine		38—51 {3.8—5.3, 28—38}
Front exhaust pipe to flexible pipe		64—89 {6.5—9.1, 47—65}
Tie-rod to rack		123—142 {12.5—14.5, 91—104}
Oil pipe		25—34 {2.5—3.5, 18—25}
Adjusting cover locknut		49—58 {5.0—6.0, 37—43}
Pressure pipe to oil pump		30—44 {3.0—4.5, 22—32}
Pump bracket to engine	FS engine	44—60 {4.4—6.2, 32—44}
	KL engine	38—51 {3.8—5.3, 28—38}
Adjuster flange nut (FS engine)		38—51 {3.8—5.3, 28—38}
Cable bracket (KL engine)		7.9—10.7 N·m {80—110 kgf·cm, 69.4—95.4 in·lbf})
Idler pulley		38—51 {3.8—5.3, 28—38}
Oil pump pulley		49—58 {5.0—6.0, 37—43}

06-60 SERVICE TOOLS

STEERING SST 06-60-1

STEERING SST

Z6U066001034W01

49 T028 3A0 Ball joint puller set  TT0283A0X	49 T028 303 Body (Part of 49 T028 3A0)  TT028303X	49 T028 304 Attachment (Part of 49 T028 3A0)  TT028304X
49 1232 670B Power steering gauge set  T1232670A	49 1232 672 Gauge (Part of 49 1232 670A)  T1232672X	49 1232 673 Valve body (Part of 49 1232 670A)  T1232673X
49 H002 671 Power steering gauge adapter  TH002671X	49 0180 510B Preload attachment  T0180510B	49 G032 3A4 Adapter set  TG0323A4X
49 G032 351 Adapter (Part of 49 G032 3A4)  TG032351X	49 G032 352 Adapter (Part of 49 G032 3A4)  TG032352X	49 G032 353 Bolt (Part of 49 G032 3A4)  TG032353X
49 D032 316 Protractor  TD032316X	49 H032 321A Hexagon wrench  TH032321A	49 F032 301 Power steering pump hanger  TF032301X
49 E017 5A0 Engine support  TE0175A0X	49 F032 320 Installer A  TF032321X	49 G032 308 Oil seal installer  TG032308X

HEATER, VENTILATION & AIR CONDITIONING (HVAC)

07 SECTION

SYMPTOM TROUBLESHOOTING 07-03
REFRIGERANT SYSTEM 07-10
BASIC SYSTEM 07-11
CONTROL SYSTEM 07-40
TECHNICAL DATA 07-50

07-03 SYMPTOM TROUBLESHOOTING

FOREWORD 07-03-1
TROUBLESHOOTING INDEX 07-03-1
NO.1 AIR CONDITIONING SYSTEM WILL NOT WORK AT ALL 07-03-2
NO.2 ILLUMINATION LIGHT AND INDICATOR LIGHT IN EACH SWITCH DO NOT ILLUMINATE 07-03-3
NO.3 AIR OUTLET TEMPERATURE DOES NOT CHANGE 07-03-4
NO.4 NO COOL AIR 07-03-8
NO.5 AIR FROM VENTS NOT COLD ENOUGH 07-03-15
NO.6 AMOUNT OF AIR BLOWN FROM VENTS DOES NOT CHANGE 07-03-17
NO.7 INSUFFICIENT AIR (OR NO AIR) BLOWN FROM VENTS 07-03-17
NO.8 IMPROPER AIR CIRCULATION .. 07-03-18
NO.9 AIRFLOW MODE DOES NOT CHANGE 07-03-20

FOREWORD

Z6U070301038W01

- Thoroughly read and understand the basic flow of troubleshooting in order to properly perform the procedures. (See 00-00-2 HOW TO USE THIS MANUAL.)

TROUBLESHOOTING INDEX

Z6U070301038W02

- Possible cause lists inspection part (step) according to malfunction. Use it to immediately confirm the inspection method.

No.	TROUBLESHOOTING ITEM	DESCRIPTION	PAGE
1	Air conditioning system will not work at all.	Malfunction in climate control unit power supply circuit or ground circuit.	(See 07-03-2 NO.1 AIR CONDITIONING SYSTEM WILL NOT WORK AT ALL)
2	Illumination light and indicator light in each switch do not illuminate.	Malfunction in A/C switch indicator light circuit or other indicator light circuit.	(See 07-03-3 NO.2 ILLUMINATION LIGHT AND INDICATOR LIGHT IN EACH SWITCH DO NOT ILLUMINATE)
3	Air outlet temperature does not change.	Malfunction in air mix actuator circuit, air mix link or air mix door.	(See 07-03-4 NO.3 AIR OUTLET TEMPERATURE DOES NOT CHANGE)
4	No cool air.	Magnetic clutch does not operate.	(See 07-03-8 NO.4 NO COOL AIR)
5	Air from vents not cold enough.	Magnetic clutch operates but A/C system malfunctions.	(See 07-03-15 NO.5 AIR FROM VENTS NOT COLD ENOUGH)
6	Amount of air blown from vents does not change.	Malfunction in blower system.	(See 07-03-17 NO.6 AMOUNT OF AIR BLOWN FROM VENTS DOES NOT CHANGE)

No.	TROUBLESHOOTING ITEM	DESCRIPTION	PAGE
7	Insufficient air (or no air) blown from vents.	Problem with each vent and/or duct.	(See 07-03-17 NO.7 INSUFFICIENT AIR (OR NO AIR) BLOWN FROM VENTS)
8	Improper air circulation.	Malfunction in air intake actuator circuit, air intake link or air intake door.	(See 07-03-18 NO.8 IMPROPER AIR CIRCULATION)
9	Airflow mode does not change.	Malfunction in airflow actuator circuit, airflow link, airflow crank or airflow door.	(See 07-03-20 NO.9 AIRFLOW MODE DOES NOT CHANGE)

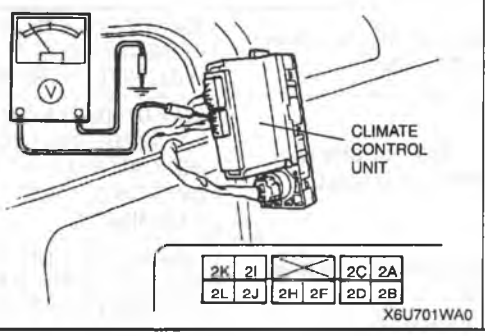
NO.1 AIR CONDITIONING SYSTEM WILL NOT WORK AT ALL

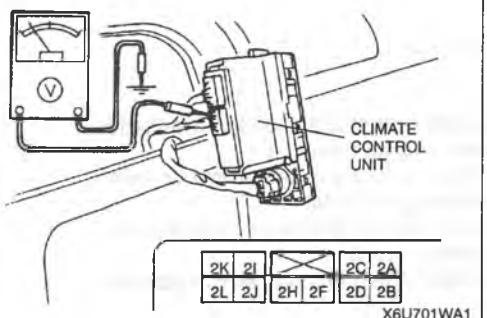
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- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

1	**Air conditioning system will not work at all**
DESCRIPTION	• Malfunction in climate control unit power supply circuit or ground circuit
POSSIBLE CAUSE	• Malfunction in climate control unit power supply circuit — Fuse malfunction — Malfunction in wiring harness between A/C 10 A fuse and climate control unit • Malfunction in climate control unit ground circuit — Climate control unit malfunction — Malfunction in wiring harness between climate control unit and ground

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT A/C 10A FUSE** • Check A/C 10 A fuse. • Is it okay?	Yes	Go to next step.
		No	Replace fuse, then go to step 4. If fuse burns out right away, go to next step.
2*	**INSPECT WIRING HARNESS BETWEEN FUSE PANEL AND CLIMATE CONTROL UNIT FOR CONTINUITY** • Turn ignition switch to ON. • Measure voltage at terminal 2L (IG2 signal) of climate control unit 10-pin connector. • Is voltage **approximately 12 V**? 	Yes	Go to next step.
		No	Repair wiring harness between A/C 10A fuse and climate control unit, then go to step 4.

STEP	INSPECTION		ACTION
3*	**CHECK TO SEE WHETHER MALFUNCTION IS IN CLIMATE CONTROL UNIT OR WIRING HARNESS (LACK OF CONTINUITY, BETWEEN CLIMATE CONTROL UNIT AND GROUND)** • Measure voltage at terminal 2J (GND signal) of climate control unit 10-pin connector. • Is voltage **0 V**? 	Yes	Replace climate control unit, then go to next step.
		No	Repair wiring harness between climate control unit and ground, then go to next step.
4	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT REOCCUR AFTER REPAIR** • Does A/C system operate correctly?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Reconfirm malfunction symptoms, then repeat from step 1 if malfunction reoccurs.

07

NO.2 ILLUMINATION LIGHT AND INDICATOR LIGHT IN EACH SWITCH DO NOT ILLUMINATE

Z6U070301038W04

2	**Illumination light and indicator light in each switch do not illuminate**
DESCRIPTION	• Malfunction in A/C switch indicator light circuit or other indicator light circuit.
POSSIBLE CAUSE	• Malfunction in A/C switch indicator light circuit — Step 1, 2 • Malfunction in other indicator lights (except A/C switch indicator light) circuit — Climate control unit malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY THAT A/C SWITCH INDICATOR LIGHT ILLUMINATES** • Turn ignition switch to ON. • Turn both A/C switch and fan switch on. • Does A/C switch indicator light illuminate?	Yes	Go to next step.
		No	Go to troubleshooting symptom No.4.
2	**VERIFY THAT AIR CONDITIONING SYSTEM WORKS** • Start engine. • Verify air conditioning system works. • Does A/C system work?	Yes	Go to next step.
		No	Go to troubleshooting symptom No.1.
3	**VERIFY THAT INDICATOR LIGHTS EXCEPT A/C SWITCH INDICATOR LIGHT ILLUMINATE** • Do other indicator lights (except A/C switch indicator light) illuminate?	Yes	Operation is normal. (Reconfirm malfunction symptoms.)
		No	Replace climate control unit, then go to next step.
4	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT REOCCUR AFTER REPAIR** • Is climate control unit indication incorrect?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Reconfirm malfunction symptoms, then repeat from step 1 if malfunction reoccurs.

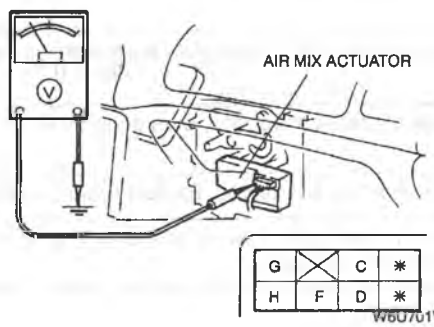
NO.3 AIR OUTLET TEMPERATURE DOES NOT CHANGE

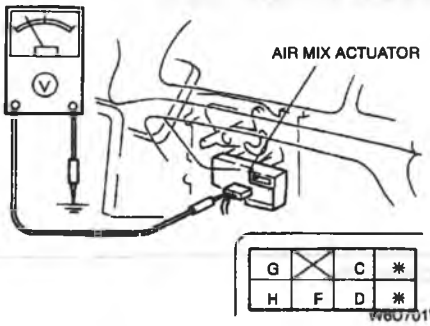
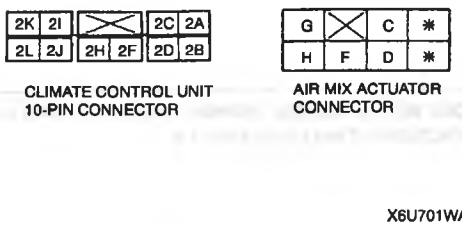
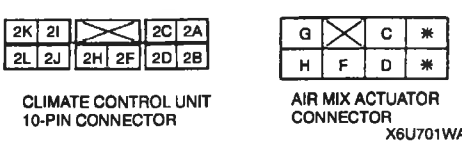
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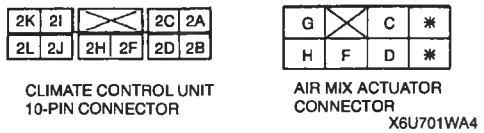
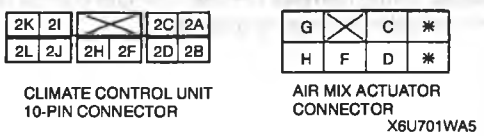
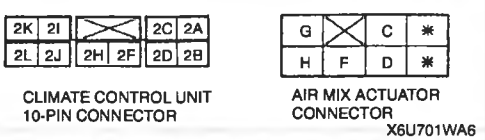
- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

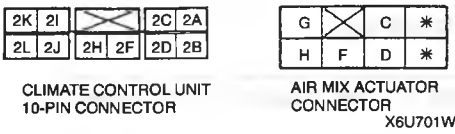
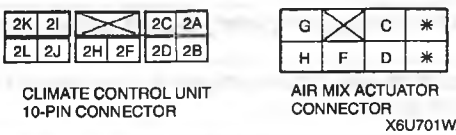
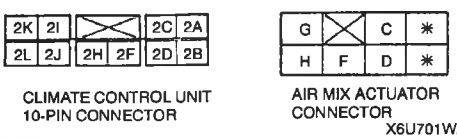
3	Air outlet temperature does not change
DESCRIPTION	• Malfunction in air mix actuator circuit, air mix link or air mix door.
POSSIBLE CAUSE	• Misunderstanding by customer — Step 1 • Malfunction in air mix actuator's +5 V signal circuit — Air mix actuator malfunction — Climate control unit malfunction — Malfunction in wiring harness between climate control unit and air mix actuator • Malfunction in air mix actuator's potentiometer input signal circuit — Malfunction in wiring harness between climate control unit and air mix actuator • Malfunction in air mix actuator's actuator control signal circuit — Malfunction in wiring harness between climate control unit and air mix actuator • Malfunction in air mix actuator's motor drive signal circuit — Malfunction in wiring harness between climate control unit and air mix actuator • Malfunction in heater unit's air mix link circuit — Step 14, 15 • Malfunction in air mix actuator circuit — Air mix actuator malfunction • Malfunction in heater unit's air mix door circuit — Climate control unit malfunction — Air mix door malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT COOLANT TEMPERATURE** • Does engine start-up at normal operating temperature?	Yes	Go to next step.
		No	Warm engine for **approximately 10 minutes**, then go to step 19.
2	**CHECK TO SEE WHETHER CLIMATE CONTROL UNIT ENTERS FAIL-SAFE MODE OR NOT** • Is air mix actuator fixed to MAX HOT or MAX COLD?	Yes	Go to next step.
		No	Go to step 10.
3	**VERIFY WHETHER AIR MIX ACTUATOR IS FIXED TO MAX HOT OR MAX COLD** • Is air mix actuator fixed to MAX HOT?	Yes	Go to next step.
		No	Go to step 8. (It fixes to MAX COLD.)
4*	**CHECK TO SEE WHETHER MALFUNCTION IS IN CLIMATE CONTROL UNIT +5V SIGNAL OR CLIMATE CONTROL UNIT POTENTIOMETER INPUT SIGNAL** • Turn ignition switch to ON. • Measure voltage at terminal G (+5 V signal) of air mix actuator connector. • Is voltage **approximately 5 V**? 	Yes	Go to step 7.
		No	Go to next step.

STEP	INSPECTION		ACTION
5	**CHECK TO SEE WHETHER MALFUNCTION (SHORT TO GROUND) IS IN AIR MIX ACTUATOR OR ELSEWHERE** • Disconnect air mix actuator connector. • Measure voltage at terminal G (+5 V signal) of air mix actuator connector of wiring harness. • Is voltage **approximately 5 V**? 	Yes	Inspect air mix actuator, then go to step 19.
		No	Go to next step.
6*	**CHECK TO SEE WHETHER MALFUNCTION (SHORT TO GROUND) IS IN CLIMATE CONTROL UNIT OR WIRING HARNESS (BETWEEN CLIMATE CONTROL UNIT AND AIR MIX ACTUATOR)** • Turn ignition switch to LOCK. • Disconnect climate control unit 10-pin connector. • Check if there is no continuity between the following terminals and ground. — Terminal 2A (10-pin, climate control unit)–terminal G (air mix actuator) • Is there no continuity? 	Yes	Replace climate control unit, then go to step 19.
		No	Repair wiring harness between climate control unit and air mix actuator, then go to step 19.
7*	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (SHORT TO GROUND, BETWEEN CLIMATE CONTROL UNIT AND AIR MIX ACTUATOR) OR ELSEWHERE** • Disconnect climate control unit 10-pin connector and air mix actuator connector. • Check if there is no continuity between the following terminals and ground. — Terminal 2D (10-pin, climate control unit)–terminal F (air mix actuator) • Is there no continuity? 	Yes	Go to step 14.
		No	Repair wiring harness between climate control unit and air mix actuator, then go to step 19.

STEP	INSPECTION		ACTION
8*	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (SHORT TO +B, BETWEEN CLIMATE CONTROL UNIT AND AIR MIX ACTUATOR) OR ELSEWHERE** • Turn ignition switch to LOCK. • Disconnect climate control unit 10-pin connector and air mix actuator connector. • Check if there is no continuity between the following terminals and +B circuit. — Terminal 2D (10-pin, climate control unit)–terminal F (air mix actuator) • Is there no continuity?  CLIMATE CONTROL UNIT 10-PIN CONNECTOR AIR MIX ACTUATOR CONNECTOR X6U701WA4	Yes	Go to next step.
		No	Repair wiring harness between climate control unit and air mix actuator, then go to step 19.
9*	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY, BETWEEN CLIMATE CONTROL UNIT AND AIR MIX ACTUATOR) OR ELSEWHERE** • Check if there is continuity between the following terminals. — Terminal 2B (10-pin, climate control unit)–terminal C (air mix actuator) • Is there continuity?  CLIMATE CONTROL UNIT 10-PIN CONNECTOR AIR MIX ACTUATOR CONNECTOR X6U701WA5	Yes	Go to step 14.
		No	Repair wiring harness between climate control unit and air mix actuator, then go to step 19.
10*	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY OR SHORT TO +B, BETWEEN CLIMATE CONTROL UNIT AND AIR MIX ACTUATOR) OR ELSEWHERE** • Turn ignition switch to LOCK. • Disconnect climate control unit 10-pin connector and air mix actuator connector. • Check if there is continuity between terminal 2A (10-pin, climate control unit) and terminal G (air mix actuator). • Also, check if there is no continuity between these two terminals and the +B circuit.  CLIMATE CONTROL UNIT 10-PIN CONNECTOR AIR MIX ACTUATOR CONNECTOR X6U701WA6 • Are both of these requirements satisfied?	Yes	Go to next step.
		No	Repair wiring harness between climate control unit and air mix actuator, then go to step 19.

STEP	INSPECTION		ACTION
11*	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY, BETWEEN CLIMATE CONTROL UNIT AND AIR MIX ACTUATOR) OR ELSEWHERE** • Check if there is continuity between the following terminals. — Terminal 2D (10-pin, climate control unit)–terminal F (air mix actuator) • Is there continuity?  CLIMATE CONTROL UNIT 10-PIN CONNECTOR AIR MIX ACTUATOR CONNECTOR X6U701WA7	Yes	Go to next step.
		No	Repair wiring harness between climate control unit and air mix actuator, then go to step 19.
12*	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (SHORT TO +B, BETWEEN CLIMATE CONTROL UNIT AND AIR MIX ACTUATOR) OR ELSEWHERE** • Check if there is continuity between the following terminals. • Terminal 2B (10-pin, climate control unit)–terminal C (air mix actuator) • Is there no continuity?  CLIMATE CONTROL UNIT 10-PIN CONNECTOR AIR MIX ACTUATOR CONNECTOR X6U701WA8	Yes	Go to next step.
		No	Repair wiring harness between climate control unit and air mix actuator, then go to step 19.
13	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY OR SHORT TO GROUND, BETWEEN CLIMATE CONTROL UNIT AND AIR MIX ACTUATOR) OR ELSEWHERE** • Check if there is continuity between the following terminals. • Also, check if there is no continuity between these four terminals and ground. — Terminal 2C (10-pin, climate control unit)–terminal H (air mix actuator) — Terminal 2F (10-pin, climate control unit)–terminal D (air mix actuator)  CLIMATE CONTROL UNIT 10-PIN CONNECTOR AIR MIX ACTUATOR CONNECTOR X6U701WA9 • Are both of these requirements satisfied?	Yes	Go to next step.
		No	Repair wiring harness between climate control unit and air mix actuator, then go to step 19.
14	**INSPECT HEATER UNIT'S AIR MIX SYSTEM** • Inspect heater unit's air mix links, air mix cranks, and air mix rod. • Is there grease on links and cranks? • Are links, cranks, and rod securely and properly installed? • Are above items okay?	Yes	Go to next step.
		No	Apply grease or properly and securely install links, cranks, and rod, then go to step 19.

07

STEP	INSPECTION		ACTION
15	**INSPECT HEATER UNIT'S AIR MIX LINK SYSTEM** • Remove air mix actuator. • Turn ignition switch to ON. • Set fan switch at fourth position. • Inspect heater unit. — Does groove of links on heater unit have no dust on it? — Does temperature of discharged air change smoothly when air mix link is operated by hand?	Yes	Go to next step.
		No	If any links have dust on it, remove dust, then go to step 19. If temperature of discharged air does not change smoothly, then go to step 17.
16	**INSPECT AIR MIX ACTUATOR** • Inspect air mix actuator. (See 07-40-14 AIR MIX ACTUATOR INSPECTION) • Is it okay?	Yes	Go to next step.
		No	Replace air mix actuator, then go to step 17.
17	**INSPECT HEATER UNIT** • Is there foreign material or obstruction in heater unit's air mix doors?	Yes	Remove obstruction, then go to step 7.
		No	Go to next step.
18	**INSPECT HEATER UNIT'S AIR MIX DOORS** • Inspect heater unit's air mix doors. — Are doors free of cracks and damage? — Are doors securely and properly installed? Are above items okay?	Yes	Replace climate control unit, then go to next step.
		No	Replace any doors, or install doors in proper position, then go to next step.
19	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT REOCCUR AFTER REPAIR** • Does temperature of discharged air change when temperature control dial is operated?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Reconfirm malfunction symptoms, then repeat from step 1 if malfunction reoccurs.

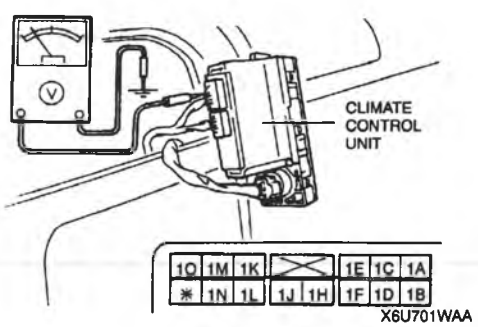
NO.4 NO COOL AIR

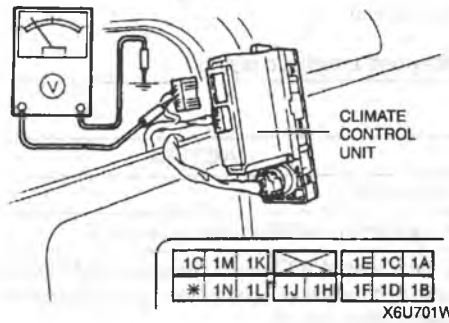
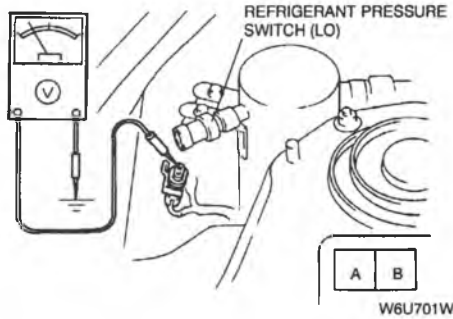
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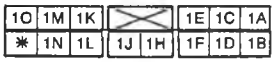
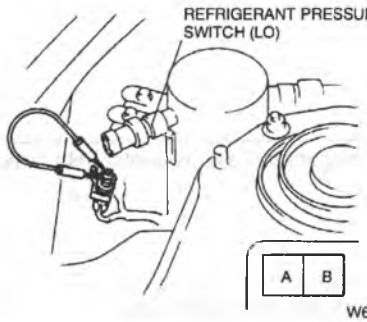
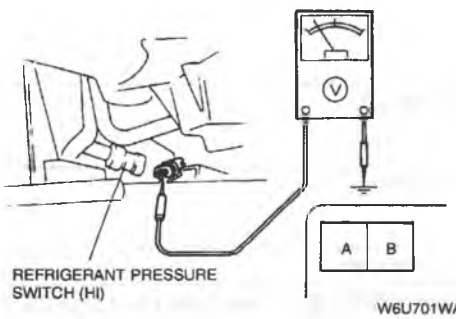
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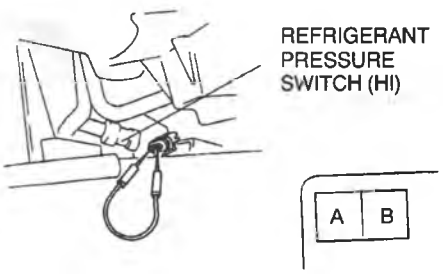
4	No cool air
DESCRIPTION	• Magnetic clutch does not operate.
POSSIBLE CAUSE	• Malfunction in A/C switch indicator light circuit — Climate control unit malfunction — Malfunction in wiring harness between climate control unit and fan switch • Malfunction in drive belt circuit — Drive belt malfunction • Malfunction in A/C signal (between climate control unit, refrigerant pressure switch, and PCM) circuit — Refrigerant pressure switch (LO) malfunction — Refrigerant pressure switch (HI) malfunction — PCM malfunction — Malfunction in wiring harness between refrigerant pressure switch (LO) and climate control unit — Malfunction in wiring harness between PCM and refrigerant pressure switch (HI) — Malfunction in wiring harness between refrigerant pressure switch (HI) and refrigerant pressure switch (LO) • Malfunction in A/C relay (IG2 signal) circuit — WIPER 20 A fuse malfunction — A/C relay malfunction — Malfunction in wiring harness between WIPER 20 A fuse and A/C relay • Malfunction in PCM (IG2 signal) circuit — Malfunction in wiring harness between A/C relay and PCM • Malfunction in A/C cut control circuit of PCM — PCM malfunction — Input signal parts malfunction • Malfunction in A/C relay (A/C control signal) circuit — AD FAN 30 A fuse malfunction — A/C relay malfunction — Malfunction in wiring harness between AD FAN 30 A fuse and A/C relay • Malfunction in A/C compressor (A/C control signal) circuit — Magnetic clutch malfunction — Malfunction in wiring harness between A/C relay and magnetic clutch

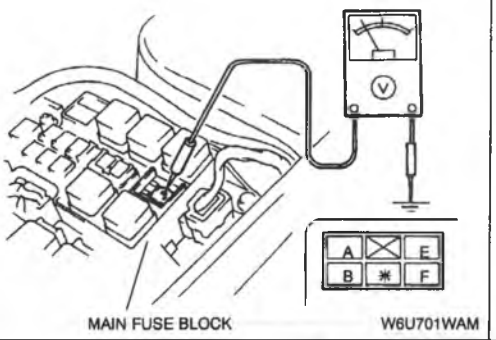
Diagnostic procedure

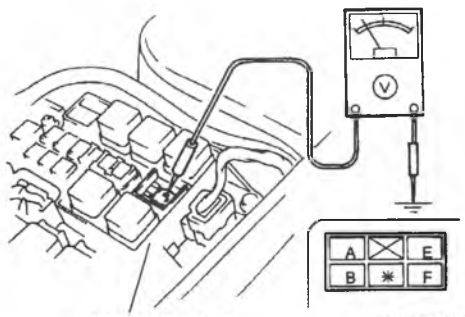
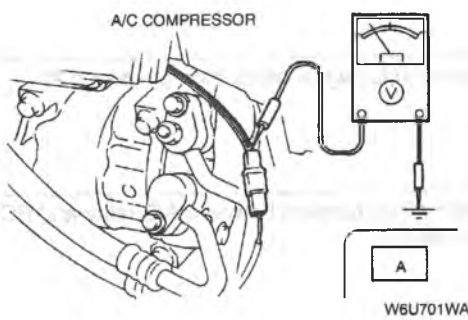
STEP	INSPECTION		ACTION
1	**INSPECT AIR BLOW OUT** • Is air discharged?	Yes	Go to next step.
		No	Go to symptom troubleshooting No. 6, 7.
2	**INSPECT A/C COMPRESSOR OPERATION** • Start engine. • Turn both A/C switch and fan switch on. • Does A/C compressor operate?	Yes	Go to next step if A/C switch indicator light does not illuminate. If indicator light works, go to symptom troubleshooting No. 5.
		No	Go to next step.
3	**INSPECT A/C SWITCH INDICATOR LIGHT** • Does A/C switch indicator light illuminate?	Yes	Go to step 5.
		No	Go to next step.
4*	**CHECK TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN WIRING HARNESS (BETWEEN CLIMATE CONTROL UNIT AND FAN SWITCH) OR CLIMATE CONTROL UNIT** • Turn fan switch off. • Measure voltage at terminal 1E (A/C signal) of climate control unit 14-pin connector. • Is voltage okay?  X6U701WAA	Yes	Replace climate control unit, then go to step 25.
		No	Repair wiring harness between climate control unit and fan switch, then go to step 25.

STEP	INSPECTION		ACTION
5	**INSPECT REFRIGERANT SYSTEM PERFORMANCE** • Perform refrigerant system performance test. (See 07-10-2 REFRIGERANT SYSTEM PERFORMANCE TEST) • Is operation normal?	Yes	Reconfirm malfunction symptoms.
		No	Go to next step.
6	**INSPECT DRIVE BELT** • Inspect drive belt. (See 01-10A-1 DRIVE BELT INSPECTION [FS]) (See 01-10B-1 DRIVE BELT INSPECTION [KL]) • Is it okay?	Yes	Verify cooling fan and condenser fan operation. If fans are inoperative, inspect fan relays, condenser fan and/or cooling fan, and related harnesses. If operation is okay, go to next step.
		No	Adjust or replace drive belt, then go to step 25. (See 01-10A-2 DRIVE BELT ADJUSTMENT [FS]) (See 01-10B-2 DRIVE BELT ADJUSTMENT [KL])
7*	**CHECK TO SEE WHETHER MALFUNCTION IS IN REFRIGERANT PRESSURE SWITCH SYSTEM OR ELSEWHERE** • Disconnect climate control unit 14-pin connector. • Start engine. • Turn both A/C switch and fan switch on. • Measure voltage at terminal 1F (A/C signal) of climate control unit 14-pin connector of wiring harness. • Is voltage okay?  X6U701WAB	Yes	Connect climate control unit connector, then go to step 15.
		No	Go to next step.
8*	**CHECK TO SEE WHETHER MALFUNCTION IS IN REFRIGERANT PRESSURE SWITCH (LO) SYSTEM OR REFRIGERANT PRESSURE SWITCH (HI) SYSTEM** • Disconnect refrigerant pressure switch (LO) connector. • Start engine. • Turn both A/C switch and fan switch on. • Measure voltage at terminal A (A/C signal) of refrigerant pressure switch (LO) connector of wiring harness. • Is voltage **approximately 12 V**?  W6U701WAE	Yes	Go to next step.
		No	Go to step 11.

STEP	INSPECTION		ACTION
9*	**INSPECT WIRING HARNESS BETWEEN REFRIGERANT PRESSURE SWITCH (LO) AND CLIMATE CONTROL UNIT FOR CONTINUITY** • Check if there is continuity between the following terminals. — Terminal B (refrigerant pressure switch (LO))–terminal 1F (14-pin, climate control unit) • Is there continuity?  CLIMATE CONTROL UNIT 14-PIN CONNECTOR  REFRIGERANT PRESSURE SWITCH (LO) CONNECTOR X6U701WAC	Yes	Go to next step.
		No	Repair wiring harness between refrigerant pressure switch (LO) and climate control unit, then go to step 25.
10	**INSPECT REFRIGERANT PRESSURE SWITCH (LO)** • Connect climate control unit 14-pin connector. • When terminals A and B of refrigerant pressure switch (LO) connector at wiring harness are shorted, is cool air discharged?  W6U701WAG	Yes	Replace refrigerant pressure switch (LO), then go to step 25.
		No	Reconfirm malfunction symptoms.
11*	**CHECK TO SEE WHETHER MALFUNCTION IS IN PCM SYSTEM OR REFRIGERANT PRESSURE SWITCH(HI) SYSTEM** • Disconnect refrigerant pressure switch (HI) connector. • Start engine. • Turn both A/C switch and fan switch on. • Measure voltage at terminal A (A/C signal) of refrigerant pressure switch (HI) connector of wiring harness. • Is voltage **approximately 12 V**?  W6U701WAH	Yes	Go to step 13.
		No	Go to next step.

STEP	INSPECTION		ACTION
12*	**CHECK TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN WIRING HARNESS (BETWEEN PCM AND REFRIGERANT PRESSURE SWITCH (HI)) OR PCM** • Measure voltage at test pin 41 (A/C signal) of PCM. (See 01-40A-15 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [FS]) (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) • Is voltage **approximately 12 V**?	Yes	Repair wiring harness between PCM and refrigerant pressure switch (HI), then go to step 25.
		No	PCM inspection completed. Go to step 25.
13*	**INSPECT WIRING HARNESS BETWEEN REFRIGERANT PRESSURE SWITCH (HI) AND REFRIGERANT PRESSURE SWITCH (LO) FOR CONTINUITY** • Check if there is continuity between the following terminals. — Terminal B (refrigerant pressure switch (HI))-terminal A (refrigerant pressure switch (LO)) • Is there continuity?  REFRIGERANT PRESSURE SWITCH (HI) CONNECTOR REFRIGERANT PRESSURE SWITCH (LO) CONNECTOR W6U701WAK	Yes	Go to next step.
		No	Repair wiring harness between refrigerant pressure switch (HI) and (LO), then go to step 25.
14	**INSPECT REFRIGERANT PRESSURE SWITCH(HI)** • Connect climate control unit 14-pin connector and refrigerant pressure switch (LO) connector. • When terminals A and B of refrigerant pressure switch connector (HI) at wiring harness are shorted, is cool air discharged?  Y6U703WE0	Yes	Replace refrigerant pressure switch (HI), then go to step 25.
		No	Reconfirm malfunction symptoms.
15	**CHECK TO SEE WHETHER MALFUNCTION IS IN A/C/ RELAY (COIL-SIDE) SYSTEM OR A/C RELAY (SWITCH-SIDE) SYSTEM** • When A/C switch is turned from OFF to ON, is operation sound heard from A/C relay?	Yes	Go to step 21.
		No	Go to next step.
16	**INSPECT WIPER 20A FUSE** • Is WIPER 20 A fuse okay?	Yes	Go to next step.
		No	Replace WIPER 20 A fuse, then go to step 25. If fuse burns out right away, go to next step.

STEP	INSPECTION		ACTION
17*	**INSPECT WIRING HARNESS BETWEEN MAIN FUSE BLOCK AND A/C RELAY FOR CONTINUITY** • Remove A/C relay. • Turn ignition switch to ON. • Turn A/C switch off. • Measure voltage at terminal A (IG2 signal) of A/C relay on main fuse block side. • Is voltage **approximately 12 V**?  MAIN FUSE BLOCK W6U701WAM	Yes	Go to next step.
		No	Repair wiring harness between WIPER 20 A fuse and A/C relay, then go to step 25.
18	**INSPECT A/C RELAY** • Inspect A/C relay. (See 07-40-19 A/C RELAY, BLOWER RELAY, AND CONDENSER FAN RELAY INSPECTION) • Is it okay?	Yes	Install A/C relay, then go to next step.
		No	Replace A/C relay, then go to step 25.
19*	**INSPECT WIRING HARNESS BETWEEN A/C RELAY AND PCM FOR CONTINUITY** • Turn A/C switch off. Measure voltage at test pin 69 (IG2 signal) of PCM. (See 01-40A-15 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [FS]) (See 01-40B-14 POWERTRAIN CONTROL MODULE (PCM) INSPECTION [KL]) • Is voltage **approximately 12 V**?	Yes	Go to next step.
		No	Repair wiring harness between A/C relay and PCM, then go to step 25.
20*	**CHECK TO SEE WHETHER MALFUNCTION IS IN PCM OR INPUT SIGNAL FOR PCM'S A/C CUT-OFF CONTROL** • Inspect input signal parts (power steering pressure switch, engine coolant temperature sensor, crankshaft position sensor, throttle position sensor, A/C switch and refrigerant pressure switches. excluding wiring harness) of PCM (A/C cut control). • Are they okay?	Yes	Replace input signal parts, then go to step 25.
		No	Repair wiring harness between A/C relay and PCM, then go to step 25.
21	**INSPECT AD FAN 30 A FUSE** • Is AD FAN 30 A fuse okay?	Yes	Go to next step.
		No	Replace AD FAN 30 A fuse, then go to step 25. If fuse burns out right away, go to next step.

STEP	INSPECTION		ACTION
22*	**INSPECT WIRING HARNESS BETWEEN MAIN FUSE BLOCK AND A/C/ RELAY FOR CONTINUITY** • Remove A/C relay. • Measure voltage at terminal B (A/C control signal) of A/C relay on main fuse block side. • Is voltage **approximately 12 V**?  MAIN FUSE BLOCK W6U701WAP	Yes	Go to next step.
		No	Repair wiring harness between AD FAN 30 A fuse and A/C relay, then go to step 25.
23	**INSPECT A/C/ RELAY** • Inspect A/C relay. (See 07-40-19 A/C RELAY, BLOWER RELAY, AND CONDENSER FAN RELAY INSPECTION) • Is it okay?	Yes	Install A/C relay, then go to next step.
		No	Replace A/C relay, then go to step 25.
24*	**CHECK TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY, BETWEEN A/C/ RELAY AND MAGNETIC CLUTCH) OR MAGNETIC CLUTCH** • Turn ignition switch to ON. • Turn A/C switch off. • Measure voltage at terminal A (A/C control signal) of magnetic clutch connector. • Is voltage **approximately 12 V**?  W6U701WAQ	Yes	Inspect magnetic clutch, then go to next step. (See 07-40-19 MAGNETIC CLUTCH INSPECTION)
		No	Repair wiring harness between A/C relay and magnetic clutch, go to next step.
25	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT REOCCUR AFTER REPAIR** • Is cool air discharged? (Is result of refrigerant system performance test correct?)	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Reconfirm malfunction symptoms, then repeat from step 1 if malfunction reoccurs.

NO.5 AIR FROM VENTS NOT COLD ENOUGH

Z6U070301038W07

5	Air from vents not cold enough
DESCRIPTION	• Magnetic clutch operates but A/C system malfunctions.
POSSIBLE CAUSE	• Malfunction in defective drive belt circuit — Drive belt malfunction • Malfunction in heater unit's air mix link circuit — Air mix link, air mix crank, and air mix rod malfunction • Malfunction in blower unit or condenser circuit — Condenser malfunction • Malfunction in refrigerant lines circuit — Refrigerant lines malfunction • Malfunction in accumulator tank circuit — Accumulator tank malfunction • Malfunction in A/C compressor circuit, insufficient compressor oil — A/C compressor malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT REFRIGERANT SYSTEM PERFORMANCE** • Perform refrigerant system performance test. (See 07-10-2 REFRIGERANT SYSTEM PERFORMANCE TEST) • Is operation okay?	Yes	Operation is normal. (Reconfirm malfunction symptoms.)
		No	Go to next step.
2	**INSPECT DRIVE BELT** • Inspect drive belt. (See 01-10A-1 DRIVE BELT INSPECTION [FS]) (See 01-10B-1 DRIVE BELT INSPECTION [KL]) • Is it okay?	Yes	Go to next step.
		No	Adjust or replace drive belt, then go to step 14. (See 01-10A-2 DRIVE BELT ADJUSTMENT [FS]) (See 01-10B-2 DRIVE BELT ADJUSTMENT [KL])
3	**INSPECT REFRIGERANT PRESSURE** • Inspect refrigerant pressure. (See 07-10-3 REFRIGERANT PRESSURE CHECK) • Are both the high and low-pressure side values high?	Yes	Go to next step.
		No	Go to step 7.
4	**VERIFY THAT AIR MIX'S LINK, CRANK AND ROD ARE INSTALLED SECURELY AND PROPERLY** • Are heater unit's air mix link, air mix crank, and air mix rod properly and securely installed in the correct position?	Yes	Go to next step.
		No	Repair or securely and properly install link, crank, and rod, then go to step 14.
5	**INSPECT BLOWER UNIT INTAKE** • Is inlet of blower unit clogged?	Yes	Remove obstruction, then go to step 14. (Within the cooling unit, if air does not reach evaporator, heat exchange does not occur and refrigerant pressure becomes high. Therefore, removal of obstruction is necessary.)
		No	Go to next step.
6	**INSPECT CONDENSER** • Inspect condenser. (See 07-11-18 CONDENSER INSPECTION) • Is it okay?	Yes	Adjust refrigerant to specified amount, then go to step 14. (Excessive amount of refrigerant.)
		No	Replace condenser, or repair and clean condenser fins, then go to step 14.
7	**CHECK TO SEE WHETHER MALFUNCTION IS IN COMPRESSOR OIL, REFRIGERANT, ACCUMULATOR TANK AND REFRIGERANT LINES OR ANOTHER** • Are the refrigerant pressure's high-pressure side and low-pressure side values low?	Yes	Go to next step.
		No	Go to step 11.

STEP	INSPECTION		ACTION
8	**INSPECT REFRIGERANT LINES** ● Inspect refrigerant lines. — Is piping free of damage and cracks? — Are piping connections free of oil grime? (visual inspection) — Are piping connections free of gas leakage? — Are piping installation points on condenser free of gas leakage? — Are piping installation points on receiver/drier free of gas leakage? — Are piping installation points on A/C compressor free of gas leakage? — Are piping installation points on cooling unit free of gas leakage? ● *Perform gas leak inspection using gas leak tester. ● Are above items okay?	Yes	Adjust both compressor oil and refrigerant to specified amount, then go to step 10.
		No	If piping or A/C components are damaged or cracked, replace them, then go to step 14. If there is no damage, go to next step.
9	**INSPECT PIPING CONNECTIONS FOR LOOSE** ● Are piping connections loose?	Yes	Tighten connections to specified torque, adjust both compressor oil and refrigerant to specified amount, then go to step 14.
		No	Replace O-ring on piping, adjust both compressor oil and refrigerant to specified amount, then go to step 14.
10	**CHECK TO SEE WHETHER MALFUNCTION IS IN ACCUMULATOR TANK OR ELSEWHERE** ● Turn A/C switch off and let air conditioner stop for **10 minutes.** ● Start engine. ● Turn both A/C switch and fan switch on. ● Does malfunction occur after A/C compressor turns on?	Yes	Go to next step.
		No	Replace accumulator tank, then go to step 14. (Since water has intermixed in accumulator tank, replacement is necessary.)
11	**CHECK TO SEE IF REFRIGERANT PRESSURE INCREASES CORRECTLY OR NOT** ● Does refrigerant pressure's high-pressure side hardly increase?	Yes	Go to next step. (Pressure hardly increases.)
		No	Reconfirm malfunction symptoms.
12	**CHECK TO SEE WHETHER MALFUNCTION IS IN A/C COMPRESSOR AND COMPRESSOR OIL AMOUNT OR ELSEWHERE** ● When engine is racing, does pressure on high-pressure side increase?	Yes	Return to step 3.
		No	Go to next step.
13	**CHECK TO SEE WHETHER MALFUNCTION IS IN A/C COMPRESSOR OR COMPRESSOR OIL AMOUNT** ● Remove A/C compressor and drain compressor oil. (See 07-11-17 A/C COMPRESSOR REMOVAL/INSTALLATION) ● Check charged compressor oil amount. ● Refill specified compressor oil amount into A/C compressor. ● After compressor oil is replenished to specified amount, does pressure on high-pressure side increase?	Yes	Troubleshooting completed. (Explain to customer that the cause was Insufficient compressor oil.)
		No	Replace A/C compressor, then go to next step. (The cause is defective compression of A/C compressor.)
14	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT REOCCUR AFTER REPAIR** ● Is cool air discharged? (Are the results of refrigerant system performance test okay?)	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Reconfirm malfunction symptoms, then repeat from step 1 if malfunction reoccurs.

NO.6 AMOUNT OF AIR BLOWN FROM VENTS DOES NOT CHANGE

Z6U070301038W08

6	Amount of air blown from vents does not change
DESCRIPTION	• Malfunction in blower system.
POSSIBLE CAUSE	• Malfunction in blower relay, blower motor, resistor, and fan switch circuit — Step 1 • Malfunction in blower unit circuit — Fan and blower unit case malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT BLOWER SYSTEM** • Inspect the following systems, electrical parts. — Blower relay, blower motor, resistor, fan switch. • Are they okay?	Yes	Go to next step.
		No	Repair or replace malfunctioning part, then go to step 5.
2	**CHECK TO SEE WHETHER MALFUNCTION IS IN BLOWER UNIT OR ELSEWHERE** • Turn ignition switch to ON. • Set to recirculate mode. • Does fan in blower unit rotate smoothly?	Yes	Go to step 4.
		No	Go to next step.
3	**INSPECT BLOWER UNIT** • Inspect fan in blower unit. — Is fan free of interference with blower unit case? — Is fan free of foreign material and obstructions? • Is fan okay?	Yes	Go to next step.
		No	Remove obstruction, repair or replace fan and blower unit case, then go to step 5.
4	**INSPECT BLOWER UNIT INTAKE VENT** • Is intake vent of blower unit clogged?	Yes	Remove obstruction, then go to next step.
		No	Check if there are any obstructions in passage from blower unit to heater unit, then go to next step.
5	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT REOCCUR AFTER REPAIR** • Is air discharged?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Reconfirm malfunction symptoms, then repeat from step 1 if malfunction reoccurs.

NO.7 INSUFFICIENT AIR (OR NO AIR) BLOWN FROM VENTS

Z6U070301038W09

7	Insufficient air (or no air) blown from vents
DESCRIPTION	• Problem with each vent and/or duct.
POSSIBLE CAUSE	• Malfunction in VENT mode circuit — Steps 2—5 • Malfunction in HEAT mode circuit — Step 6 • Malfunction in DEFROSTER mode circuit — Steps 7—9

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY AIRFLOW MODE OPERATION** • Does airflow mode change when airflow mode switch is operated?	Yes	Go to next step.
		No	Go to troubleshooting symptom No. 9.
2	**CHECK TO SEE WHETHER MALFUNCTION IS IN VENT MODE OR ANOTHER MODES** • Is air discharged when in VENT mode?	Yes	Go to step 6.
		No	Go to next step.
3	**VERIFY EACH VENT DIALS POSITION** • Are center and side vent dials at closed position?	Yes	Turn dial to open position, then go to step 10.
		No	Go to next step.
4	**INSPECT VENT** • Is vent clogged?	Yes	Remove obstruction, then go to step 10.
		No	Go to next step.

STEP	INSPECTION		ACTION
5	**VERIFY THAT DUCT IN DASHBOARD IS INSTALLED** • Is duct in dashboard properly installed and in good condition?	Yes	Check duct for clogging, deformity, and air leakage, then go to step 10.
		No	Securely and properly install duct, then go to step 10.
6	**CHECK TO SEE WHETHER MALFUNCTION IS IN HEAT MODE OR DEFROSTER MODE** • Is air discharged when in HEAT mode?	Yes	Go to next step.
		No	Check vent for clogging, then go to step 10.
7	**INSPECT DEFROSTER MODE** • Is air discharged when in DEFROSTER mode?	Yes	Operation is okay. Reconfirm malfunction symptoms.
		No	Go to next step.
8	**INSPECT VENT** • Is vent clogged?	Yes	Remove obstruction, then go to step 10.
		No	Go to next step.
9	**VERIFY THAT DEFROSTER DUCT IS INSTALLED** • Is defroster duct properly installed and in good condition?	Yes	Check duct for clogging, deformity, and air leakage, then go to next step.
		No	Securely and properly install duct, then go to next step.
10	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT REOCCUR AFTER REPAIR** • Is air discharged from vent?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Reconfirm malfunction symptoms, then repeat from step 1 if malfunction reoccurs.

NO.8 IMPROPER AIR CIRCULATION

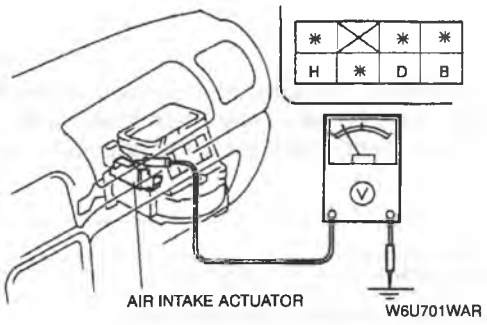
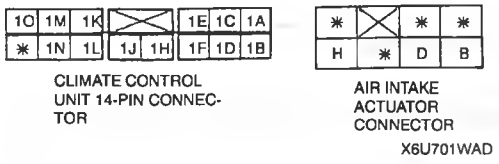
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- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

8	Improper air circulation
DESCRIPTION	• Malfunction in air intake actuator circuit, air intake link or air intake door.
POSSIBLE CAUSE	• Malfunction in air intake link circuit — Air intake link malfunction • Malfunction in IG2 signal circuit of air intake actuator — Malfunction in wiring harness between A/C 10 A fuse and air intake actuator • Malfunction in air intake actuator circuit — Air intake actuator malfunction • Malfunction in RECIRCULATE and FRESH signal circuit of climate control unit — Malfunction in wiring harness between climate control unit and air intake actuator • Malfunction in air intake door circuit — Climate control unit malfunction — Air intake door malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT AIR INTAKE LINK** • Inspect air intake link. — Is link securely and properly installed? — Is link free of obstructions and hindrances? • Are above items okay?	Yes	Go to next step.
		No	Install link in proper position. If link is damaged, replace it, then go to step 7.

STEP	INSPECTION		ACTION
2*	**INSPECT WIRING HARNESS BETWEEN FUSE PANEL AND AIR INTAKE ACTUATOR FOR CONTINUITY** • Measure voltage at terminal 1H (IG-2 signal) of air intake actuator connector. • Is voltage **approximately 12 V**?  	Yes	Go to next step.
		No	Repair wiring harness between A/C 10 A fuse and air intake actuator, then go to step 7.
3	**CHECK TO SEE WHETHER MALFUNCTION IS IN BLOWER UNIT'S AIR INTAKE DOOR OR ELSEWHERE** • Remove air intake actuator. • Turn ignition switch to ON. • Set fan switch at fourth position. • Is each air intake mode (RECIRCULATE, FRESH) accessed smoothly when air intake link is operated by hand.	Yes	Go to next step.
		No	Go to step 6.
4	**INSPECT AIR INTAKE ACTUATOR** • Inspect air intake actuator. (See 07-40-13 AIR INTAKE ACTUATOR INSPECTION) • Is it okay?	Yes	Go to next step.
		No	Replace air intake actuator, then go to step 7.
5*	**INSPECT WIRING HARNESS BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR FOR CONTINUITY** • Turn ignition switch to LOCK. • Disconnect climate control unit 14-pin connector. • Check if there is continuity between the following terminals. — Terminal 1H (14-pin, climate control unit) – terminal 1B (air intake actuator) — Terminal 1J (14-pin, climate control unit) – terminal 1F (air intake actuator) • Is there continuity?  	Yes	Go to next step.
		No	Repair wiring harness between climate control unit and air intake actuator, then go to step 7.
	• Check if there is no continuity between the above terminals and ground. • Is there any continuity?		
6	**CHECK TO SEE WHETHER MALFUNCTION IS IN BLOWER UNIT'S AIR INTAKE DOOR OR CLIMATE CONTROL UNIT** • Inspect blower unit's air intake door. — Is door free of obstructions, cracks, and damage? — Is door securely and properly installed? • Are above items okay?	Yes	Replace climate control unit, then go to next step.
		No	Remove obstruction, or install door in proper position. If door is cracked or damaged, replace it, then go to next step.

STEP	INSPECTION		ACTION
7	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT REOCCUR AFTER REPAIR** ● Does air intake mode change smoothly?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Reconfirm malfunction symptoms, then repeat from step 1 if malfunction reoccurs.

NO.9 AIRFLOW MODE DOES NOT CHANGE

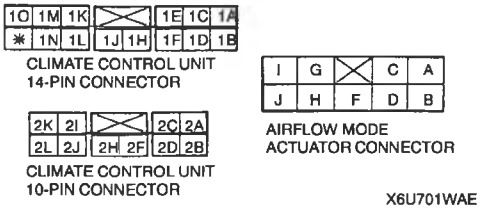
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- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

9	**Airflow mode does not change**
DESCRIPTION	● Malfunction in airflow actuator circuit, airflow link, airflow crank or airflow door.
POSSIBLE CAUSE	● Malfunction in climate control unit's airflow mode link or airflow mode crank circuit — Step 1 ● Malfunction in airflow mode actuator circuit — Airflow mode actuator malfunction ● Malfunction in climate control unit's each signal circuit — Malfunction in wiring harness between climate control unit and airflow mode actuator ● Malfunction in heater unit's each door circuit — Climate control unit malfunction — Heater unit's doors malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT HEATER UNIT'S AIRFLOW MODE SYSTEM** ● Remove airflow mode actuator. Inspect heater unit's airflow mode links and airflow mode cranks. — Is there grease on links and clamp? — Are links and clamp securely and properly installed? ● Are above items okay?	Yes	Go to next step.
		No	Apply grease or properly and securely install links, then go to step 6.
2	**CHECK TO SEE WHETHER MALFUNCTION IS IN HEATER UNIT'S DOOR OR ELSEWHERE** ● Turn ignition switch to ON. ● Set fan switch at fourth position. ● Is each airflow mode (VENT, BI-LEVEL, HEAT, HEAT/DEF, DEFROSTER) accessed smoothly when airflow mode main link is operated by hand?	Yes	Go to next step.
		No	Go to step 5.
3	**INSPECT AIRFLOW MODE ACTUATOR** ● Inspect airflow mode actuator. (See 07-40-15 AIRFLOW MODE ACTUATOR INSPECTION) ● Is it okay?	Yes	Go to next step.
		No	Replace airflow mode actuator, then go to step 6.

STEP	INSPECTION		ACTION
4*	**INSPECT WIRING HARNESS BETWEEN CLIMATE CONTROL UNIT AND AIRFLOW MODE ACTUATOR FOR LACK OF CONTINUITY OR SHORT TO GROUND** • Turn ignition switch to LOCK. • Disconnect climate control unit 10-pin and 14-pin connectors. • Check if there is continuity between the following terminals. — Terminal 1C (14-pin, climate control unit) – terminal H (airflow mode actuator) — Terminal 1N (14-pin, climate control unit) – terminal F (airflow mode actuator) — Terminal 1O (14-pin, climate control unit) – terminal A (airflow mode actuator) — Terminal 1M (14-pin, climate control unit) – terminal I (airflow mode actuator) — Terminal 1L (14-pin, climate control unit) – terminal G (airflow mode actuator) — Terminal 1K (14-pin, climate control unit) – terminal C (airflow mode actuator) — Terminal 1A (14-pin, climate control unit) – terminal J (airflow mode actuator) — Terminal 2H (10-pin, climate control unit) – terminal D (airflow mode actuator) — Terminal 2I (10-pin, climate control unit) – terminal B (airflow mode actuator) • Is there continuity?  	Yes	Go to next step.
	• Check if there is no continuity between the above terminals and ground. • Is there any continuity?	No	Repair wiring harness between climate control unit and airflow mode actuator, then go to step 6.
5	**INSPECT HEATER UNIT'S DOOR** • Inspect heater unit's doors. — Is door free of obstructions, cracks, and damage? — Are doors securely and properly installed? • Are above items okay?	Yes	Replace climate control unit, then go to next step.
		No	Remove obstruction, or install doors in proper position. If any doors are cracked or damaged, replace them, then go to next step.
6	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT REOCCUR AFTER REPAIR** • Does airflow mode change when airflow mode switch is operated?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Reconfirm malfunction symptoms, then repeat from step 1 if malfunction reoccurs.

07-10 REFRIGERANT SYSTEM

REFRIGERANT SYSTEM SERVICE WARNINGS 07-10-1
Using/Handling Unapproved Refrigerant 07-10-1
Handling Refrigerant 07-10-1
Storing Refrigerant 07-10-1
REFRIGERANT SYSTEM SERVICE CAUTIONS 07-10-2
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REFRIGERANT SYSTEM SERVICE WARNINGS

Z6U071001039W01

Using/Handling Unapproved Refrigerant

- **Using a flammable refrigerant, such as OZ-12, in this vehicle is dangerous. In an accident, the refrigerant may catch fire, resulting in serious injury or death. When servicing this vehicle, use only R-134a.**
- **Checking for system leaks on a vehicle that has been serviced with flammable refrigerant, such as OZ-12, is dangerous. Conventional leak detectors use an electronically generated arc which can ignite the refrigerant, causing serious injury or death. If a flammable refrigerant may have been used to service the system, or if you suspect a flammable refrigerant has been used, contact the local fire marshall or EPA office for information on handling the refrigerant.**

Handling Refrigerant

- **Avoid breathing air conditioning refrigerant or lubricant vapor. Exposure may irritate eyes, nose and throat. Also, due to environmental concerns, use service equipment certified to meet the requirements of SAE J2210 (R-134a recycling equipment) when draining R-134a from the air conditioning system. If accidental system discharge occurs, ventilate work area before resuming service.**
- **Do not pressure test or leak test R-134a service equipment and/or vehicle air conditioning system with compressed air. Some mixtures of air and R-134a have been shown to be combustible at elevated pressures. These mixtures, if ignited, may cause injury or property damage. Additional health and safety information may be obtained from refrigerant manufacturers.**
- **Do not allow the refrigerant to leak near fire or any kind of heat. A poisonous gas may be generated if the refrigerant gas contacts fire or heat such as from cigarettes and heaters. When carrying out any operation that can cause refrigerant leakage, extinguish or remove the above-mentioned heat sources and maintain adequate ventilation.**
- **Handling liquid refrigerant is dangerous. A drop of it on the skin can result in localized frostbite. When handling the refrigerant, wear gloves and safety goggles. If refrigerant splashes into the eyes, immediately wash them with clean water and consult a doctor.**

Storing Refrigerant

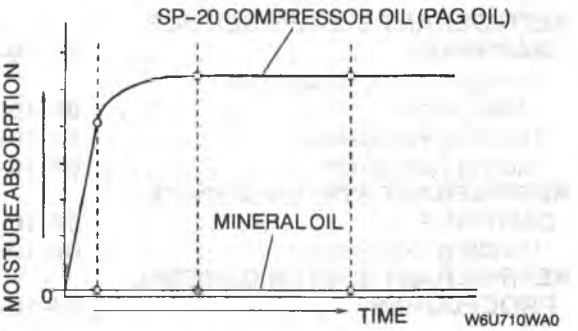
- **The refrigerant container is highly pressurized. If it is subjected to high heat, it could explode, scattering metal fragments and liquid refrigerant that can seriously injure you. Store the refrigerant at temperatures below 40 °C {104 °F}.**

REFRIGERANT SYSTEM SERVICE CAUTIONS

Z6U071001039W02

Handling Compressor Oil

- **Use only SP-20 compressor oil for this vehicle. Using PAG oil other than SP-20 compressor oil can damage the A/C compressor.**
- **Do not spill SP-20 compressor oil on the vehicle. A drop of compressor oil on the vehicle surface can eat away at the paint. If oil gets on the vehicle, wipe it off immediately.**
- **SP-20 compressor oil (PAG oil) has a higher moisture absorption efficiency than the previously used mineral oil. If moisture mixes with the compressor oil, the refrigerant system could be damaged. Therefore, install caps immediately after using the compressor oil or removing refrigerant system parts to prevent moisture absorption.**

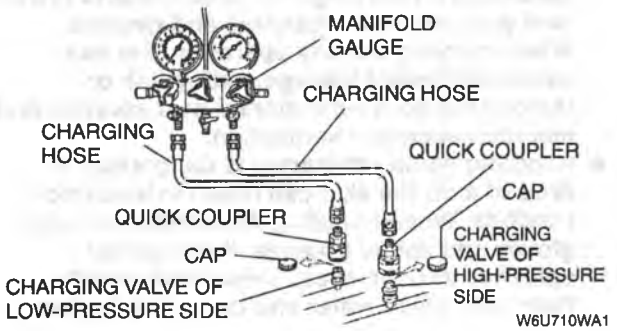


REFRIGERANT SYSTEM GENERAL PROCEDURES

Z6U071001039W03

Manifold Gauge Set Installation

1. Fully close the valves of the manifold gauge.
2. Connect the charging hoses to the high- and low-pressure side joints of the manifold gauge.

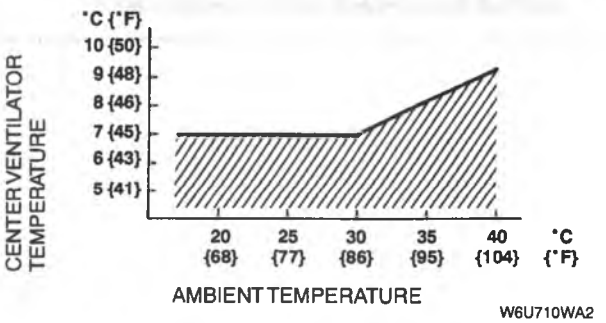


3. Connect the quick couplers to the ends of the charging hoses.
4. Connect the quick couplers to the charging valves.

REFRIGERANT SYSTEM PERFORMANCE TEST

Z6U071001039W04

1. Warm up the engine and run it at a constant **1,500 rpm.**
2. Set the fan switch at 4th position.
3. Turn the A/C switch on.
4. Set the RECIRCULATE mode.
5. Set the temperature control to MAX COLD.
6. Set the VENT mode.
7. Close all the doors and windows.
8. Wait until the center ventilator temperature stabilizes.
9. Measure the center ventilator temperature.
10. Measure the ambient temperature.
11. Verify that the intersection of the center ventilator temperature and the ambient temperature is in the shaded zone.

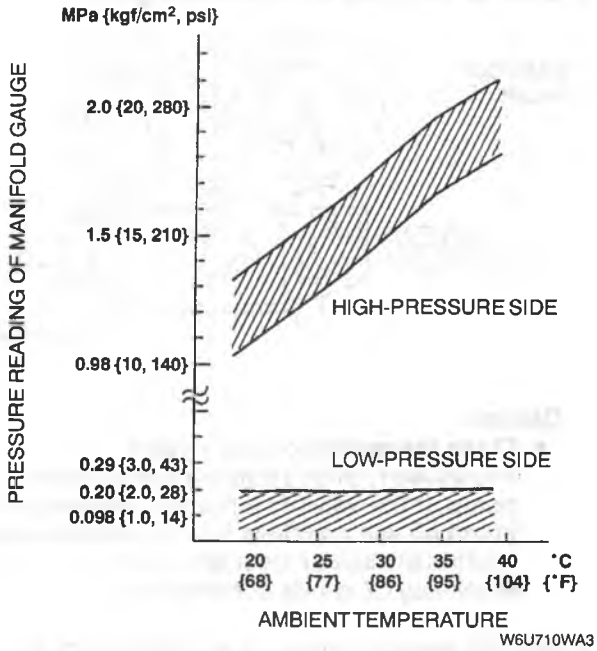


- If not as specified, troubleshoot the refrigerant system. (See 07-03-1 TROUBLESHOOTING INDEX.)

REFRIGERANT PRESSURE CHECK

1. Install the manifold gauge set.
2. Warm up the engine and run it at a constant **1,500 rpm**.
3. Set the fan switch at 4th position.
4. Turn the A/C switch on.
5. Set the RECIRCULATE mode.
6. Set the temperature control to MAX COLD.
7. Set the VENT mode.
8. Close all the doors and windows.
9. Measure the ambient temperature and the high- and low-pressure side reading of the manifold gauge.
10. Verify that the intersection of the pressure reading of the manifold gauge and ambient temperature is in the shaded zone.

Z6U071078834W01



- If not as specified, troubleshoot the refrigerant system. (See 07-03-1 TROUBLESHOOTING INDEX.)

REFRIGERANT CHARGING

Warning

- **Avoid breathing air conditioning refrigerant or lubricant vapor. Exposure may irritate eyes, nose and throat. Also, due to environmental concerns, use service equipment certified to meet the requirements of SAE J2210 (R-134a recycling equipment) when draining R-134a from the air conditioning system. If accidental system discharge occurs, ventilate work area before resuming service.**

Charging Recycled R-134a Refrigerant

Connect an R-134a Recovery/Recycling/Recharging device to the vehicle and follow the device manufacturer's instructions.

Charging New R-134a Refrigerant

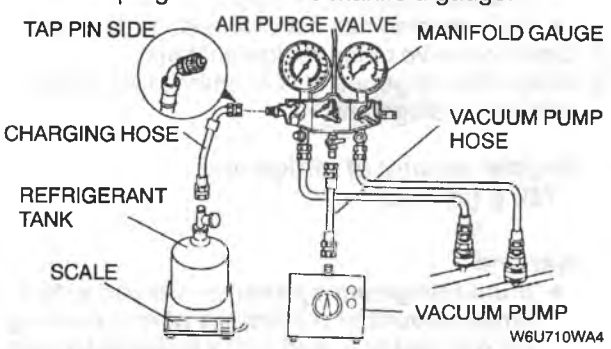
Caution

- **Do not exceed the specification when charging the system with refrigerant. Doing so will decrease the efficiency of the air conditioner or damage the refrigeration cycle parts.**

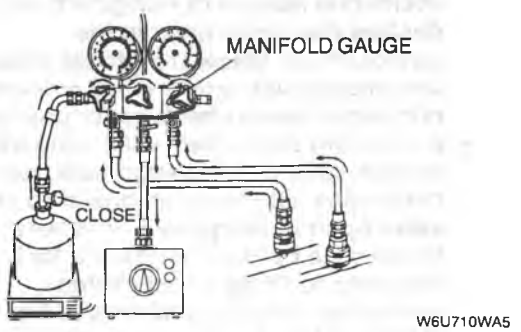
1. Install the manifold gauge set.

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2. Connect the tap pin side of the charging hose to the air purge valve of the manifold gauge.

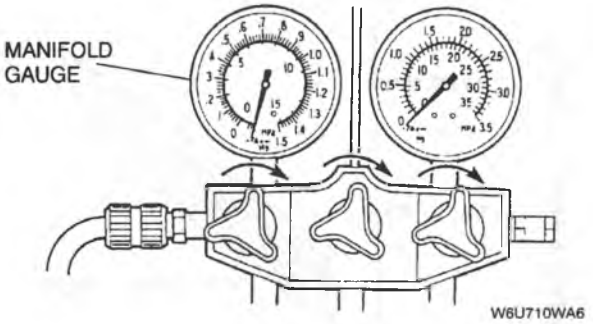


3. Connect the vacuum pump hose to the center joint of the manifold gauge.



4. Connect the vacuum pump hose to the vacuum pump.

5. Connect the charging hose to the refrigerant tank.
6. Place the refrigerant tank on the scale.
7. Open all the valves of the manifold gauge.



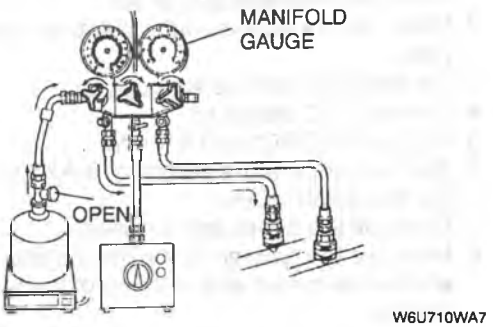
Caution
- **Close the manifold gauge valve immediately after stopping the vacuum pump. If the valve is left open, the vacuum pump oil will backflow into the refrigeration cycle and cause a decrease in the efficiency of the air conditioner.**

8. Start the vacuum pump and let it operate for **15 minutes**.
9. Verify that high- and low-pressure side readings of the manifold gauge are at **−101 kPa {−760 mmHg, −29.9 inHg}**. Close each valve of the manifold gauge.
10. Stop the vacuum pump and wait for **5 minutes**.
11. Check the high- and low-pressure side readings of the manifold gauge.
    - If the reading has changed, check for leaks and then repeat from step 7.
    - If the reading has not changed, go to step 12.
12. Open the valve of the refrigerant tank.
13. Weigh the refrigerant tank to charge the suitable amount of refrigerant.

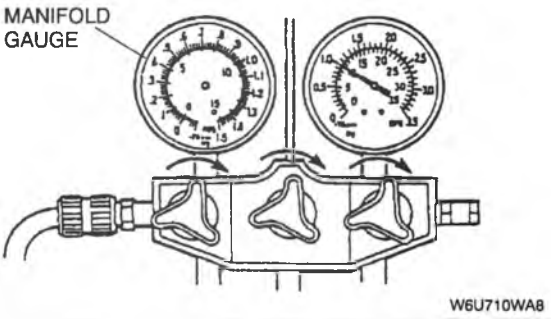
Regular amount of refrigerant
750 g {26.5 oz}

Warning
- **If the refrigerant system is charged with a large amount of refrigerant when checking for gas leakage, and if any leakage should occur, the refrigerant will be released into the atmosphere. In order to prevent the accidental release of refrigerant which can destroy the ozone layer in the stratosphere, follow the proper procedures and charge with only a small amount of refrigerant when checking for gas leakage.**
- **If charging the system with refrigerant by service cans or refrigerant tank, running the engine with the high-pressure side valve open is dangerous. Pressure within the service cans or refrigerant tank will increase and they could explode, scattering metal fragments and liquid refrigerant that can seriously injure you. Therefore, do not open the high-pressure side valve while the engine is running.**

14. Open the low-pressure side valve of the manifold gauge.



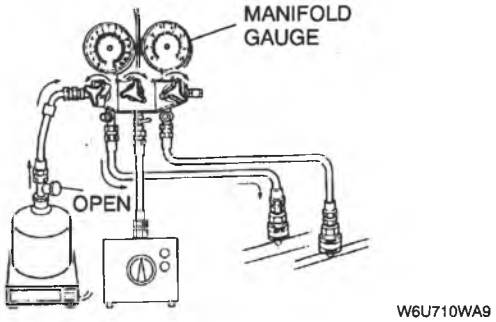
15. When the high-pressure side reading increases to **0.098 MPa {1.0 kgf/cm^2, 14 psi}**, close the low-pressure side valve of the manifold gauge.



16. Check for leaks from the cooler pipe/hose connections by using a gas leak tester.
    - If there are no leaks, go to step 18.
    - If a leak is found at a loose joint, tighten the joint, go to next step.
17. Check for leaks again.
    - If there are no leaks after tightening the joint, go to next step.
    - If there is still a leak at the same joint, discharge the refrigerant and then repair the joint. Repeat the charging procedure from step 7.

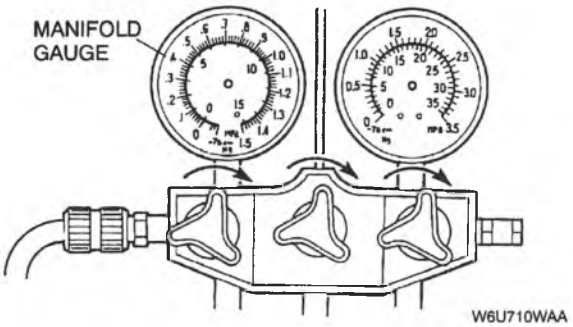
Warning
- **If charging the system with refrigerant using service cans or refrigerant tank, running the engine with the high-pressure side valve open is dangerous. Pressure within the service cans or refrigerant tank will increase and they could explode, scattering metal fragments and liquid refrigerant that can seriously injure you. Therefore, do not open the high-pressure side valve while the engine is running.**

18. Open the low-pressure side valve of the manifold gauge and charge with refrigerant until the weight of refrigerant tank has decreased **350 g {12.4 oz}** from the amount in step 13.



W6U710WA9

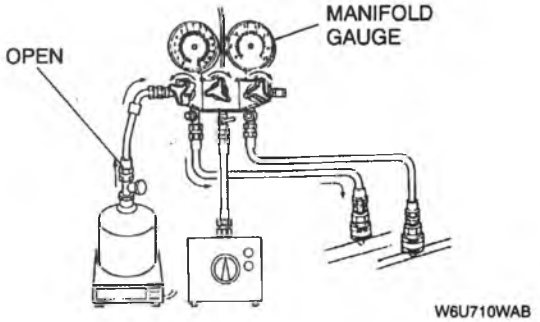
19. Close the low-pressure side valve of the manifold gauge.



W6U710WAA

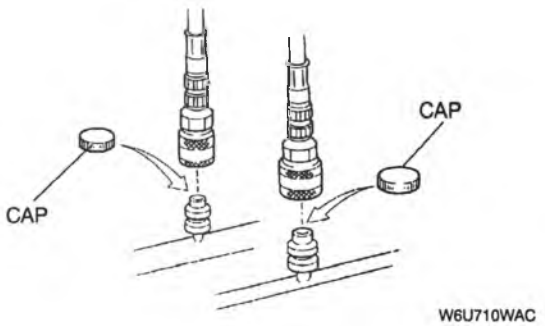
Warning
- **If charging the system with refrigerant by service cans or refrigerant tank, running the engine with the high-pressure side valve open is dangerous. Pressure within the service cans or refrigerant tank will increase and they could explode, scattering metal fragments and liquid refrigerant that can seriously injure you. Therefore, do not open the high-pressure side valve while the engine is running.**

20. Start the engine and actuate the A/C compressor.
21. Open the low-pressure side valve of the manifold gauge and charge with refrigerant until the weight of the refrigerant tank has decreased **750 g {26.5 oz}** from the amount in step 13.



W6U710WAB

22. Close the low-pressure side valve of the manifold gauge and the valve of the refrigerant tank.
23. Stop the engine and A/C compressor.
24. Check for leaks from the cooler pipe/hose connections by using a gas leak tester.
    - If there are no leaks, go to step 26.
    - If a leak is found at a loose joint, tighten the joint, go to next step.
25. Check for leaks again.
    - If there are no leaks after tightening the joint, go to next step.
    - If there is still a leak at the same joint, discharge the refrigerant and then repair the joint. Repeat the charging procedure from step 7.
26. Remove the manifold gauge set.
27. Install the caps to the charging valves.



W6U710WAC

REFRIGERANT RECOVERY

Z6U071078834W03

Warning
- **Avoid breathing air conditioning refrigerant or lubricant vapor. Exposure may irritate eyes, nose and throat. Also, due to environmental concerns, use service equipment certified to meet the requirements of SAE J2210 (R-134a recycling equipment) when draining R-134a from the air conditioning system. If accidental system discharge occurs, ventilate work area before resuming service.**

Connect an R-134a Recovery/Recycling/Recharging device to the vehicle and follow the device manufacturer's instructions.

07-11 BASIC SYSTEM

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BASIC SYSTEM

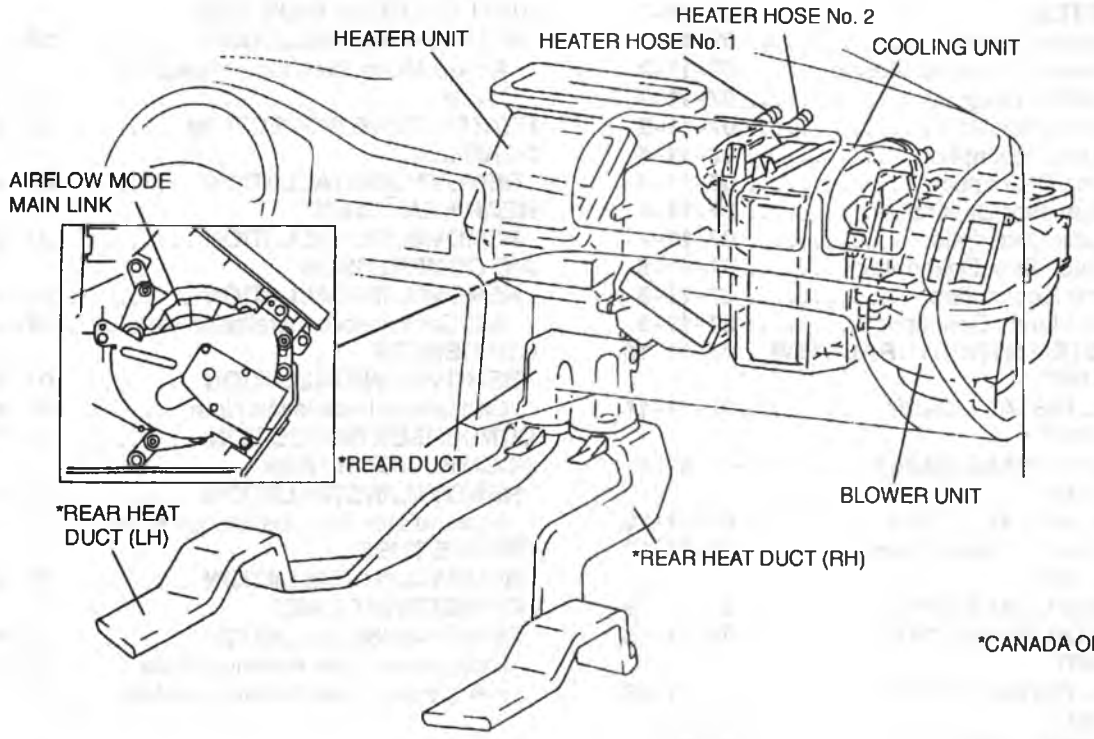
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Basic System Outline

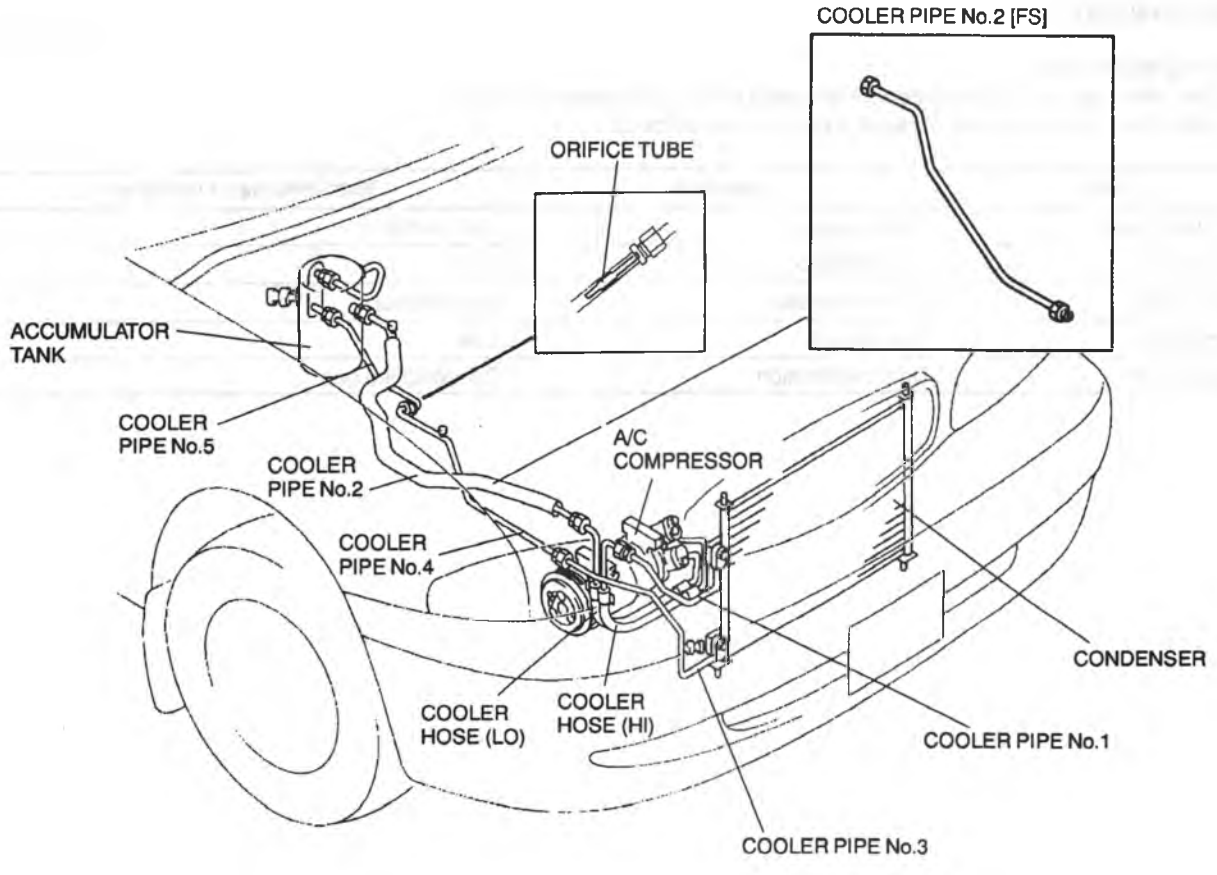
- The basic system is composed with parts which are basic of HVAC.
- Operation of main parts of basic system is as follows:

Item	Operation	State change of refrigerant
A/C compressor	Compression	High-pressure
Condenser	Condensation	Liquid
Orifice tube	Decompression	Low-pressure
Evaporator	Evaporation	Gas
Accumulator	Dehumidification	Dehumidified gas

Basic System Structural View
Passenger compartment



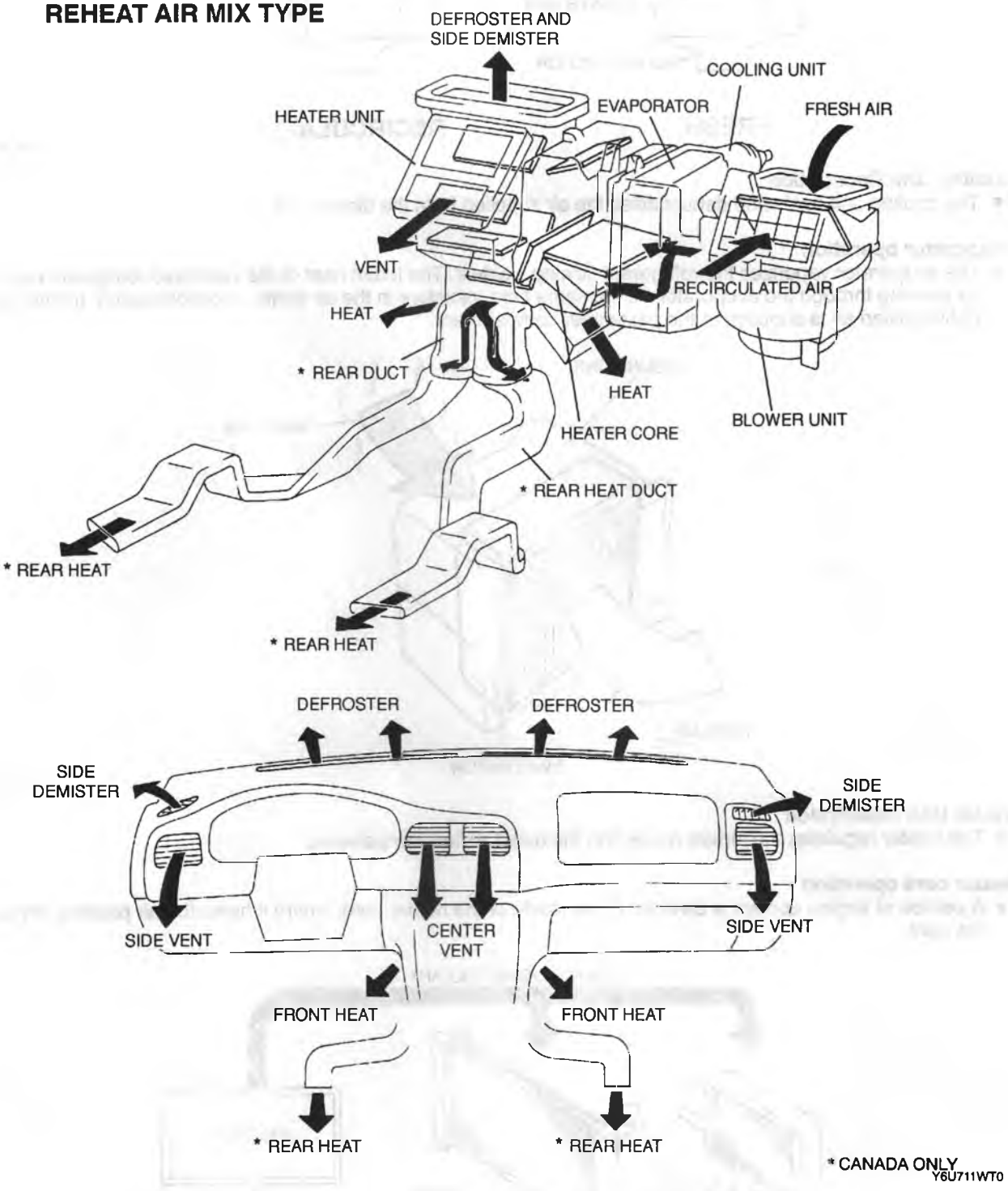
Engine room



Blower Airflow Diagram

- The air passes the blower unit, cooling unit, and heater unit then blows from each vent into the passenger compartment.
- When the heater is turned on, the air that passed from the blower unit is cooled, dehumidified and filtered by the evaporator, then heated by the heater core.
- The ventilation of the rear seats is improved by using rear heat ducts. (CANADA only)
- The side windows can be prevented from becoming cloudy by ventilation from the side demister.

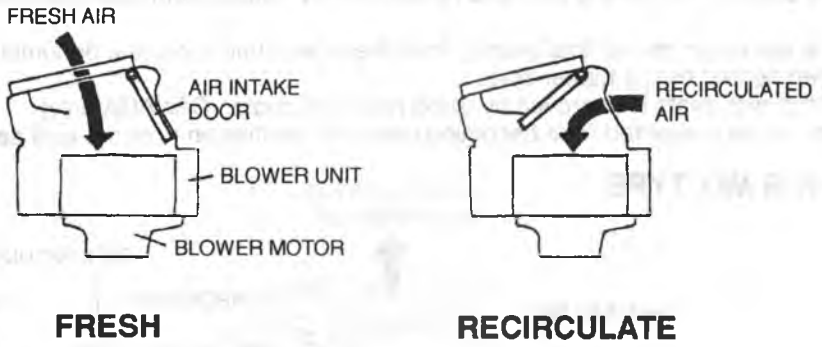
REHEAT AIR MIX TYPE



Blower Unit Description

- The blower unit blows either fresh air or recirculated air into the passenger compartment.

Air intake door operation



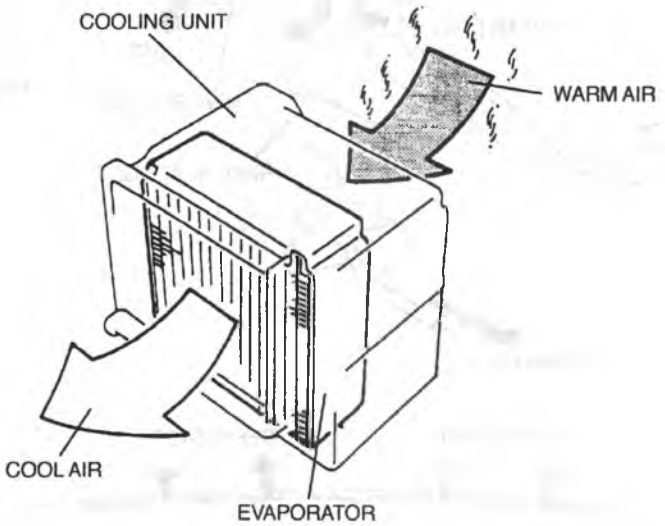
W6U711SA3

Cooling Unit Description

- The cooling unit cools and dehumidifies the air supplied from the blower unit.

Evaporator operation

- The evaporator vaporizes the refrigerant flowing inside it. The latent heat of the vaporized refrigerant cools the air passing through the evaporator. At the same time, moisture in the air forms as condensation. In this way, dehumidified air is supplied to the passenger compartment.



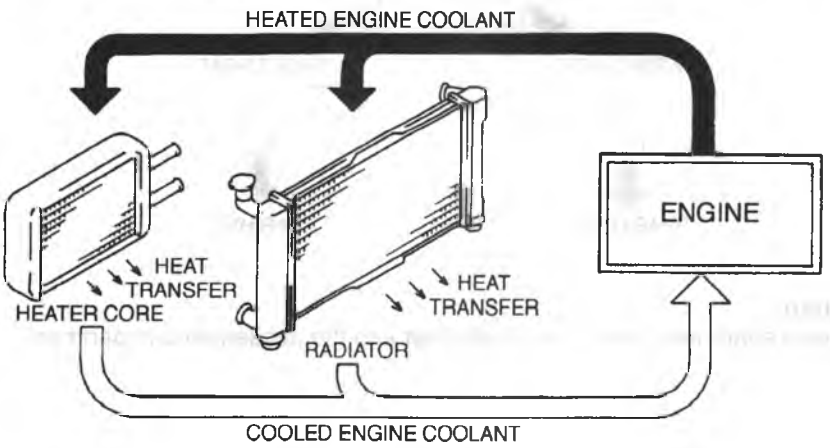
W6U711SA4

Heater Unit Description

- The heater regulates the airflow mode and the outlet airflow temperature.

Heater core operation

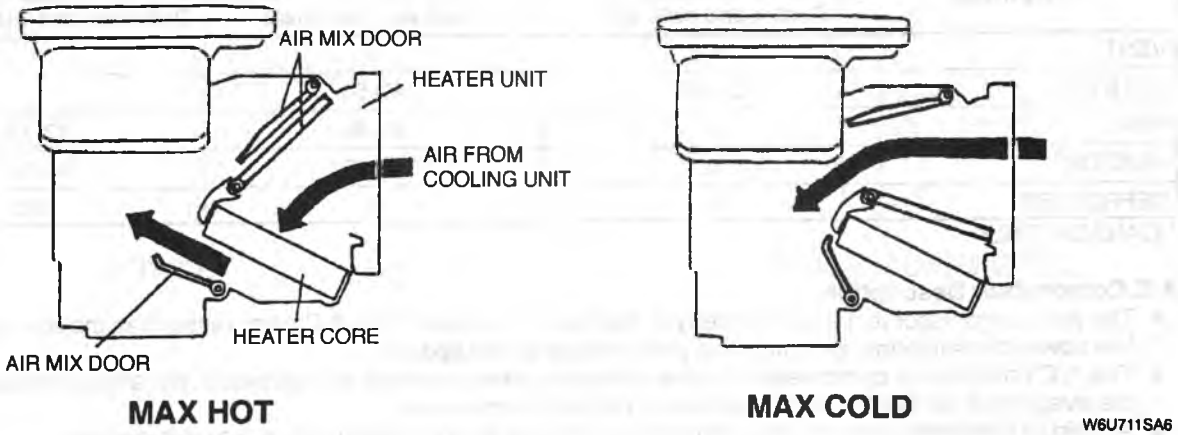
- A portion of engine coolant is diverted to the inside of the heater core, where it heats the air passing through the core.



W6U711SA5

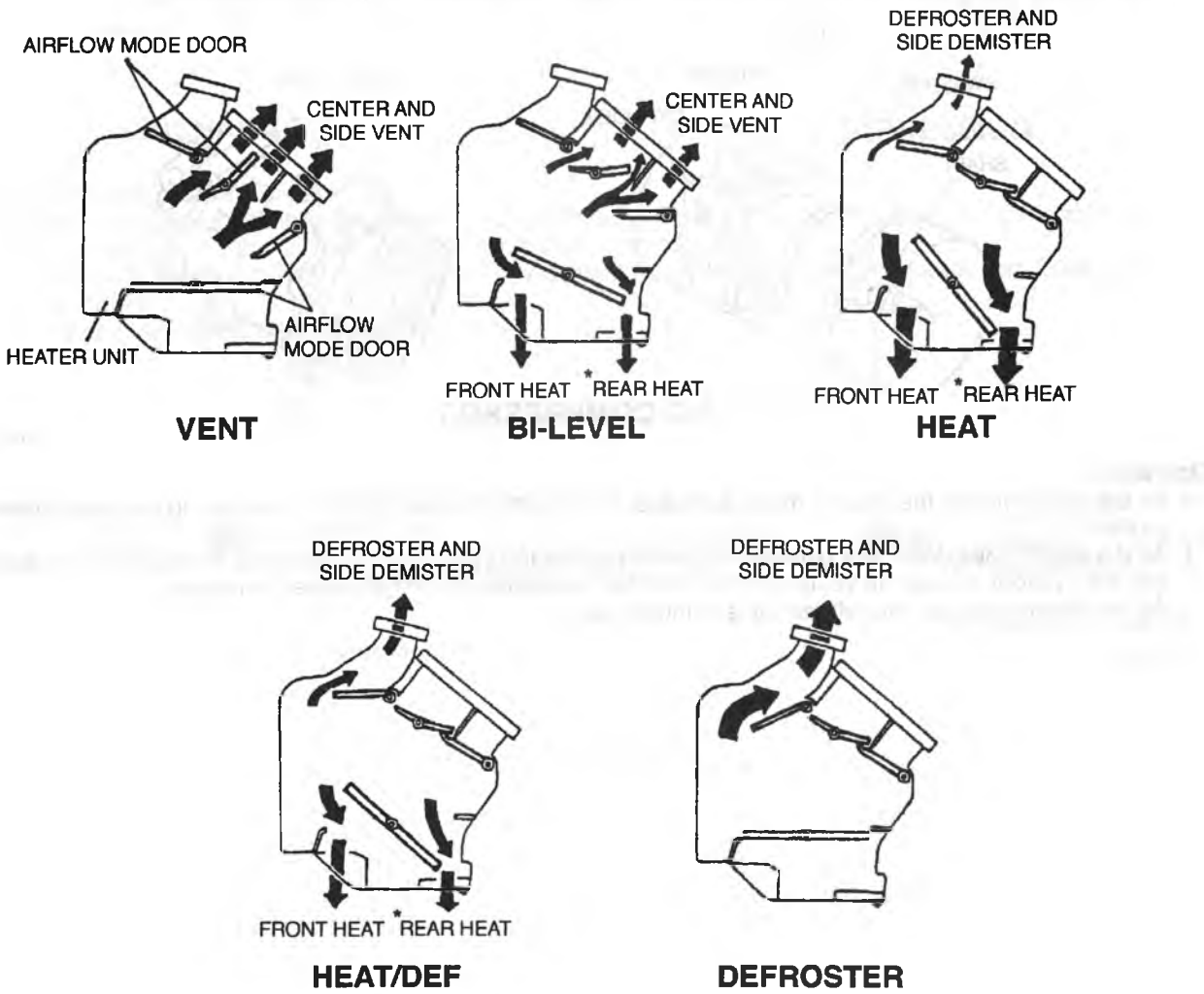
Air mix door operation

- The air mix doors, installed in the heater unit, move to each position: HOT or COLD, by the air mix actuator's operation. As a result, airflow distribution changes.



Airflow mode door operation

- The airflow mode doors, installed in the heater unit, move to each position: VENT, BI-LEVEL, HEAT, HEAT/DEF, DEFROSTER, by the airflow mode actuator's operation. As a result, airflow mode changes.



* CANADA ONLY

Y6U711WT1

Airflow distribution

Airflow mode	Distribution (%)		
	Center and side vent	Front and *rear heat	Defroster and side demister
VENT	100	0	0
BI-LEVEL	50-60	40-50	0
HEAT	0	82-88	12-18
HEAT/DEF	0	45-55	45-55
DEFROSTER	0	0	100

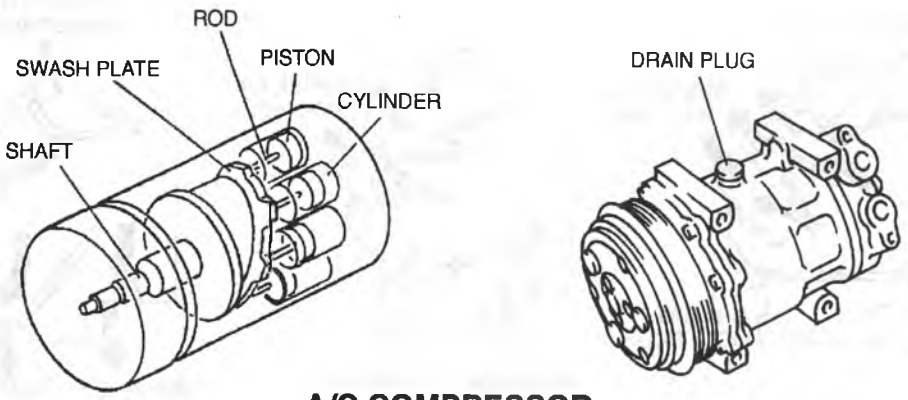
* CANADA ONLY

A/C Compressor Description

- The A/C compressor is a swash plate type that has 7 cylinders. This A/C compressor has the advantages of low power consumption and improved performance at low speeds.
- The A/C compressor compresses the low-pressure gaseous refrigerant vaporized into a high-pressure gas by the evaporator so that the condenser can liquidize it more easily.
- A drain plug is installed in the A/C compressor which improves service when the oil is drained.

Structure

- The A/C compressor consists mainly of a shaft, a swash plate, seven rods, and seven pistons.
- Seven pistons are fitted on the circumference of the swash plate which is fixed to the shaft.



A/C COMPRESSOR

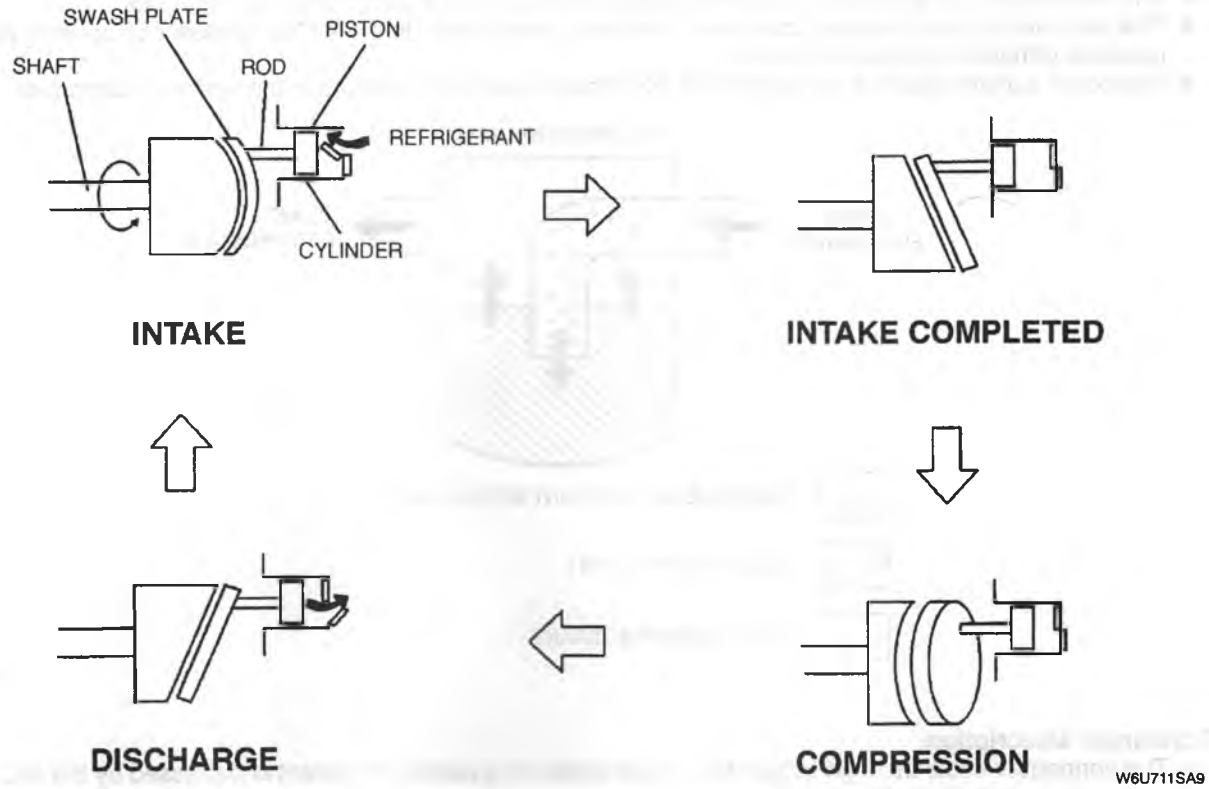
W6U711SA8

Operation

- As the shaft rotates, the pistons move back and forth inside the cylinders to correspond to the swash plate motion.

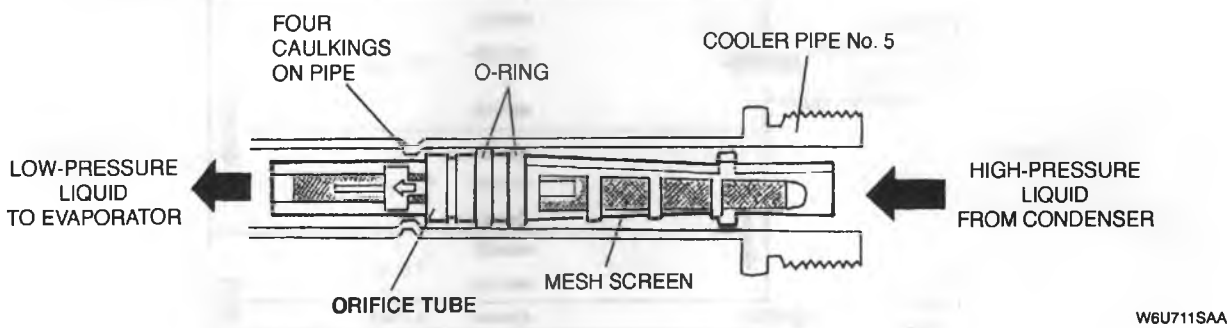
1. As the piston goes down, the outside refrigerant pushes the suction valve down and the refrigerant is sucked into the cylinder so that the volume of the chamber increases and the pressure decreases.
2. As the piston goes up, the refrigerant is compressed.

3. The compressed refrigerant pushes the discharge valve up and the refrigerant is discharged from the cylinder.



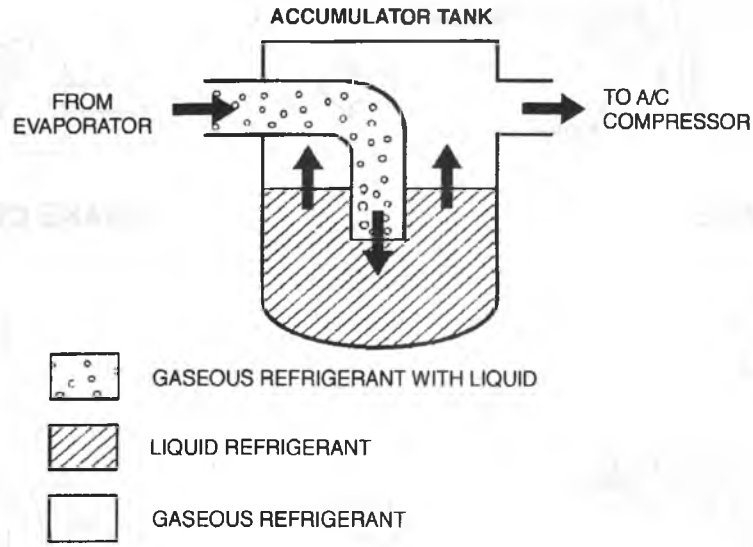
Orifice Tube Description

- The orifice tube reduces the pressure of the liquid refrigerant and at the same time, it adjusts the amount of the liquid refrigerant supplied to the evaporator to maintain cooling ability.
- Two O-rings are installed in the orifice tube. They prevent high-pressure liquid refrigerant from flowing out to the evaporator.
- The orifice tube is installed in cooler pipe No. 5.



Accumulator Tank Description

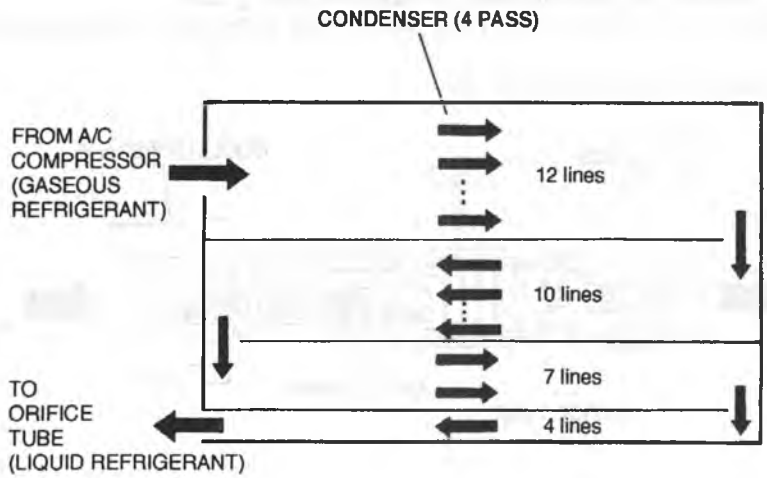
- The accumulator tank is a device which separates the gas from the liquid for the refrigerant.
- The accumulator tank prevents the liquid from being compressed in the A/C compressor by sending only gaseous refrigerant to the compressor.
- Desiccant a drying agent is installed in the accumulator tank and moisture in the system is absorbed.



W6U711SAB

Condenser Description

- The condenser cools the high temperature, high pressure gaseous refrigerant compressed by the A/C compressor, and converts it to a liquid.
- A multiflow condenser is used. Refrigerant is divided and moved through several tubes. This reduces flow passage resistance and increases the surface area for heat exchange, thereby improving cooling efficiency.

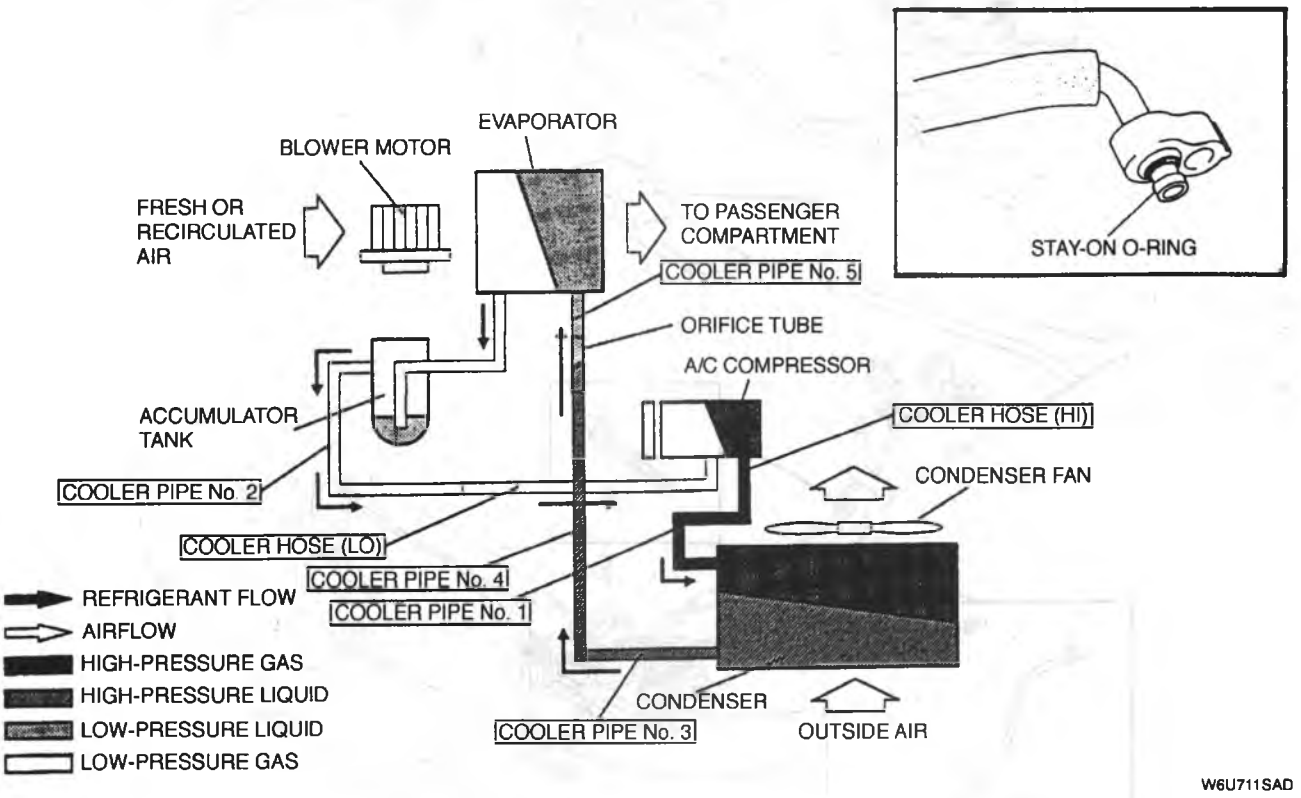


W6U711SAC

Refrigerant Lines Description

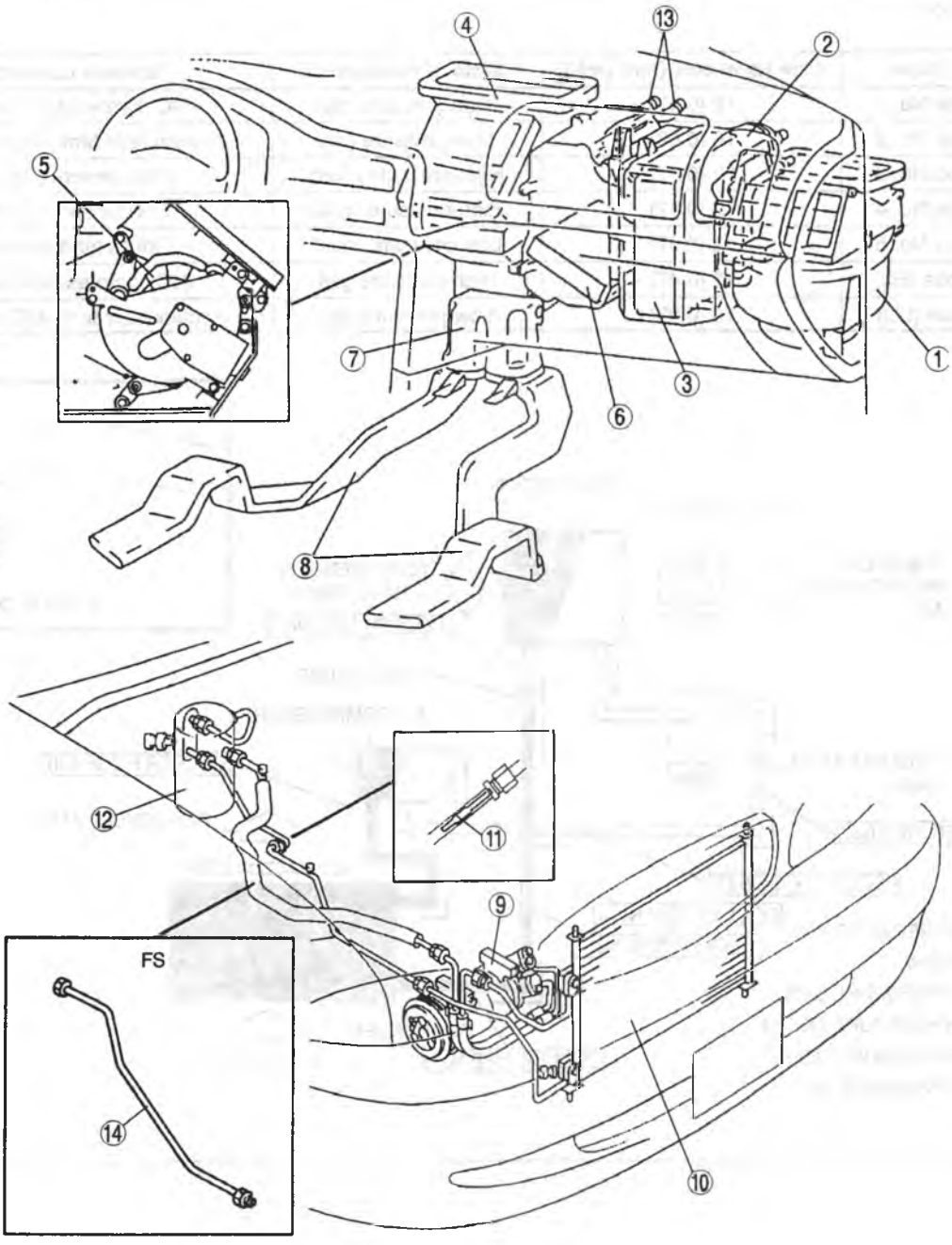
- Main component of the A/C system are connected with five pipes and two hoses.
- To prevent O-rings from falling off while piping work is being done, stay-on O-rings are used on block piping connections.

Hose or pipe	Size [diameter (mm {in})]	State of refrigerant	Between connections
Cooler pipe No. 1	12 {0.47}	High-pressure gas	A/C compressor-condenser
Cooler pipe No. 2	16 {0.63}	Low-pressure gas	Accumulator tank-A/C compressor
Cooler pipe No. 3	12 {0.47}	High-pressure liquid	Condenser-orifice tube
Cooler pipe No. 4	12 {0.47}	High-pressure liquid	Condenser-orifice tube
Cooler pipe No. 5	12 {0.47}	Low-pressure liquid	Orifice tube-evaporator
Cooler hose (HI)	12 {0.47}	High-pressure gas	A/C compressor-condenser
Cooler hose (LO)	16 {0.63}	Low-pressure gas	Accumulator tank-A/C compressor



BASIC SYSTEM STRUCTURAL VIEW

Z6U071101040W02



Y6U711WA0

1	Blower unit
2	Cooling unit
3	Evaporator
4	Heater unit
5	Airflow mode main link
6	Heater core
7	Rear duct (CANADA only)

8	Rear heat duct (CANADA only)
9	A/C compressor
10	Condenser
11	Orifice tube
12	Accumulator tank
13	Heater hose
14	Refrigerant lines

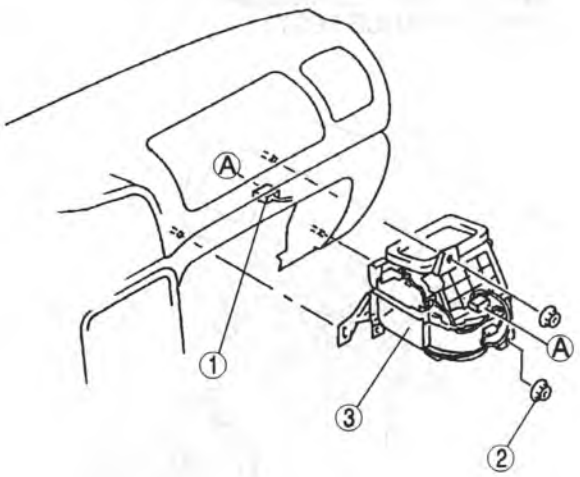
BLOWER UNIT REMOVAL/INSTALLATION

Z6U071161140W01

1. Disconnect the negative battery cable.
2. Remove the cooling unit. (See 07-11-12 COOLING UNIT REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Connector
2	Nut
3	Blower unit

4. Install in the reverse order of removal.



W6U711WA1

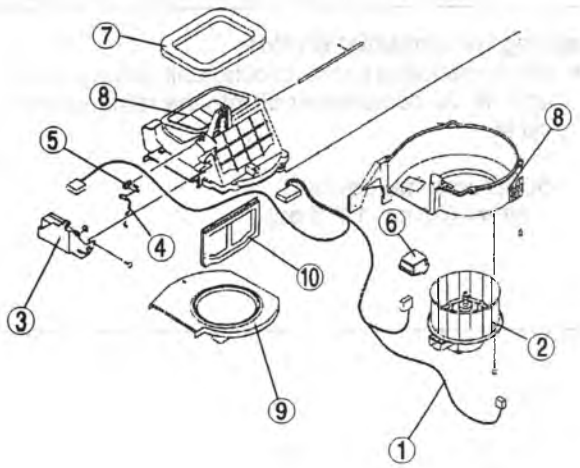
BLOWER UNIT DISASSEMBLY/ASSEMBLY

Z6U071161140W02

1. Disassemble in the order indicated in the table.

1	Blower harness
2	Blower motor
3	Air intake actuator
4	Air intake rod
5	Air intake link
6	Resistor
7	Polyurethane protector
8	Case
9	Air guider
10	Air intake door

2. Assemble in the reverse order of disassembly.

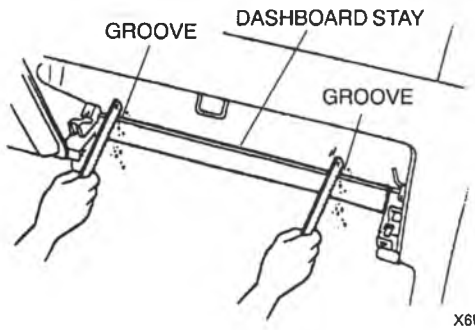


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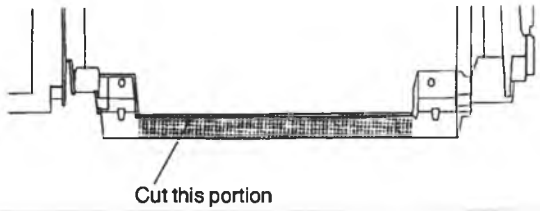
COOLING UNIT REMOVAL/INSTALLATION

Z6U071161520W01

1. Evacuate the refrigerant from the system.
2. Remove the center lower panel. (See 09-17-4 CENTER LOWER PANEL REMOVAL/INSTALLATION.)
3. Cut the grooves of dashboard stay as shown below using a coping saw.



X6U711WA0

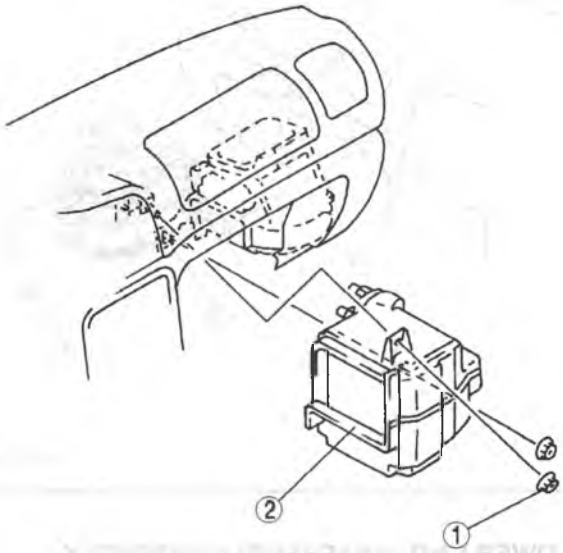


X6U711WA3

Caution

- **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise will occur. Always immediately plug all open fittings after removing any refrigeration cycle parts to keep moisture or foreign material out of the cycle.**

4. Disconnect the accumulator tank. (See 07-11-19 ACCUMULATOR TANK REMOVAL/INSTALLATION.)
5. Disconnect cooler pipe No.5. (See 07-11-20 REFRIGERANT LINES REMOVAL/INSTALLATION.)
6. Remove in the order indicated in the table. Do not allow compressor oil to spill.
7. Install in the reverse order of removal.
8. Recharge with refrigerant. (See 07-10-3 REFRIGERANT CHARGING.) (See 07-10-5 REFRIGERANT RECOVERY.)
9. Perform the refrigerant system performance test. (See 07-10-2 REFRIGERANT SYSTEM PERFORMANCE TEST.)



W6U711WA3

1	Nut
2	Cooling unit (See 07-11-12 Cooling Unit Installation Note)

Cooling Unit Installation Note

- When installing a new cooling unit (evaporator), add SP-20 compressor oil into the refrigeration cycle.

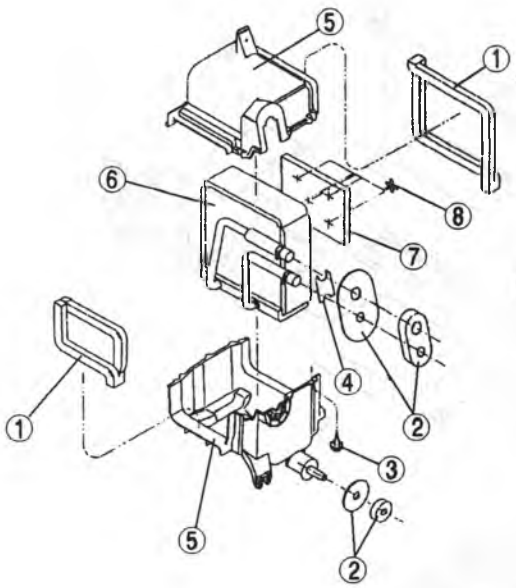
Supplemental amount
50 ml {50 cc, 1.7 fl oz}

COOLING UNIT DISASSEMBLY/ASSEMBLY

Z6U071161520W02

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

1	Polyurethane protector
2	Seal
3	Screw
4	Spacer
5	Case
6	Evaporator
7	Air filter
8	Clip



X6U711WA1

EVAPORATOR INSPECTION

Z6U071161810W01

1. Remove the evaporator from the cooling unit. (See 07-11-13 COOLING UNIT DISASSEMBLY/ASSEMBLY.)
2. Check for cracks, damage, and oil leakage. If any are found, replace the evaporator.
3. Check for bent fins. If any are bent, use a flathead screwdriver to straighten them.

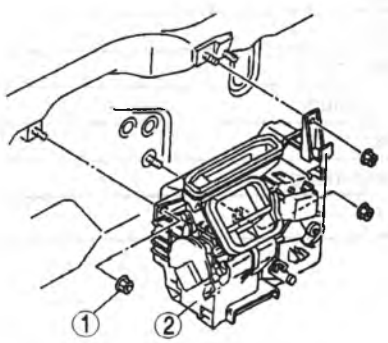
HEATER UNIT REMOVAL/INSTALLATION

Z6U071161130W01

1. Disconnect the negative battery cable.
2. Drain the engine coolant. (See 01-12-2 ENGINE COOLANT REPLACEMENT.)
3. Remove the dashboard. (See 09-17-2 DASHBOARD REMOVAL/INSTALLATION.)
4. Remove the cooling unit. (See 07-11-12 COOLING UNIT REMOVAL/INSTALLATION.)
5. Remove the rear duct.
6. Disconnect the heater hoses.
7. Remove in the order indicated in the table.

1	Nut
2	Heater unit

8. Install in the reverse order of removal.

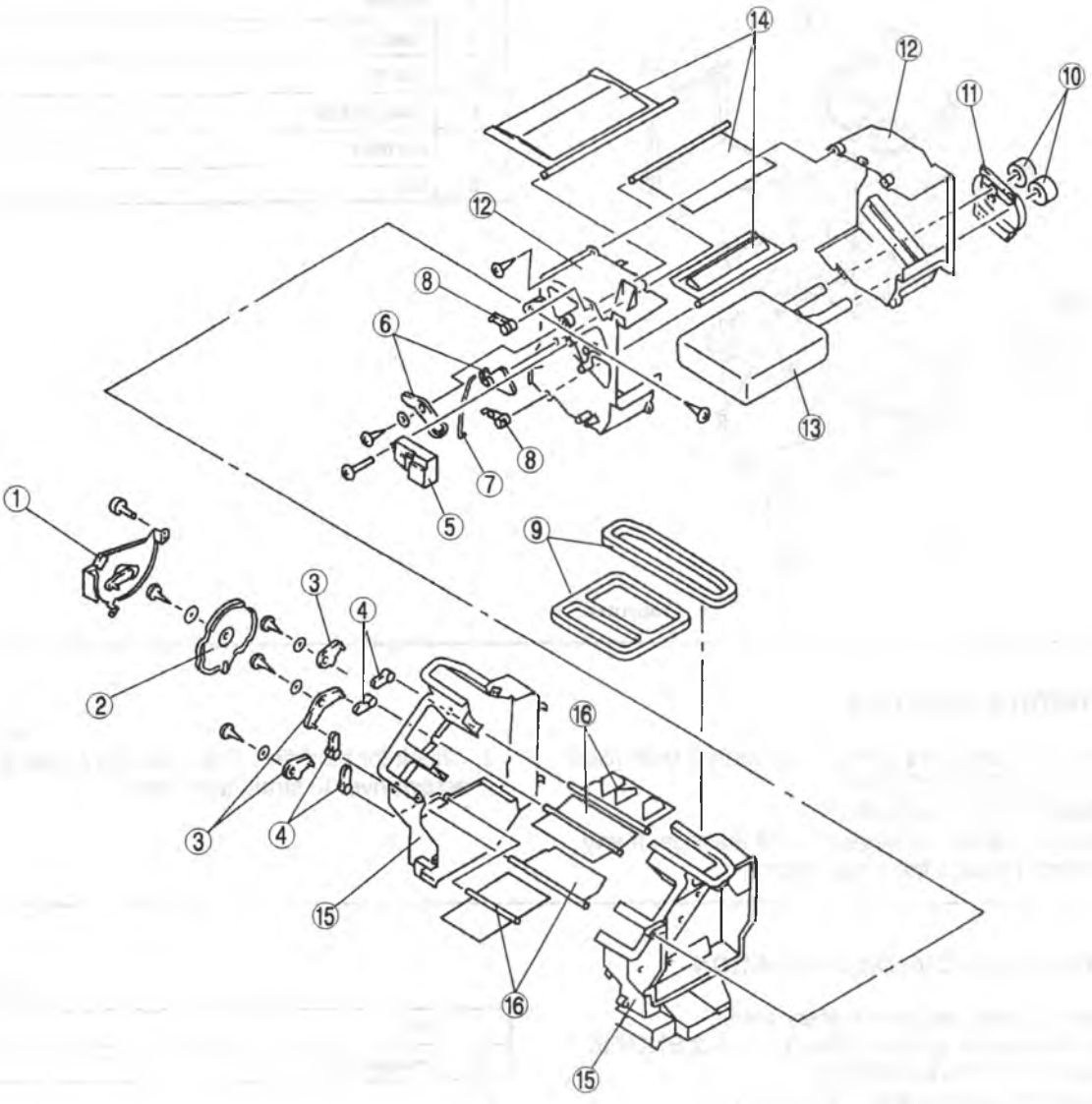


W6U711WA5

HEATER UNIT DISASSEMBLY/ASSEMBLY

Z6U071161130W02

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



W6U711WA6

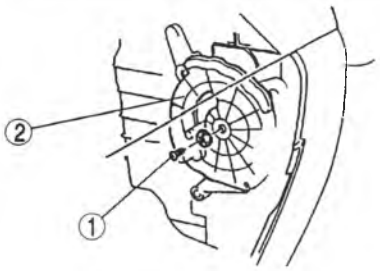
1	Airflow mode actuator
2	Airflow mode main link
3	Airflow mode sub link
4	Airflow mode crank
5	Air mix actuator
6	Air mix link
7	Air mix rod
8	Air mix crank

9	Polyurethane protector
10	Seal
11	Cover
12	Case
13	Heater core
14	Air mix door
15	Case
16	Airflow mode door

AIRFLOW MODE MAIN LINK REMOVAL/INSTALLATION

Z6U071161030W01

1. Disconnect the negative battery cable.
2. Remove the airflow mode actuator.
3. Remove in the order indicated in the table.



W6U711WA7

1	Screw
2	Airflow mode main link (See 07-11-15 Airflow Mode Main Link Installation Note)

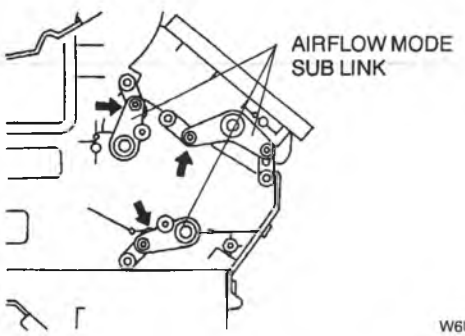
4. Install in the reverse order of removal.

Airflow Mode Main Link Installation Note

Caution

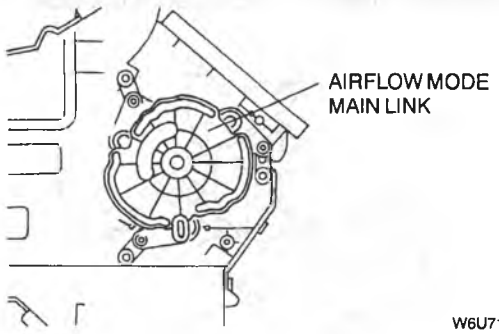
- **If any grease other than the specified grease is applied to the links, abnormal noise will occur or the links will not properly operate. Therefore, do not apply any grease to the links.**

1. Push and hold each airflow mode sub link in the direction of the arrow.



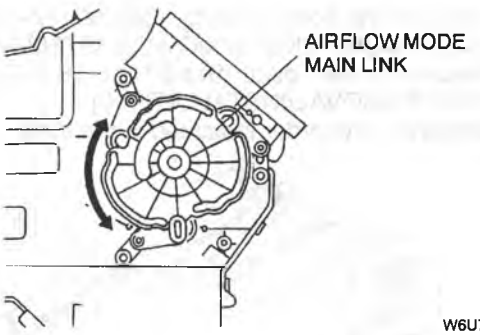
W6U711WA8

2. Set the airflow mode main link to the heater unit as shown in the figure.



W6U711WAH

3. Press the airflow mode main link lightly and rotate it in the direction of the arrow, then set the projections of each airflow mode sub link into the grooves of the airflow mode main link.



W6U711WA9

4. Rotate airflow mode main link and verify that each mode is accessed properly.

HEATER CORE INSPECTION

Z6U071161910W01

1. Remove the heater core from the heater unit. (See 07-11-14 HEATER UNIT DISASSEMBLY/ASSEMBLY.)
2. Check for cracks, damage, and coolant leakage.
   - If any are found, replace the heater core.
3. Check for bent fins.
   - If any are bent, use a flathead screwdriver to straighten them.
4. Verify that the heater core inlet and outlet are not distorted or damaged. Repair with pliers if necessary.

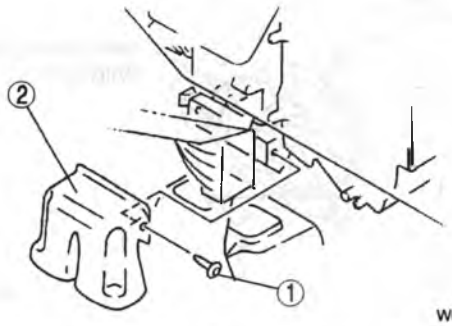
REAR DUCT REMOVAL/INSTALLATION

Z6U071161271W01

1. Remove the side wall. (See 09-17-8 SIDE WALL REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.

1	Fastener
2	Rear duct

3. Install in the reverse order of removal.



W6U711WAA

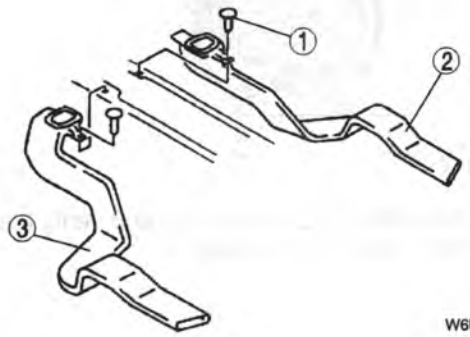
REAR HEAT DUCT REMOVAL/INSTALLATION

Z6U071161273W01

1. Turn over the floor covering. (See 09-17-16 FLOOR COVERING REMOVAL/INSTALLATION.)
2. Remove the rear duct. (See 07-11-16 REAR DUCT REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Fastener
2	Rear heat duct (RH)
3	Rear heat duct (LH)

4. Install in the reverse order of removal.



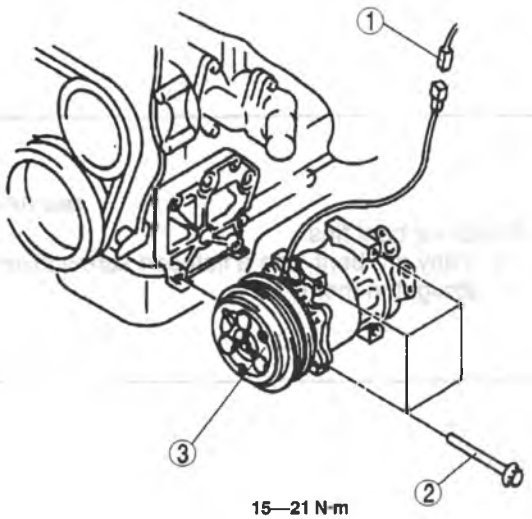
W6U711WAB

A/C COMPRESSOR REMOVAL/INSTALLATION

1. Evacuate the refrigerant from the system.
2. Disconnect the negative battery cable.
3. Remove the under cover.
4. Remove the drive belt.

Caution
- **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise will occur. Always immediately plug all open fittings after removing any refrigeration cycle parts to keep moisture or foreign material out of the cycle.**

5. Disconnect the cooler hoses (HI) and (LO). (See 07-11-20 REFRIGERANT LINES REMOVAL/INSTALLATION.)
6. Remove in the order indicated in the table. Do not allow compressor oil to spill.



X6U711WA4

Z6U071161450W01

1	Connector
2	Bolt
3	A/C compressor (See 07-11-17 A/C Compressor Installation Note)

7. Install in the reverse order of removal.
8. Adjust the drive belt. (See 01-10A-2 DRIVE BELT ADJUSTMENT [FS].)(See 01-10B-2 DRIVE BELT ADJUSTMENT [KL].)
9. Recharge with refrigerant. (See 07-10-3 REFRIGERANT CHARGING.) (See 07-10-5 REFRIGERANT RECOVERY.)
10. Perform the refrigerant system performance test. (See 07-10-2 REFRIGERANT SYSTEM PERFORMANCE TEST.)

A/C Compressor Installation Note
- Remove the following amount of SP-20 compressor oil from the new A/C compressor when replacing the A/C compressor.

Compressor oil to be removed
240 ml {240 cc, 8.11 fl oz} - [compressor oil from old A/C compressor + 15 ml {15 cc, 0.5 fl oz}]

CONDENSER REMOVAL/INSTALLATION

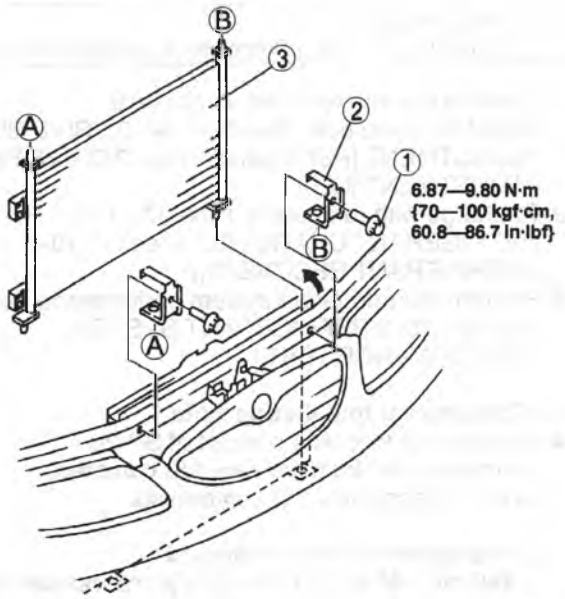
Z6U071161480W01

1. Evacuate the refrigerant from the system.
2. Disconnect the negative battery cable.
3. Remove the upper seal board.

Caution
- **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise will occur. Always immediately plug all open fittings after removing any refrigeration cycle parts to keep moisture or foreign material out of the cycle.**

4. Disconnect cooler pipe No.1 and No.3. (See 07-11-20 REFRIGERANT LINES REMOVAL/INSTALLATION.)
5. Remove in the order indicated in the table. Do not allow compressor oil to spill.
6. Install in the reverse order of removal.
7. Recharge with refrigerant. (See 07-10-3 REFRIGERANT CHARGING.) (See 07-10-5 REFRIGERANT RECOVERY.)

8. Perform the refrigerant system performance test. (See 07-10-2 REFRIGERANT SYSTEM PERFORMANCE TEST.)



W6U711WAD

1	Bolt
2	Condenser bracket
3	Condenser (See 07-11-18 Condenser Installation Note)

Condenser Installation Note

- When installing a new condenser, add SP-20 compressor oil into the refrigeration cycle.

Supplemental amount
25 ml {25 cc, 0.8 fl oz}

CONDENSER INSPECTION

Z6U071161480W02

1. Check for cracks, damage, and oil leakage.
   - If any are found, replace the condenser.
2. Check for fins clogged by dust.
   - If any are clogged, remove the dust from the fins.
3. Check for bent fins.
   - If any are bent, use a flathead screwdriver to straighten them.

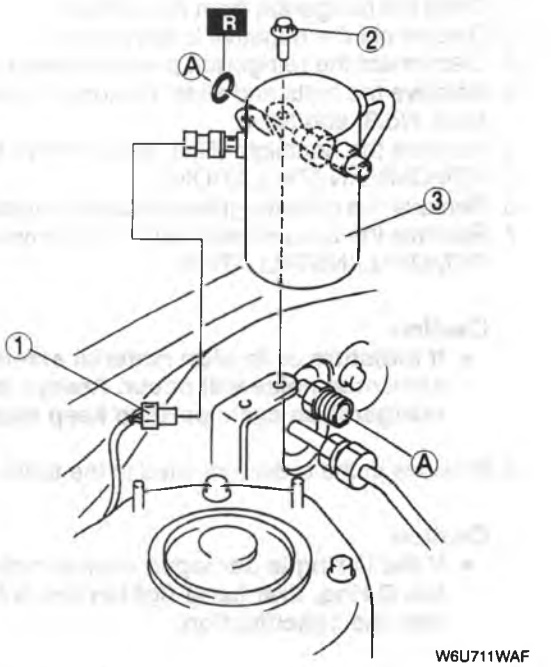
ACCUMULATOR TANK REMOVAL/INSTALLATION

Z6U071161500W01

1. Evacuate the refrigerant from the system.
2. Disconnect the negative battery cable.

Caution
- **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise will occur. Always immediately plug all open fittings after removing any refrigeration cycle parts to keep moisture or foreign material out of the cycle.**

3. Disconnect cooler pipe No.2 (See 07-11-20 REFRIGERANT LINES REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table. Do not allow compressor oil to spill.
5. Install in the reverse order of removal.
6. Recharge with refrigerant. (See 07-10-3 REFRIGERANT CHARGING.) (See 07-10-5 REFRIGERANT RECOVERY.)
7. Perform the refrigerant system performance test. (See 07-10-2 REFRIGERANT SYSTEM PERFORMANCE TEST.)



W6U711WAF

1	Connector
2	Bolt
3	Accumulator tank (See 07-11-19 Accumulator Tank Installation Note)

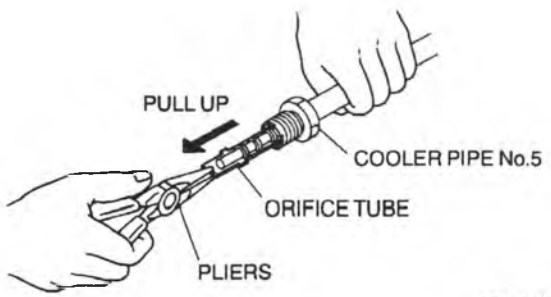
Accumulator Tank Installation Note
- When installing a new accumulator tank, add SP-20 compressor oil into the refrigeration cycle.

Supplemental amount
15 ml {15 cc, 0.5 fl oz}

ORIFICE TUBE REMOVAL/INSTALLATION

Z6U071161409W01

1. Drain the refrigerant from the system.
2. Remove cooler pipe No.5. (See 07-11-20 REFRIGERANT LINES REMOVAL/INSTALLATION.)
3. Remove the orifice tube carefully to prevent it from breaking.



W6U711WAE

4. Install in the reverse order of removal.
5. Recharge with refrigerant. (See 07-10-3 REFRIGERANT CHARGING.) (See 07-10-5 REFRIGERANT RECOVERY.)
6. Perform the refrigerant system performance test. (See 07-10-2 REFRIGERANT SYSTEM PERFORMANCE TEST.)

REFRIGERANT LINES REMOVAL/INSTALLATION

Z6U071161460W01

1. Drain the refrigerant from the system.
2. Disconnect the negative battery cable.
3. Disconnect the refrigerant pressure switch (HI) connector, then remove cooler pipe No.3.
4. Remove the bolts and slide the coolant reservoir, then remove the cooler hose (HI), (LO), cooler pipe No.1, No.2, No.3, and No.4.
5. Remove the headlight (RH), then remove cooler pipe No.1 and No.3. (See 09-18-2 HEADLIGHT REMOVAL/INSTALLATION.)
6. Remove the radiator grille and splash shield, then remove cooler pipe No.3.
7. Remove the accumulator tank, then remove cooler pipe No.5. (See 07-11-19 ACCUMULATOR TANK REMOVAL/INSTALLATION.)

Caution

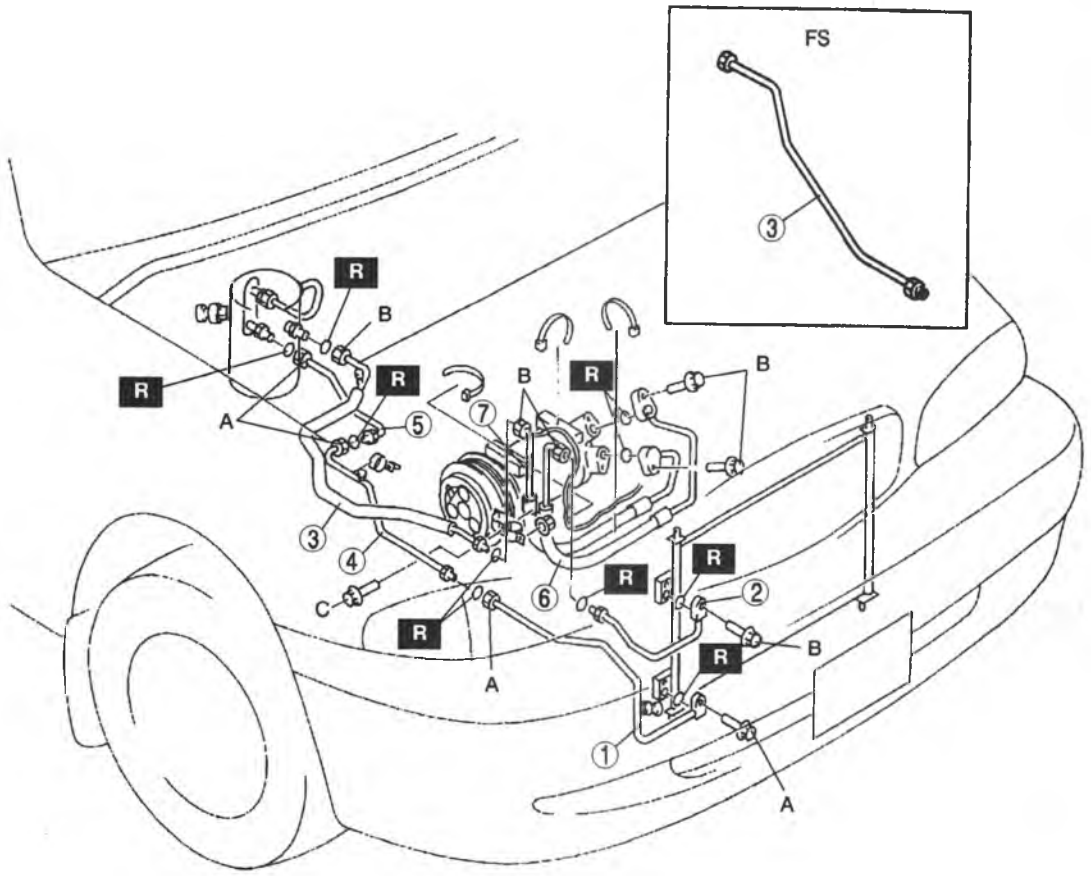
- **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise will occur. Always immediately plug all open fittings after removing any refrigeration cycle parts to keep moisture or foreign material out of the cycle.**

8. Remove in the order indicated in the table. Do not allow compressor oil to spill.

Caution

- **If the O-ring is damaged during installation, gas leakage can occur. In order to prevent damaging the O-ring, first hand-tighten the nut or bolt on the piping connection, then use a wrench to tighten into the specification.**

9. Install in the reverse order of removal.
10. Recharge with refrigerant. (See 07-10-3 REFRIGERANT CHARGING.) (See 07-10-5 REFRIGERANT RECOVERY.)
11. Perform the refrigerant system performance test. (See 07-10-2 REFRIGERANT SYSTEM PERFORMANCE TEST.)



A: 15—24 N·m {1.5—2.5 kgf·m, 11—18 ft·lbf}
B: 20—29 N·m {2.0—3.0 kgf·m, 15—21 ft·lbf}
C: 4.0—5.8 N·m {40—60 kgf·Cm, 35—52 In·lbf}
Y6U711WA1

1	Cooler pipe No.3 (See 07-11-21 Refrigerant Lines Removal Note) (See 07-11-21 Refrigerant Lines Installation Note)
2	Cooler pipe No.1 (See 07-11-21 Refrigerant Lines Removal Note) (See 07-11-21 Refrigerant Lines Installation Note)
3	Cooler pipe No.2 (See 07-11-21 Refrigerant Lines Removal Note) (See 07-11-21 Refrigerant Lines Installation Note)
4	Cooler pipe No.4 (See 07-11-21 Refrigerant Lines Removal Note) (See 07-11-21 Refrigerant Lines Installation Note)
5	Cooler pipe No.5 (See 07-11-21 Refrigerant Lines Removal Note) (See 07-11-21 Refrigerant Lines Installation Note)
6	Cooler hose (HI) (See 07-11-21 Refrigerant Lines Removal Note) (See 07-11-21 Refrigerant Lines Installation Note)
7	Cooler hose (LO) (See 07-11-21 Refrigerant Lines Removal Note) (See 07-11-21 Refrigerant Lines Installation Note)

Refrigerant Lines Removal Note

- Loosen the nut by using 2 spanners, then remove the cooler pipe.

Refrigerant Lines Installation Note

- Tighten the nut by using a spanner and a torque wrench, then install the cooler pipe or hose.
- Apply compressor oil to O-rings and connect the joint.
- When installing a new cooler pipe or hose, add SP-20 compressor oil into the refrigeration cycle.

Supplemental amount
10 ml {10 cc, 0.3 fl oz}

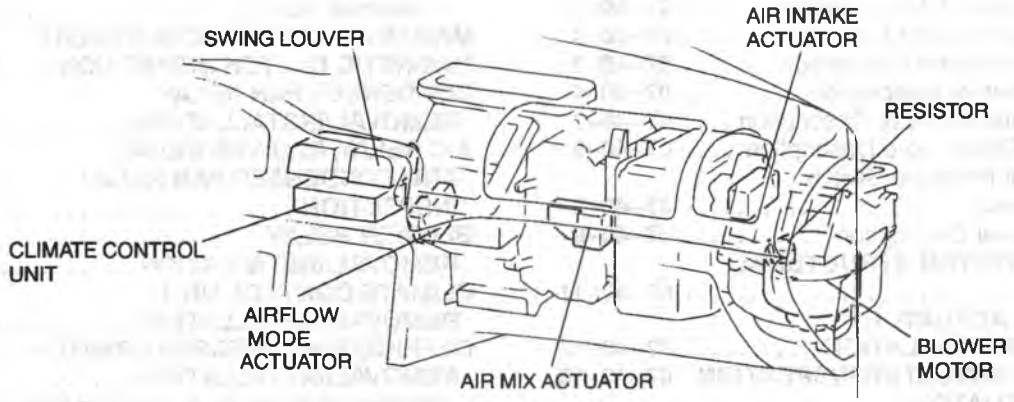
07-40 CONTROL SYSTEM

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CONTROL SYSTEM

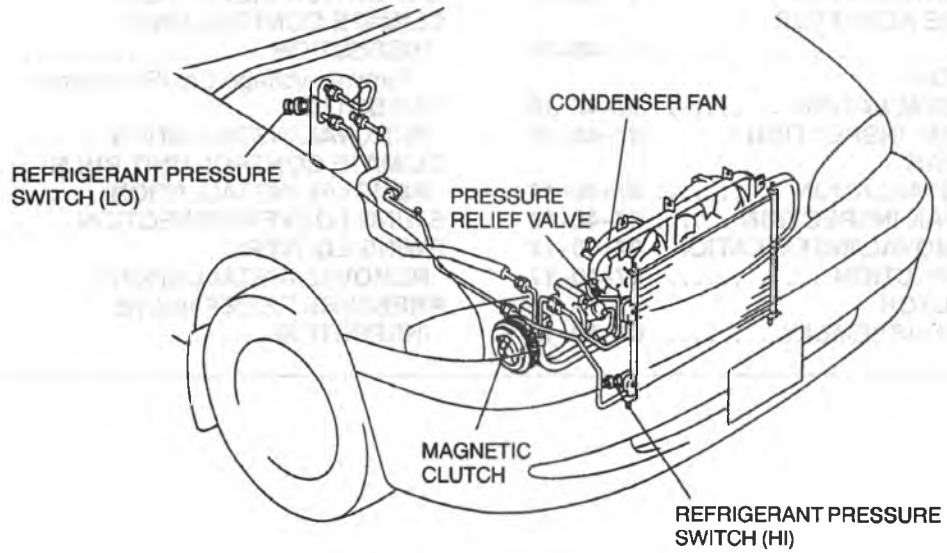
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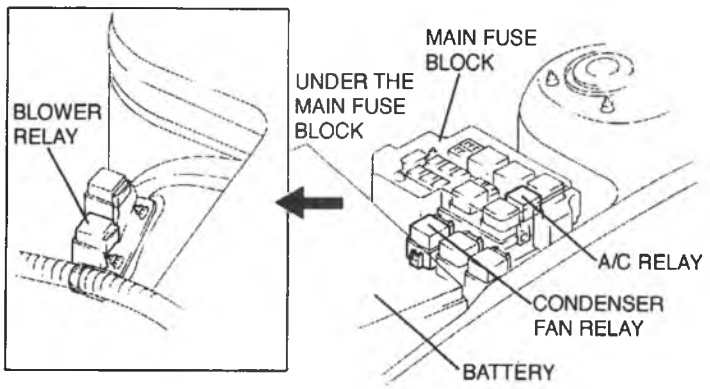
Control System Structural View
Passenger compartment



Y6U740WAG

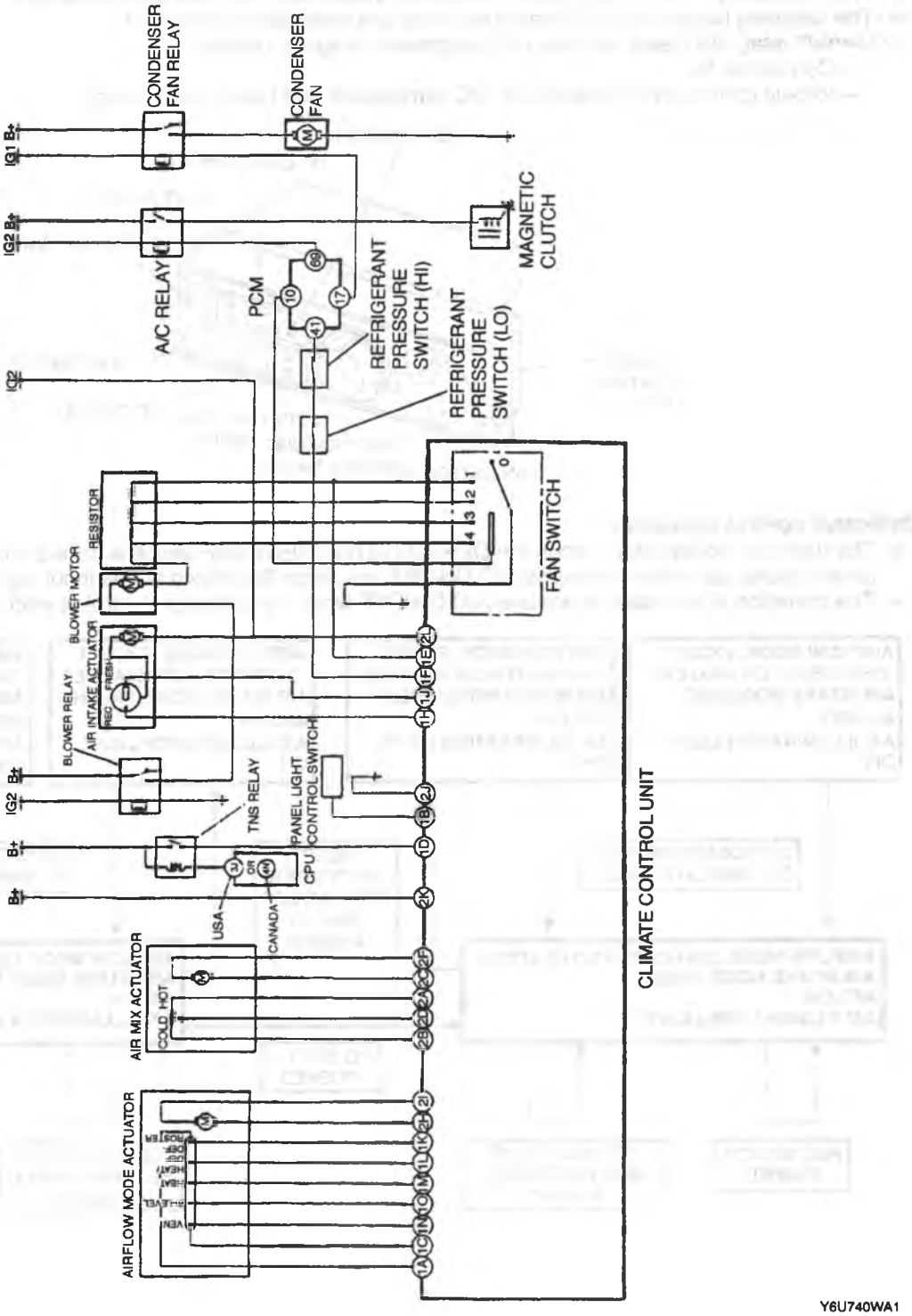
Engine room





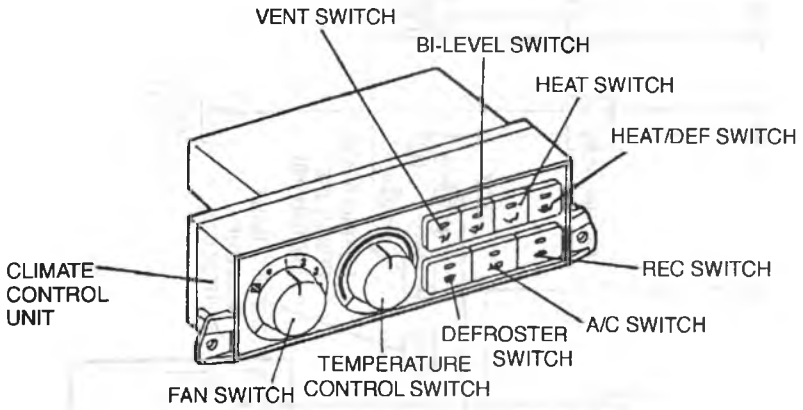
Y6U740WAH

Control System Wiring Diagram



Climate Control Unit Description

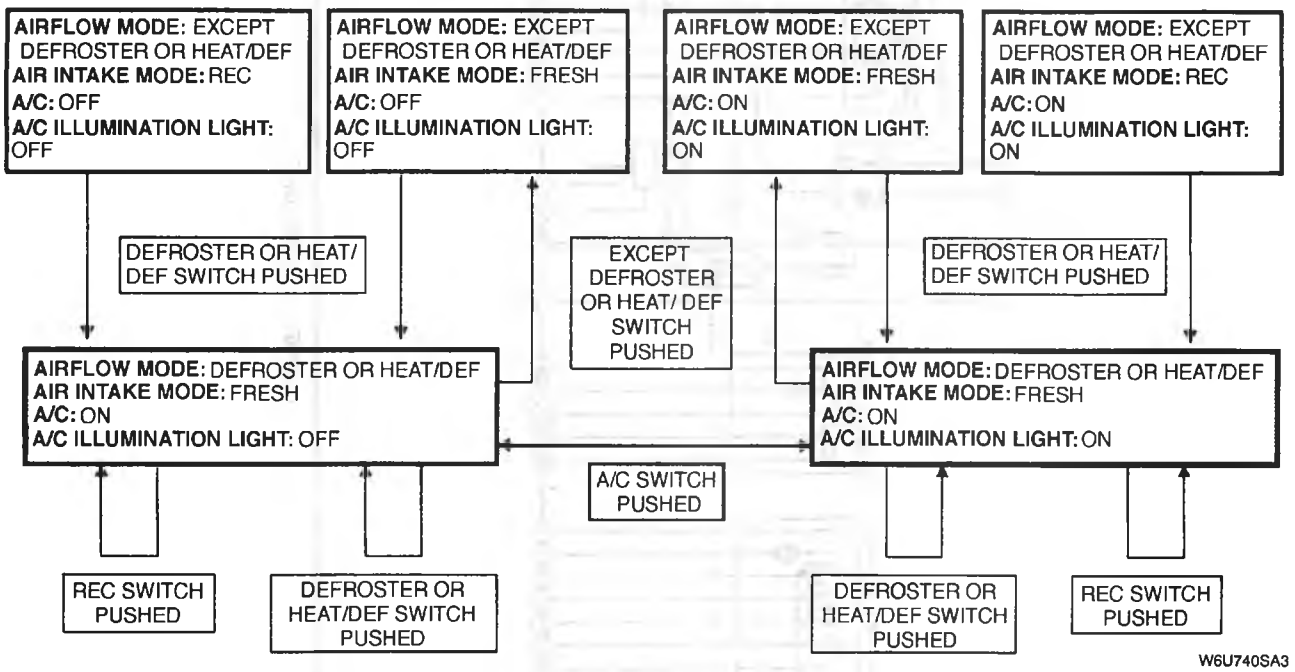
- The climate control unit controls air mixture, air intake, air flow mode and fan speed.
- The following heater and A/C related functions are controlled by the PCM:
  - —A/C relay (A/C relay controls A/C compressor magnetic clutch.)
  - —Condenser fan
  - —Idle-up control (compensates for A/C compressor and blower motor load)



Y6U740WA2

Defroster control operation

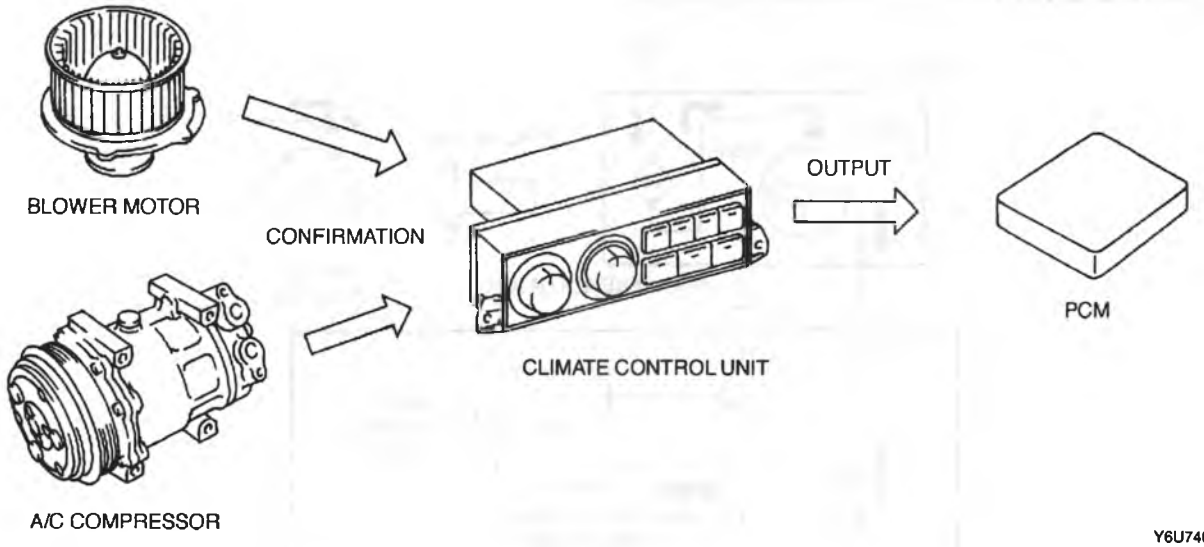
- The defroster control starts when the DEFROSTER or HEAT/DEF switch is turned on. When the defroster control starts, air intake mode and A/C ON/OFF are controlled based on the input signal of each switch.
- The transition of air intake mode and A/C ON/OFF when the defroster control operates is as follows:



W6U740SA3

Idle-up control operation

- Engine speed is controlled via the PCM to prevent poor engine performance caused by the A/C compressor and blower motor operation (increased electrical load) while the engine is idling.
- The climate control unit sends A/C and electrical load idle-up signals to the PCM. Based on these signals, the PCM actuates the idle-up device.



Y6U740WA4

A/C compressor idle-up control

- The climate control unit sends A/C signals to the PCM which actuates the A/C relay and the idle-up device.

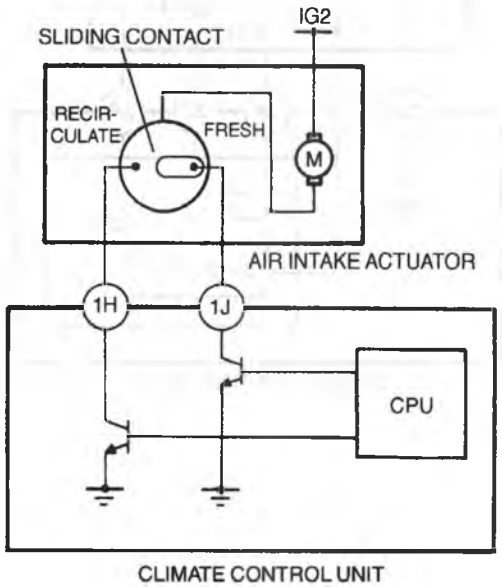
Electrical load idle-up control

- When the fan switch is at 3 and 4, the fan switch sends an electrical load idle-up signal to the PCM. Based on this signal, the PCM actuates the idle-up device.

Air Intake Actuator Description

- The air intake actuator is operated by signals from the climate control unit, and opens and closes the air intake door.
- The air intake actuator has a built-in sliding contact that is linked to the motor.

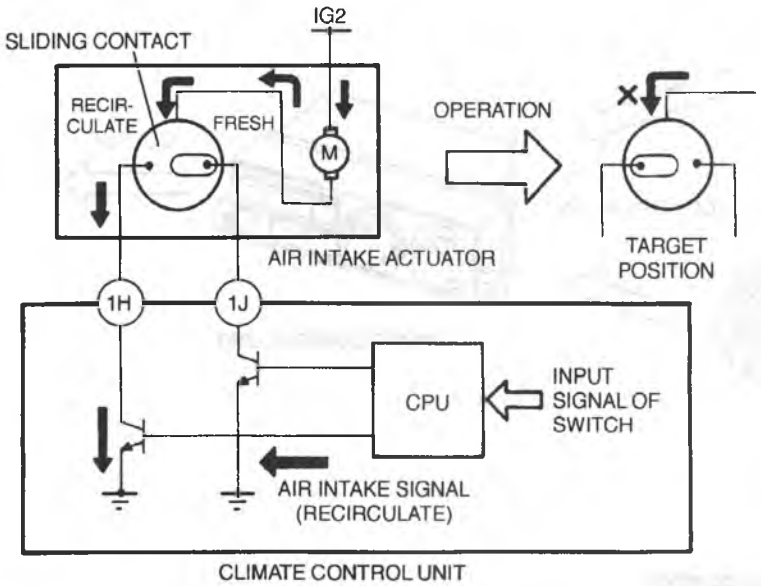
System wiring diagram



Y6U740WA5

Operation

1. The CPU of the climate control unit sends an air intake signal based on the input signal from the switch and turns the transistor on.
2. The motor of the air intake actuator operates until the sliding contact rotates to a target position.
3. When the motor has rotated to the target position, the sliding contact goes off.
4. The motor drive circuit is cut, and the motor stops.

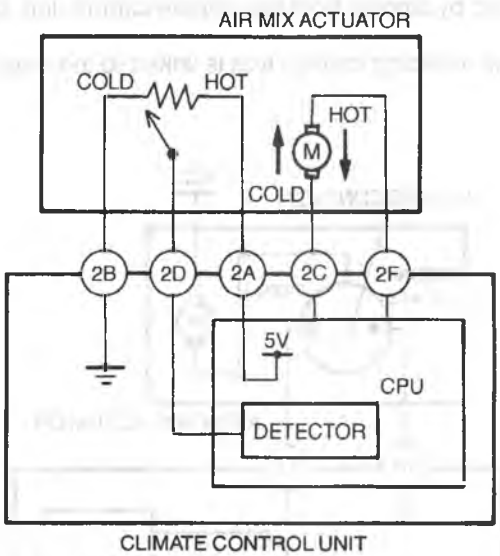


Y6U740WA6

Air Mix Actuator Description

- The air mix actuator is operated by signals from the climate control unit, and opens and closes the air mix doors.
- The air mix actuator is equipped with a potentiometer that is linked to the motor.

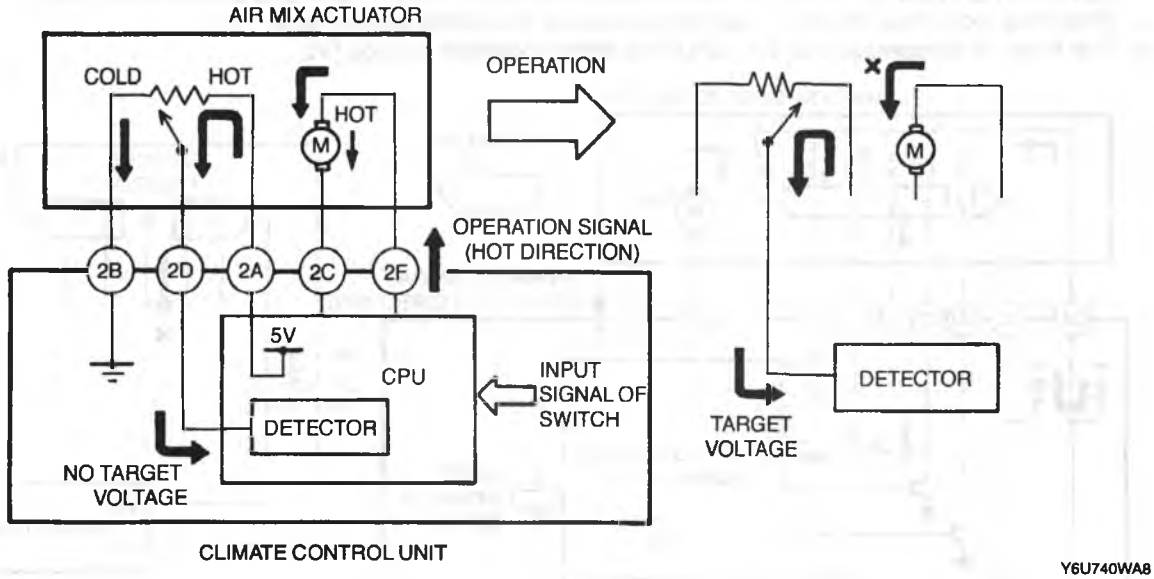
System wiring diagram



Y6U740WA7

Operation

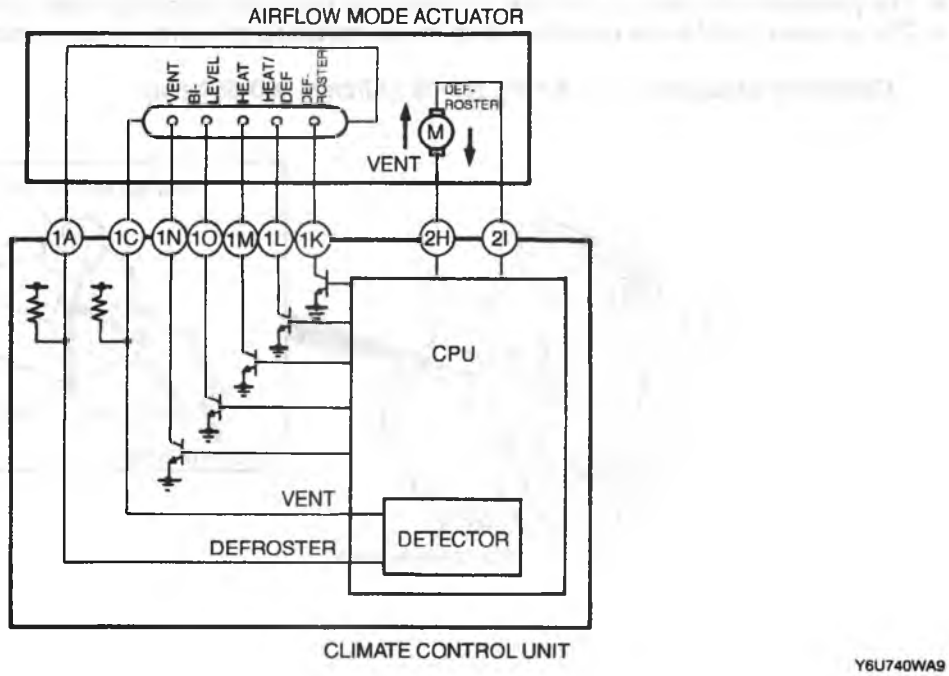
1. The CPU of the climate control unit decides the voltage of the target based on the input signal of the switch.
2. When the voltage of the target is high compared with the detected voltage, the CPU rotates the motor of the motor in the direction of COLD.
3. When the CPU detects the target voltage, the motor is stopped.



Airflow Mode Actuator Description

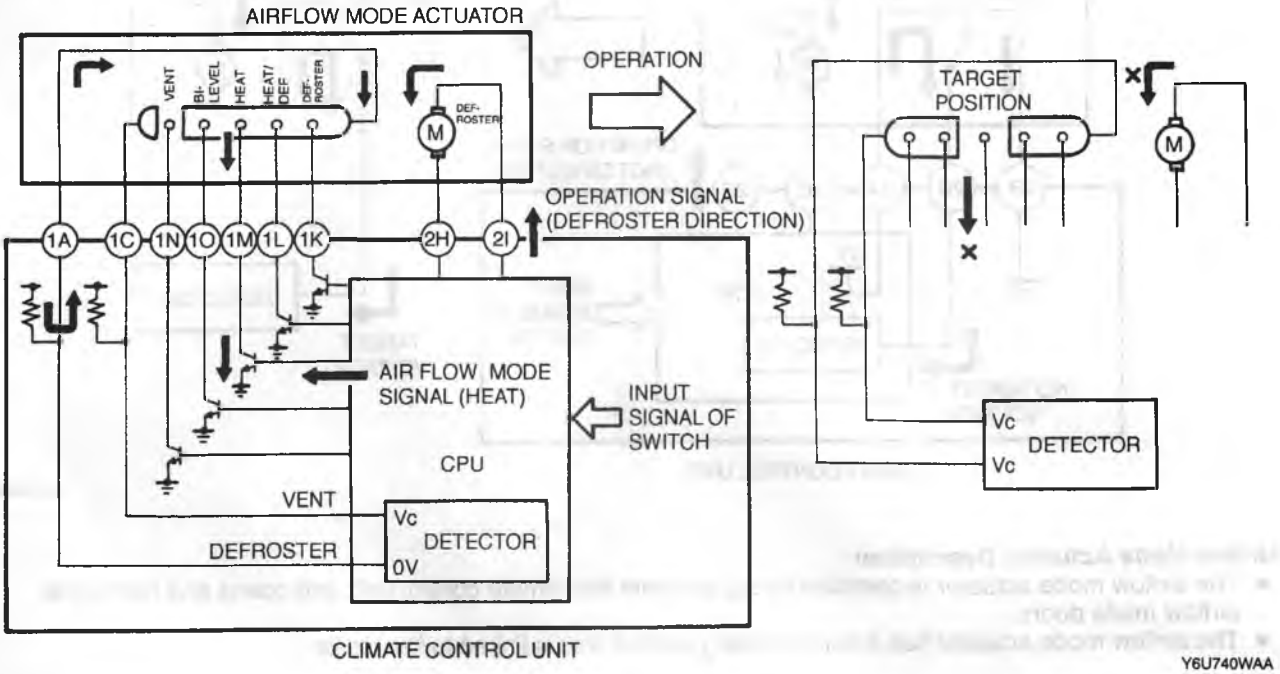
- The airflow mode actuator is operated by signals from the climate control unit, and opens and closes the airflow mode doors.
- The airflow mode actuator has a built-in sliding contact that is linked to the motor.

System wiring diagram



Operation

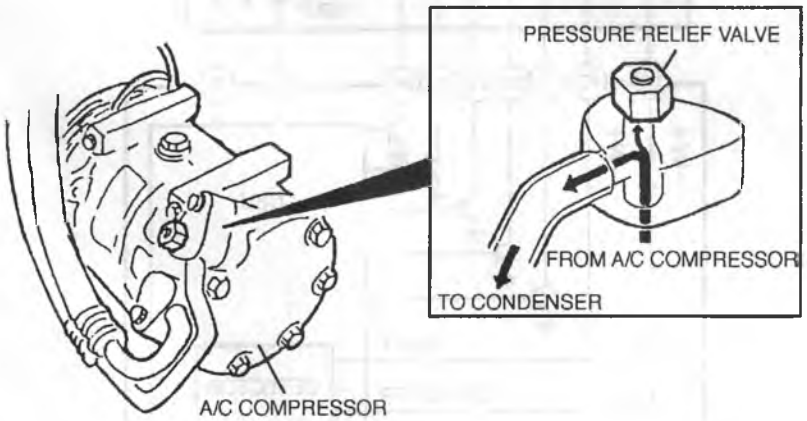
1. The CPU of the climate control unit sends an airflow mode signal based on the input signal from the switch and turns the transistor on.
2. Because the circuit is grounded, the CPU detects voltage as 0 V.
3. The CPU rotates the motor of the airflow mode actuator in the direction of DEFROSTER if detected on the DEFROSTER side. the motor is rotated in the direction of VENT if detected on the VENT side.
4. When the motor has rotated to the target position, the sliding contact goes off.
5. The motor is stopped so that the CPU may detect constant voltage (Vc).



Pressure Relief Valve Description

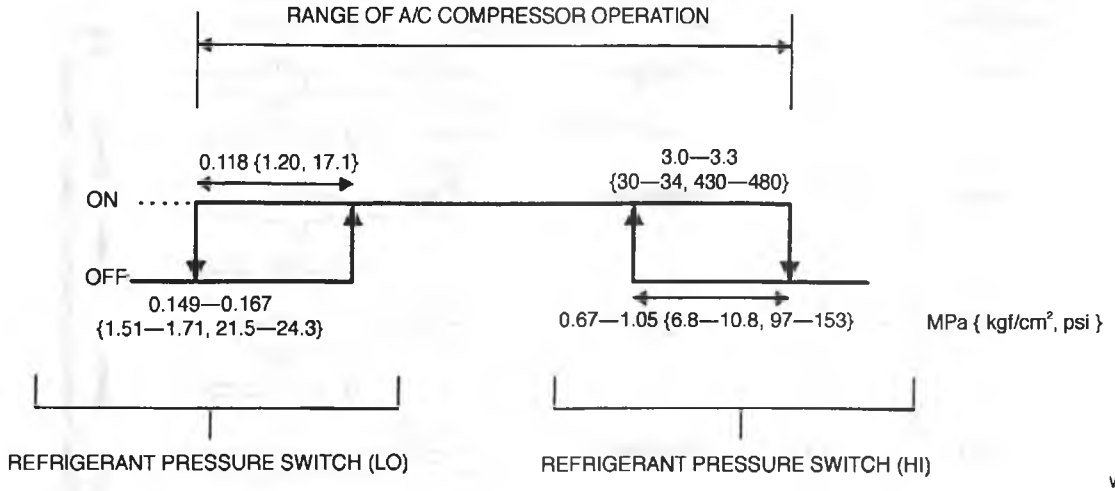
- The pressure relief valve is installed on the cooler hose (HI) (discharge side of the A/C compressor).
- The pressure relief valve operates when the compressed refrigerant is abnormally high.

Operating pressure: 3.2-3.8 MPa {32-39 kgf/cm^2, 460-550 psi}



Refrigerant Pressure Switch Description

- The refrigerant pressure switch (HI) is installed in the cooler pipe No. 3.
- The refrigerant pressure switch (LO) is installed on the accumulator tank.
- If the pressure is abnormal, the refrigerant pressure switches cut the A/C signal sent from the climate control unit to the PCM, thereby stopping the A/C compressor.
- The refrigerant pressure switches are used to respond to both abnormally high and abnormally low-pressure.



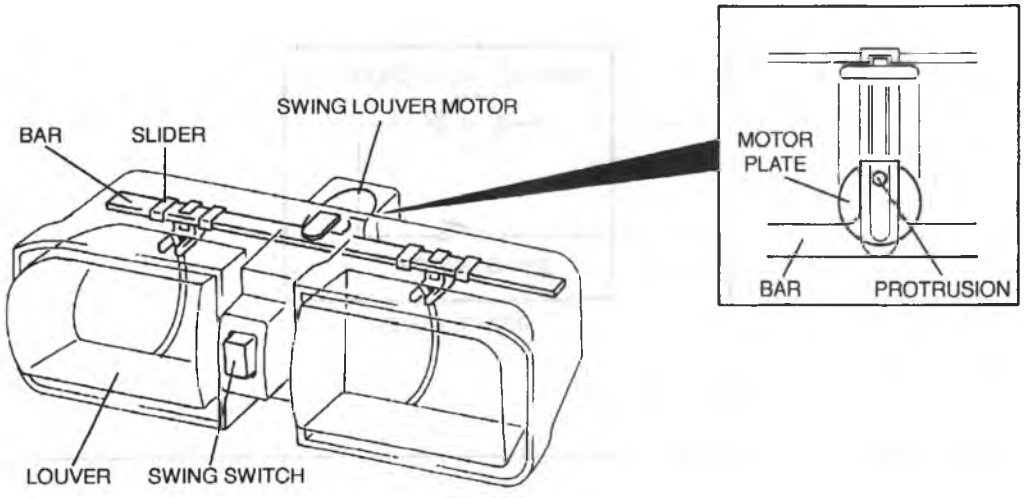
W6U740SAC

Swing Louver Description

- The swing louver is installed on the center vent and operates the right and left air distribution fins to send airflow evenly.

Structure

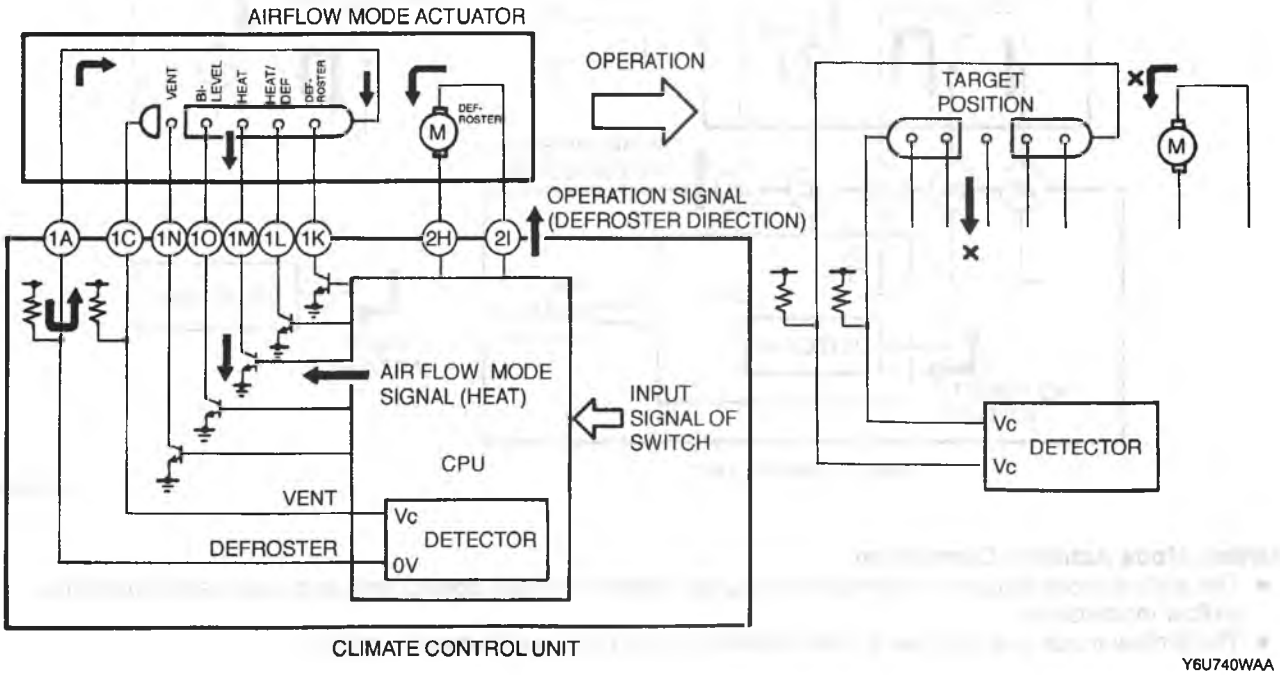
- The swing louver consists of a swing switch, swing louver motor, a bar, two sliders, and two louvers.



W6U740SAD

Operation

1. The CPU of the climate control unit sends an airflow mode signal based on the input signal from the switch and turns the transistor on.
2. Because the circuit is grounded, the CPU detects voltage as 0 V.
3. The CPU rotates the motor of the airflow mode actuator in the direction of DEFROSTER if detected on the DEFROSTER side. the motor is rotated in the direction of VENT if detected on the VENT side.
4. When the motor has rotated to the target position, the sliding contact goes off.
5. The motor is stopped so that the CPU may detect constant voltage (Vc).

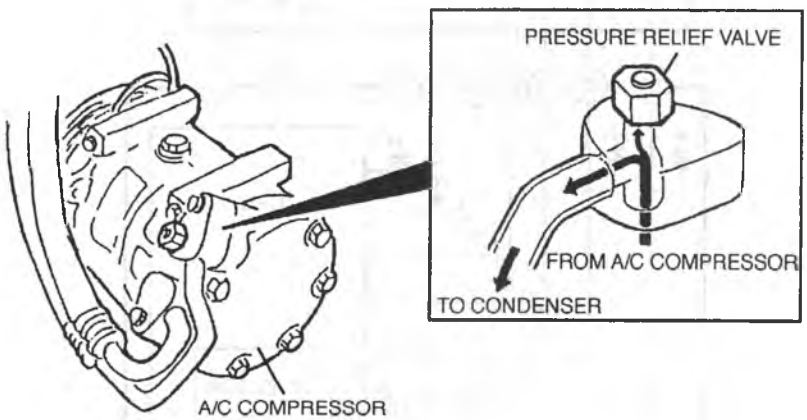


Y6U740WAA

Pressure Relief Valve Description

- The pressure relief valve is installed on the cooler hose (HI) (discharge side of the A/C compressor).
- The pressure relief valve operates when the compressed refrigerant is abnormally high.

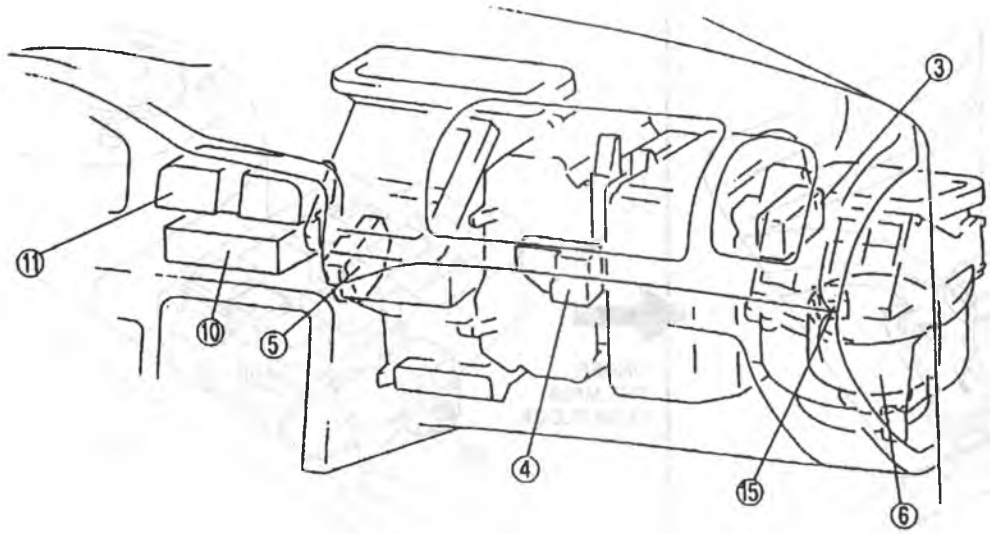
Operating pressure: 3.2-3.8 MPa {32-39 kgf/cm^2, 460-550 psi}

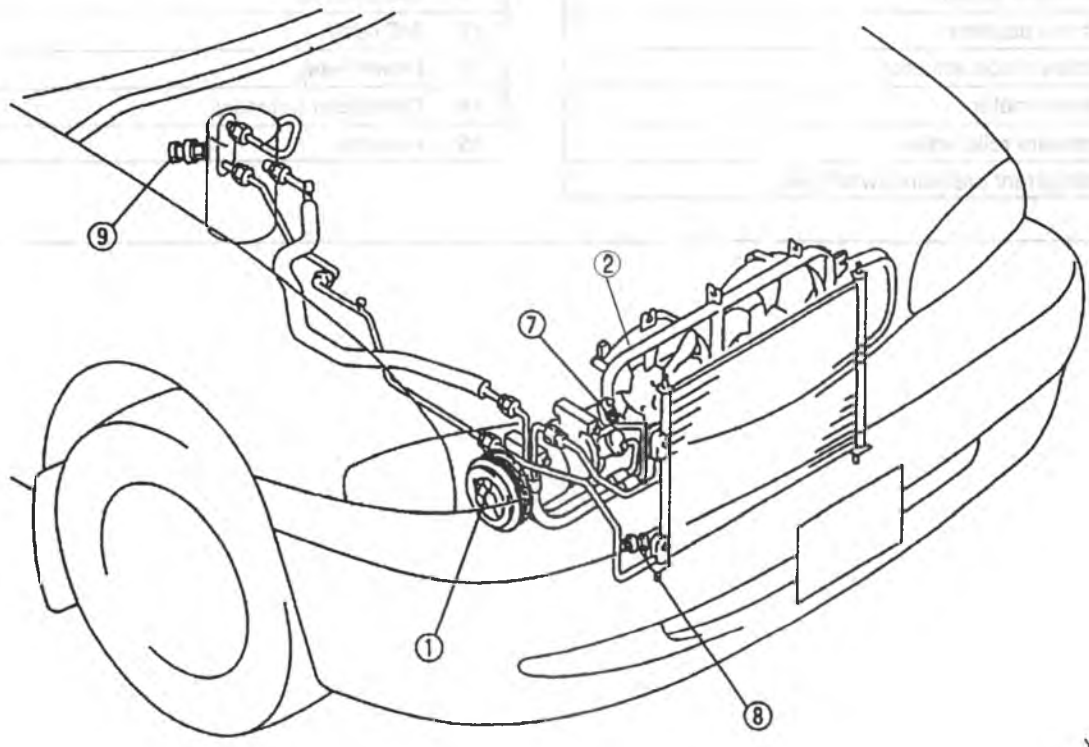


W6U740SAB

CONTROL SYSTEM STRUCTURAL VIEW

Z6U074001042W02

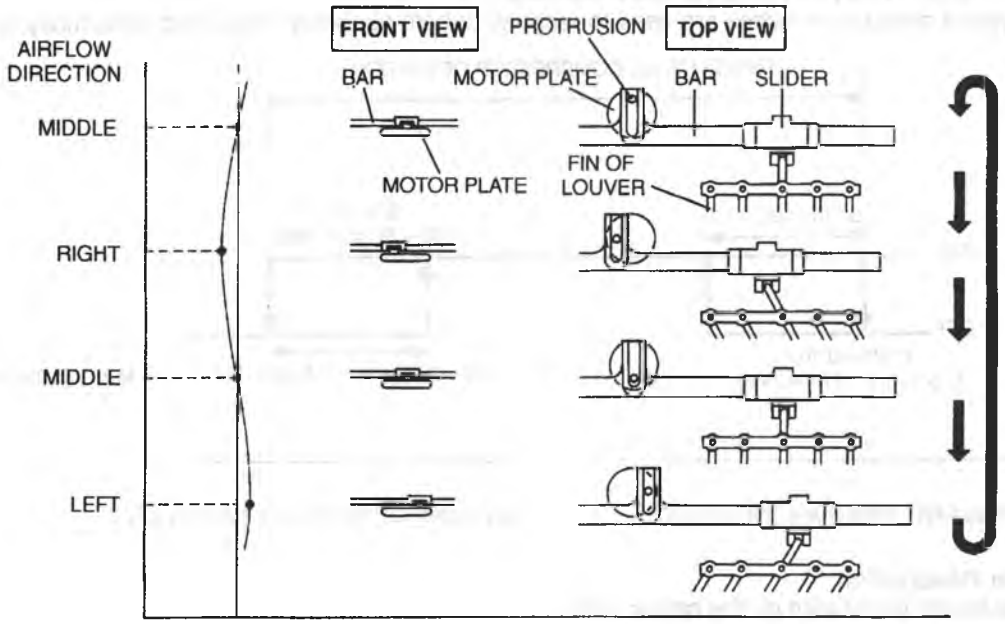




Y6U740WQQ

Mechanical operation

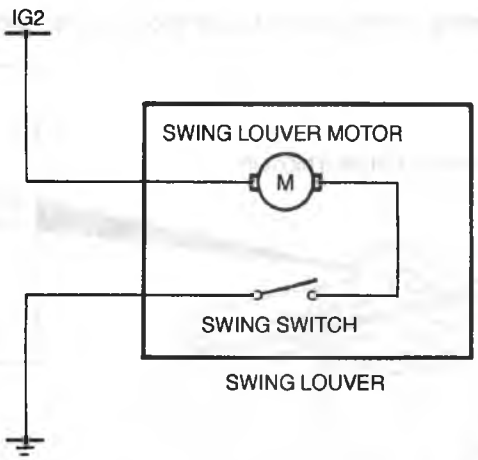
1. When the swing motor rotates, the protrusion on the motor plate rotates.
2. The protrusion on the motor plate moves within a groove on the bar.
3. The fins of the louver move right and left because the bar, slider, and louver are synchronized.



W6U740SAE

Electric operation

- The current flows to the swing louver motor when the switch is turned on and the motor operates.



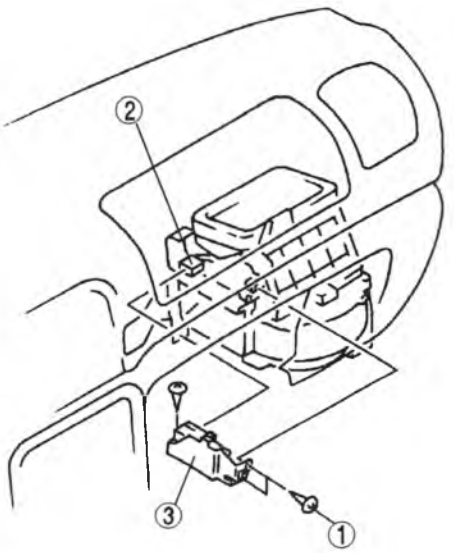
W6U740SAF

AIR INTAKE ACTUATOR REMOVAL/INSTALLATION

Z6U074061060W01

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

1	Screw
2	Blower harness
3	Air intake actuator



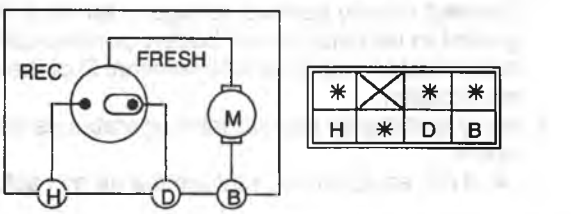
W6U740WAA

AIR INTAKE ACTUATOR INSPECTION

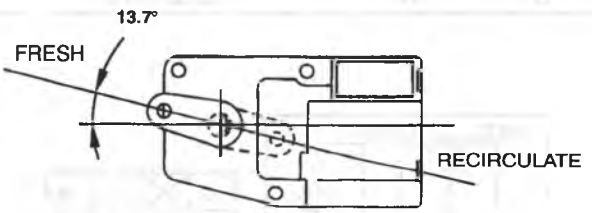
Z6U074061060W02

1. Remove the air intake actuator.
2. Connect battery positive voltage to terminal B and ground to terminal D or H of the air intake actuator.
3. Verify that the air intake actuator operates as shown below.
   - If not as specified, replace the air intake actuator.

Connection		Movement
B+	GND	
B	H	FRESH→RECIRCULATE
B	D	RECIRCULATE→FRESH



W6U740WAB



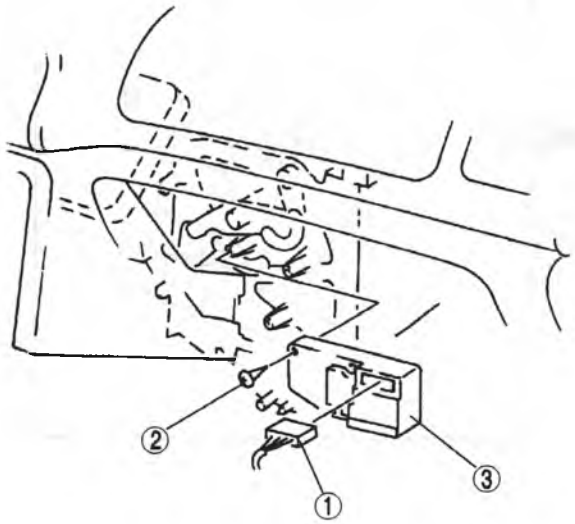
W6U740WAC

AIR MIX ACTUATOR REMOVAL/INSTALLATION

Z6U074061415W01

1. Disconnect the negative battery cable.
2. Remove the glove compartment.
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Connector
2	Screw
3	Air mix actuator



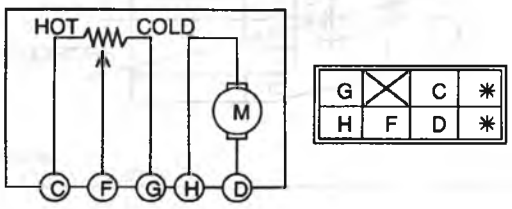
W6U740WAD

AIR MIX ACTUATOR INSPECTION

Z6U074061415W02

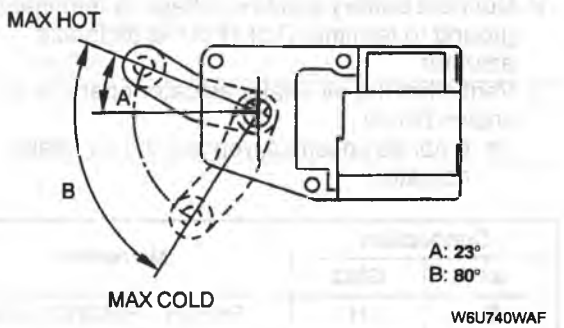
1. Remove the air mix actuator.
2. Connect battery positive voltage to terminal D and ground to terminal H, and battery positive voltage to terminal H and ground to terminal D of the air mix actuator.
3. Verify that the air mix actuator operates as shown below.
   - If not as specified, replace the air mix actuator.

Connection		Movement
B+	GND	
H	D	HOT→COLD
D	H	COLD→HOT



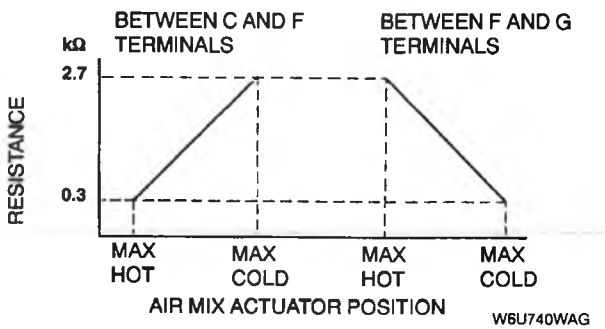
G		C	✳
H	F	D	✳

W6U740WAE



W6U740WAF

4. Verify that the resistance between the terminals of the air mix actuator is as shown in the graph.
   - If not as specified, replace the air mix actuator.



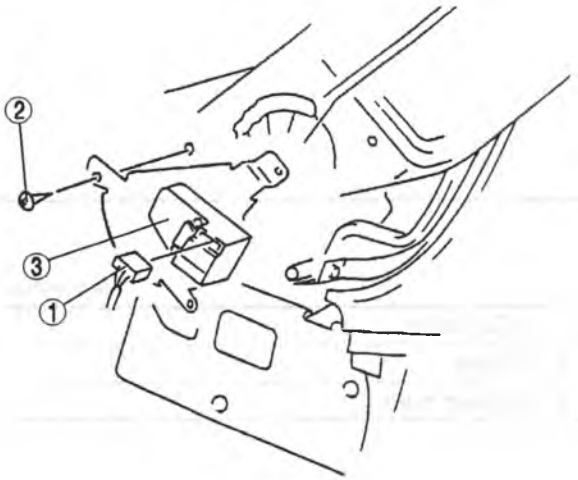
W6U740WAG

AIRFLOW MODE ACTUATOR REMOVAL/INSTALLATION

Z6U074061070W01

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

1	Connector
2	Screw
3	Airflow mode actuator



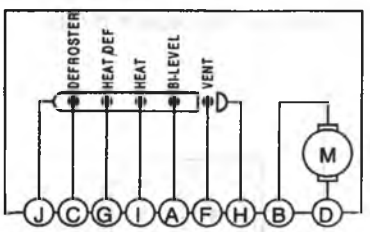
W6U740WAH

AIRFLOW MODE ACTUATOR INSPECTION

Z6U074061070W02

1. Remove the airflow mode actuator.
2. Connect battery positive voltage to terminal B and ground to terminal D, and battery positive voltage to terminal D and ground to terminal B of the airflow mode actuator.
3. Verify that the airflow mode actuator operates as shown below.
   - If not as specified, replace the airflow mode actuator.

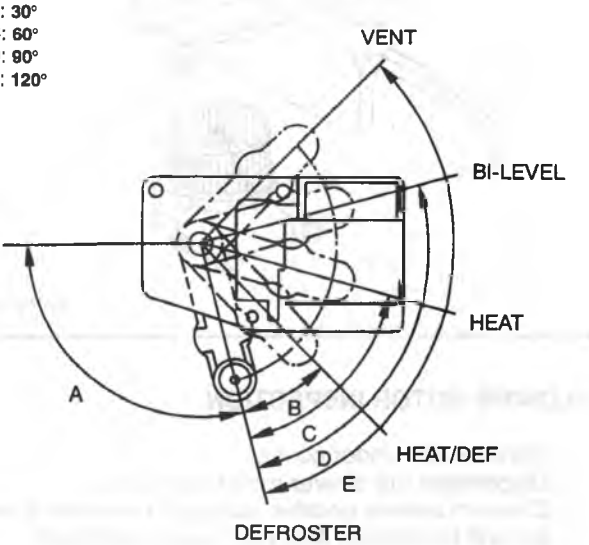
Connection		Movement
B+	GND	
B	D	VENT→DEFROSTER
D	B	DEFROSTER→VENT



I	G		C	A
J	H	F	D	B

W6U740WAJ

A: 105°
B: 30°
C: 60°
D: 90°
E: 120°



W6U740WAK

4. Check for continuity between the airflow mode actuator terminals by using an ohmmeter.

- If not as specified, replace the airflow mode actuator.

○—○ : Continuity

Airflow mode	Terminal						
	H	F	A	I	G	C	J
VENT			○	○	○	○	○
BI-LEVEL	○	○		○	○	○	○
HEAT	○	○	○		○	○	○
HEAT/DEF	○	○	○	○		○	○
DEFROSTER	○	○	○	○	○		

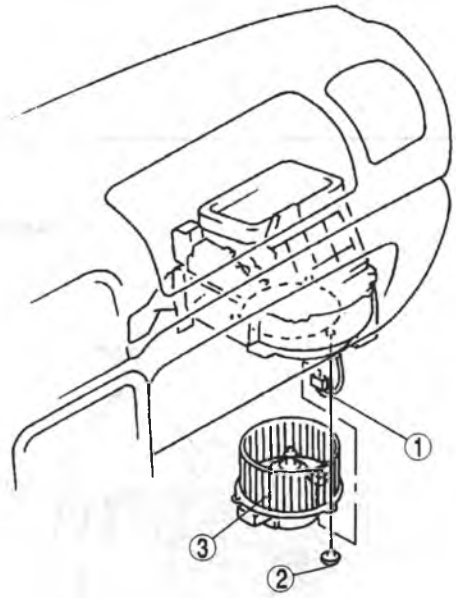
W6U740WAL

BLOWER MOTOR REMOVAL/INSTALLATION

Z6U074061020W01

1. Disconnect the negative battery cable.
2. Remove the under cover.
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Connector
2	Screw
3	Blower motor



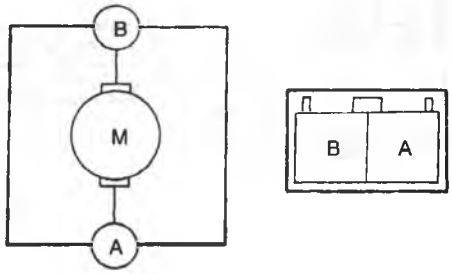
W6U740WAN

BLOWER MOTOR INSPECTION

Z6U074061020W02

1. Remove the under cover.
2. Disconnect the blower motor connector.
3. Connect battery positive voltage to terminal B and ground to terminal A of the blower motor and verify its operation.

- If not as specified, replace the blower motor.



W6U740WAM

CONDENSER FAN REMOVAL/INSTALLATION

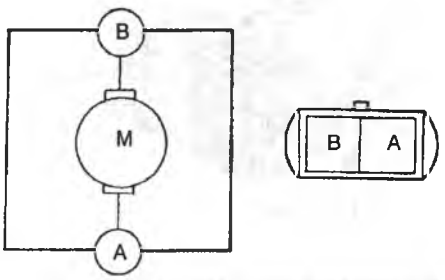
Z6U074061710W01

1. Remove/install the condenser fan.
   (See 01-12-7 FAN MOTOR REMOVAL/INSTALLATION.)

CONDENSER FAN INSPECTION

Z6U074061710W02

1. Disconnect the condenser fan connector.
2. Connect battery positive voltage to terminal B and ground to terminal A of the condenser fan and verify its operation.
   - If not as specified, replace the condenser fan.



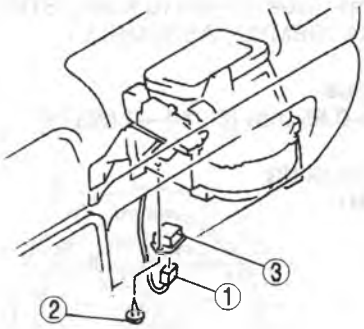
Y6U740WA0

RESISTOR REMOVAL/INSTALLATION

Z6U074061015W01

1. Disconnect the negative battery cable.
2. Remove the under cover.
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Connector
2	Screw
3	Resistor



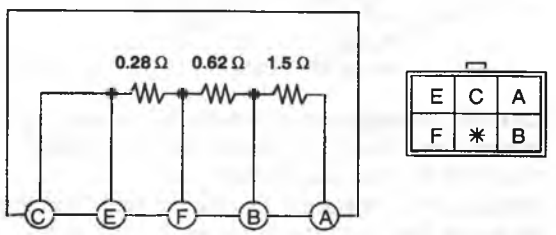
W6U740WB8

RESISTOR INSPECTION

Z6U074061015W02

1. Remove the under cover.
2. Disconnect the resistor connector.
3. Check for continuity between terminal C and E of the resistor.
4. Verify that the resistance between the terminals of the resistor is as shown in the table.
   - If not as specified, replace the resistor.

Terminal	Resistance (Ω)
C—F	0.25—0.31
C—B	0.83—0.97
C—A	2.21—2.59

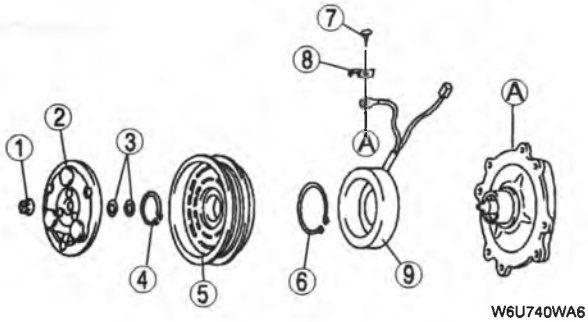


W6U740WB7

MAGNETIC CLUTCH DISASSEMBLY/ASSEMBLY

Z6U074061010W01

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.
3. Adjust the magnetic clutch clearance. (See 07-40-18 MAGNETIC CLUTCH ADJUSTMENT.)

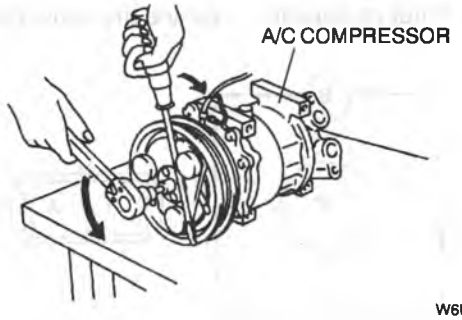


W6U740WA6

1	Nut (See 07-40-18 Nut Removal/Installation Note)
2	Pressure plate
3	Shim
4	Snap ring
5	A/C compressor pulley (See 07-40-18 A/C Compressor Pulley Removal Note)
6	Snap ring
7	Screw
8	Clip
9	Stator

Nut Removal/Installation Note

- When removing or installing the nut, hold the pressure plate in place as shown in the figure.



W6U740WA7

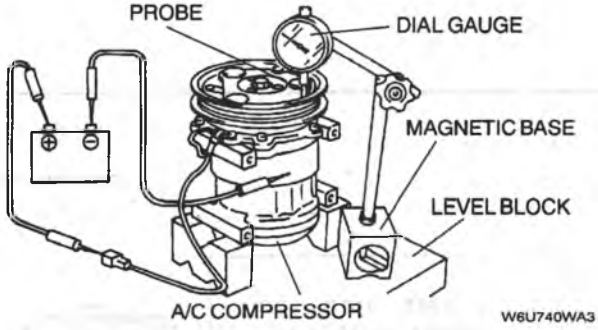
A/C Compressor Pulley Removal Note

- When removing the A/C compressor pulley, remove it by using a puller.

MAGNETIC CLUTCH ADJUSTMENT

Z6U074061010W02

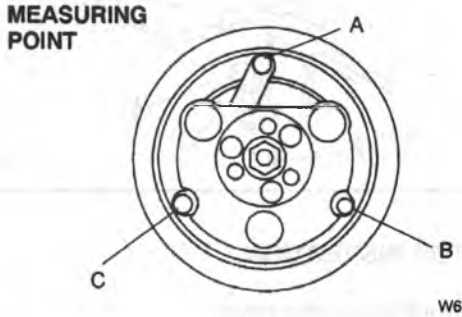
1. Remove and set the A/C compressor on a level block. (See 07-11-17 A/C COMPRESSOR REMOVAL/INSTALLATION.)
2. Turn on the magnetic clutch by connecting the battery positive voltage to the magnetic clutch connector terminal and the ground to the A/C compressor body.
3. Fix a dial gauge on a magnetic base and set the probe onto measuring point A on the pressure plate surface.



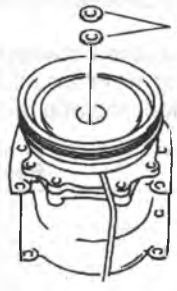
W6U740WA3

4. Turn off the magnetic clutch by disconnecting the ground from the A/C compressor body, then measure the dial gauge readings.
5. Measure the clearance for point B and C on the pressure plate surface by repeating the above steps 2 through 4.
   - If not within the specification, remove the pressure plate and adjust the clearance by changing the shim size or the number of shims. (See 07-40-18 MAGNETIC CLUTCH DISASSEMBLY/ASSEMBLY.)

Clearance
0.35—0.65 mm {0.014—0.025 in}



W6U740WA4

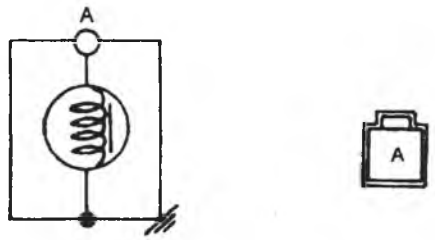


W6U740WA5

MAGNETIC CLUTCH INSPECTION

Z6U074061010W03

1. Disconnect the magnetic clutch connector.
2. Connect battery positive voltage to terminal A of magnetic clutch and ground to the A/C compressor body.



W6U740WA2

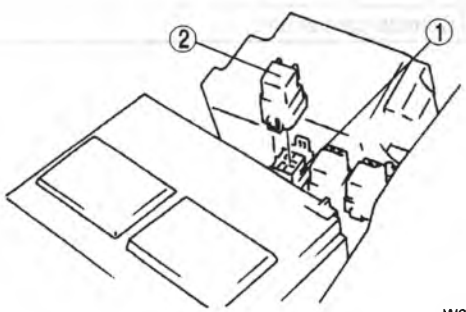
3. Verify that the magnetic clutch operates.
   - If not as specified, go to next step.
4. Verify the magnetic clutch clearance.
   - If not as specified, adjust the magnetic clutch clearance. (See 07-40-18 MAGNETIC CLUTCH ADJUSTMENT.)
   - If the magnetic clutch clearance is okay, replace the stator.

CONDENSER FAN RELAY REMOVAL/INSTALLATION

Z6U074067721W01

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

1	Connector
2	Condenser fan relay



W6U740WB6

A/C RELAY, BLOWER RELAY, AND CONDENSER FAN RELAY INSPECTION

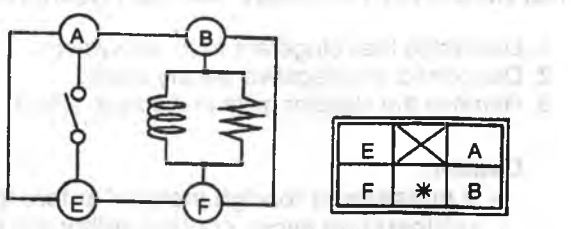
Z6U074067723W01

1. Remove the relay.
2. Check for continuity between the relay terminals by using an ohmmeter.
   - If not as specified, replace the relay.

○—○ : Continuity

Step	Terminal			
	B	F	A	E
1	○—○			
2	B+	GND	○—○	

W6U740WB3



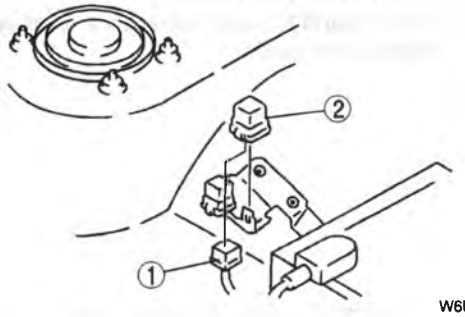
W6U740WB4

BLOWER RELAY REMOVAL/INSTALLATION

Z6U074067740W01

1. Disconnect the negative battery cable.
2. Remove the nuts to move the main fuse block to the side.
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Connector
2	Blower relay



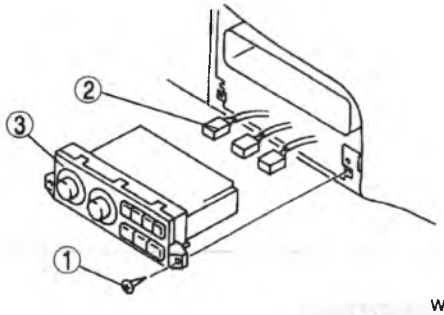
W6U740WB5

CLIMATE CONTROL UNIT REMOVAL/INSTALLATION

Z6U074061190W01

1. Disconnect the negative battery cable.
2. Remove the meter hood. (See 09-17-7 METER HOOD REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Screw
2	Connector
3	Climate control unit



W6U740WAV

REFRIGERANT PRESSURE SWITCH REMOVAL/INSTALLATION

Z6U074061503W01

1. Discharge the refrigerant from the system.
2. Disconnect the negative battery cable.
3. Remove the radiator grille and splash shield.

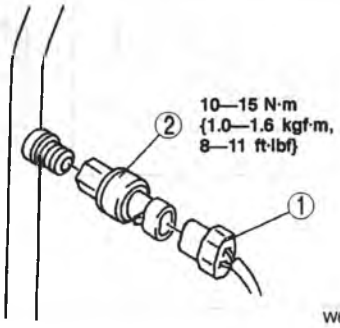
Caution

- **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise will occur. Always, immediately plug all open fittings after removing any refrigeration cycle parts to keep moisture or foreign material out of the cycle.**

4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. Recharge with refrigerant. (See 07-10-3 REFRIGERANT CHARGING.) (See 07-10-5 REFRIGERANT RECOVERY.)

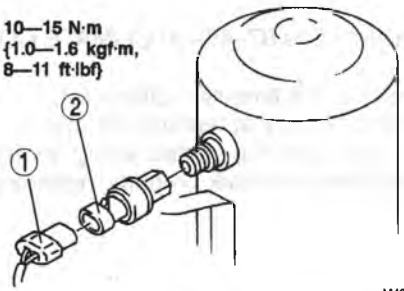
7. Perform the refrigerant system performance test. (See 07-10-2 REFRIGERANT SYSTEM PERFORMANCE TEST.)

HI



W6U740WAT

LO



W6U740WAU

1	Connector
2	Refrigerant pressure switch (See 07-40-21 Refrigerant Pressure Switch Installation Note)

Refrigerant Pressure Switch Installation Note

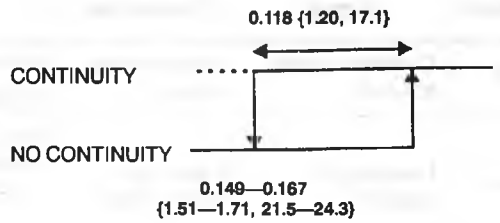
- Apply compressor oil to the O-ring and connect the joint.

REFRIGERANT PRESSURE SWITCH INSPECTION

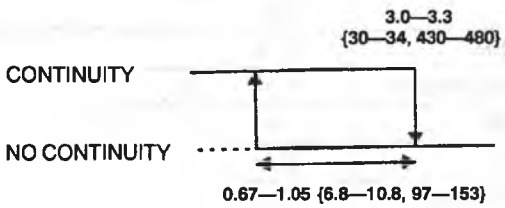
Z6U074061503W02

1. Install the manifold gauge set.
2. Disconnect the refrigerant pressure switch connector.
3. Verify the high- and low-pressure side reading of manifold gauge.
4. Check for continuity between terminals of the refrigerant pressure switch.
   - If not as specified, replace the refrigerant pressure switch.

LO



HI

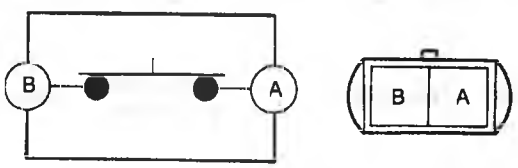


MPa {kgf/cm², psi}

W6U740WAQ

MPa {kgf/cm², psi}

W6U740WAR



W6U740WAS

FAN SWITCH INSPECTION

Z6U074061050W01

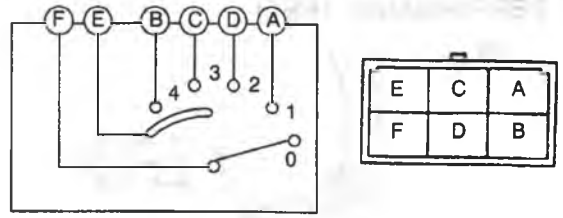
1. Remove the climate control unit. (See 07-40-20 CLIMATE CONTROL UNIT REMOVAL/INSTALLATION.)
2. Check for continuity between the fan switch terminals by using an ohmmeter.

- If not as specified, replace the fan switch.

○—○ : Continuity

Switch position	Terminal					
	A	B	C	D	E	F
0						
1	○					○
2				○		○
3			○		○	○
4		○			○	○

W6U740WAX



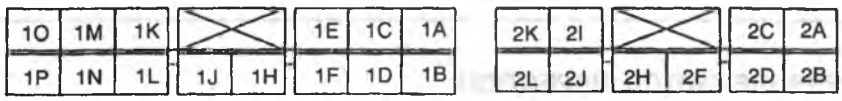
W6U740WAY

CLIMATE CONTROL UNIT INSPECTION

Z6U074061190W02

1. Slide out the climate control unit with the connectors still connected. (See 07-40-20 CLIMATE CONTROL UNIT REMOVAL/INSTALLATION.)
2. Measure the voltage at each climate control unit terminal and refer to the terminal voltage list.
3. Disconnect the climate control unit connector before checking for continuity at terminal 2B and 2J.
   - If not as specified, inspect the parts listed under "Inspection area" and the related wiring harnesses.
   - If the parts and wiring harnesses are okay but the system still does not work properly, replace the climate control unit.

Terminal Voltage List (Reference)



W6U740WAW

Terminal	Signal	Connection	Test condition		Voltage (V) /Continuity	Inspection area
1A	Common power source	Airflow mode actuator	Moving to DEFROSTER		0.5	Airflow mode actuator
			Moving to VENT		10.5	
1B	Panel light control	Panel light control SW	Inspect terminal C of panel light control switch (See 09-18-15 PANEL LIGHT CONTROL SWITCH INSPECTION)		—	Panel light control SW
1C	Common power source	Airflow mode actuator	Moving to VENT		0.5	Airflow mode actuator
			Moving to DEFROSTER		10.5	
1D	TNS	TNS relay	Headlight switch at TNS position		B+	TNS relay
			Headlight switch at OFF		0	
1E	Fan SW	• Fan SW • Resistor	Fan SW	Off	B+	• Fan SW • Resistor
				1st position	0.1	
				2nd position	0.3	
				3rd position	0.5	
				4th position	0.4	
1F	A/C	Refrigerant pressure SW (LO)	Fan SW and A/C SW off		B+	• Refrigerant pressure SW (LO) • Refrigerant pressure SW (HI) • ECM/PCM
			Fan SW and A/C SW on		0	
1H	RECIRCULATE	Air intake actuator	Air intake mode at RECIRCULATE		0	Air intake actuator
			Air intake mode at FRESH		B+	
1J	FRESH	Air intake actuator	Air intake mode at FRESH		0	Air intake actuator
			Air intake mode at RECIRCULATE		B+	

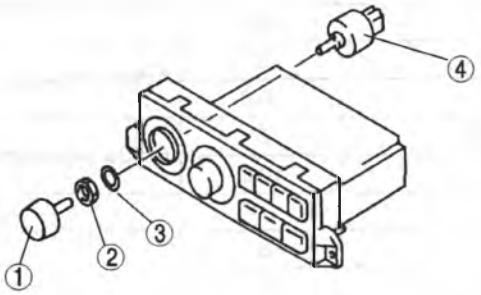
Terminal	Signal	Connection	Test condition	Voltage (V) /Continuity	Inspection area
1K	DEFROSTER	Airflow mode actuator	Airflow mode at DEFROSTER	0	Airflow mode actuator
			Other	10.6	
1L	HEAT/DEF	Airflow mode actuator	Airflow mode at HEAT/DEF	0	Airflow mode actuator
			Other	10.6	
1M	HEAT	Airflow mode actuator	Airflow mode at HEAT	0	Airflow mode actuator
			Other	10.6	
1N	VENT	Airflow mode actuator	Airflow mode at VENT	0	Airflow mode actuator
			Other	10.6	
1O	BI-LEVEL	Airflow mode actuator	Airflow mode at BI-LEVEL	0	Airflow mode actuator
			Other	10.6	
1P	—	Not used	—	—	—
2A	+5 V	Air mix actuator	IG SW at ON	5	—
			IG SW at LOCK or ACC	0	
2B	GND	Air mix actuator	Constant: Check for continuity to ground	Yes	—
2C	Motor drive	Air mix actuator	Moving to HOT	0.6	Air mix actuator
			Moving to COLD	10.7	
2D	Potentiometer input	Air mix actuator	Airflow temperature mode at MAX HOT	4.3	Air mix actuator
			Airflow temperature mode at MAX COLD	0.6	
2F	Motor drive	Air mix actuator	Moving to COLD	0.6	Air mix actuator
			Moving to HOT	10.7	
2H	Motor drive	Airflow mode actuator	Moving to VENT	10.6	Airflow mode actuator
			Moving to DEFROSTER	0.7	
2I	Motor drive	Airflow mode actuator	Moving to DEFROSTER	10.6	Airflow mode actuator
			Moving to VENT	0.7	
2J	GND	GND	Constant: Check for continuity to ground	Yes	—
2K	Power supply	ROOM 15 A fuse	Constant	B+	ROOM 15 A fuse
2L	IG2	A/C 10 A fuse	IG SW at ON	B+	A/C 10 A fuse
			IG SW at LOCK or ACC	0	

FAN SWITCH REMOVAL/INSTALLATION

Z6U074061050W02

1. Disconnect the negative battery cable.
2. Remove the climate control unit. (See 07-40-20 CLIMATE CONTROL UNIT REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Knob
2	Nut
3	Washer
4	Fan switch

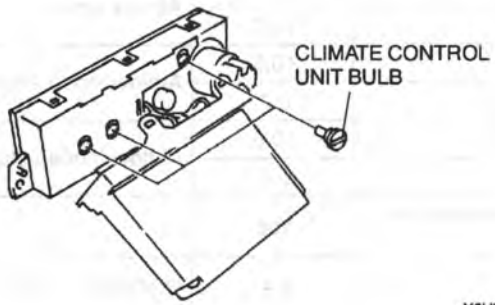


W6U740WAZ

CLIMATE CONTROL UNIT BULB REMOVAL/INSTALLATION

Z6U074061095W01

1. Disconnect the negative battery cable.
2. Remove the climate control unit. (See 07-40-20 CLIMATE CONTROL UNIT REMOVAL/INSTALLATION.)
3. Remove the climate control unit bulb.
4. Install in the reverse order of removal.



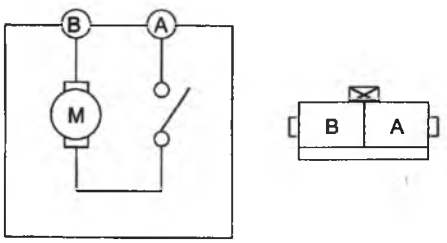
X6U740WA0

SWING LOUVER INSPECTION

Z6U074064930W01

1. Remove the meter hood. (See 09-17-7 METER HOOD REMOVAL/INSTALLATION.)
2. Connect battery positive voltage to terminal B and ground to terminal A of the swing louver.
3. Verify that the swing louver operates as indicated below.
   - If not as specified, replace the swing louver.

Swing louver switch position	Swing louver
Off	Stopped
On	Operation



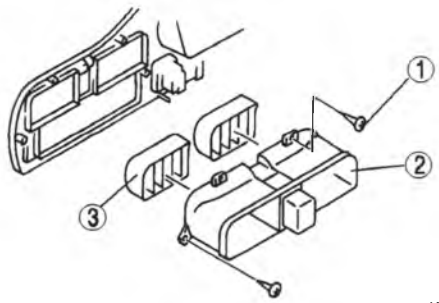
W6U740WB1

SWING LOUVER REMOVAL/INSTALLATION

Z6U074064930W02

1. Disconnect the negative battery cable.
2. Remove the meter hood. (See 09-17-7 METER HOOD REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Screw
2	Swing louver
3	Vent grille

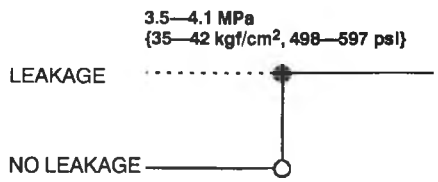


W6U740WB2

PRESSURE RELIEF VALVE INSPECTION

Z6U074061461W01

1. Install the manifold gauge set.
2. Start the engine.
3. Turn the fan switch and A/C switch on.
4. Verify the high-pressure side reading of the manifold gauge.
5. Check for leaks from the pressure relief valve by using a gas leak tester.
   - If not as specified, replace the cooler hose (HI).



W6U740WAP

07-50 TECHNICAL DATA

HVAC TECHNICAL DATA ..... 07-50-1 HVAC TIGHTENING TORQUE 07-50-1

HVAC TECHNICAL DATA

Z6U075001038W01

Item				Specification
Refrigerant	Type			R-134a
	Regular amount		(g {oz})	750 {26.5}
A/C compressor	Lube oil	Type		SP-20
		Sealed volume	(ml {cc, fl oz})	240 {240, 8.11}
	Magnetic clutch clearance		(mm {in})	0.35—0.65 {0.014—0.025}

HVAC TIGHTENING TORQUE

Z6U075001038W02

Item		Tightening torque (N·m {kgf·m, ft·lbf})
BASIC SYSTEM		
A/C compressor		20—30 {2.0—3.1, 15—22}
Refrigerant lines	Cooler pipe No.1—Cooler hose (HI)	20—30 {2.0—3.1, 15—22}
	Cooler pipe No.1—Condenser	20—30 {2.0—3.1, 15—22}
	Condenser—Cooler pipe No.3	20—30 {2.0—3.1, 15—22}
	Cooler pipe No.3—Cooler pipe No.4	15—24 {1.5—2.5, 11—18}
	Cooler pipe No.4—Cooler pipe No.5	15—24 {1.5—2.5, 11—18}
	Cooler pipe No.5—Accumulator	15—24 {1.5—2.5, 11—18}
	Accumulator—Cooler pipe No.2	20—30 {2.0—3.1, 15—22}
	Cooler pipe No.2—Cooler hose (LO)	20—30 {2.0—3.1, 15—22}
	Cooler hose (LO)—A/C compressor	7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}
	A/C compressor—Cooler hose (HI)	7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}
Condenser		6.87—9.80 N·m {70—100 kgf·cm, 60.8—86.7 in·lbf}
CONTROL SYSTEM		
Refrigerant pressure switch	HI	10—15 {1.0—1.6, 8—11}
	LO	

RESTRAINTS

08
SECTION

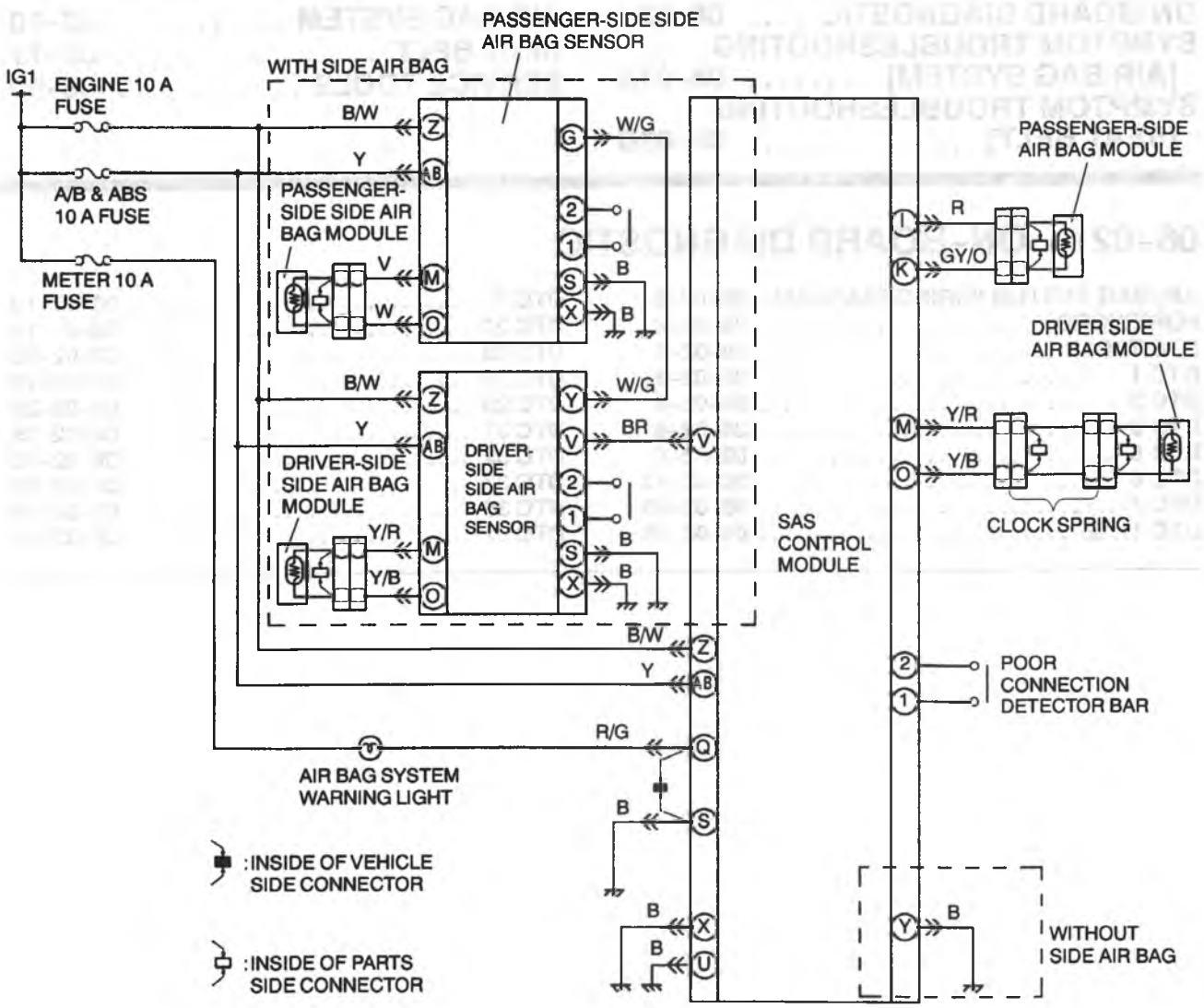
ON-BOARD DIAGNOSTIC 08-02
SYMPTOM TROUBLESHOOTING
[AIR BAG SYSTEM] 08-03A
SYMPTOM TROUBLESHOOTING
[SEAT BELT] 08-03B
AIR BAG SYSTEM 08-10
SEAT BELT 08-11
SERVICE TOOLS 08-60

08-02 ON-BOARD DIAGNOSTIC

AIR BAG SYSTEM WIRING DIAGRAM . 08-02-2
FOREWORD 08-02-3
DTC TABLE 08-02-3
DTC 1 08-02-5
DTC 2 08-02-6
DTC 3 08-02-6
DTC 5 08-02-8
DTC 6 08-02-13
DTC 7 08-02-16
DTC 11,12 08-02-18
DTC 21 08-02-19
DTC 22 08-02-19
DTC 23 08-02-20
DTC 25 08-02-22
DTC 26 08-02-23
DTC 31 08-02-25
DTC 32 08-02-25
DTC 33 08-02-26
DTC 35 08-02-28
DTC 37 08-02-30

AIR BAG SYSTEM WIRING DIAGRAM

Z6U080201046W01

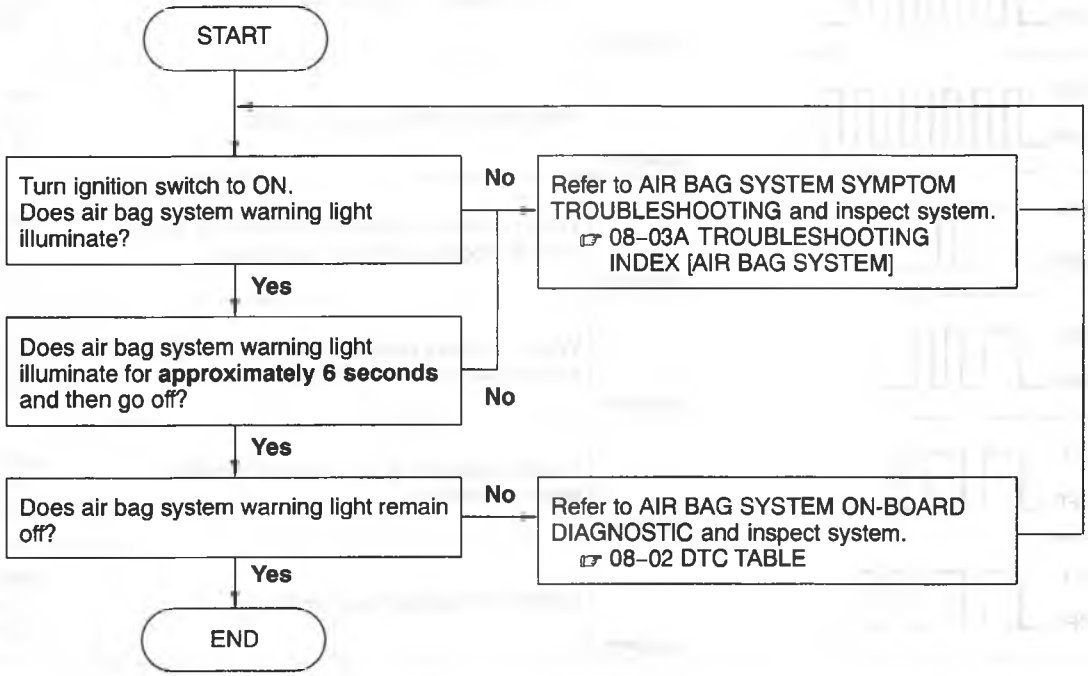


Y6U802WA6

FOREWORD

Z6U080201046W02

- Use the following flowchart to verify the cause of the trouble.



Y6U802WE0

DTC TABLE

Z6U080201046W03

Note

- When DTCs not shown in the diagnostic trouble code table are displayed, replace the SAS control module.
- When DTC 21,22,23,25,26,31,32,33,35 or 37 is displayed for vehicles without a side air bag, replace the SAS control module.
- After a new SAS control module or the side air bag sensor is installed, the air bag system warning light continuously flashes when the ignition switch is turned to the ON position. This is the deployment authorization standby code output by the SAS control module. Perform the deployment authorization and restore the system to an operational state.
- If the air bag system warning light does not illuminate or remains illuminated when the ignition switch is turned to the ON position, inspect and repair the lighting circuit system of air bag system warning light and then confirm that the air bag system warning light is operational.

DTC	Output pattern	Description	Page
1	ON / OFF  Y6U802WA7	SAS control module connector poor connection	(See 08-02-5 DTC 1)
2	ON / OFF  Y6U802WA8	SAS control module	(See 08-02-6 DTC 2)
3	ON / OFF  Y6U802WA9	Battery	(See 08-02-6 DTC 3)
5	ON / OFF  Y6U802WB0	Harness between SAS control module and side air bag sensor	(See 08-02-8 DTC 5)

DTC	Output pattern	Description	Page
6		Driver-side air bag module	(See 08-02-13 DTC 6)
7		Passenger-side air bag module	(See 08-02-16 DTC 7)
11*		Wiring harness between terminal U of SAS control module connector and ground	(See 08-02-18 DTC 11,12)
12*		Wiring harness between terminal U of SAS control module connector and ground	(See 08-02-18 DTC 11,12)
21		Driver-side side air bag sensor connector poor connection	(See 08-02-19 DTC 21)
22		Driver-side side air bag sensor	(See 08-02-19 DTC 22)
23		Battery	(See 08-02-20 DTC 23)
25		Harness between SAS control module and driver-side side air bag sensor	(See 08-02-22 DTC 25)
26		Driver-side side air bag sensor	(See 08-02-23 DTC 26)
31		Passenger-side side air bag sensor connector poor connection	(See 08-02-25 DTC 31)
32		Passenger-side side air bag sensor	(See 08-02-25 DTC 32)
33		Battery	(See 08-02-26 DTC 33)
35		Harness between SAS control module and side air bag sensor	(See 08-02-28 DTC 35)
37		Passenger-side side air bag module	(See 08-02-30 DTC 37)
—	Continuously flashes	Deployment authorization standby code	—

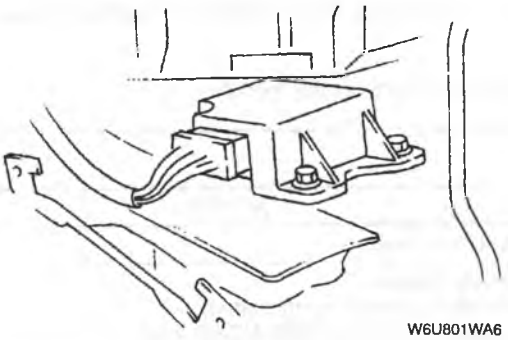
* : When there is a malfunction in wiring harness between terminal U of SAS control module connector and ground, both DTC 11 and 12 are displayed.

DTC 1

Z6U080201046W04

DTC 1	SAS control module connector poor connection
POSSIBLE CAUSE	• SAS control module connector malfunction • Poor connection of SAS control module connector • SAS control module malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Warning** • **Handling the air bag system components improperly can accidentally deploy the air bag modules, which may seriously injure you. Read SERVICE WARNINGS, before handling the air bag system components. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)** • Turn ignition switch to LOCK. • Disconnect negative battery cable and wait for **more than 1 minute** to allow the backup power supply of SAS control module to deplete its stored power. • Remove rear console. (See 09-17-5 REAR CONSOLE REMOVAL/INSTALLATION) • Remove driver-side side wall. • Is SAS control module connector securely connected?  W6U801WA6	Yes	Go to next step.
		No	Connect connector properly.
2	• Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Disconnect SAS control module connector. • Is SAS control module connector okay?	Yes	Replace SAS control module. (See 08-10-15 SAS CONTROL MODULE REMOVAL/INSTALLATION)
		No	Repair dash harness of air bag system.

DTC 2

Z6U080201046W05

DTC 2	SAS control module
DETECTION CONDITION	**Warning** • **Detection conditions are for understanding the DTC outline before performing inspection. Performing an inspection with only detection conditions may cause injury due to operating error or damage the system. When performing an inspection, always follow the diagnosis procedure.** • Malfunction in SAS control module circuit.
POSSIBLE CAUSE	• SAS control module malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
—	—	—	Replace SAS control module. (See 08-10-15 SAS CONTROL MODULE REMOVAL/INSTALLATION)

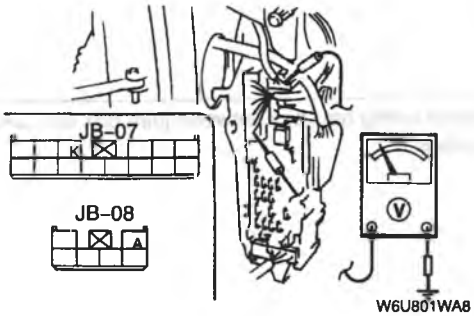
DTC 3

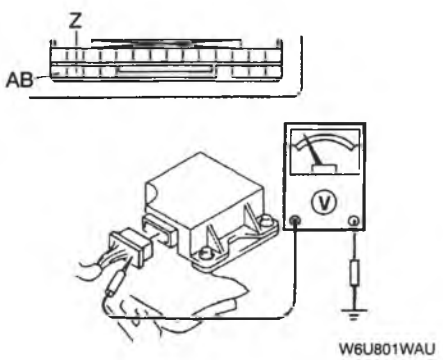
Z6U080201046W06

DTC 3	Battery
POSSIBLE CAUSE	**Note** • Diagnostic trouble code 3 is indicated when the voltage simultaneously drops in the harness of both of the following circuits. — Harness between terminal A of joint box connector (JB-08) and terminal AB of SAS control module connector. — Harness between terminal K of joint box connector (JB-07) and terminal Z of SAS control module connector. • Battery weak • Malfunction in wiring harness between battery and SAS control module • SAS control module malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT BATTERY** • Is battery voltage **more than 9 V?**	Yes	Go to next step.
		No	Battery is weak. Inspect engine charging system. (See 01-03A-3 FOREWORD [FS]) (See 01-03B-3 FOREWORD [KL])

STEP	INSPECTION		ACTION
2	**INSPECT WIRING HARNESS BETWEEN BATTERY AND JOINT BOX** ● Remove driver-side front scuff plate. ● Remove driver-side front side trim. ● Remove joint box without disconnecting connector. ● Turn ignition switch to ON. ● Measure voltage at terminals A (JB-08) and K (JB-07) of joint box connector of wiring harness. ● Is voltage of at either terminal **more than 9 V**? 	Yes	Go to next step.
		No	Repair wiring harness between battery and joint box.

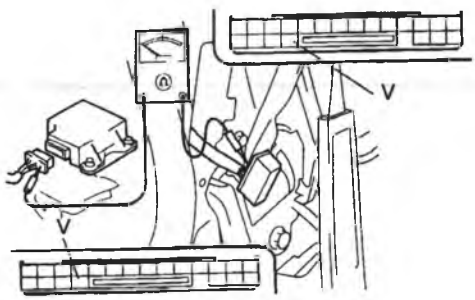
STEP	INSPECTION		ACTION
3	**INSPECT WIRING HARNESS BETWEEN JOINT BOX AND SAS CONTROL MODULE** **Warning** • **Handling the air bag system components improperly can accidentally deploy the air bag modules, which may seriously injure you. Read SERVICE WARNINGS, before handling the air bag system components. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)** • Turn ignition switch to LOCK. • Disconnect negative battery cable and wait for **more than 1 minute** to allow the backup power supply of SAS control module to deplete its stored power. • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Disconnect SAS control module connector. • Connect negative battery cable. • Turn ignition switch to ON. • Measure voltage at terminals AB and Z of SAS control module connector. • Is voltage of at either terminal **more than 9 V?**  W6U801WAU	Yes	Replace SAS control module. (See 08-10-15 SAS CONTROL MODULE REMOVAL/INSTALLATION)
		No	Repair wiring harness between joint box and SAS control module.

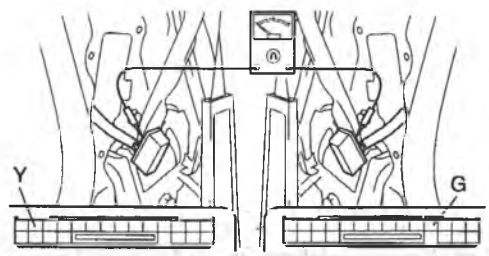
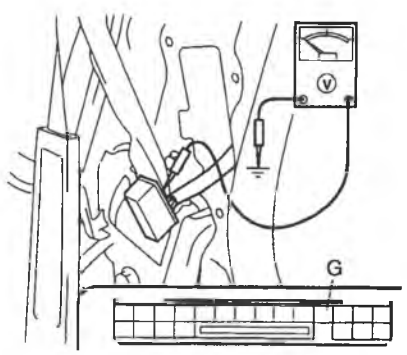
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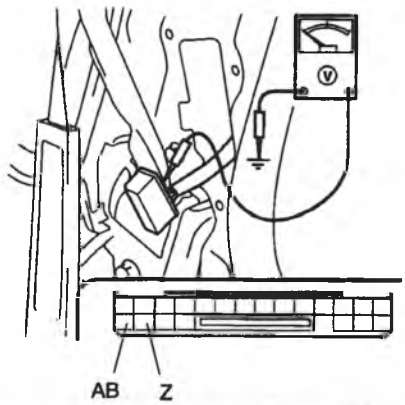
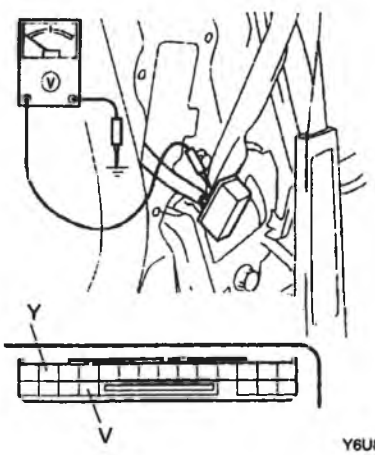
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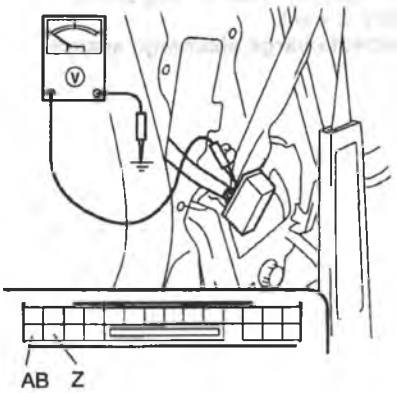
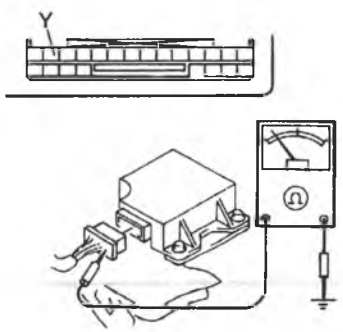
DTC 5	Harness between SAS control module and side air bag sensor
POSSIBLE CAUSE	**Vehicle with side air bag** • Driver-side side air bag sensor malfunction • Passenger-side side air bag sensor malfunction • SAS control module malfunction • Open or short circuit in wiring harness among SAS control module, driver-side side air bag sensor and passenger-side side air bag sensor • Poor connection of connector among SAS control module, driver-side side air bag sensor and passenger-side side air bag sensor **Vehicle without side air bag** • Malfunction of connector between SAS control module and ground • Open or short circuit in wiring harness between SAS control module and ground • SAS control module malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is vehicle equipped with side air bag?	Yes	Go to next step.
		No	Go to step **8**.
2	**INSPECT WIRING HARNESS BETWEEN SAS CONTROL MODULE AND DRIVER-SIDE SIDE AIR BAG SENSOR** **Warning** • **Handling the air bag system components improperly can accidentally deploy the air bag modules, which may seriously injure you. Read SERVICE WARNINGS, before handling the air bag system components. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)** • Turn the ignition switch to LOCK. • Disconnect the negative battery cable and wait for more than **1 minute** to allow the backup power supply of SAS control module and side air bag sensor to deplete. • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Remove rear console. (See 09-17-5 REAR CONSOLE REMOVAL/INSTALLATION) • Remove driver's side side wall. • Disconnect SAS control module connector. • Disconnect driver-side side air bag module connector. • Remove driver's side B-pillar lower trim. (See 09-17-11 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION) • Disconnect driver-side side air bag sensor connector. • Check wiring harness between terminal V of SAS control module connector and terminal V of driver-side side air bag sensor for following. — Short to ground — Short to power supply — Open circuit • Is wiring harness okay?  Y6U802WA2	Yes	Go to next step.
		No	Repair wiring harness between SAS control module and driver-side side air bag sensor.

STEP	INSPECTION		ACTION
3	**INSPECT WIRING HARNESS BETWEEN DRIVER-SIDE SIDE AIR BAG SENSOR AND PASSENGER-SIDE SIDE AIR BAG SENSOR** • Disconnect passenger-side side air bag module connector. • Remove passenger's side B-pillar lower trim. (See 09-17-11 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION) • Disconnect passenger-side side air bag sensor connector. • Is there continuity between terminal Y of driver-side side air bag sensor connector and terminal G of passenger -side side air bag sensor connector?  Y6U802WA3	Yes	Go to next step.
		No	Repair wiring harness between driver-side side air bag sensor and passenger-side side air bag sensor.
4	**INSPECT COMMUNICATION CIRCUIT** • Connect passenger-side side air bag sensor connector. • Connect negative battery cable. • Turn ignition switch to ON. • Measure voltage terminal G of passenger-side side air bag sensor connector. • Is voltage **approximately 5V?**  Y6U802WA4	Yes	Go to step 6.
		No	Go to next step.

STEP	INSPECTION		ACTION
5	**INSPECT POWER SUPPLY CIRCUIT OF PASSENGER-SIDE SIDE AIR BAG SENSOR** • Measure voltage at Z and AB terminals of passenger-side side air bag sensor connector. • Is voltage of at least either terminal **more than 8V**?  Y6U802WC5	Yes	Replace passenger-side side air bag sensor. (See 08-10-13 SIDE AIR BAG SENSOR REMOVAL/INSTALLATION)
		No	• **Repair wiring harness between battery and passenger-side side air bag sensor.** • Battery is weak. **Inspect charge/discharge system.**
6	**INSPECT COMMUNICATION CIRCUIT** • Turn the ignition switch to LOCK. • Disconnect the negative battery cable and wait for more than **1 minute** to allow the backup power supply of the side air bag sensor to deplete its stored power. • Disconnect passenger-side side air bag sensor connector. • Connect driver-side side air bag sensor connector. • Connect negative battery cable. • Turn ignition switch to ON. • Measure voltage at V and Y terminals of driver-side side air bag sensor connector. • Is voltage **approximately 5V**?  Y6U802WC7	Yes	Replace SAS control module. (See 08-10-15 SAS CONTROL MODULE REMOVAL/INSTALLATION)
		No	Go to next step.

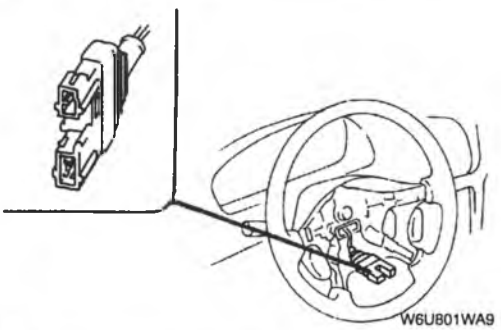
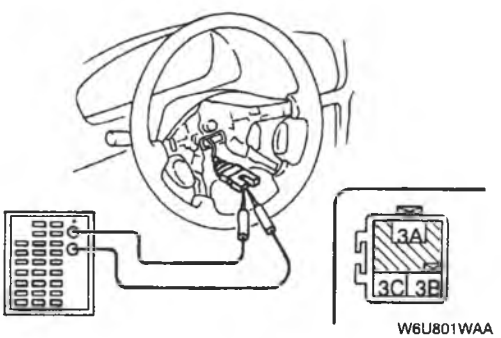
STEP	INSPECTION		ACTION
7	**INSPECT POWER SUPPLY CIRCUIT OF DRIVER-SIDE SIDE AIR BAG SENSOR** • Measure voltage at Z and AB terminals of driver-side side air bag sensor connector. • Is voltage of at either terminal **more than 8V**?  Y6U802WA1	Yes	Replace driver-side side air bag sensor. (See 08-10-13 SIDE AIR BAG SENSOR REMOVAL/INSTALLATION)
		No	Repair wiring harness between battery and driver-side side air bag sensor. • Battery is weak. Inspect charge/discharge system.
8	**INSPECT WIRING HARNESS BETWEEN SAS CONTROL MODULE AND GND** • Turn the ignition switch to LOCK. • Disconnect the negative battery cable and wait for more than **1 minute** to allow the backup power supply of the SAS control module to deplete its stored power. • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Remove rear console. (See 09-17-5 REAR CONSOLE REMOVAL/INSTALLATION) • Remove driver's side side wall. • Disconnect SAS control module connector. • Inspect wiring harness between terminal Y of SAS control module connector and ground for the following. — Open circuit. • Is wiring harness okay?  Y6U802WC6	Yes	Replace SAS control module. (See 08-10-15 SAS CONTROL MODULE REMOVAL/INSTALLATION)
		No	Replace wiring harness.

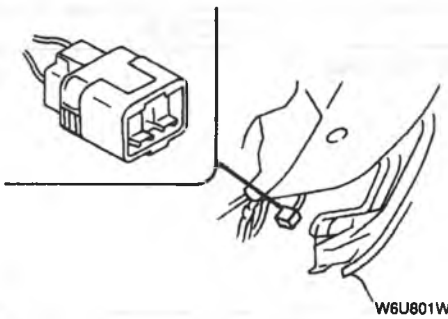
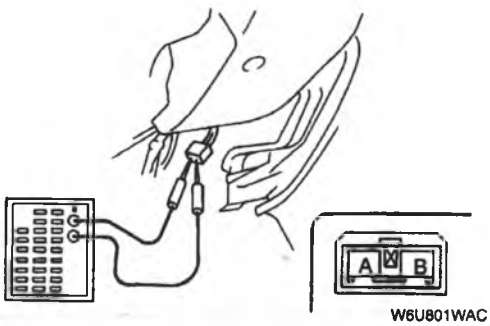
DTC 6

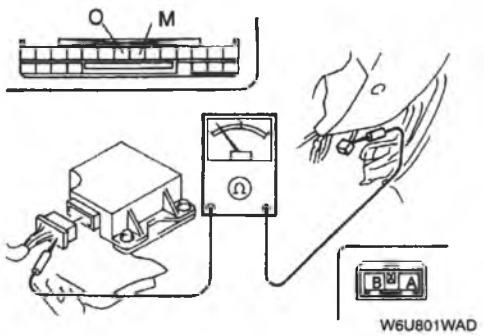
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DTC 6	Driver-side air bag module
POSSIBLE CAUSE	• Driver-side air bag module malfunction • Clock spring malfunction • Malfunction in wiring harness between SAS control module and driver-side air bag module • Inoperative connectors between clock spring and SAS control module • SAS control module malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Warning** • **Handling the air bag system components improperly can accidentally deploy the air bag modules, which may seriously injure you. Read SERVICE WARNINGS, before handling the air bag system components. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)**	Yes	Go to next step.
	• Turn ignition switch to LOCK. • Disconnect negative battery cable and wait for **more than 1 minute** to allow the backup power supply of SAS control module to deplete its stored power. • Remove driver-side air bag module. (See 08-10-10 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION) • Is clock spring pin okay?  W6U801WA9	No	Replace clock spring. (See 08-10-14 CLOCK SPRING REMOVAL/INSTALLATION)
2	• Connect leads of **SST** (Fuel And Thermometer checker) or apply **2Ω** resister to terminals 3B and 3C of clock spring. • Set resistance of **SST** (Fuel And Thermometer checker) to **2Ω**. • Connect negative battery cable. • Is DTC 6 indicated when ignition switch is turned to ON?  W6U801WAA	Yes	Go to next step.
		No	Replace driver-side air bag module. (See 08-10-10 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION)

STEP	INSPECTION		ACTION
3	• Turn ignition switch to LOCK. • Disconnect negative battery cable and wait for **more than 1 minute** to allow backup power supply of SAS control module to deplete its stored power. • Remove column cover. • Disconnect clock spring connector. • Is clock spring connector pin okay?  W6U801WAB	Yes	Go to next step.
		No	Repair dash harness of air bag system.
4	• Connect leads of **SST** (Fuel And Thermometer checker) or apply **2Ω** resister to terminals A and B of the clock spring connector. • Set resistance of **SST** (Fuel And Thermometer checker) to **2Ω**. • Connect negative battery cable. • Is DTC 6 indicated when ignition switch is turned to ON?  W6U801WAC	Yes	Go to next step.
		No	Replace clock spring. (See 08-10-14 CLOCK SPRING REMOVAL/INSTALLATION)

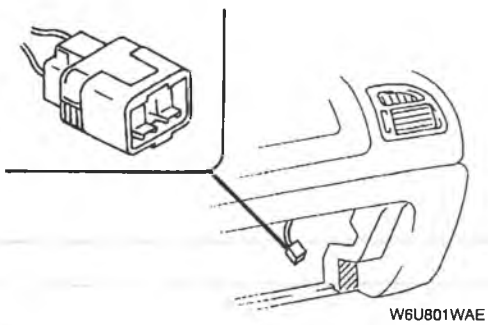
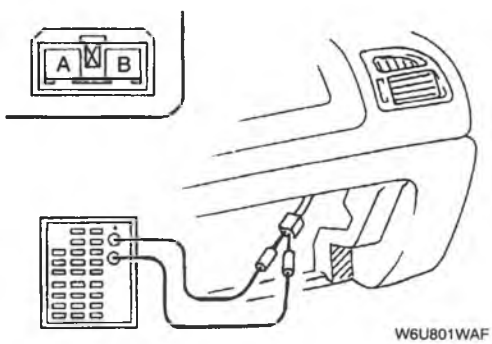
STEP	INSPECTION		ACTION
5	**INSPECT WIRING HARNESS BETWEEN SAS CONTROL MODULE AND CLOCK SPRING** ● Turn ignition switch to LOCK. ● Disconnect negative battery cable and wait for **more than 1 minute** to allow backup power supply of SAS control module to deplete its stored power. ● Remove glove compartment. ● Disconnect passenger-side air bag module connector. ● Remove rear console. (See 09-17-5 REAR CONSOLE REMOVAL/INSTALLATION) ● Remove driver-side side wall. ● Disconnect SAS control module connector. ● Inspect wiring harnesses between terminal O of SAS control module connector and terminal A of clock spring connector and between terminal M of SAS control module connector and terminal B of clock spring connector for following: — Short to ground — Short to power supply — Open circuit ● Are wiring harnesses okay?  W6U801WAD	Yes	Replace SAS control module. (See 08-10-15 SAS CONTROL MODULE REMOVAL/INSTALLATION)
		No	Repair dash harness of air bag system.

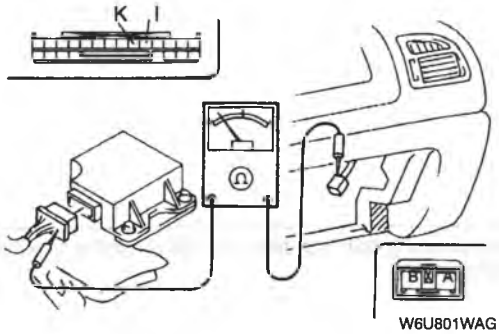
DTC 7

Z6U080201046W09

DTC 7	Passenger-side air bag module
POSSIBLE CAUSE	• Passenger-side air bag module malfunction • Malfunction in wiring harness between SAS control module and passenger-side air bag module • Inoperative connectors between passenger-side air bag module and SAS control module • SAS control module malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Warning** • **Handling the air bag system components improperly can accidentally deploy the air bag modules, which may seriously injure you. Read SERVICE WARNINGS, before handling the air bag system components. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)** • Turn ignition switch to LOCK. • Disconnect negative battery cable and wait for **more than 1 minute** to allow backup power supply of SAS control module to deplete its stored power. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Is passenger-side air bag module connector pin okay?  W6U801WAE	Yes	Go to next step.
		No	Repair wiring harness.
2	• Connect leads of **SST** (Fuel And Thermometer checker) or apply **2Ω** resistor to terminals A and B of the passenger-side air bag module connector. • Set resistance of **SST** (Fuel And Thermometer checker) to **2Ω**. • Connect negative battery cable. • Is DTC 7 indicated when ignition switch is turned to ON?  W6U801WAF	Yes	Go to next step.
		No	Replace passenger-side air bag module. (See 08-10-11 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION)

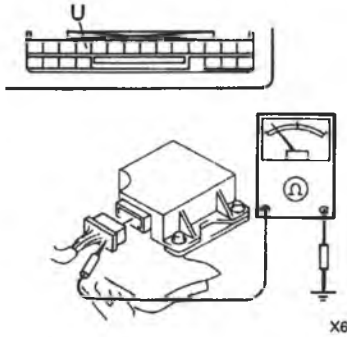
STEP	INSPECTION		ACTION
3	**INSPECT WIRING HARNESS BETWEEN SAS CONTROL MODULE AND PASSENGER-SIDE AIR BAG MODULE** ● Turn ignition switch to LOCK. ● Disconnect negative battery cable and wait for **more than 1 minute** to allow backup power supply of SAS control module to deplete its stored power. ● Remove column cover. ● Disconnect clock spring connector. ● Remove rear console. (See 09-17-5 REAR CONSOLE REMOVAL/INSTALLATION) ● Remove driver-side side wall. ● Disconnect SAS control module connector. ● Inspect wiring harnesses between terminal K of SAS control module connector and terminal A of passenger-side air bag module connector and between terminal I of SAS control module connector and terminal B of passenger-side air bag module connector for following: — Short to ground — Short to power supply — Open circuit ● Are wiring harnesses okay?  W6U801WAG	Yes	Replace SAS control module. (See 08-10-15 SAS CONTROL MODULE REMOVAL/INSTALLATION)
		No	Repair dash harness of air bag system.

DTC 11,12

Z6U080201046W10

DTC 11,12	Wiring harness between terminal U of SAS control module connector and ground
DETECTION CONDITION	**Warning** • **Detection conditions are for understanding the DTC outline before performing inspection. Performing an inspection with only detection conditions may cause injury due to operating error or damage the system. When performing an inspection, always follow the diagnosis procedure.** • Terminal U of SAS control module connector is open
POSSIBLE CAUSE	• Inoperative connectors between SAS control module and ground • Open or short circuit in wiring harness between SAS control module and ground • SAS control module malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT WIRING HARNESS BETWEEN SAS CONTROL MODULE AND GND** **Warning** • **Handling the air bag system components improperly can accidentally deploy the air bag modules, which may seriously injure you. Read SERVICE WARNINGS, before handling the air bag system components. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)** • Turn ignition switch to LOCK. • Disconnect negative battery cable and wait for **more than 1 minute** to allow backup power supply of SAS control module to deplete its stored power. • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side air bag module connector. • Remove rear console. (See 09-17-5 REAR CONSOLE REMOVAL/INSTALLATION) • Remove driver-side side wall. • Disconnect SAS control module connector. • Inspect the following points for the wiring harness between terminal U of SAS control module connector and ground. — Short to power supply — Open circuit • Is wiring harness okay?  X6U801WA2	Yes	Replace SAS control module. (See 08-10-15 SAS CONTROL MODULE REMOVAL/INSTALLATION)
		No	Repair wiring harness between SAS control module and GND.

DTC 21

Z6U080201046W11

DTC 21	Driver-side side air bag sensor connector poor connection
POSSIBLE CAUSE	• Driver-side side air bag sensor connector malfunction • Poor connection of driver-side side air bag sensor connector • Driver-side side air bag sensor malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Warning** • **Handling the air bag system components improperly can accidentally deploy the air bag modules, which may seriously injure you. Read SERVICE WARNINGS, before handling the air bag system components. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)** • Turn the ignition switch to LOCK. • Disconnect the negative battery cable and wait for more than **1 minute** to allow the backup power supply of the side air bag sensor to deplete its stored power. • Remove driver's side B-pillar lower trim. (See 09-17-11 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION) • Is driver-side side air bag sensor connector securely connected?	Yes	Go to next step.
		No	Reconnect connector properly.
2	• Disconnect driver-side side air bag module connector. • Disconnect driver-side side air bag sensor connector. • Is driver-side air bag sensor connector okay?	Yes	Replace driver-side side air bag sensor. (See 08-10-13 SIDE AIR BAG SENSOR REMOVAL/INSTALLATION)
		No	Replace wiring harness.

DTC 22

Z6U080201046W12

DTC 22	Driver-side side air bag sensor
POSSIBLE CAUSE	• Driver-side side air bag sensor malfunction

Diagnostic procedure

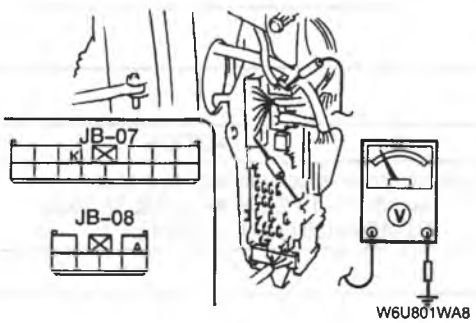
STEP	INSPECTION		ACTION
—	—	—	Replace driver-side side air bag sensor. (See 08-10-13 SIDE AIR BAG SENSOR REMOVAL/INSTALLATION.)

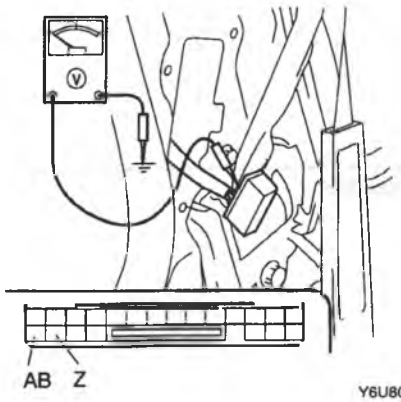
DTC 23

Z6U080201046W13

DTC 23	Battery
POSSIBLE CAUSE	**Note** ● Diagnostic trouble code 23 is indicated when the voltage simultaneously drops in the harness of both of the following circuits. — Harness between A terminal of the fuse block connector (JB-08) and terminal AB of the driver-side side air bag sensor connector. — Harness between K terminal of the fuse block connector (JB-07) and terminal Z of the driver-side side air bag sensor connector. ● Weak battery ● Malfunction in wiring harness between battery and driver-side side air bag sensor. ● Driver-side side air bag sensor malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT BATTERY** **Warning** ● **Handling the air bag system components improperly can accidentally deploy the air bag modules, which may seriously injure you. Read SERVICE WARNINGS, before handling the air bag system components. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)** ● Is battery to voltage **more than 9V**?	Yes	Go to next step.
		No	Battery is weak. Inspect charge/discharge system.
2	**INSPECT WIRING HARNESS BETWEEN BATTERY AND JOINT BOX** ● Remove driver's side front scuff plate. ● Remove driver's side front side trim. ● Remove joint box without disconnecting connector ● Turn ignition switch to ON. ● Measure voltage at terminals A (JB-08) and K (JB-07) of joint box connector of wiring harness. ● Is voltage of at either terminal **more than 9V**?  W6U801WA8	Yes	Go to next step.
		No	Repair wiring harness between battery and joint box.

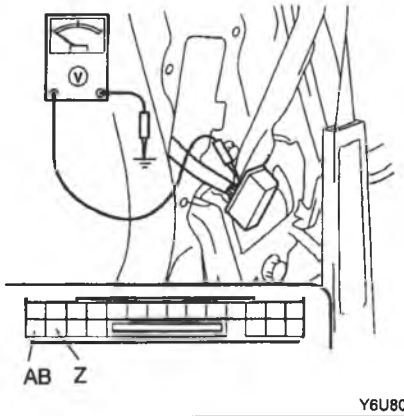
STEP	INSPECTION		ACTION
3	**INSPECT POWER CIRCUIT OF DRIVER-SIDE SIDE AIR BAG SENSOR** ● Turn the ignition switch to LOCK. ● Disconnect the negative battery cable and wait for more than **1 minute** to allow the backup power supply of the side air bag sensor to deplete its stored power. ● Disconnect driver-side side air bag module connector. ● Remove driver's side B-pillar lower trim. (See 09-17-11 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION) ● Disconnect driver-side side air bag sensor connector. ● Connect negative battery cable. ● Turn ignition switch to ON. ● Measure voltage at Z and AB terminals of driver-side side air bag sensor connector. ● Is voltage of at either terminal **more than 9V**?  Y6U802WA1	Yes	Replace driver-side side air bag sensor. (See 08-10-13 SIDE AIR BAG SENSOR REMOVAL/INSTALLATION)
		No	Repair wiring harness between joint box and driver-side side air bag sensor.

DTC 25

Z6U080201046W14

DTC 25	Harness between SAS control module and driver-side side air bag sensor
POSSIBLE CAUSE	• Open or short circuit in wiring harness • Driver-side side side air bag sensor malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT COMMUNICATION CIRCUIT** **Warning** • **Handling the air bag system components improperly can accidentally deploy the air bag modules, which may seriously injure you. Read SERVICE WARNINGS, before handling the air bag system components. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)** • Turn the ignition switch to LOCK. • Disconnect the negative battery cable and wait for more than 1 minute to allow the backup power supply of the SAS control module and side air bag sensor to deplete its stored power. • Remove column cover. • Disconnect clock spring connector. • Remove glove compartment. • Disconnect passenger-side side air bag module connector. • Disconnect passenger-side side air bag sensor connector. • Remove rear console. (See 09-17-5 REAR CONSOLE REMOVAL/INSTALLATION) • Remove driver's side side wall. • Disconnect SAS control module connector. • Disconnect passenger-side side air bag sensor connector. • Connect negative battery cable. • Measure voltage terminals V and Y of driver-side side air bag sensor connector. • Is voltage **approximately 5V**?	Yes	Replace driver-side side air bag sensor. (See 08-10-13 SIDE AIR BAG SENSOR REMOVAL/INSTALLATION)
		No	Go to next step.
2	**INSPECT POWER SUPPLY CIRCUIT OF DRIVER-SIDE SIDE AIR BAG SENSOR** • Measure voltage terminals Z and AB of driver-side side air bag sensor connector. • Is voltage of at either terminal **more than 8V**?  Y6U802WA1	Yes	Replace driver-side side air bag sensor. (See 08-10-13 SIDE AIR BAG SENSOR REMOVAL/INSTALLATION)
		No	• Repair wiring harness between battery and driver-side side air bag sensor. • Battery is weak.Inspect charge/discharge system.

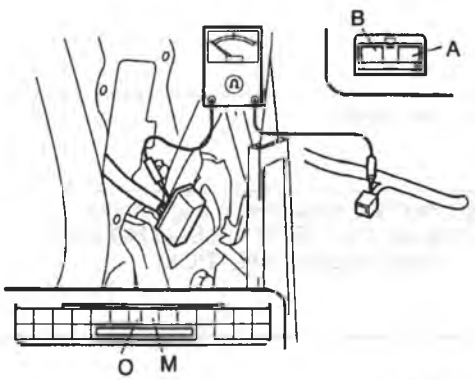
DTC 26

Z6U080201046W15

DTC 26	Driver-side side air bag module
POSSIBLE CAUSE	• Driver-side side air bag module malfunction • Malfunction in wiring harness between driver-side side air bag sensor and driver-side side air bag module • Inoperative connectors between driver-side side air bag sensor and driver-side side air bag module. • Driver-side side air bag sensor malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Warning** • **Handling the air bag system components improperly can accidentally deploy the air bag modules, which may seriously injure you. Read SERVICE WARNINGS, before handling the air bag system components. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)** • Turn the ignition switch to LOCK. • Disconnect the negative battery cable and wait for more than **1 minute** to allow the backup power supply of the side air bag sensor to deplete its stored power. • Disconnect driver-side side air bag module connector. • Is driver-side side air bag module connector pin okay?	Yes	Go to next step.
		No	Replace wiring harness
2	• Connect leads of **SST** (Checker, Fuel And Thermometer) or apply **2Ω** resistor to terminals A and B of the driver-side side air bag module connector. • Set resistance of **SST** (Checker, Fuel And Thermometer) to **2Ω**. • Connect negative battery cable. • If diagnostic trouble code 26 indicated when ignition switch is turned to ON?	Yes	Go to next step.
		No	Replace driver-side side air bag module. (See 08-10-11 SIDE AIR BAG MODULE REMOVAL/INSTALLATION)

STEP	INSPECTION		ACTION
3	**INSPECT WIRING HARNESS BETWEEN DRIVER-SIDE SIDE AIR BAG SENSOR AND DRIVER-SIDE SIDE AIR BAG MODULE** • Turn ignition switch to LOCK. • Disconnect negative battery cable and wait for more than **1 minute** to allow backup power supply of the side air bag sensor to deplete its stored power. • Remove driver's side B-pillar lower trim. (See 09-17-11 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION) • Disconnect driver-side side air bag sensor connector. • Inspect wiring harness between terminal O of driver-side side air bag sensor connector and terminal A of driver-side side air bag module connector, and between terminal M of driver-side side air bag sensor connector and terminal B of driver-side side air bag module connector for following. — Short to ground — Short to power supply — Open circuit • Is wiring harness okay?  Y6U802WA5	Yes	Replace driver-side side air bag sensor. (See 08-10-13 SIDE AIR BAG SENSOR REMOVAL/INSTALLATION)
		No	Repair wiring harness between driver-side side air bag sensor and driver-side side air bag module.

DTC 31

Z6U080201046W16

DTC 31	Passenger-side side air bag sensor connector poor connection
POSSIBLE CAUSE	• Passenger-side side air bag sensor connector malfunction • Poor connection of passenger-side side air bag sensor • Passenger-side side air bag sensor malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Warning** • **Handling the air bag system components improperly can accidentally deploy the air bag modules, which may seriously injure you. Read SERVICE WARNINGS, before handling the air bag system components. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)**	Yes	Go to next step.
	• Turn the ignition switch to LOCK. • Disconnect the negative battery cable and wait for more than **1 minute** to allow the backup power supply of the side air bag sensor to deplete its stored power. • Remove passenger's side B-pillar lower trim. See 09-17-11 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION • Is passenger-side side air bag sensor connector securely connected?	No	Reconnect connector properly.
2	• Disconnect passenger-side side air bag module connector • Disconnect passenger-side side air bag sensor connector. • Is passenger-side side air bag sensor connector okay?	Yes	Replace passenger-side side air bag sensor. (See 08-10-13 SIDE AIR BAG SENSOR REMOVAL/INSTALLATION)
		No	Repair wiring harness.

DTC 32

Z6U080201046W17

DTC 32	Passenger-side side air bag sensor
POSSIBLE CAUSE	• Passenger-side side air bag sensor malfunction

Diagnostic procedure

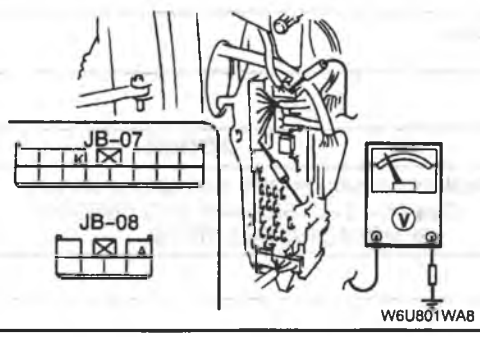
STEP	INSPECTION		ACTION
—	—	—	Replace passenger-side side air bag sensor. (See 08-10-13 SIDE AIR BAG SENSOR REMOVAL/INSTALLATION)

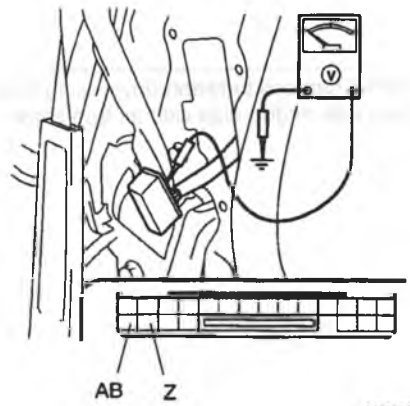
DTC 33

Z6U080201046W18

DTC 33	Battery
POSSIBLE CAUSE	**Note** ● Diagnostic trouble code 33 is indicated when the voltage simultaneously drops in the harness of both of the following circuits. — Harness between A terminal of the fuse block connector (JB-08) and terminal Z of the passenger-side side air bag sensor connector. — Harness between K terminal of the fuse block connector (JB-07) and terminal AB of the passenger-side side air bag sensor connector. ● Weak battery ● Malfunction in wiring harness between battery and passenger-side side air bag sensor ● Passenger-side side air bag sensor malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT BATTERY** **Warning** ● **Handling the air bag system components improperly can accidentally deploy the air bag modules, which may seriously injure you. Read SERVICE WARNINGS, before handling the air bag system components. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)** ● Is battery to voltage **more than 9V**?	Yes	Go to next step.
		No	Battery is weak. Inspect charge/discharge system.
2	**INSPECT WIRING HARNESS BETWEEN BATTERY AND JOINT BOX** ● Remove driver's side front scuff plate. ● Remove driver's side front side trim. ● Remove joint box without disconnecting connector ● Turn ignition switch to ON. ● Measure voltage at A (JB-08) and K (JB-07) terminals of joint box connector. ● Is voltage of at either terminal **more than 9V**?  W6U801WA8	Yes	Go to next step.
		No	Repair wiring harness between battery and joint box.

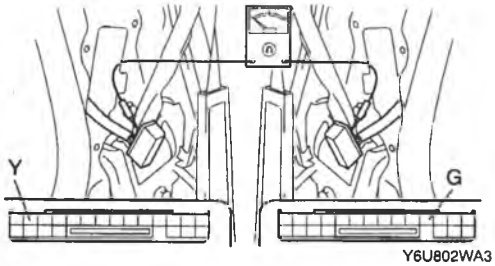
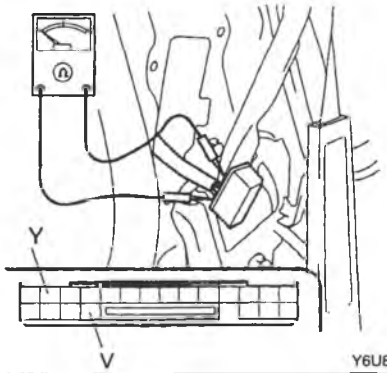
STEP	INSPECTION		ACTION
3	**INSPECT POWER CIRCUIT OF PASSENGER-SIDE SIDE AIR BAG SENSOR** • Turn the ignition switch to LOCK. • Disconnect the negative battery cable and wait for more than **1 minute** to allow the backup power supply of the side air bag sensor to deplete its stored power. • Disconnect passenger-side side air bag module connector. • Remove passenger's side B-pillar lower trim. See 09-17-11 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION • Disconnect passenger-side side air bag sensor connector. • Connect negative battery cable. • Turn ignition switch to ON. • Measure voltage at Z and AB terminals of passenger-side side air bag sensor connector. • Is voltage of at either terminal **more than 9V** ?  Y6U802WC5	Yes	Replace passenger-side side air bag sensor. (See 08-10-13 SIDE AIR BAG SENSOR REMOVAL/INSTALLATION)
		No	Repair wiring harness between fuse block and passenger-side side air bag sensor.

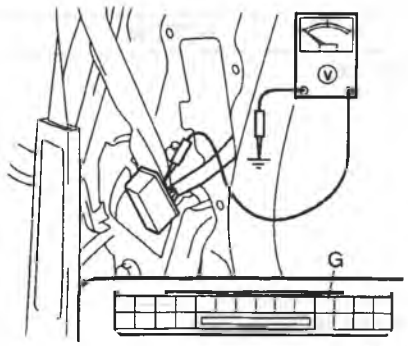
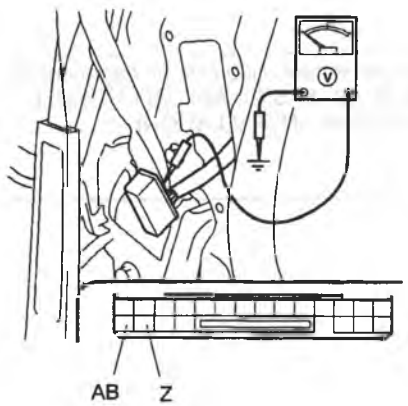
DTC 35

Z6U080201046W19

DTC 35	Harness between SAS control module and passenger-side side air bag sensor
POSSIBLE CAUSE	• Damaged passenger-side side air bag sensor • Open or short circuit in wiring harness

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Warning** • **Handling the air bag system components improperly can accidentally deploy the air bag modules, which may seriously injure you. Read SERVICE WARNINGS, before handling the air bag system components. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)** • Turn the ignition switch to LOCK • Disconnect the negative battery cable and wait for more than **1 minute** to allow the backup power supply of the SAS control module and side air bag sensor to deplete its stored power. • Disconnect driver-side side air bag module connector. • Disconnect passenger-side side air bag module connector. • Remove driver's and passenger's side B-pillar lower trims. (See 09-17-11 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION) • Disconnect driver-side side air bag sensor connector. • Disconnect passenger-side side air bag sensor connector. • Is there continuity between terminal Y of driver-side side air bag sensor connector and terminal G of passenger-side side air bag sensor connector?  Y6U802WA3	Yes	Go to next step.
		No	Repair wiring harness between driver-side side air bag sensor and passenger-side side air bag sensor.
2	**INSPECT DRIVER-SIDE SIDE AIR BAG SENSOR INNER CIRCUIT** • Is there continuity between terminal V and Y of driver-side side air bag sensor?  Y6U802WA0	Yes	Go to next step.
		No	Replace driver-side side air bag sensor. (See 08-10-13 SIDE AIR BAG SENSOR REMOVAL/INSTALLATION)

STEP	INSPECTION		ACTION
3	**INSPECT COMMUNICATION CIRCUIT** • Connect passenger-side side air bag sensor connector. • Connect negative battery cable. • Turn ignition switch to ON. • Measure voltage terminal G of passenger-side side air bag sensor connector. • Is voltage **approximately 5V**?  Y6U802WA4	Yes	Replace passenger-side side air bag sensor. (See 08-10-13 SIDE AIR BAG SENSOR REMOVAL/INSTALLATION)
		No	Go to next step.
4	**INSPECT POWER SUPPLY CIRCUIT OF PASSENGER-SIDE SIDE AIR BAG SENSOR** • Measure voltage terminals Z and AB of passenger-side side air bag sensor connector. • Is voltage of at either terminal **more than 8V** ?  Y6U802WC5	Yes	Replace passenger-side side air bag sensor. (See 08-10-13 SIDE AIR BAG SENSOR REMOVAL/INSTALLATION)
		No	• Repair wiring harness between battery and passenger-side side air bag sensor. • Battery is weak. **Inspect charge/discharge system.**

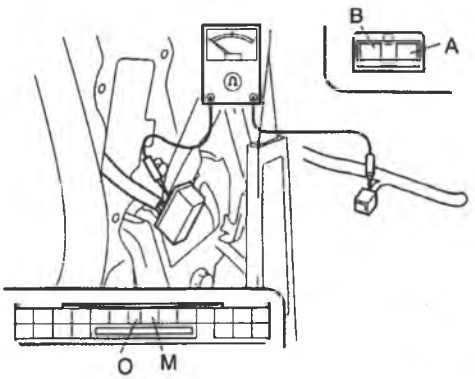
DTC 37

Z6U080201046W20

DTC 37	Passenger-side side air bag module
POSSIBLE CAUSE	• Passenger-side side air bag module malfunction • Open or short circuit in wiring harness • Malfunction in wiring harness between passenger-side side air bag sensor and passenger-side side air bag module • Inoperative connectors between passenger-side side air bag sensor and passenger-side side air bag module. • Passenger-side side air bag sensor malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**Warning** • **Handling the air bag system components improperly can accidentally deploy the air bag modules, which may seriously injure you. Read SERVICE WARNINGS, before handling the air bag system components. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)** • Turn the ignition switch to LOCK. • Disconnect the negative battery cable and wait for more than **1 minute** to allow the backup power supply of the side air bag sensor to deplete its stored power. • Disconnect passenger-side side air bag module connector. • Is passenger-side side air bag module connector pin okay?	Yes	Go to next step.
		No	Repair wiring harness
2	• Connect leads of **SST** (Checker, Fuel And Thermometer) or apply **2Ω** resistor to terminals A and B of the passenger-side side air bag module connector. • Set resistance of **SST** (Checker, Fuel And Thermometer) to **2Ω**. • Connect negative battery cable. • If diagnostic trouble code 37 indicated when ignition switch is turned to ON?	Yes	Go to next step.
		No	Replace passenger-side side air bag module. (See 08-10-11 SIDE AIR BAG MODULE REMOVAL/INSTALLATION)

STEP	INSPECTION		ACTION
3	**INSPECT WIRING HARNESS BETWEEN PASSENGER-SIDE SIDE AIR BAG SENSOR AND PASSENGER-SIDE SIDE AIR BAG MODULE** • Turn ignition switch to LOCK. • Disconnect negative battery cable and wait for more than 1 minute to allow backup power supply of the side air bag sensor to deplete its stored power. • Remove passenger's side B-pillar lower trim. See 09-17-11 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION • Disconnect passenger-side side air bag sensor connector. • Inspect wiring harness between terminal O of passenger-side side air bag sensor connector and terminal A of passenger-side side air bag module connector, and between terminal M of passenger-side side air bag sensor connector and terminal B of passenger-side side air bag module connector for following. — Short to ground — Short to power supply — Open circuit • Is wiring harness okay?  Y6U802WA5	Yes	Replace passenger-side side air bag sensor. (See 08-10-11 SIDE AIR BAG MODULE REMOVAL/INSTALLATION)
		No	Repair wiring harness between passenger-side side air bag sensor and passenger-side side air bag sensor.

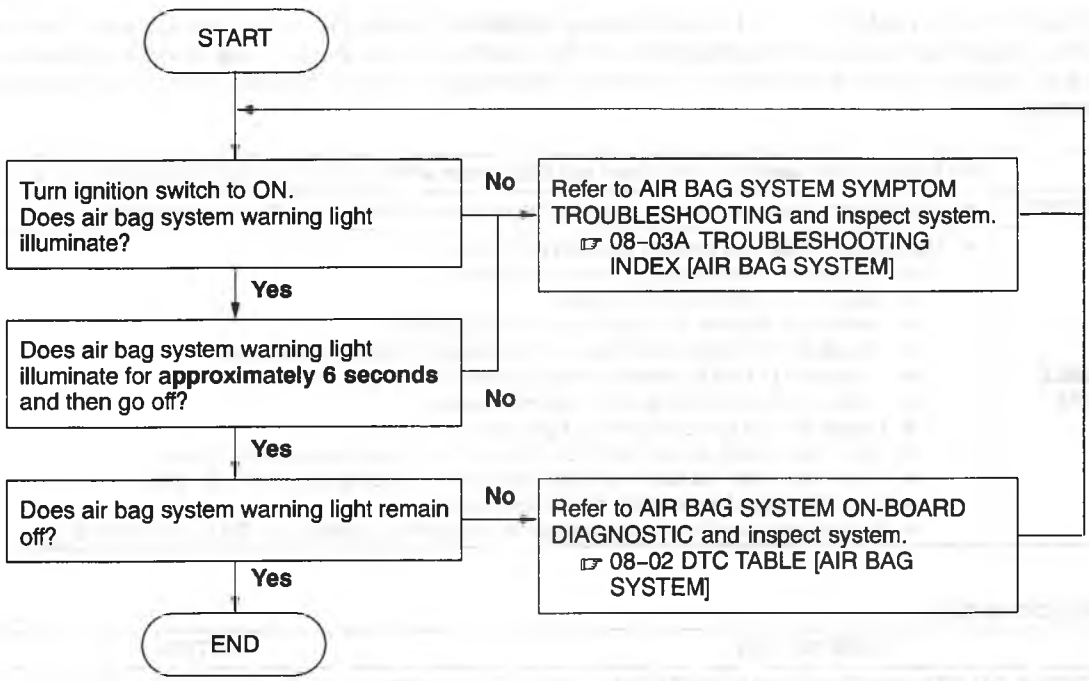
08-03A SYMPTOM TROUBLESHOOTING

FOREWORD [AIR BAG SYSTEM] 08-03A-1
TROUBLESHOOTING INDEX [AIR BAG SYSTEM] 08-03A-1
NO.1 AIR BAG SYSTEM WARNING LIGHT DOES NOT ILLUMINATE WHEN IGNITION SWITCH IS TURNED TO ON 08-03A-2
NO.2 AIR BAG SYSTEM WARNING LIGHT ILLUMINATES IMMEDIATELY AFTER IGNITION SWITCH IS TURNED TO ON AND REMAINS ILLUMINATED 08-03A-5

FOREWORD [AIR BAG SYSTEM]

Z6U080301046W01

- Use the following flowchart to verify the cause of the trouble.



Y6U803WA0

TROUBLESHOOTING INDEX [AIR BAG SYSTEM]

Z6U080301046W02

- To diagnose the appropriate area,use the chart below to verify the symptoms.

No.	TROUBLESHOOTING ITEM	DESCRIPTION	PAGE
1	Air bag system warning light does not illuminate.	Malfunction in air bag system warning circuit (open circuit or short to power supply).	(See 08-03A-2 NO.1 AIR BAG SYSTEM WARNING LIGHT DOES NOT ILLUMINATE WHEN IGNITION SWITCH IS TURNED TO ON)
2	Air bag system warning light is illuminated all the time.	Malfunction in air bag system warning circuit (short to ground).	(See 08-03A-5 NO.2 AIR BAG SYSTEM WARNING LIGHT ILLUMINATES IMMEDIATELY AFTER IGNITION SWITCH IS TURNED TO ON AND REMAINS ILLUMINATED)

Note

- If symptom still exists after performing troubleshooting, check the following:
  1. Poor contact at terminal B of short connector (4-pin) between instrument cluster and SAS control module
  2. Simultaneous poor contact at terminals S and X of SAS control module connector (21-pin)
  3. Simultaneous poor contact at terminals AB and Z of SAS control module connector (21-pin)
  4. Simultaneous poor contact in wiring harness between terminal S of SAS control module connector (21-pin) and ground terminal X of SAS control module connector (21-pin) and ground
  5. Simultaneous poor contact in wiring harness between METER 10 A fuse and SAS control module, ENGINE 10 A fuse and SAS control module

NO.1 AIR BAG SYSTEM WARNING LIGHT DOES NOT ILLUMINATE WHEN IGNITION SWITCH IS TURNED TO ON

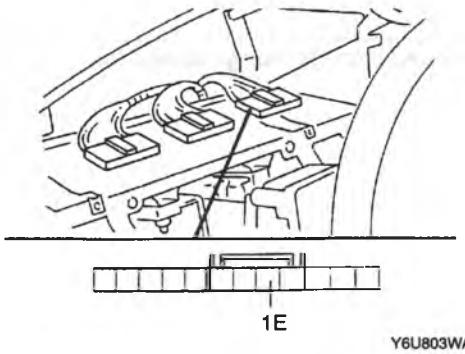
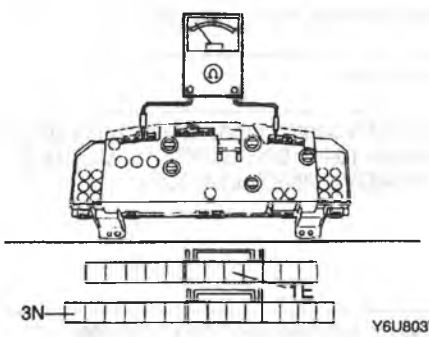
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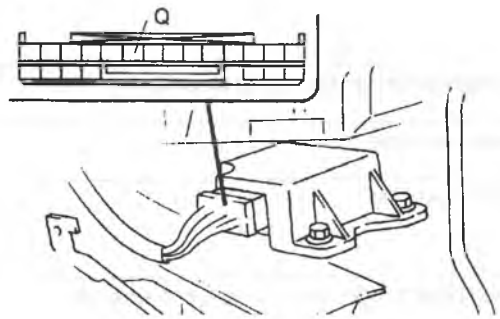
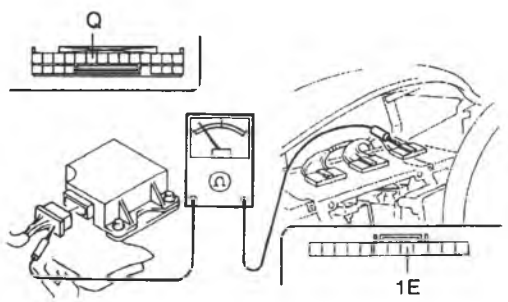
- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors,terminals and wiring harness are connected correctly and undamaged.

1	**Air bag system warning light does not illuminate when ignition switch is turned to ON**
DESCRIPTION	• Malfunction in air bag system warning circuit (open circuit or short to power supply).
POSSIBLE CAUSE	• Malfunction in air bag system warning light circuit — Air bag system warning light does not illuminate • SAS control module malfunction • Instrument cluster (print plate No.1) malfunction • Terminal 1E of instrument cluster connector (12-pin) malfunction • Terminal Q of SAS control module connector (21-pin) malfunction • Air bag system warning light bulb malfunction • Loose air bag system warning light bulb • Poor connection at terminal 1E of instrument cluster connector (12-pin) • Poor connection at terminal Q of SAS control module connector (21-pin) • Poor contact of instrument cluster connector • Malfunction in wiring harness between instrument cluster and SAS control module

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**CHECK TO SEE WHETHER MALFUNCTION IS IN AIR BAG SYSTEM WARNING LIGHT CIRCUIT OR OTHER WARNING AND INDICATOR LIGHT CIRCUIT IN INSTRUMENT CLUSTER** • Turn ignition switch to ON position. • Do other warning and indicator lights illuminate?	Yes	Turn ignition switch to LOCK position, then go to next step.
		No	Inspect condition of instrument cluster power supply system, ground system and instrument cluster connectors, then go to step 10.
2	**INSPECT AIR BAG SYSTEM WARNING LIGHT BULB INSTALLATION** • Is air bag system warning light bulb securely installed?	Yes	Go to next step.
		No	Reinstall properly, then go to step 10
3	**INSPECT AIR BAG SYSTEM WARNING LIGHT BULB** • Is air bag system warning light bulb okay?	Yes	Reinstall properly, then go to next step.
		No	Replace air bag system warning light bulb, then go to step 10.

STEP	INSPECTION		ACTION
4	**VERIFY THAT INSTRUMENT CLUSTER CONNECTOR TERMINAL 1E IS CONNECTED** ● Remove instrument cluster. ● Is terminal 1E of instrument cluster connector (12-pin) securely connected with connector?  Y6U803WAJ	Yes	Go to next step.
		No	Reconnect properly, then go to step 10.
5	**INSPECT INSTRUMENT CLUSTER CONNECTOR TERMINAL 1E** ● Is terminal 1E of instrument cluster connector (12-pin) damaged?	Yes	Replace terminal, then go to step 10.
		No	Go to next step.
6	**INSPECT INSTRUMENT CLUSTER PRINT PLATE** ● Check for continuity between terminal 1E and 3N of print plate No.1 of instrument cluster. Is there continuity?  Y6U803WAL	Yes	Go to next step.
		No	Replace print plate No.1, then go to step 10.

STEP	INSPECTION		ACTION
7	**VERIFY THAT SAS CONTROL MODULE CONNECTOR TERMINAL Q IS CONNECTED** ● Turn ignition switch to LOCK. ● Disconnect negative battery cable and wait for **more than 1 minute** to allow the backup power supply of SAS control module to deplete its stored power. ● Remove column cover. ● Disconnect clock spring connector. ● Remove glove compartment. ● Disconnect passenger-side air bag module connector. ● Remove driver-side side wall. ● Disconnect SAS control module connector (21-pin). ● Is terminal Q of SAS control module connector (21-pin) securely connected with connector?  W6U801WAM	Yes	Go to next step.
		No	Reconnect properly, then go to step 10.
8	**INSPECT SAS CONTROL MODULE CONNECTOR TERMINAL Q** ● Is terminal Q of SAS control module connector (21-pin) damaged?	Yes	Replace terminal, then go to step 10.
		No	Go to next step.
9*	**CHECK TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN SAS CONTROL MODULE OR WIRING HARNESS (BETWEEN INSTRUMENT CLUSTER AND SAS CONTROL MODULE)** ● Inspect wiring harness between terminal Q of SAS control module connector (21-pin) and terminal 1E of instrument cluster (12-pin) for following: — Short to power supply — Open circuit ● Are they okay?  Y6U803WAV	Yes	Replace SAS control module, then go to step 10. (See 08-10-15 SAS CONTROL MODULE REMOVAL/INSTALLATION)
		No	Replace air bag harness, then go to step 10.

STEP	INSPECTION		ACTION
10	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT REOCCUR AFTER REPAIR** • Connect SAS control module connector. • Connect instrument cluster connector. • Connect passenger-side air bag module connector. • Connect clock spring connector. • Connect negative battery cable. • When turning ignition switch to ON, does air bag system warning light operate properly?	Yes	Troubleshooting completed.
		No	Reconfirm symptoms of malfunction.

NO.2 AIR BAG SYSTEM WARNING LIGHT ILLUMINATES IMMEDIATELY AFTER IGNITION SWITCH IS TURNED TO ON AND REMAINS ILLUMINATED

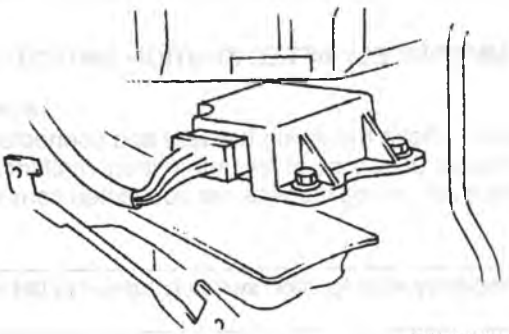
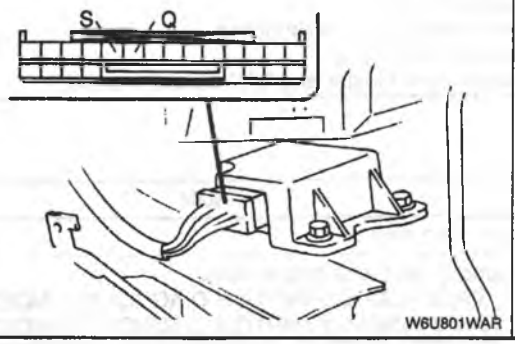
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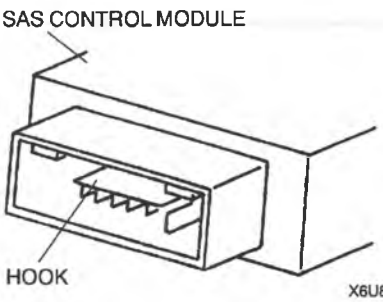
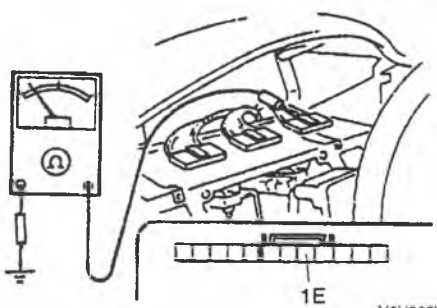
- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

2	**Air bag system warning light illuminates immediately after ignition switch is turned to ON and remains illuminated**
DESCRIPTION	• Malfunction in air bag system warning circuit (short to ground).
POSSIBLE CAUSE	• Malfunction in air bag system warning light circuit — Air bag system warning light remains illuminated • SAS control module malfunction • Instrument cluster (print plate No.1) malfunction • Malfunction in short bar between terminal Q of SAS control module connector (21-pin) and terminal S of SAS control module connector (21-pin) • Battery malfunction or battery charge/discharge system malfunction • No connection in SAS control module connector (21-pin) • Malfunction in wiring harness between instrument cluster and SAS control module

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT BATTERY VOLTAGE** • Measure battery positive voltage. • Is voltage **more than 9 V**?	Yes	Go to next step.
		No	Inspect engine charging system. (See 01-03A-5 SYMPTOM DIAGNOSTIC INDEX [FS]) (See 01-03B-5 SYMPTOM DIAGNOSTIC INDEX [KL])

STEP	INSPECTION		ACTION
2	**VERIFY THAT SAS CONTROL MODULE IS CONNECTED** • Turn ignition switch to LOCK. • Disconnect negative battery cable and wait for **more than 1 minute** to allow the backup power supply of SAS control module to deplete its stored power. • Remove rear console. (See 09-17-5 REAR CONSOLE REMOVAL/INSTALLATION) • Remove the driver-side side wall. • Is SAS control module connector (21-pin) securely connected?  X6U801WA4	Yes	Go to next step.
		No	Reconnect properly, then go to step 7.
3	**INSPECT SAS CONTROL MODULE CONNECTOR TERMINAL Q AND S** • Is short bar between terminal Q of SAS control module (21-pin) and terminal S of SAS control module (21-pin) damaged?  W6U801WAR	Yes	Replace dash harness, then go to step 7.
		No	Go to next step.

STEP	INSPECTION		ACTION
4	**INSPECT SAS CONTROL MODULE SHORT BAR HOOK** ● Remove column cover. ● Disconnect clock spring connector. ● Remove glove compartment. ● Disconnect passenger-side air bag module connector. ● Remove driver-side side wall. ● Disconnect SAS control module connector (21-pin). ● Is hook that activates SAS control module connector short bar okay?	Yes	Go to next step.
		No	Replace SAS control module, then go to step 7. (See 08-10-15 SAS CONTROL MODULE REMOVAL/INSTALLATION)
			
5*	**INSPECT WIRING HARNESS BETWEEN SAS CONTROL MODULE AND INSTRUMENT CLUSTER FOR SHORT TO GROUND** ● Disconnect instrument cluster connector (12-pin). ● Insert insulative material between terminals Q and S of SAS control module connector (21-pin) so short bar cannot operate. ● Check for continuity between terminal 1E of instrument cluster connector (12-pin) and ground. ● Is there continuity?	Yes	Replace air bag harness, then go to step 7.
		No	Go to next step.
			
6	**INSPECT INSTRUMENT CLUSTER PRINT PLATE** ● Is there continuity between terminal 1E and any of the following print plate terminals in the instrument cluster? — 2B — 2N	Yes	Replace print plate No.1, then go to next step.
		No	Replace SAS control module, then go to next step. (See 08-10-15 SAS CONTROL MODULE REMOVAL/INSTALLATION)

STEP	INSPECTION		ACTION
7	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT REOCCUR AFTER REPAIR** • Connect SAS control module connector. • Connect instrument cluster connector. • Connect passenger-side air bag module connector. • Connect clock spring connector. • Connect negative battery cable. • When turning ignition switch to ON, does air bag system warning light operate properly?	Yes	Troubleshooting completed.
		No	Reconfirm symptoms of malfunction.

08-03B SYMPTOM TROUBLESHOOTING [SEAT BELT]

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TROUBLESHOOTING INDEX [SEAT BELT] 08-03B-1
NO.1 SEAT BELT WARNING LIGHT AND BUZZER DO NOT OPERATE 08-03B-1
NO.2 SEAT BELT WARNING BUZZER SOUNDS, BUT WARNING LIGHT DOES NOT ILLUMINATE 08-03B-2
NO.3 SEAT BELT WARNING LIGHT ILLUMINATES BUT WARNING BUZZER DOES NOT SOUND 08-03B-3
NO.4 SEAT BELT WARNING BUZZER SOUNDS FOR 4 TO 8 SECONDS AFTER IGNITION SWITCH IS TURNED TO ON (BELT FASTENED) 08-03B-5

FOREWORD [SEAT BELT]

Z6U080301046W05

- Thoroughly read and understand the basic flow of troubleshooting in order to properly perform the procedures. (See 00-00-5 Troubleshooting Procedure.)

TROUBLESHOOTING INDEX [SEAT BELT]

Z6U080301046W06

- Use the chart below to verify the symptom of the trouble in order to diagnose the appropriate area.

No.	TROUBLESHOOTING ITEM	PAGE
1	Seat belt warning light and buzzer do not operate.	(See 08-03B-1 NO.1 SEAT BELT WARNING LIGHT AND BUZZER DO NOT OPERATE)
2	Seat belt warning buzzer sounds, but warning light does not illuminate.	(See 08-03B-2 NO.2 SEAT BELT WARNING BUZZER SOUNDS, BUT WARNING LIGHT DOES NOT ILLUMINATE)
3	Seat belt warning light illuminates but warning buzzer does not sound.	(See 08-03B-3 NO.3 SEAT BELT WARNING LIGHT ILLUMINATES BUT WARNING BUZZER DOES NOT SOUND)
4	Seat belt warning buzzer sounds for 4 to 8 seconds after ignition switch is turned to ON (belt is fastened).	(See 08-03B-5 NO.4 SEAT BELT WARNING BUZZER SOUNDS FOR 4 TO 8 SECONDS AFTER IGNITION SWITCH IS TURNED TO ON (BELT FASTENED))

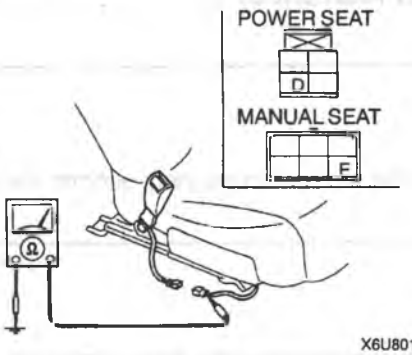
NO.1 SEAT BELT WARNING LIGHT AND BUZZER DO NOT OPERATE

Z6U080301046W07

1	Seat belt warning light and buzzer do not operate
POSSIBLE CAUSE	• Malfunction in seat belt warning light and buzzer input signal circuit — Buckle switch malfunction — Malfunction in wiring harness between instrument cluster, CPU and buckle switch — Malfunction in wiring harness between buckle switch and ground • Malfunction in instrument cluster power supply circuit — Malfunction in wiring harness between METER 10 A fuse and instrument cluster — METER 10 A fuse malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT BUCKLE SWITCH** • Inspect buckle switch. See 08-11-3 BUCKLE SWITCH INSPECTION • Is buckle switch okay?	Yes	Go to next step.
		No	Replace driver-side front buckle.

STEP	INSPECTION		ACTION
2	**VERIFY THAT BUCKLE SWITCH CONNECTOR TERMINAL D (MANUAL SEAT F) IS GROUNDED** • Check for continuity between terminal D (Manual seat: F) at buckle switch connector and ground. • Is there continuity?  X6U801WB0	Yes	Go to next step.
		No	Repair wiring harness between buckle switch and ground.
3	**VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN INSTRUMENT CLUSTER, CPU AND BUCKLE SWITCH) OR INSTRUMENT CLUSTER POWER SUPPLY** • Are other warning lights illuminated with ignition switch to ON?	Yes	Repair wiring harness between instrument cluster, CPU and buckle switch.
		No	Inspect instrument cluster power supply. (See 09-03P-1 TROUBLESHOOTING INDEX [INSTRUMENTATION/DRIVER INFO.])

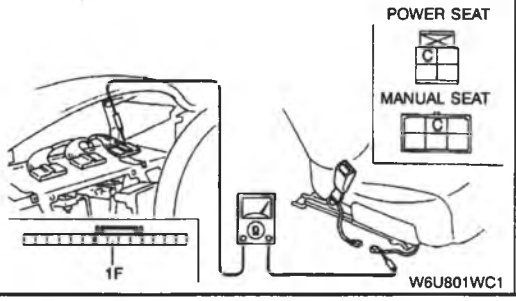
NO.2 SEAT BELT WARNING BUZZER SOUNDS, BUT WARNING LIGHT DOES NOT ILLUMINATE

Z6U080301046W08

2	**Seat belt warning buzzer sounds, but warning light does not illuminate**
POSSIBLE CAUSE	• Malfunction in seat belt warning light input signal circuit — Seat belt warning light bulb malfunction — Instrument cluster (print plate No.1) malfunction — Malfunction in wiring harness between instrument cluster and buckle switch • Malfunction in instrument cluster power supply circuit — Malfunction in wiring harness between METER 10 A fuse and instrument cluster

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT INSTRUMENT CLUSTER POWER SUPPLY** • Are other warning lights illuminated with ignition switch to ON?	Yes	Go to next step.
		No	Inspect instrument cluster power supply. (See 09-03P-1 TROUBLESHOOTING INDEX [INSTRUMENTATION/DRIVER INFO.])
2	**INSPECT SEAT BELT WARNING LIGHT BULB** • Remove the instrument cluster. • Remove and check the seat belt warning light bulb. • Is seat belt warning light bulb okay?	Yes	Go to next step.
		No	Replace seat belt warning light bulb.

STEP	INSPECTION		ACTION
3	**VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN INSTRUMENT CLUSTER AND BUCKLE SWITCH) OR PRINT PLATE NO.1** ● Disconnect buckle switch connector. ● Check for continuity between terminal 1F at instrument cluster connector and terminal C at buckle switch connector. ● Is there continuity? 	Yes	Replace print plate No.1. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
		No	Repair wiring harness between instrument cluster and buckle switch.

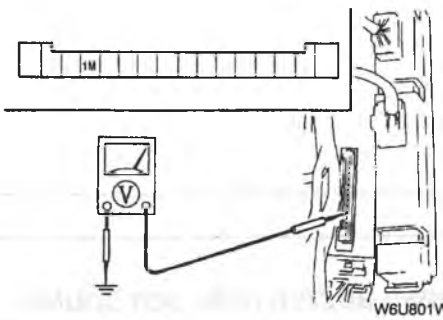
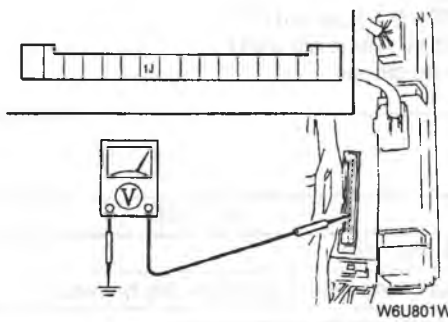
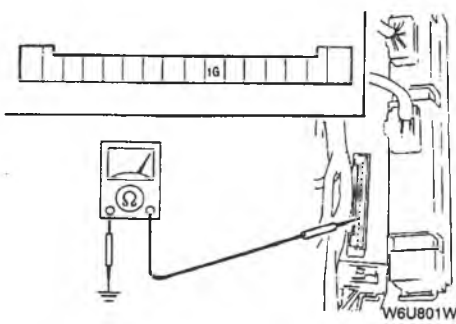
NO.3 SEAT BELT WARNING LIGHT ILLUMINATES BUT WARNING BUZZER DOES NOT SOUND

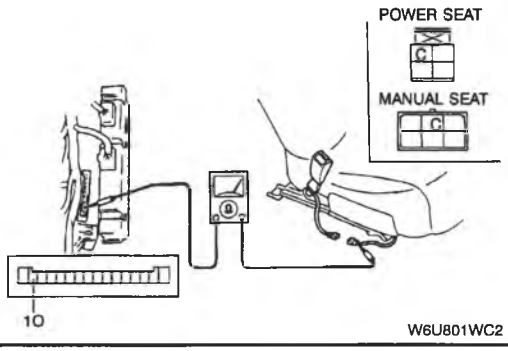
Z6U080301046W09

3	Seat belt warning light illuminates but warning buzzer does not sound
POSSIBLE CAUSE	● Malfunction in seat belt warning buzzer input signal circuit — CPU malfunction — Malfunction in wiring harness between CPU and buckle switch ● Malfunction in CPU power supply/ground circuit — Malfunction in wiring harness between METER 10 A fuse and CPU — Malfunction in wiring harness between ROOM 15 A fuse and CPU — Malfunction in wiring harness between CPU and ground — ROOM 15 A fuse malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT FUSE** ● Is ROOM 15 A fuse okay?	Yes	Go to next step.
		No	Replace fuse after repairing wiring harness.
2	**INSPECT SEAT BELT WARNING SYSTEM** ● Has seat belt warning buzzer sounded for **4 to 8 seconds** since turning ignition switch to ON?	Yes	Seat belt warning system is okay.
		No	Go to next step.

STEP	INSPECTION		ACTION
3	**INSPECT WIRING HARNESS BETWEEN CPU POWER SUPPLY AND CPU FOR CONTINUITY** • Disconnect negative battery cable. • Remove driver's side front scuff plate. • Remove driver's side front side trim. • Remove nuts fixed in joint box and remove CPU from joint box. • Connect negative battery cable. • Turn ignition switch to ON. • Measure voltage at terminal 1M at joint box of wiring harness. • Is voltage **B**+?  W6U801WC3	Yes	Go to next step.
		No	Repair wiring harness between METER 10 A fuse and CPU.
4	**INSPECT WIRING HARNESS BETWEEN CPU POWER SUPPLY AND CPU FOR CONTINUITY** • Measure voltage at terminal 1J at joint box of wiring harness. • Is voltage **B**+?  W6U801WC4	Yes	Go to next step.
		No	Repair wiring harness between ROOM 15 A fuse and joint box.
5	**VERIFY THAT JOINT BOX CONNECTOR TERMINAL 1G IS GROUNDED** • Disconnect negative battery cable. • Check for continuity between terminal 1G at joint box of wiring harness and ground. • Is there continuity?  W6U801WC5	Yes	Go to next step.
		No	Repair wiring harness between joint box and ground.

STEP	INSPECTION		ACTION
6	**VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN CPU AND BUCKLE SWITCH) OR CPU** • Disconnect buckle switch connector. • Check for continuity between termninal 10 at joint box and terminal C at buckle switch connector. • Is there continuity? 	Yes	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION)
		No	Repair wiring harness between CPU and buckle switch.

NO.4 SEAT BELT WARNING BUZZER SOUNDS FOR 4 TO 8 SECONDS AFTER IGNITION SWITCH IS TURNED TO ON (BELT FASTENED)

Z6U080301046W10

4	**Seat belt warning buzzer sounds for 4 to 8 seconds after ignition switch is turned to ON (belt fastened)**
POSSIBLE CAUSE	• Malfunction in seat belt warning buzzer input signal circuit — CPU malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
—	—	—	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION)

08-10 AIR BAG SYSTEM

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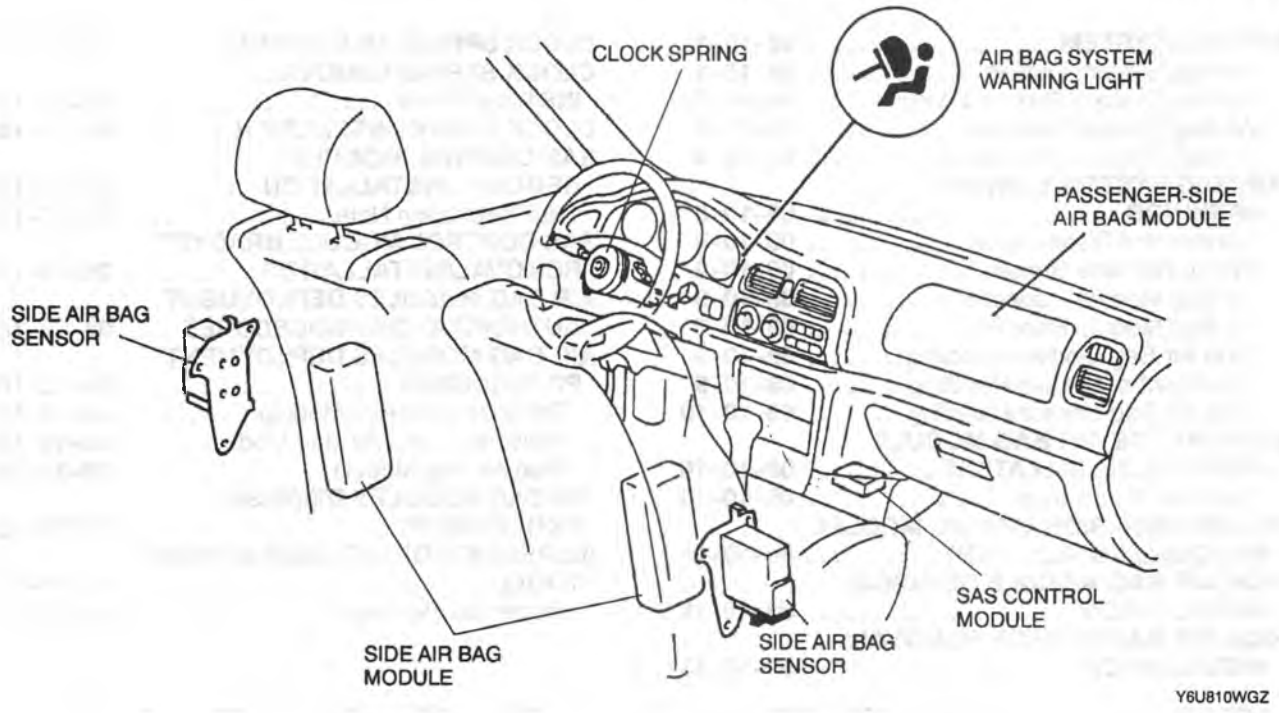
AIR BAG SYSTEM

Z6U081001046W01

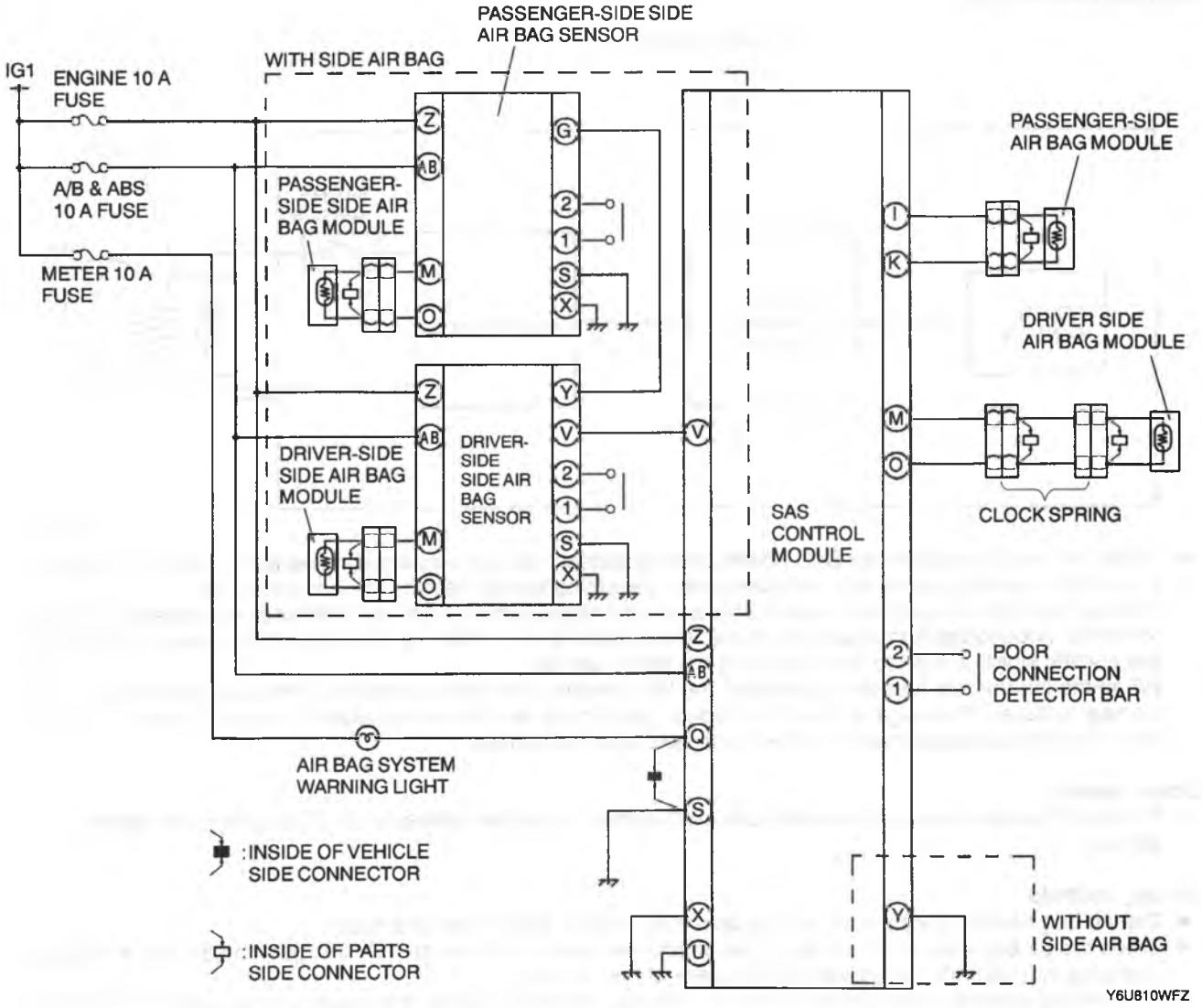
Air Bag System Outline

- The air bag system provides, increased protection for the driver and passenger in an accident when used with the seat belt system. If the vehicle suffers a frontal crash or a side crash, air bags equipped in the steering wheel or seat will inflate to protect the driver and passenger by reducing the shock of the collision.
- The air bag system consists of the following:
  - —Driver-side air bag module
  - —Passenger-side air bag module
  - —Side air bag module
  - —Side air bag sensor
  - —SAS control module
  - —Clock spring
  - —Air bag system warning light

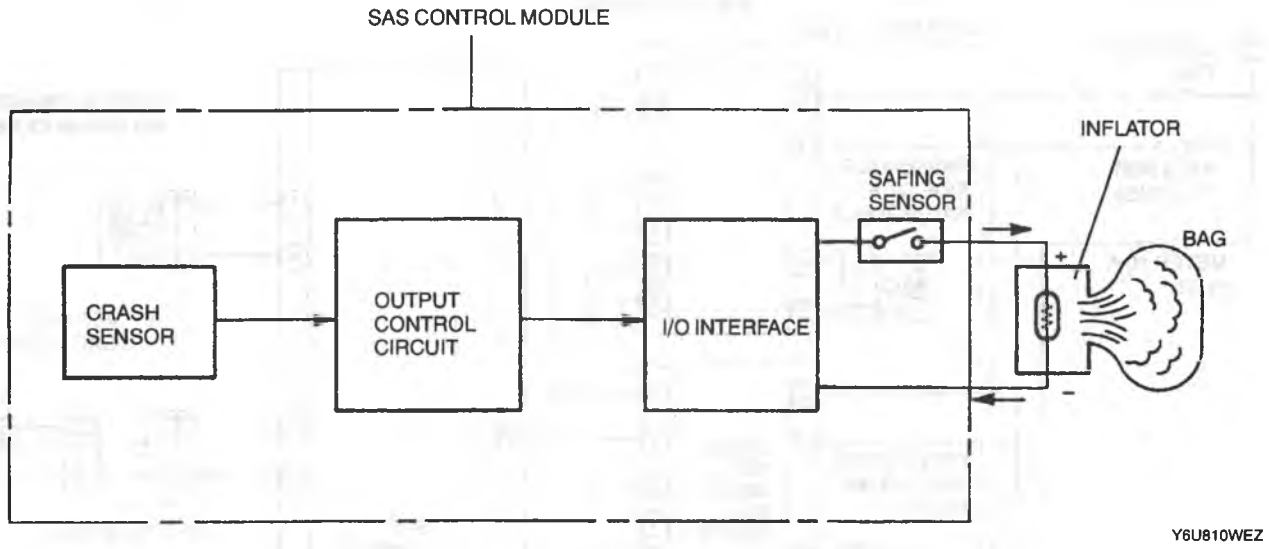
Air Bag System Structural View



Air Bag System Diagram



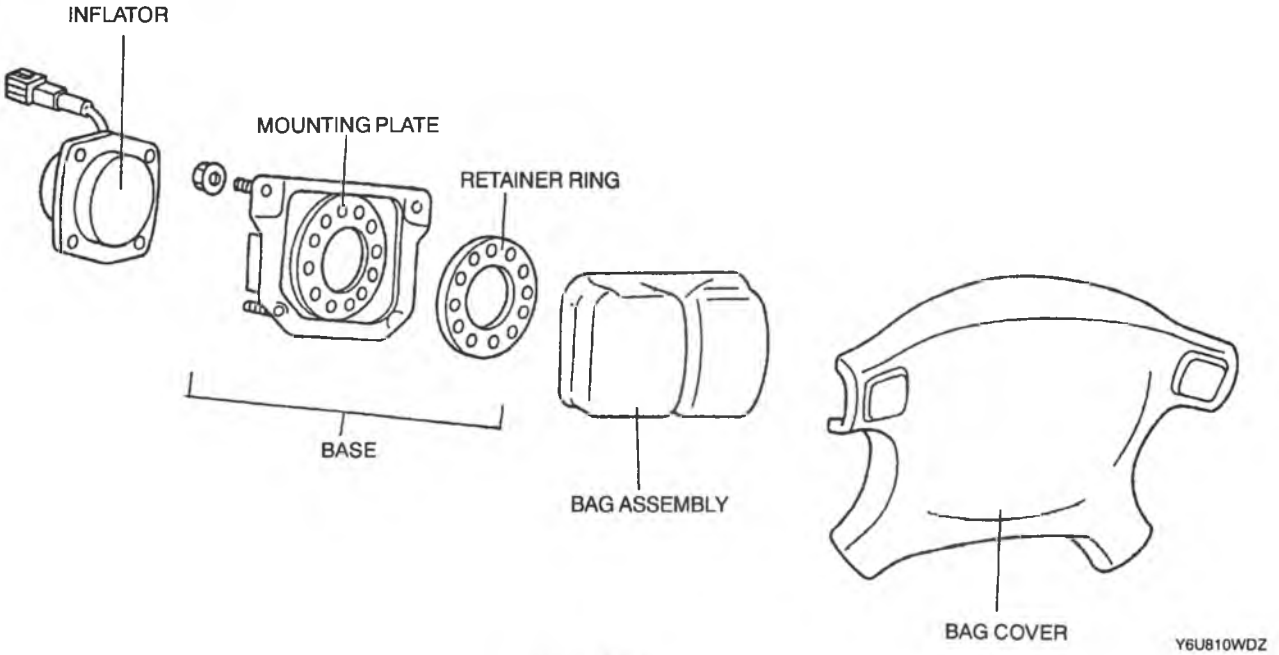
Air Bag System Description
SAS control module



- When the crash sensor in the SAS control module detects vehicle deceleration due to the shock of a collision, it outputs an electric signal and simultaneously, the safing sensor detects this and turns ON.
  The output control circuit calculates the input electric signal and determines whether or not to send the signal to the I/O (input/output) interface. If the calculated value is more than the value set in the output control circuit, the electric signal is sent to the inflator via the safing sensor.
  When the inflator receives the signal from the I/O interface, the inflator generates nitrogen gas to deploy the air bag modules. The bags release the nitrogen gas from a vent hole in the back of the bag to reduce shock to the driver and passenger and to allow easier exit from the vehicle.

Crash sensor
- The crash sensor use a piezo electric device to convert distortion (pressure displacement) to an electric signal.

Air bag module
- The air bag module consists of the bag assembly, inflator, bag cover, and base.
- When the air bag module is activated, the inflator generates nitrogen gas. By this gas, the air bag is inflated and pops out from the bag cover, which opens at the tear line.
- The air bag vents the nitrogen gas from the vent hole at the back side of the bag to reduce shock to the driver and passenger.
- The air bag module is replaced as an assembly if it malfunctions or if deployed.

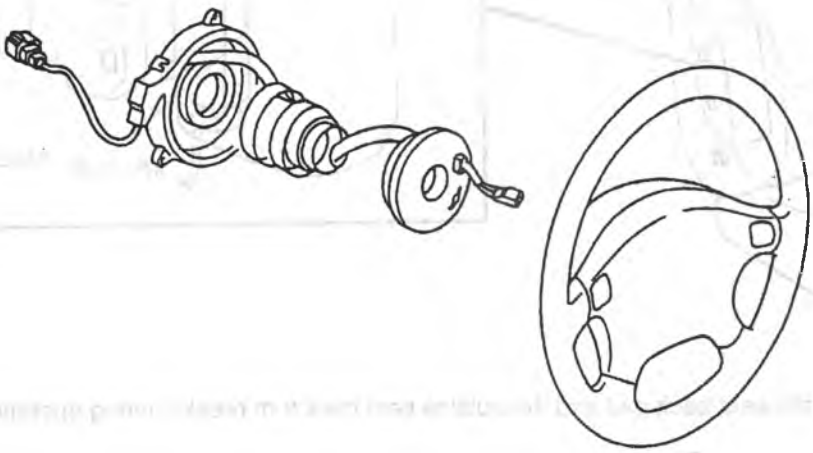


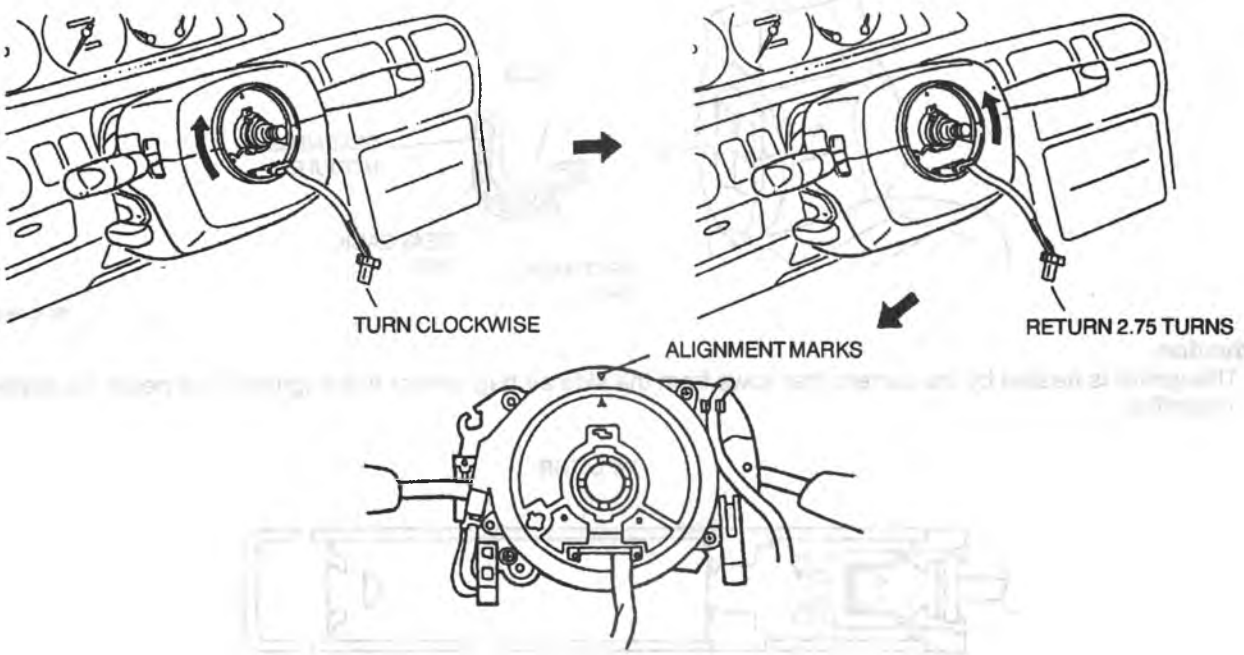
Clock spring connector

- The clock spring connector is part of the combination switch.
- The clock spring connector ensures uninterrupted electrical contact to the air bag module while allowing rotation of the steering wheel.
- The clock spring connector and combination switch are serviced as an assembly.

Caution

- **Whenever the steering wheel is removed, before reinstalling it, set the clock spring connector as follows:**
  1. **Set the front wheels straight ahead.**
  2. **Turn the clock spring connector clockwise until it stops. (Do not force it.)**
  3. **Return the connector 2.75 turns.**
  4. **Align the marks on the clock spring connector to the outer housing.**

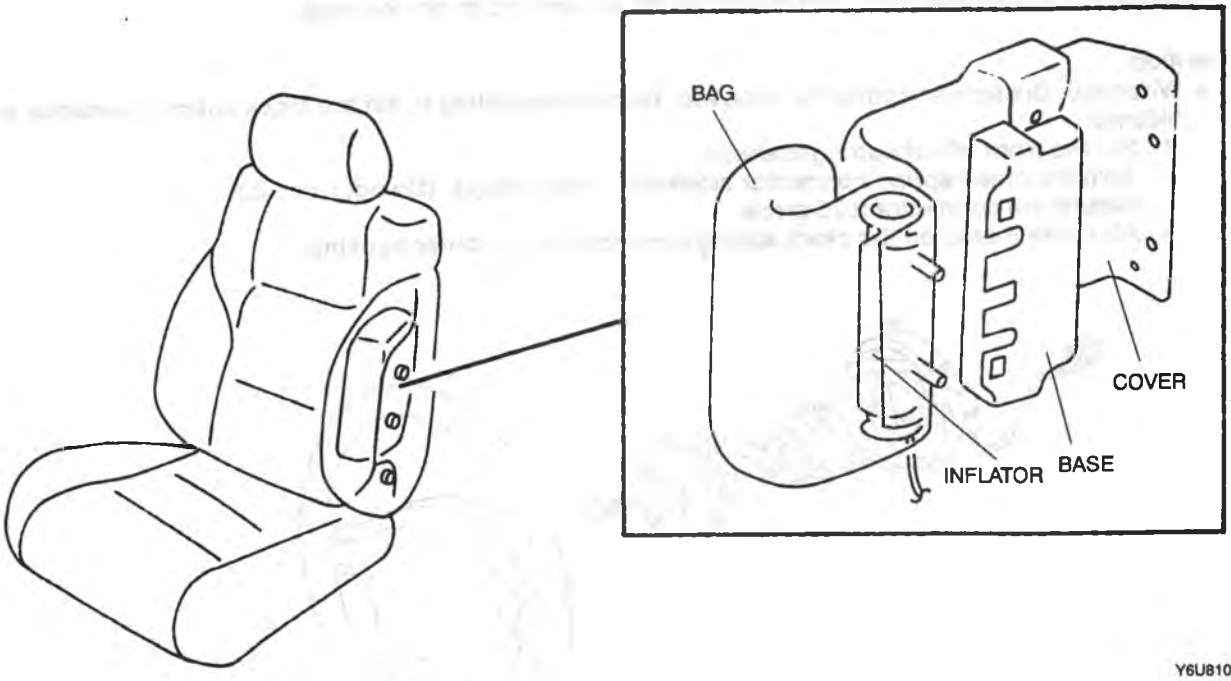




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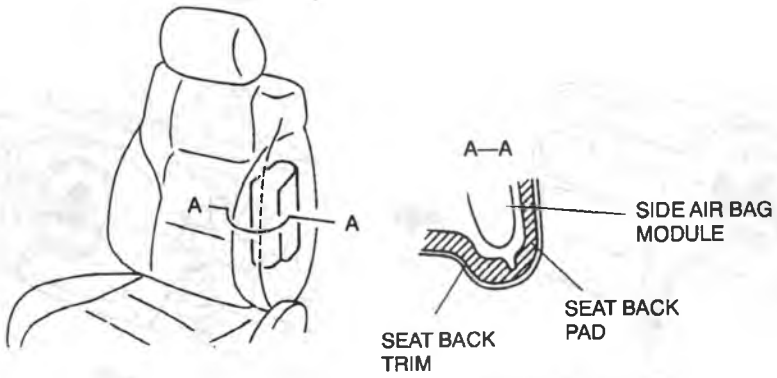
Side air bag module
Structure

- The side air bag module is composed of the following parts.



Y6U810WBZ

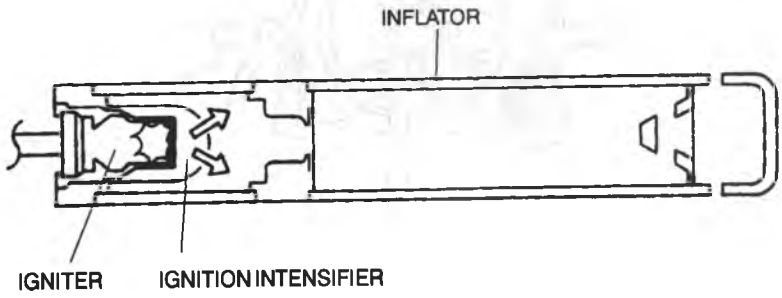
- The bag comes out from the seat back pad and the outside seat back trim breaks during operation.



Y6U810WAZ

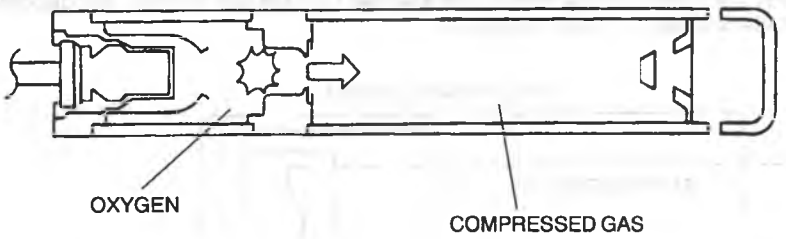
Activation

1. The igniter is heated by the current that flows from the side air bag sensor to the igniter. This heats the ignition intensifier.



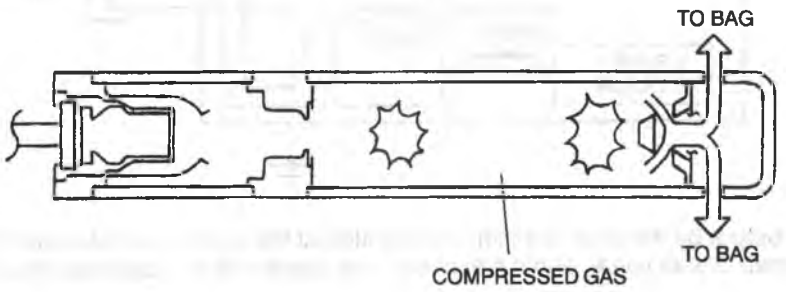
Y6U810WZY

2. The ignition intensifier burns due to its chemical reaction with oxygen, breaks the wall of the compressed gas chamber, and ignites the compressed gas.



Y6U810WTY

3. The compressed gas raises pressure and bursts from the wall out of the breaking outlet.



Y6U810WYY

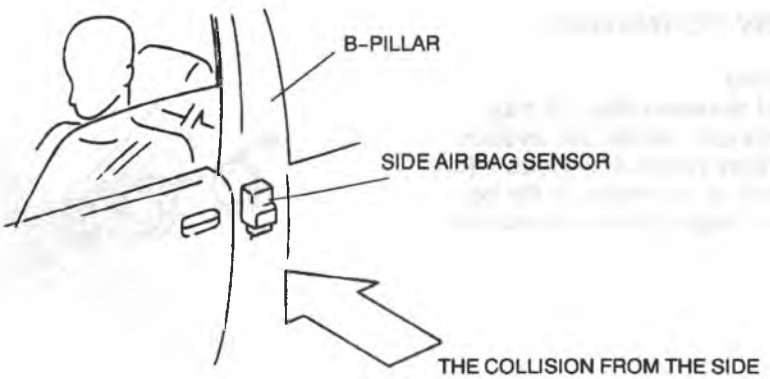
4. The bag swells from being instantaneously injected with gas and absorbs the collision impact from the driver or passenger.



Y6U810WXY

Side air bag sensor

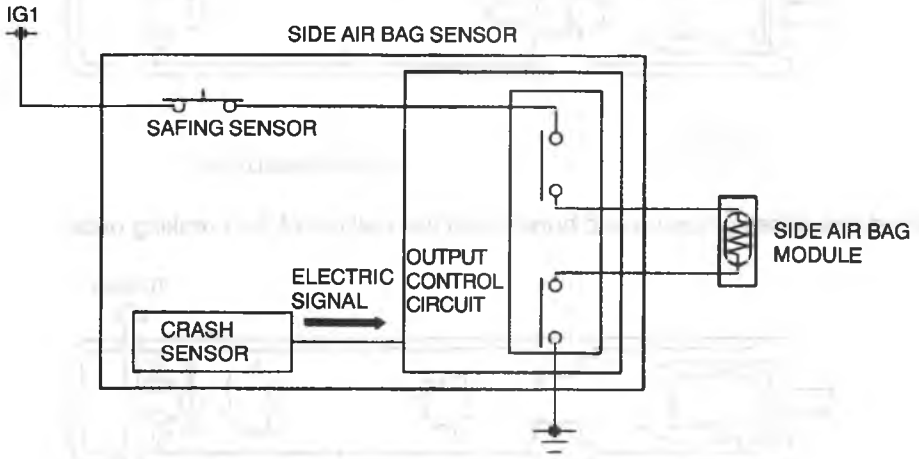
- The side air bag sensor is built into the B-pillar and senses collisions from the side.



Y6U810WWY

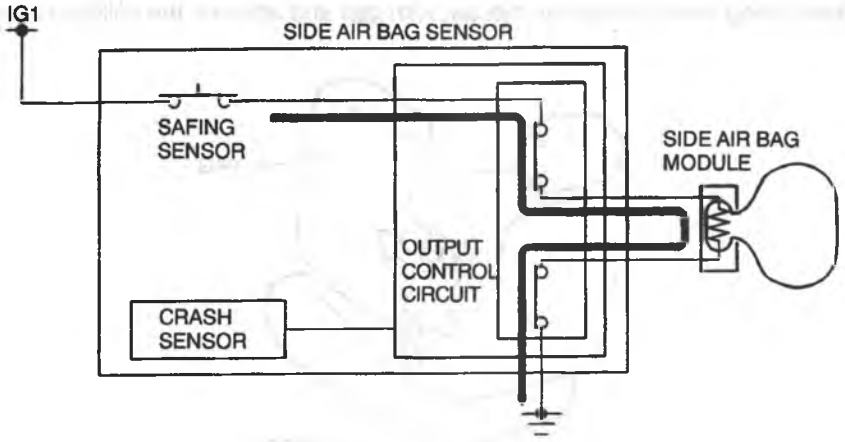
Activation

1. When the vehicle is involved in a collision from the side, the safing sensor detects the collision to activate the unit. Simultaneously, the crash sensor within the side air bag sensor detects the deceleration, converts this information into an electric signal, then outputs it.



Y6U810WVY

2. The electric signal output by the crash sensor is calculated at the output control circuit. That calculated value is compared to its own preset value, and if it exceeds that preset value, it operates the side air bag module to deploy.



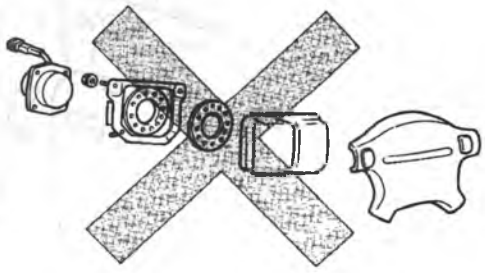
Y6U810WUY

AIR BAG SYSTEM SERVICE WARNINGS

Z6U081001046W02

Component Disassembly

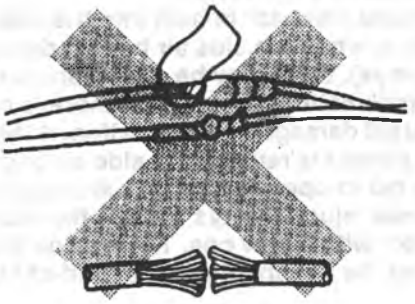
- **Disassembling and reassembling air bag system components can render the system inoperative which may result in serious injury or death in the event of an accident. Do not disassemble any air bag system component.**



W6U810WA0

Wiring Harness Repair

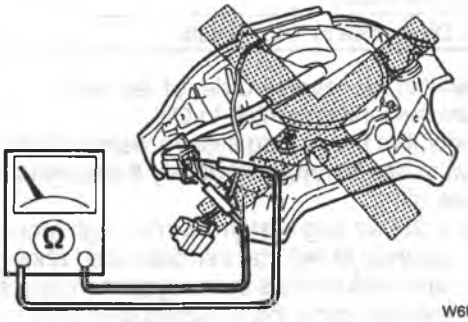
- **Incorrectly repairing an air bag system wiring harness can accidentally deploy the air bag module which may cause serious injury. If a problem is found in the system wiring, replace the wiring harness. Do not try to repair it.**



W6U810WA1

Air Bag Module Inspection

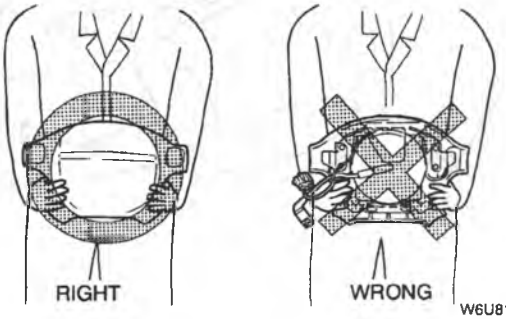
- **Inspecting the air bag module by using an ohmmeter can deploy the air bag module which may cause serious injury. Do not use an ohmmeter to inspect the air bag module.**



W6U810WA2

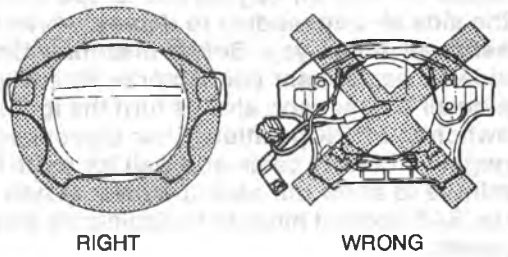
Air Bag Module Handling

- **A live (undeployed) air bag module may accidentally deploy when it is handled and cause serious injury. When carrying a live air bag module, point the front surface away from your body to lessen the chance of injury in case it deploys.**



W6U810WA3

- **A live air bag module placed face down on a surface is dangerous. If the air bag module deploys, the motion of the module can cause serious injury. Always face the front surface up to reduce the motion of the module in case it accidentally deploys.**



W6U810WA4

Side Air Bag Module Handling

- **When the side air bag module deploys due to a collision, the interior or the seat back (pad, frame, etc.) may become damaged. If the seat back is reused and the side air bag module does not deploy properly, a serious accident may result. When the side air bag module deploys, always replace both the side air bag module and seat back (pad, frame, trim) with new parts. After preparation and also when the side air bag module is deployed in the vehicle using SSTs (Deployment tool and Adapter harness), confirm that the seat operates normally and that the harness is positioned properly.**

SAS Control Module Handling

- **Installing a connected SAS control module is dangerous. Movement generated during installation can cause the crash sensor inside the control module to send an electrical signal to the air bag modules. This will deploy the air bag modules, which may result in serious injury. Therefore, before connecting the SAS control module, firmly mount the control module to the vehicle.**
- **Disconnecting the SAS control module connector or removing the SAS control module with the ignition switch ON can cause the air bag modules to deploy, which may seriously injure you. Before disconnecting the SAS control module connector or removing the SAS control module, 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 control module to deplete its stored power.**
- **Once an air bag is deployed due to an accident or other causes, the SAS control module must be replaced with a new one even if the used one does not have any external signs of damage. The used SAS control module may have been damaged internally which may cause improper operation, resulting in major injuries or even death. The used SAS control**

module cannot be bench-checked or self-checked.

Side Air Bag Sensor Handling

- **Disconnecting the side air bag sensor connector or removing the side air bag sensor with the ignition switch at ON position can cause the side air bag sensor to operate and the side air bag module to deploy, which may seriously injure you. Before disconnecting the side air bag sensor connector or removing the side air bag sensor, always turn the ignition switch to LOCK position , then disconnect the negative battery cable and wait for more than 1 minute to allow the backup power supply of the SAS control module to deplete its stored power.**
- **If the side air bag sensor is subjected to shock or the sensor is disassembled, the side air bag module may operate (deploy) suddenly and cause injury, or it may fail to operate normally and cause a serious accident. Do not subject the side air bag sensor to shock or disassemble the sensor.**
- **Because a sensor is built into the side air bag sensor, when the side air bag module operates (deploys), there may be a problem, such as an internal malfunction, even if there is not any external damage or deformation. If the side air bag sensor is reused, the side air bag module may fail to operate normally and cause a serious injury. Always replace the side air bag sensor with a new one. The side air bag sensor cannot be bench-checked or self-checked.**

DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION

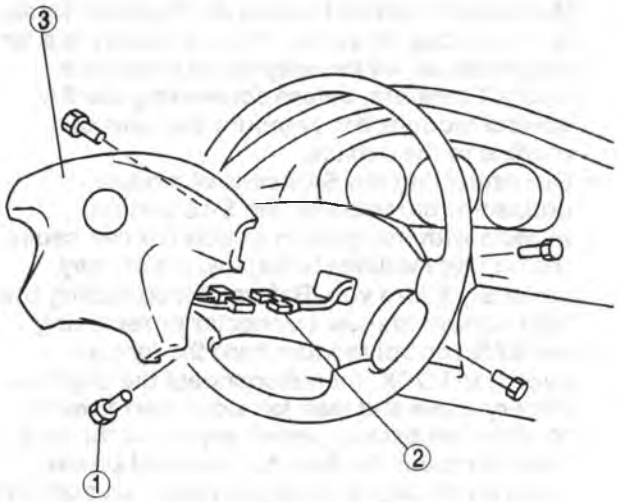
Z6U081057010W01

Warning

- **Handling the air bag module improperly can accidentally deploy the air bag module which may cause serious injury. Read AIR BAG SYSTEM SERVICE WARNINGS before handling the air bag module. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)**

1. Turn the ignition switch to LOCK.
2. Disconnect the negative battery cable and wait for **more than 1 minute** to allow the backup power supply of the SAS control module to deplete its stored power.
3. Remove in the order indicated in the table.

1	Bolt (See 08-10-10 Bolt Installation Note)
2	Connector
3	Driver-side air bag module



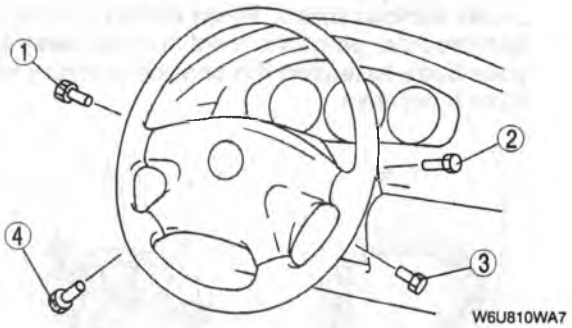
7.9—10.7 N·m {80—110 kgf·cm, 70—95 in·lbf}

Z6U810WA0

4. Install in the reverse order of removal.
5. Turn the ignition switch to ON.
6. Verify that the air bag system warning light illuminates for **approximately 6 seconds** then goes off.
   - If the air bag system warning light does not operate in the manner described above, there are malfunctions in the system. Inspect the system using the on-board diagnostic. (See 08-02-3 FOREWORD.)

Bolt Installation Note

- Tighten the bolts in the order shown in the figure.



W6U810WA7

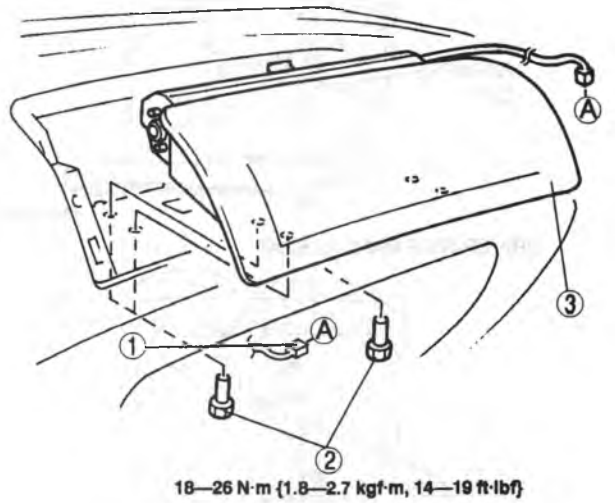
PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION

Z6U081057050W01

Warning

- **Handling the air bag module improperly can accidentally deploy the air bag module which may cause serious injury. Read AIR BAG SYSTEM SERVICE WARNINGS before handling the air bag module. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)**

1. Turn the ignition switch to LOCK.
2. Disconnect the negative battery cable and wait for **more than 1 minute** to allow the backup power supply of the SAS control module to deplete its stored power.
3. Remove the glove compartment.
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. Turn the ignition switch to ON.
7. Verify that the air bag system warning light illuminates for **approximately 6 seconds** then goes off.
   - If the air bag system warning light does not operate in the manner described above, there are malfunctions in the system. Inspect the system using the on-board diagnostic. (See 08-02-3 FOREWORD.)



W6U810WA8

1	Connector
2	Bolt
3	Passenger-side air bag module

SIDE AIR BAG MODULE REMOVAL/INSTALLATION

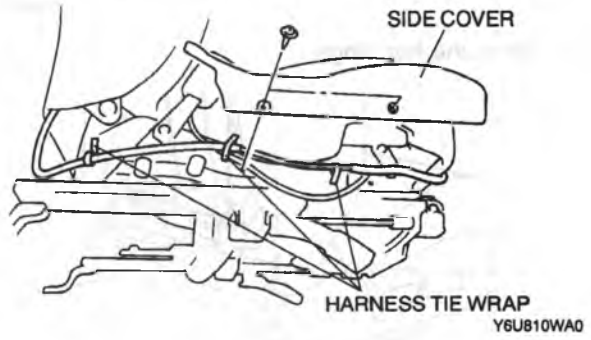
Z6U081057050W02

Warning

- **Handling the air bag module improperly can accidentally deploy the air bag module, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling the air bag module. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)**

Warning

- **If the side air bag module is installed with a foreign body in the seat back, the debris may be scattered when the side air bag module operates (deploys), causing injury. Verify that there is no debris in the seat back before installing the side air bag module.**

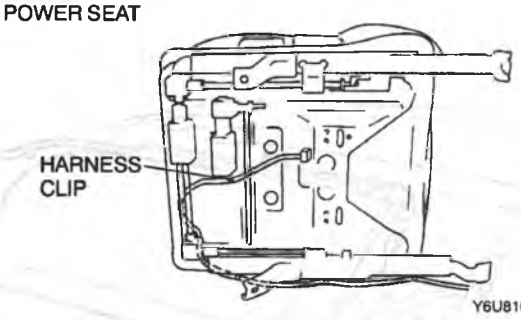


Y6U810WA0

1. Turn the ignition switch to LOCK.
2. Disconnect the negative battery cable and wait for **more than 1 minute** .
3. Remove the front seat. (See 09-13-1 FRONT SEAT REMOVAL/INSTALLATION.)
4. Remove the side cover. (See 09-13-2 FRONT SEAT DISASSEMBLY/ASSEMBLY.)
5. Remove the harness tie wraps.

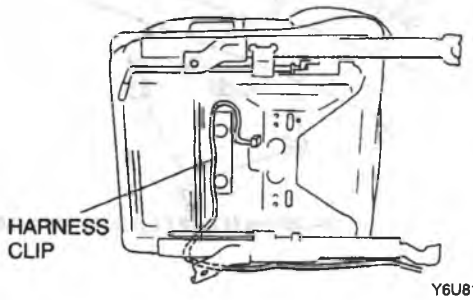
6. Remove the harness clips.

POWER SEAT



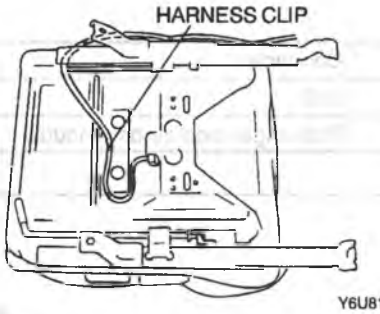
Y6U810WA1

DRIVER-SIDE MANUAL SEAT



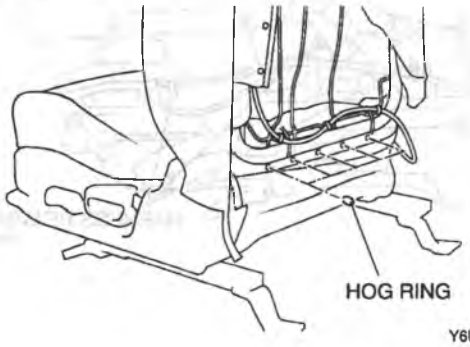
Y6U810WD0

PASSENGER-SIDE MANUAL SEAT



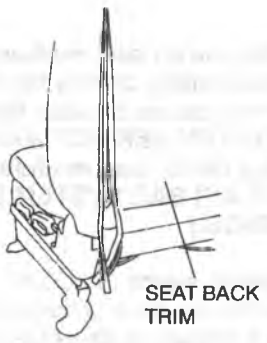
Y6U810WD1

7. Unzip the hog rings.



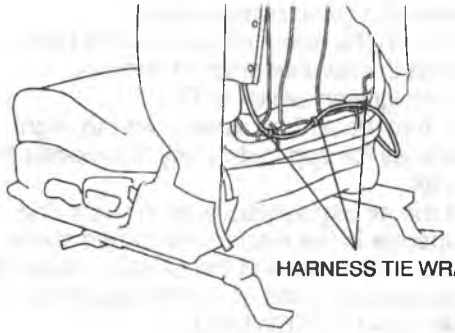
Y6U810WA2

8. Unzip the seat back trim.



Y6U810WA3

9. Remove the harness tie wraps.



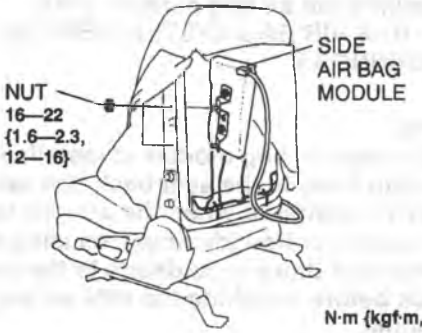
Y6U810WA4

10. Remove the hog rings.



Y6U810WA5

11. Turn the seat back cushion over.
12. Remove the nuts to remove the side air bag module.



Y6U810WA6

Warning

- **If the air bag harness is not secured at the marked point or the harness is caught, the side air bag module may fail to operate (deploy) in an accident, causing a serious accident. Be sure to secure the air bag harness at the marked point, and make sure the harness is not caught during operation the seat.**

13. Install in the reverse order of removal.
14. Turn the ignition switch to ON.
15. Verify that the air bag system warning light illuminates for **approximately 6 seconds** and then goes off.

- If the air bag system warning light does not operate in the manner described above, there are malfunctions in the system. Inspect the system using the on-board diagnostic . (See 08-02-3 FOREWORD.)

SIDE AIR BAG SENSOR REMOVAL/INSTALLATION

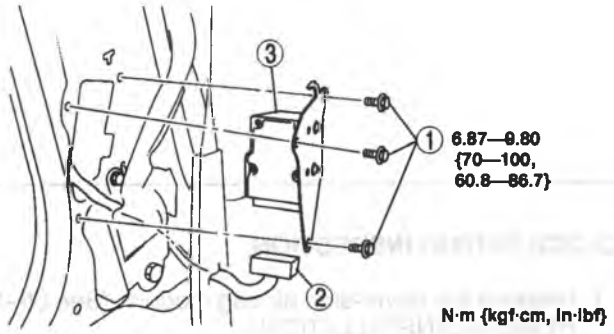
Z6U081057050W03

Warning

- **Handling the side air bag sensor improperly can accidentally deploy the side air bag module, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling the air bag module. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)**

1. Turn the ignition switch to LOCK.
2. Disconnect the negative battery cable and wait for **more than 1 minute** .
3. Remove the B-pillar trim.
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. Turn the ignition switch to ON.
7. Verify that the air bag system warning light illuminates for **approximately 6 seconds** and then goes off.

- If the air bag system warning light does not operate in the manner described above, there are malfunctions in the system. Inspect the system using the on-board diagnostic . (See 08-02-3 FOREWORD .)



Y6U810WA7

1	Bolt
2	Connector
3	Side air bag sensor

CLOCK SPRING ADJUSTMENT

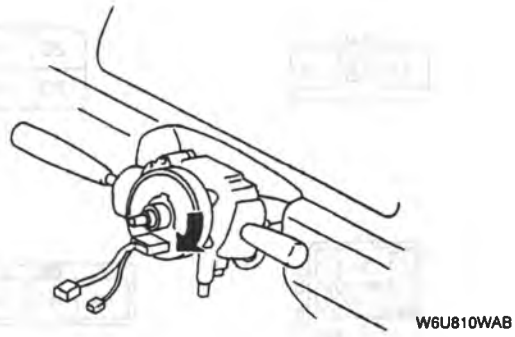
Z6U081066123W01

1. Set the front wheels straight ahead.

Caution

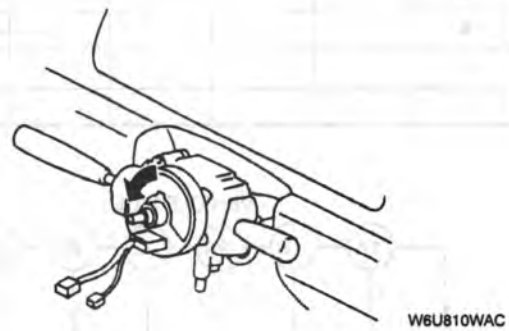
- **The clock spring will break if overwound. Do not force the clock spring when turning it.**

2. Turn the clock spring clockwise until it stops.



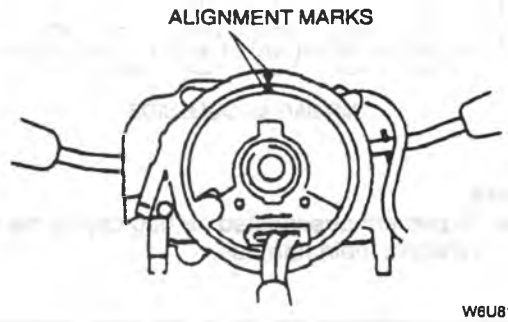
W6U810WAB

3. Turn the clock spring counterclockwise **2.75 turns**.



W6U810WAC

4. Align the mark on the clock spring with the mark on the outer housing.

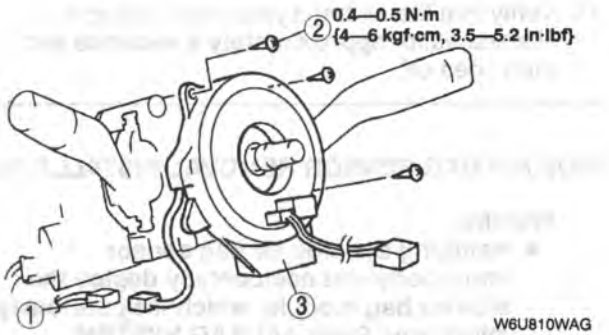


W6U810WAD

CLOCK SPRING REMOVAL/INSTALLATION

1. Turn the ignition switch to LOCK.
2. Remove the column cover.
3. Remove the driver-side air bag module. (See 08-10-10 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
4. Remove the steering wheel. (See 06-12-5 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal. (See 08-10-13 CLOCK SPRING ADJUSTMENT.)

Z6U081066123W02



W6U810WAG

1	Connector
2	Screw
3	Clock spring

CLOCK SPRING INSPECTION

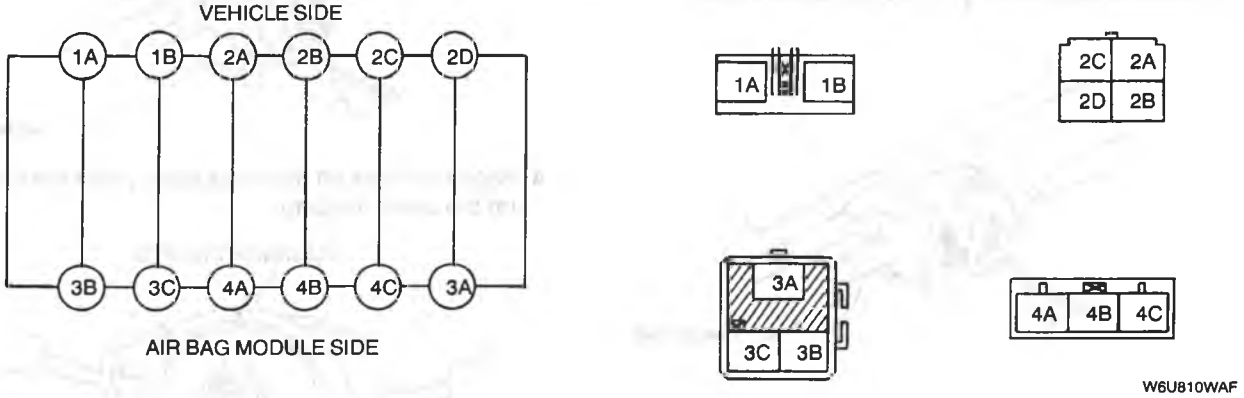
Z6U081066123W03

1. Remove the driver-side air bag module. (See 08-10-10 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
2. Disconnect the clock spring connector.
3. Check for continuity between the clock spring terminals.
   - If not as specified, replace the clock spring.

○—○ : Continuity

Step	Terminal											
	1A	1B	2A	2B	2C	2D	3A	3B	3C	4A	4B	4C
1	○							○				
2		○							○			
3			○							○		
4				○							○	
5					○							○
6						○	○					

W6U810WAE



W6U810WAF

Note

- To prevent unexpected air bag deployment, terminals 1A and 1B are shorted when disconnected from the vehicle's main harness.

SAS CONTROL MODULE REMOVAL/INSTALLATION

Z6U081057030W01

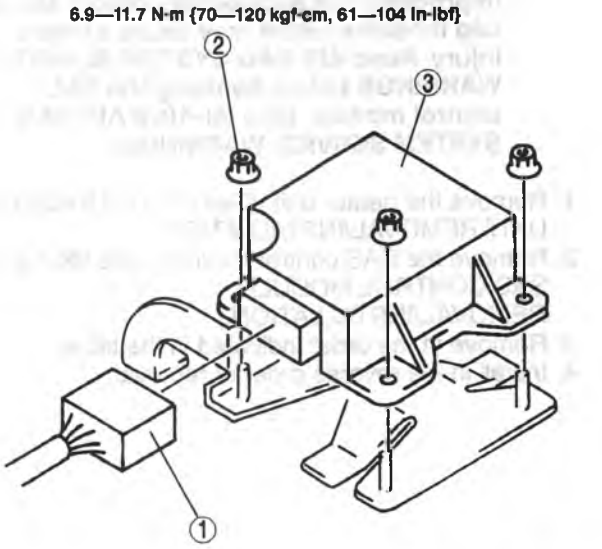
Warning

- **Handling the SAS control module improperly can accidentally deploy the air bag modules which may cause serious injury. Read AIR BAG SYSTEM SERVICE WARNINGS before handling the SAS control module. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)**

1. Turn the ignition switch to LOCK.
2. Disconnect the negative battery cable and wait for **more than 1 minute** to allow the backup power supply of the SAS control module to deplete its stored power.
3. Remove the rear console. (See 09-17-5 REAR CONSOLE REMOVAL/INSTALLATION.)
4. Remove the side wall.
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.
7. Turn the ignition switch to ON.
8. Verify that the air bag system warning light illuminates for **approximately 6 seconds** then goes off.

Note

- When a new SAS control module has been installed, the air bag system warning light flashes continuously if there aren't any malfunctions in the system. Perform the air bag modules deployment authorization procedures. (See 08-10-16 AIR BAG MODULES DEPLOYMENT AUTHORIZATION PROCEDURES.)
- If the air bag system warning light does not operate in the manner described above, there are malfunctions in the system. Inspect the system using the on-board diagnostic. (See 08-02-3 FOREWORD.)

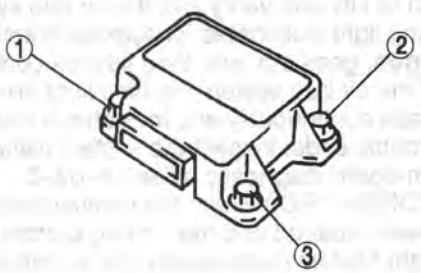


W6U810WAH

1	Connector
2	Nut (See 08-10-15 Nut Installation Note)
3	SAS control module

Nut Installation Note

- Tighten the nuts in the order shown in the figure.



W6U810WA6

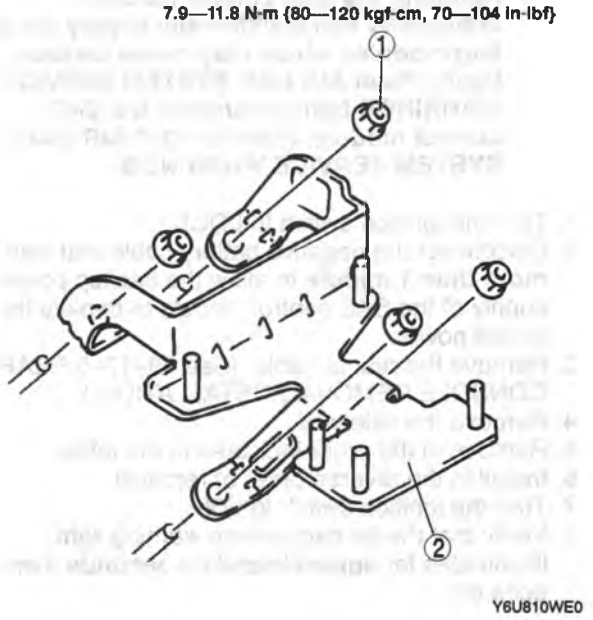
SAS CONTROL MODULE BRACKET REMOVAL/INSTALLATION

Z6U081057035W01

Warning

- **Handling the SAS control module improperly can accidentally deploy the air bag modules which may cause serious injury. Read AIR BAG SYSTEM SERVICE WARNINGS before handling the SAS control module. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)**

1. Remove the heater unit. (See 07-11-13 HEATER UNIT REMOVAL/INSTALLATION.)
2. Remove the SAS control module. (See 08-10-15 SAS CONTROL MODULE REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.



Y6U810WE0

1	Nut
2	SAS control module bracket

AIR BAG MODULES DEPLOYMENT AUTHORIZATION PROCEDURES

Z6U081057000W01

1. Install a new SAS control module. Turn the ignition switch to ON and verify that the air bag system warning light illuminates for **approximately 6 seconds**, goes out, and then flashes continuously.
   - If the air bag system warning light does not flash continuously and indicates a diagnostic trouble code, inspect the system using the on-board diagnostic. (See 08-02-3 FOREWORD.) When the malfunctions have been repaired and the air bag system warning light flashes continuously, go to step 2.
2. If the air bag system warning light flashes continuously, turn the ignition switch to LOCK and back to ON after **more than approximately 1 second**.
3. Verify that the air bag system warning light illuminates for **approximately 6 seconds** and then goes off.
   - If the light stays on, perform the deployment authorization procedure again.

AIR BAG MODULES DEPLOYMENT PROCEDURES

Z6U081057000W02

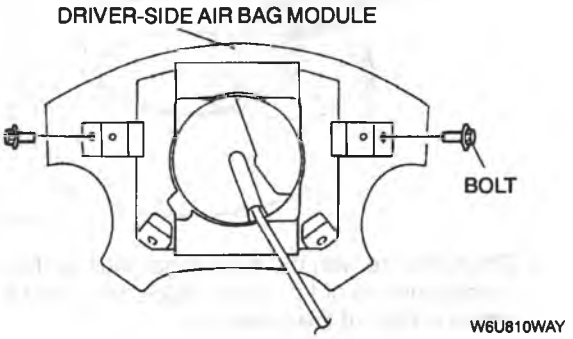
Note

- If the **SSTs** (Deployment Tool and Adapter Harness) are not available, consult the nearest Mazda representative for assistance.

1. Inspect the **SST** (Deployment Tool). (See 08-10-21 INSPECTION OF SST (DEPLOYMENT TOOL).)
2. Turn the ignition switch to LOCK.
3. Disconnect the negative battery cable and wait for **more than 1 minute** to allow the backup power supply of the SAS control module to deplete its stored power.
4. Follow the appropriate procedure for deploying the driver-side air bag or passenger-side air bag modules.

Driver-side Air Bag Module

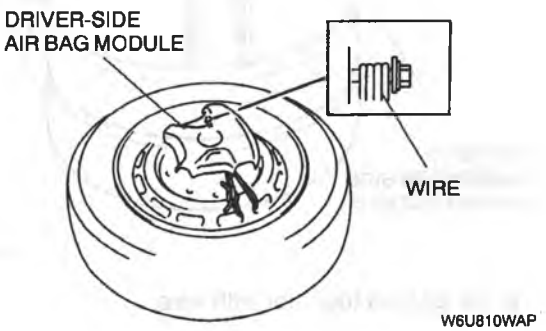
1. Remove the driver-side air bag module. (See 08-10-10 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
2. Install the two bolts to the driver-side air bag module.



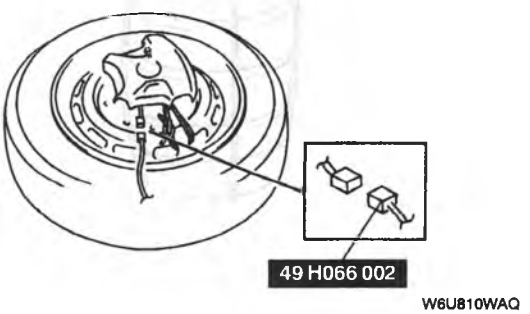
Warning

- **If the air bag module is not properly installed to the tire wheel, serious injury may occur when the module is deployed. When installing the air bag module to the tire wheel, make sure the module is facing up.**

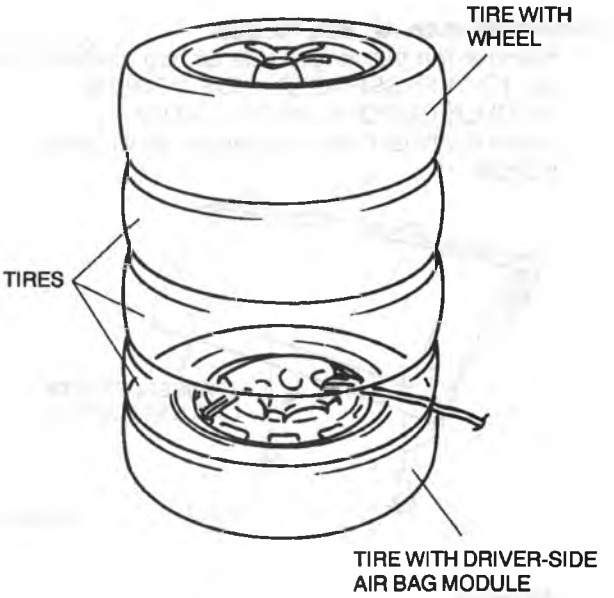
3. Tie the air bag module to the tire wheel with the front of the module facing up. Wrap the wire through the wheel and around the air bag module bolt **at least four times**.



4. Connect the **SST** (Deployment Tool) to the driver-side air bag module as shown.



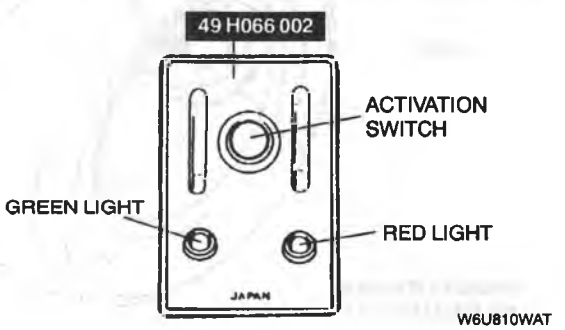
5. Stack three tires on top of the tire with the attached air bag module. Make sure the tire on top of the stack has a wheel.



6. Tie all tires together with wire.



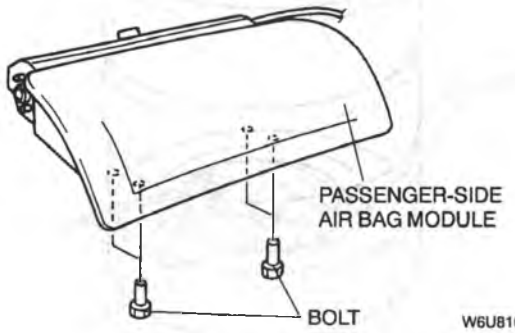
7. Connect the red clip of the **SST** (Deployment Tool) to the positive battery terminal and the black clip to the negative battery terminal.
8. Verify that the red light on the **SST** (Deployment Tool) is illuminated.



9. Make sure all persons are standing at least **6 m {20 ft}** from the tire.
10. Press the activation switch on the **SST** (Deployment Tool) to deploy the air bag module.

Passenger-side Air Bag Module

1. Remove the passenger-side air bag module. (See 08-10-11 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
2. Install the bolts to the passenger-side air bag module.

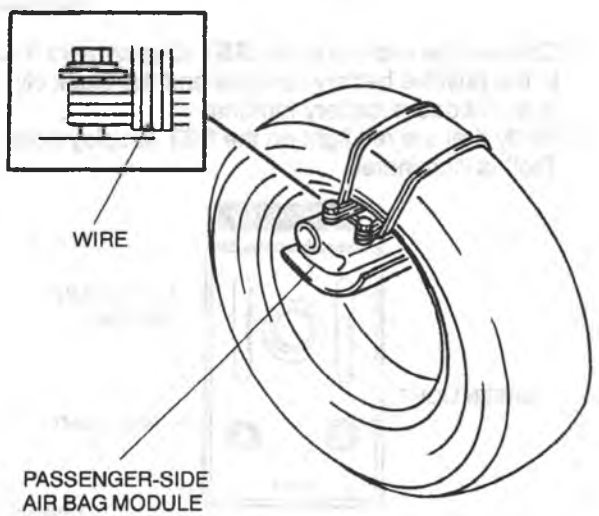


W6U810WAU

Warning

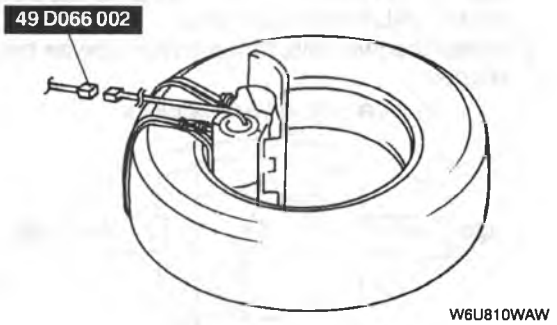
- **If the air bag module is not properly installed to the tire wheel, serious injury may occur when the module is deployed. When installing the air bag module to the tire wheel, make sure the module is facing up.**

3. Tie the air bag module to the tire wheel with the front of the module facing up. Wrap the wire through the wheel and around the air bag module bolt **at least four times**.



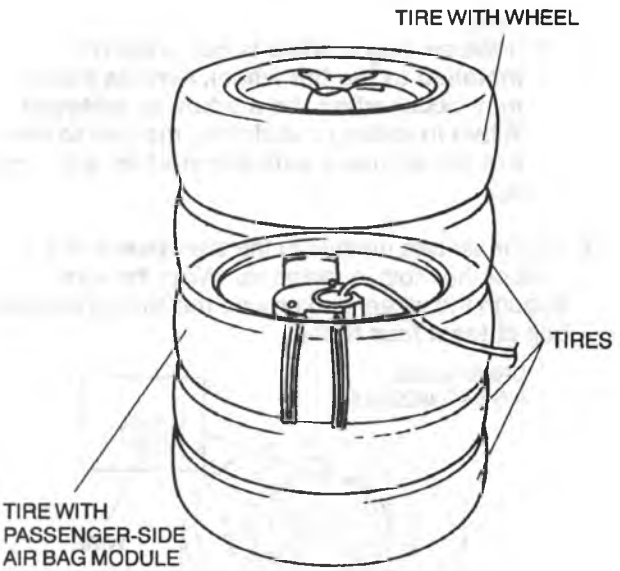
W6U810WAV

4. Connect the **SST** (Adapter Harness) to the passenger-side air bag module as shown.



W6U810WAW

5. Stack the tire with the passenger-side air bag module on top of two tires. Stack a tire with a wheel on top of the three tires.



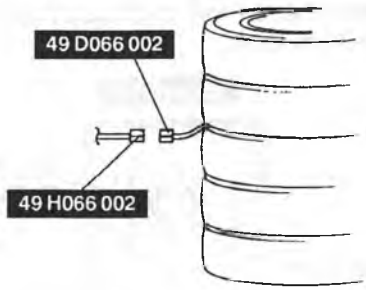
W6U810WAX

6. Tie all tires together with wire.



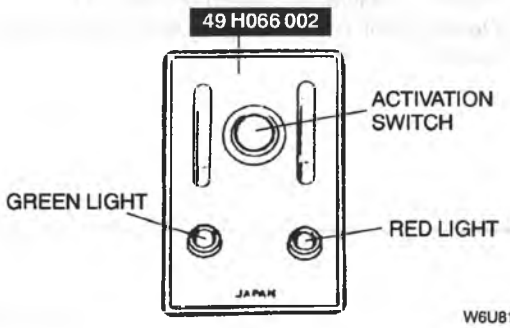
W6U810WAS

7. Connect the **SST** (Deployment Tool) to the **SST** (Adapter Harness).



W6U810WAZ

8. Connect the red clip of the **SST** (Deployment Tool) to the positive battery terminal and the black clip to the negative battery terminal.
9. Verify that the red light on the **SST** (Deployment Tool) is illuminated.

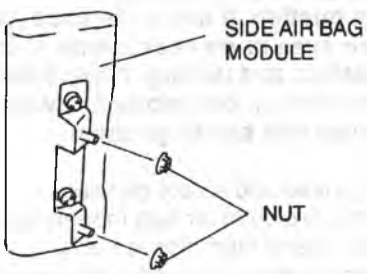


W6U810WAT

10. Make sure all persons are standing at least **6 m {20 ft}** from the tire.
11. Press the activation switch on the **SST** (Deployment Tool) to deploy the passenger-side air bag module.

Side Air Bag Module

1. Remove the side air bag module. (See 08-10-11 SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
2. Install the nuts to the side air bag module.

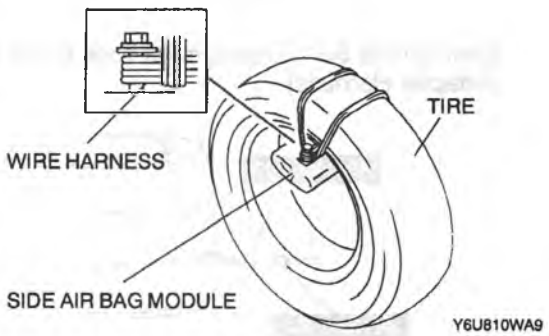


Y6U810WA8

Warning

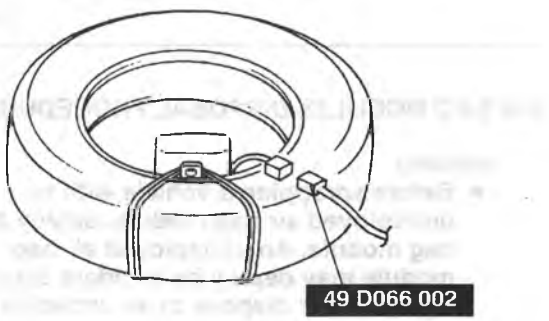
- **If the air bag module is not properly installed to the tire, serious injury may occur when the module is deployed. When installing the air bag module to the tire, make sure the module is facing the center of the tire.**

3. Tie the side air bag module to the tire with the module facing the center of the tire. Wrap the wire through the tire and around the nuts **at least four times**.



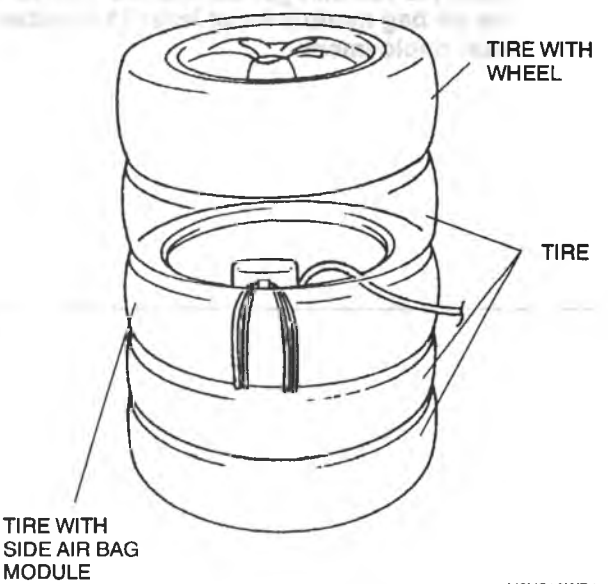
Y6U810WA9

4. Connect the **SST** (Adapter Harness) to the side air bag module as shown.



Y6U810WB0

5. Stack the tire with the side air bag module on top of two tires. Stack a tire on top of three tires. Stack another tire that has a wheel on top of the four tires.



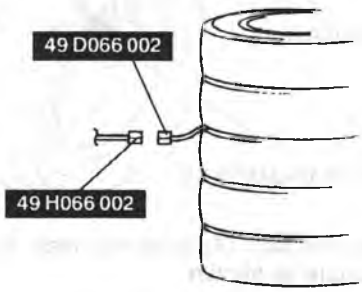
Y6U810WB1

6. Tie all tires together with wire.



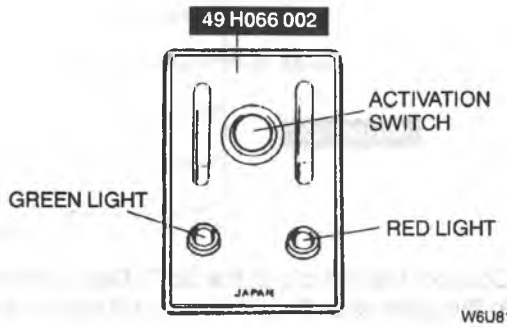
W6U810WAS

7. Connect the **SST** (Deployment Tool) to the **SST** (Adapter Harness).



W6U810WAZ

8. Connect the red clip of the **SST** (Deployment Tool) to the positive battery terminal and the black clip to the negative battery terminal.
9. Verify that the red light on the **SST** (Deployment Tool) is illuminated.



W6U810WAT

10. Make sure all persons are standing at least **6 m {20 ft}** from the tire.
11. Press the activation switch on the **SST** (Deployment Tool) to deploy the side air bag module.

AIR BAG MODULES DISPOSAL PROCEDURES

Z6U081057000W03

Warning
- **Before scrapping a vehicle with an undeployed air bag module, deploy the air bag module. An undeployed air bag module may deploy by accident causing injury. Never dispose of an undeployed air bag module.**

Warning
- **The air bag is very hot immediately after it deploys. You can get burned. Do not touch the air bag module for at least 15 minutes after deployment.**

Warning
- **Pouring water on a deployed air bag is dangerous. The water will mix with residual gasses to form a gas that makes breathing difficult. Do not pour water on the deployed air bag module.**

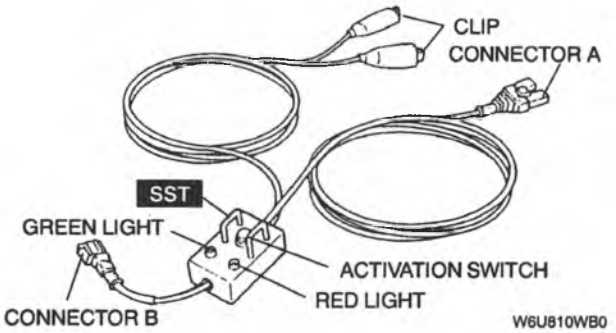
Warning
- **A deployed air bag module may contain deposits of sodium hydroxide, a caustic byproduct of the gas-generated combustion. If this substance gets into your eyes or on your hands, it can cause irritation and itching. When handling a deployed air bag module, always wear gloves and safety glasses.**

1. Put on gloves and safety glasses.
2. Place the deployed air bag module in a plastic bag, seal it and then dispose of it.
3. Wash your hands after removing your gloves.

INSPECTION OF SST (DEPLOYMENT TOOL)

Z6U081001078W01

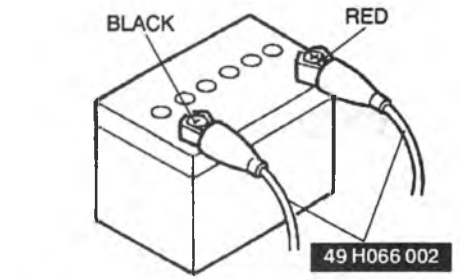
- Use the **SST** (Deployment Tool) to deploy a live air bag module before disposal.
- Before connecting the **SST** (Deployment Tool) to the clock spring, driver-side air bag module or passenger-side air bag module, inspect the operation of the **SST** (Deployment Tool).

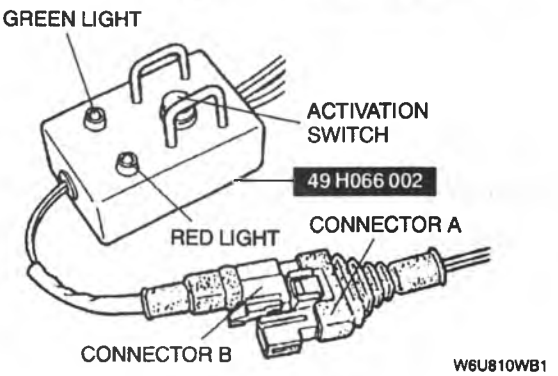


Inspection Procedure

1. Follow the steps below to verify that the **SST** (Deployment Tool) is operating correctly.
   - If not as specified, do not use the **SST** (Deployment Tool) because it may cause the air bag to unexpectedly deploy upon connection to the air bag module.

Step	Inspection procedure	Light condition	
		Green	Red
1	Connect red clip to positive battery terminal and black clip to negative battery terminal.	On	Off
2	Connect connectors A and B of **SST** (Deployment Tool).	Off	On
3	Press activation switch	On	Off





08-11 SEAT BELT

FRONT SEAT BELT REMOVAL/INSTALLATION 08-11-1
REAR SEAT BELT REMOVAL/INSTALLATION 08-11-2
REAR CENTER SEAT BELT REMOVAL/INSTALLATION 08-11-2
FRONT BUCKLE REMOVAL/INSTALLATION 08-11-3
Driver's Side 08-11-3
Passenger's Side 08-11-3
BUCKLE SWITCH INSPECTION 08-11-3
REAR BUCKLE REMOVAL/INSTALLATION 08-11-4
SEAT BELT ELR INSPECTION 08-11-4
SEAT BELT ALR INSPECTION 08-11-4
LOAD LIMITER RETRACTOR INSPECTION 08-11-5
CHILD-RESTRAINT SEAT ANCHOR REMOVAL/INSTALLATION 08-11-5

FRONT SEAT BELT REMOVAL/INSTALLATION

Caution

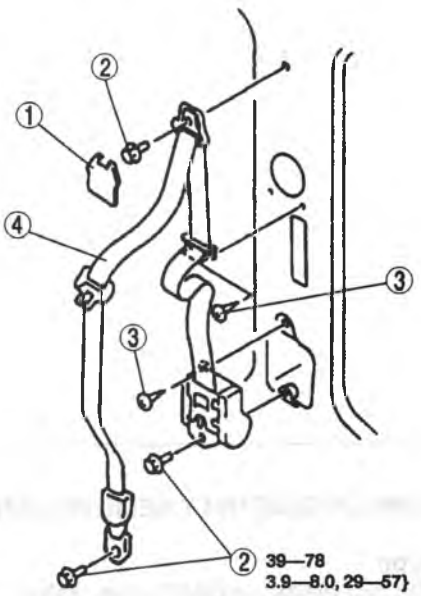
- **Do not disassemble the retractor. The emergency locking retractor (ELR) has a spring that will unwind if the retractor is disassembled. The spring cannot be rewound by hand. If this occurs, the ELR will not work properly.**

Note

- Front seat belts are fitted with a load limiter.

1. Remove the B-pillar lower trim. (See 09-17-11 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

Z6U081157630W01



N·m {kgf·m, ft·lbf}

Y6U811WA0

1	Cover
2	Bolt
3	Screw
4	Front seat belt

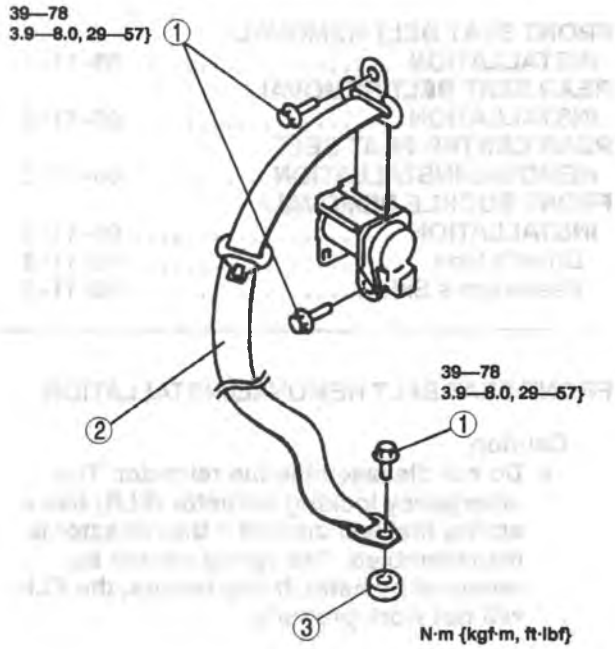
REAR SEAT BELT REMOVAL/INSTALLATION

Z6U081157730W01

Caution

- **Do not disassemble the retractor. The emergency locking retractor (ELR) has a spring that will unwind if the retractor is disassembled. The spring cannot be rewound by hand. If this occurs, the ELR will not work properly.**

1. Remove the C-pillar trim. (See 09-17-12 C-PILLAR TRIM REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



Y6U811WA2

1	Bolt
2	Rear seat belt
3	Spacer (left side only)

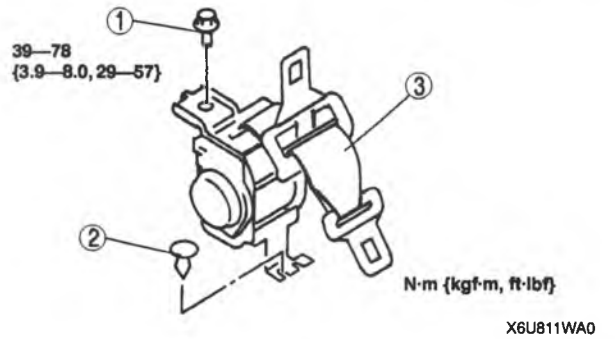
REAR CENTER SEAT BELT REMOVAL/INSTALLATION

Z6U081157740W01

Caution

- **Do not disassemble the retractor. The emergency locking retractor (ELR) has a spring that will unwind if the retractor is disassembled. The spring cannot be rewound by hand. If this occurs, the ELR will not work properly.**

1. Remove the rear package trim. (See 09-17-12 REAR PACKAGE TRIM REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



X6U811WA0

1	Bolt
2	Fastener
3	Rear center seat belt

FRONT BUCKLE REMOVAL/INSTALLATION

Z6U081157620W01

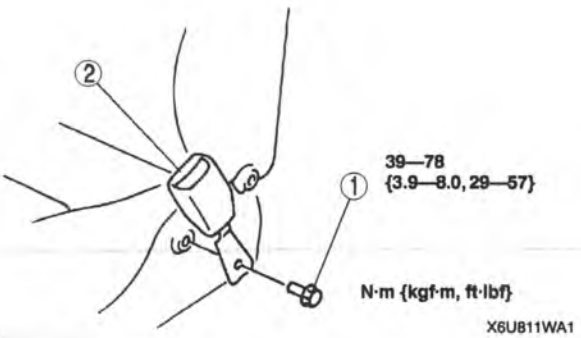
Driver's Side

1. Remove the front seat. (See 09-13-1 FRONT SEAT REMOVAL/INSTALLATION.)
2. Remove the front buckle from the front seat. (See 09-13-2 FRONT SEAT DISASSEMBLY/ASSEMBLY.)
3. Install in the reverse order of removal.

Passenger's Side

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.

1	Bolt
2	Front buckle



X6U811WA1

BUCKLE SWITCH INSPECTION

Z6U081157620W02

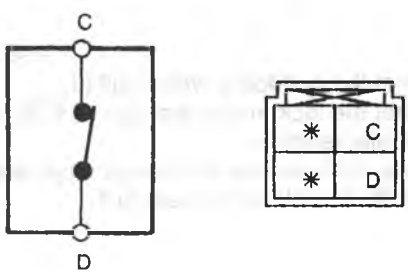
1. Disconnect the negative battery cable.
2. Disconnect the driver-side buckle switch connector.
3. Check for continuity between the buckle switch terminals.
   - If not as specified, replace the driver's side front buckle.

Power seat

○——○ : Continuity

Seat belt	Terminal	
	C	D
Buckled		
Unbuckled	○	○

W6U811WA4



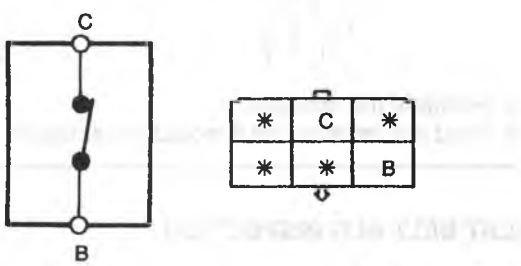
W6U811WA5

Manual seat

○——○ : Continuity

Seat belt	Terminal	
	C	B
Buckled		
Unbuckled	○	○

W6U811WB0

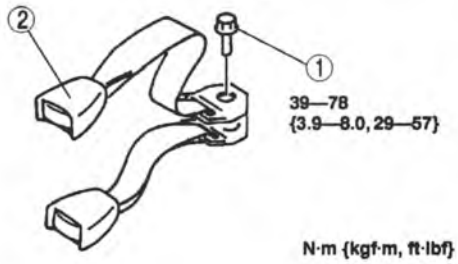


W6U811WA9

REAR BUCKLE REMOVAL/INSTALLATION

Z6U081157720W01

1. Remove the rear seat cushion.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



X6U811WA2

1	Bolt
2	Rear buckle

SEAT BELT ELR INSPECTION

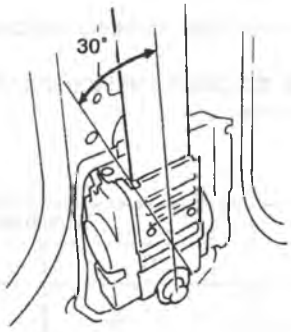
Z6U081157630W02

1. Verify that the belt can be pulled out smoothly and moves smoothly when worn.
2. Verify that the retractor locks when the belt is quickly pulled.



W6U811WA7

3. Remove the retractor.
4. Hold the retractor as it would be installed.
5. Slowly incline the retractor while pulling out the belt.
6. Verify that the retractor locks at **approximately 30°** inclination.
   - If any of the above-mentioned steps are not as specified, replace the seat belt.



W6U811WA8

SEAT BELT ALR INSPECTION

Z6U081157630W03

1. Pulling the belt out all the way will change the lock mode from ELR to ALR (Automatic Locking Retractor).
2. Verify that the retractor makes a clicking sound as the belt slowly retracts.
   - If no sound is heard, the lock mode has not changed to ALR. If necessary, repeat step 1.
3. Verify that the belt locks when pulled.
4. Verify that the lock mode changes to ELR when the belt fully retracts.
   - If any of the above-mentioned steps are not as specified, replace the seat belt.

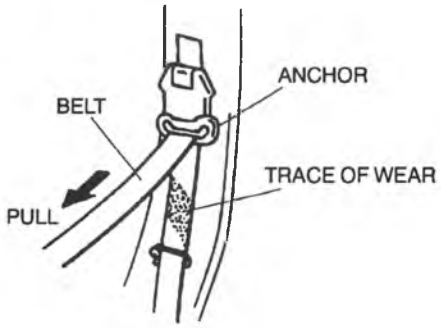
LOAD LIMITER RETRACTOR INSPECTION

Z6U081157630W04

Warning

- **When the load limiter operates, the belt and anchor rub against each other strongly leaving a trace of wear. If the seat belt is used in this state, the seat belt will not function to its designed effect and there is the possibility of serious injury to passengers. Be sure to replace the seat belt once the load limiter operates.**

1. If the vehicle has been subjected to a shock in an accident, pull the belt from the retractor and confirm that there is no trace of wear (the load limiter has not operated) by visually inspecting and feeling the belt.
- Replace the seat belt if there is a trace of wear.

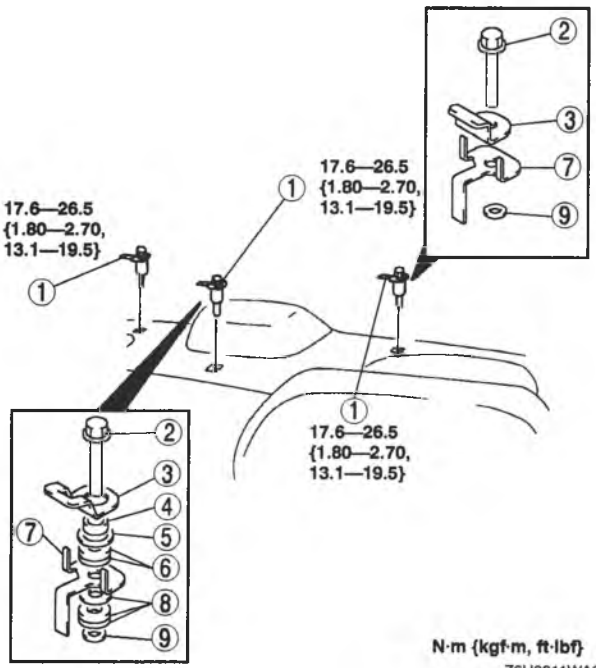


Y6U811WA3

CHILD-RESTRAINT SEAT ANCHOR REMOVAL/INSTALLATION

Z6U081100117W01

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



Z6U0811WA0

1	Child-restraint seat anchor
2	Bolt
3	Anchor bracket
4	Collar
5	Washer
6	Spacer
7	Stopper
8	Spacer
9	Washer

08-50 TECHNICAL DATA

RESTRAINTS TIGHTENING TORQUE . 08-50-1

RESTRAINTS TIGHTENING TORQUE

Z6U000001045W01

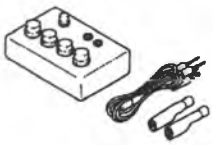
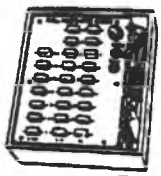
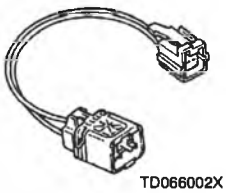
Item		Tightening torque (N·m {kgf·m, ft·lbf})
AIR BAG SYSTEM		
Driver-side air bag module		7.9—10.7 N·m {80—110 kgf·cm, 70—95 in·lbf}
Passenger-side air bag module		18—26 {1.8—2.7, 14—19}
Side air bag module		16—22 {1.6—2.3, 12—16}
Side air bag sensor		6.87—9.80 N·m {70—100 kgf·cm, 60.8—86.7 in·lbf}
SAS control module		6.9—11.7 N·m {70—120 kgf·cm, 61—104 in·lbf}
SEAT BELT		
Front seat belt		39—78 {3.9—8.0, 29—57}
Rear seat belt		39—78 {3.9—8.0, 29—57}
Rear center seat belt		39—78 {3.9—8.0, 29—57}
Front buckle	Passenger's side	39—78 {3.9—8.0, 29—57}
Rear buckle		39—78 {3.9—8.0, 29—57}
Child-restraint seat anchor		17.6—26.5 {1.80—2.70, 13.1—19.5}

08-60 SERVICE TOOLS

RESTRAINTS SST 08-60-1

RESTRAINTS SST

Z6U086001045W01

49 H066 002 Deployment tool  TH066002X	49 N088 0A0 Fuel and Thermometer checker(New)*  TN0880A0X	49 0839 285 Fuel and Thermometer checker(Old)*  T0839285X
49 D066 002 Adapter harness  TD066002X	—	—

* : Both checker can be used for 2001MY Mazda 626 model.

BODY & ACCESSORIES

09 SECTION

ON-BOARD DIAGNOSTIC 09-02
SYMPTOM TROUBLESHOOTING [POWER WINDOW SYSTEM] 09-03A
SYMPTOM TROUBLESHOOTING [REAR WINDOW DEFROSTER] 09-03B
SYMPTOM TROUBLESHOOTING [POWER OUTSIDE MIRROR] 09-03C
SYMPTOM TROUBLESHOOTING [POWER SEAT] 09-03D
SYMPTOM TROUBLESHOOTING [POWER DOOR LOCK SYSTEM] 09-03E
SYMPTOM TROUBLESHOOTING [THEFT-DETERRENT (KEYLESS ENTRY SECURITY) SYSTEM 09-03G
SYMPTOM TROUBLESHOOTING [SUNROOF] 09-03H
SYMPTOM TROUBLESHOOTING [EXTERIOR LIGHTING SYSTEM] 09-03J
SYMPTOM TROUBLESHOOTING [INTERIOR LIGHTING SYSTEM] 09-03K
SYMPTOM TROUBLESHOOTING [SIGNAL LIGHTING SYSTEM] 09-03L
SYMPTOM TROUBLESHOOTING [WIPER/WASHER SYSTEMS] 09-03M
SYMPTOM TROUBLESHOOTING [INSTRUMENTATION/ DRIVER INFO.] 09-03P
BODY PANELS 09-10
DOORS AND LIFTGATE 09-11
GLASS/WINDOWS/MIRRORS . 09-12
SEATS 09-13
SECURITY AND LOCKS 09-14
SUNROOF 09-15
EXTERIOR TRIM 09-16
INTERIOR TRIM 09-17
LIGHTING SYSTEM 09-18
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ENTERTAINMENT 09-20
POWER SYSTEMS 09-21
INSTRUMENTATION/DRIVER INFO. 09-22
CONTROL SYSTEM 09-40
TECHNICAL DATA 09-50
SERVICE TOOLS 09-60

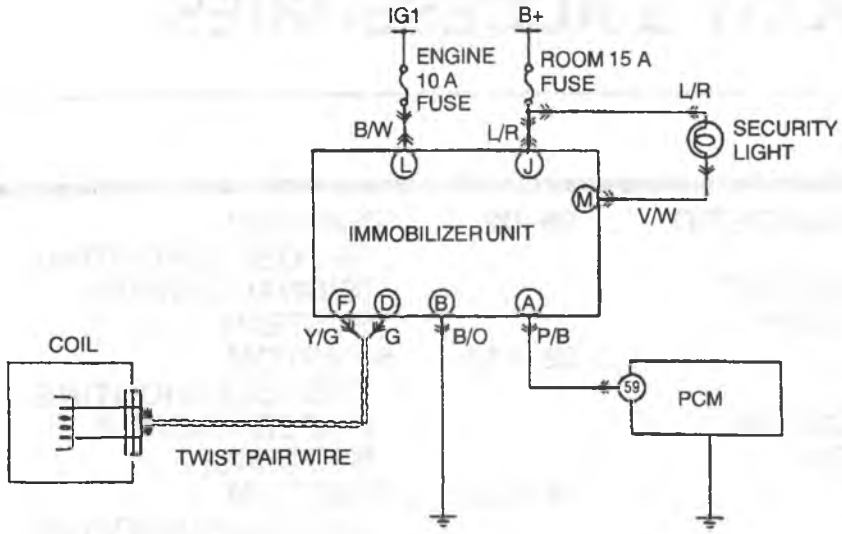
09

09-02 ON-BOARD DIAGNOSTIC

IMMOBILIZER SYSTEM WIRING DIAGRAM 09-02-2
FOREWORD 09-02-2
DTC TABLE 09-02-2
DTC 1 09-02-3
DTC 2 09-02-3
DTC 3 09-02-4
DTC 11 09-02-4
DTC 21 09-02-5
DTC 24 09-02-5
DTC 30 09-02-6

IMMOBILIZER SYSTEM WIRING DIAGRAM

Z6U090267000W01



Z6U902WAA

FOREWORD

Z6U090267000W02

Caution

- **When the engine does not start or stalls and the following DTCs are not indicated, go to engine symptom troubleshooting. (See 01-03A-3 FOREWORD [FS].) (See 01-03B-3 FOREWORD [KL].)**

Note

- When the immobilizer system is defective, the engine starts once and soon stalls after the starter is turned for the first three times. The engine cannot be started after the third time.
- If engine condition is normal but light stays on, inspect for short circuit between security light and immobilizer unit connector terminal M. Repair or replace the wiring harness if necessary.

1. Turn the ignition switch to START position **for 2 seconds**, then back to ON position.
2. Wait for **2 minutes**.
3. Verify the security light condition and read the DTC if indicated.
4. Verify the DTC with NGS set or equivalent.
5. If the DTC is indicated, go to troubleshooting referring to the DTC table.

DTC TABLE

Z6U090267000W03

DTC	Output pattern	Description	Page
1	ON / OFF  YMU902WA0	ID number unregistered in immobilizer unit is input after engine cranking.	(See 09-02-3 DTC 1)
2	ON / OFF  YMU902WA1	ID number format error (voltage range, frequency)	(See 09-02-3 DTC 2)
3	ON / OFF  YMU902WA2	ID number is not input into immobilizer unit after cranking engine.	(See 09-02-4 DTC 3)

DTC	Output pattern	Description	Page
11	 YMU902WA3	Coil or wiring harness between immobilizer unit and coil is open circuit.	(See 09-02-4 DTC 11)
21	 YMU902WA4	Code word/ID number memorized in immobilizer unit EEPROM cannot be read.	(See 09-02-5 DTC 21)
24	 YMU902WA5	Open or short circuit in wiring harness between immobilizer unit and PCM.	(See 09-02-5 DTC 24)
30	 YMU902WA6	Immobilizer unit—PCM communication error	(See 09-02-6 DTC 30)

Note

- Perform the following if the security light stays on:
  - — If gasoline engine stalls, go to symptom troubleshooting NO.5 "ENGINE STALLS AFTER START/AT IDLE" in Section 01–03 (See 01-03A-17 NO.5 ENGINE STALLS-AFTER START, AT IDLE [FS].) (See 01-03B-17 NO.5 ENGINE STALLS-AFTER START, AT IDLE [KL].)
  - — If gasoline engine won't start, go to symptom troubleshooting NO.6 "CRANKS NORMALLY BUT WILL NOT START" in Section 01–03. (See 01-03A-21 NO.6 CRANKS NORMALLY BUT WILL NOT START [FS].) (See 01-03B-21 NO.6 CRANKS NORMALLY BUT WILL NOT START [KL].)
  - — If engine condition is normal but light stays on, inspect for continuity between the following wiring harness and body ground: security light and immobilizer unit connector terminal M. Repair or replace the wiring harness.

DTC 1

Z6U090267000W04

DTC 1	**ID number unregistered in immobilizer unit is input after engine cranking.**
POSSIBLE CAUSE	• ID number is unregistered in immobilizer unit.

Diagnostic procedure

STEP	INSPECTION		ACTION
—	—	—	Go to ID number input procedure. (See 09-14-30 Key Replacement or Addition)

DTC 2

Z6U090267000W05

DTC 2	**ID number format error (voltage range, frequency)**
POSSIBLE CAUSE	• Defective transponder in the key

Diagnostic procedure

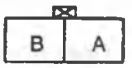
STEP	INSPECTION		ACTION
—	—	—	Dispose of defective key. Duplicate key if necessary. (See 09-14-30 Key Replacement or Addition)

DTC 3

Z6U090267000W06

DTC 3	ID number is not input into immobilizer unit after cranking engine.
POSSIBLE CAUSE	• No transponder in the key • Defective transponder in the key (ID number is not output.) • Defective coil at steering lock • Defective wiring harness between coil and immobilizer unit

COIL CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Y6U902WA1

Diagnostic procedure

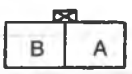
STEP	INSPECTION		ACTION
1	• Does security light indicate DTC 11?	Yes	Go to DTC 11.
		No	Go to next step.
2	• Does security light indicate DTC 30?	Yes	Go to DTC 30.
		No	Go to next step.
3	**INSPECT FOR OTHER PROPER KEYS** • Does engine start with other proper keys?	Yes	Dispose of defective key. Duplicate key if necessary. (See 09-14-30 Key Replacement or Addition)
		No	Go to next step.
4	**INSPECT COIL CIRCUIT FOR SHORT TO GND OR COIL CIRCUIT FOR CONTINUITY** • Disconnect the coil connector. • Inspect for short circuits between coil connector terminals A and B and ground, and also between coil connector terminals A and B. • Is there a short?	Yes	Repair the wiring harness connected to terminals A and/or B.
		No	Troubleshooting is completed.

DTC 11

Z6U090267000W07

DTC 11	Coil or wiring harness between immobilizer unit and coil is open circuit.
POSSIBLE CAUSE	• Open circuit in coil • Poor connection of coil connector • Poor connection of immobilizer unit • Defective wiring harness between immobilizer unit and coil

COIL CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

IMMOBILIZER UNIT CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Y6U902WA2

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT CONNECTOR CONNECTION** • Is connector of coil or immobilizer unit connected securely?	Yes	Go to next step.
		No	Connect connector securely.
2	**INSPECT COIL CIRCUIT FOR CONTINUITY** • Is there continuity between coil terminals A and B?	Yes	Go to next step.
		No	Replace coil. (See 09-14-29 COIL REMOVAL/INSTALLATION)

STEP	INSPECTION		ACTION
3	**INSPECT COIL CIRCUIT FOR OPEN** • Disconnect coil connector and immobilizer unit connector. • Inspect for open circuit in wiring harness: — Immobilizer unit D to coil A, and immobilizer unit F to coil B — Immobilizer unit D to coil B, and immobilizer unit F to coil A • Is there an open? **Note** • Vehicle harness which is connected to immobilizer unit terminals D and F, uses a twist pair wire. Because twist pair wire does not have polarity, immobilizer unit connector terminal D may be connected to coil connector terminal A or B. Likewise, immobilizer unit connector terminal F may be connected to coil connector terminal A or B.	Yes	Replace immobilizer unit and reprogram immobilizer system. (See 09-14-32 Immobilizer Unit Replacement)
		No	Repair wiring harness between coil and immobilizer unit.

DTC 21

Z6U090267000W08

DTC 21	**Code word/ID number memorized in immobilizer unit EEPROM cannot be read.**
POSSIBLE CAUSE	• Defective immobilizer unit

09

Diagnostic procedure

STEP	INSPECTION		ACTION
—	**INSPECT IMMOBILIZER UNIT** • Turn ignition switch from LOCK position to START position **for 2 seconds**. • Does security light indicate DTC 21 again?	Yes	Replace immobilizer unit and reprogram immobilizer system. (See 09-14-32 Immobilizer Unit Replacement)
		No	Immobilizer system is okay.

DTC 24

Z6U090267000W09

DTC 24	**Open or short circuit in wiring harness between immobilizer unit and PCM**
POSSIBLE CAUSE	• Defective immobilizer unit • Defective PCM • Poor connection of connector • Defective wiring harness

IMMOBILIZER UNIT CONNECTOR



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

YMU902WA9

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT CONNECTOR CONNECTION** • Are both immobilizer unit and PCM connectors connected properly?	Yes	Go to next step.
		No	Connect connectors properly.

STEP	INSPECTION		ACTION
2	**INSPECT COMMUNICATION CIRCUIT FOR CONTINUITY** • Disconnect immobilizer unit and PCM connectors. • Connect the **SST** (104 Pin Breakout Box) to PCM connector with PCM disconnected. • Tighten connector bolt. • Is there continuity between immobilizer unit connector terminal A and 104 pin breakout box terminal 59?	Yes	Go to next step.
		No	Repair wiring harness between PCM and immobilizer unit.
3	**INSPECT IMMOBILIZER UNIT FOR SHORT TO GND** • Is there continuity between immobilizer unit connector terminal A and ground?	Yes	Repair for short circuit in wiring harness between PCM and immobilizer unit.
		No	Go to next step.
4	**INSPECT COMMUNICATION CIRCUIT** • Connect PCM connector. • Turn ignition switch to ON position. • Measure voltage at immobilizer unit connector terminal A. • Is voltage **more than 10 V**?	Yes	Replace immobilizer unit and reprogram immobilizer system. (See 09-14-32 Immobilizer Unit Replacement) **Note** • Confirm that voltage at immobilizer unit connector terminal L is **more than 10 V** when turning ignition switch to ON position after repairing malfunction of DTC 24. If not specified, repair wiring harness between ENGINE 10 A fuse and immobilizer unit.
		No	Replace PCM and reprogram immobilizer system. (See 09-14-33 PCM Replacement) **Note** • Confirm that voltage at immobilizer unit connector terminal L is **more than 10 V** when turning ignition switch to ON position after repairing malfunction of DTC 24. If not specified, repair wiring harness between ENGINE 10 A fuse and immobilizer unit.

DTC 30

Z6U090267000W10

DTC 30	Immobilizer unit—PCM communication error
POSSIBLE CAUSE	• Defective immobilizer unit • Defective PCM

Diagnostic procedure

STEP	INSPECTION		ACTION
—	**INSPECT INNER CIRCUIT OF IMMOBILIZER UNIT** • Replace immobilizer unit and reprogram immobilizer system. (See 09-14-32 Immobilizer Unit Replacement) • Does engine start?	Yes	Immobilizer unit was defective.
		No	Replace PCM and reprogram immobilizer system. (See 09-14-33 PCM Replacement)

09-03A SYMPTOM TROUBLESHOOTING [POWER WINDOW SYSTEMS]

FOREWORD [POWER WINDOW SYSTEM] 09-03A-1
TROUBLESHOOTING INDEX [POWER WINDOW SYSTEM] 09-03A-1
NO.1 POWER WINDOWS DO NOT OPERATE 09-03A-2
NO.2 POWER WINDOW AT DRIVER'S DOOR CANNOT BE OPERATED BY POWER WINDOW MAIN SWITCH 09-03A-3
NO.3 POWER WINDOW AT DRIVER'S DOOR DOES NOT OPERATE WITH ONE-TOUCH OPERATION 09-03A-4
NO.4 POWER WINDOWS (EXCEPT AT DRIVER'S DOOR) CAN BE OPERATED BY POWER WINDOW MAIN SWITCH, BUT CANNOT BE OPERATED BY POWER WINDOW SUBSWITCH 09-03A-4
NO.5 POWER WINDOWS (EXCEPT AT DRIVER'S DOOR) CAN BE OPERATED BY POWER WINDOW SUBSWITCHES, BUT CANNOT BE OPERATED BY POWER WINDOW MAIN SWITCH . 09-03A-5
NO.6 POWER WINDOWS (EXCEPT AT DRIVER'S DOOR) CAN BE OPERATED BY POWER WINDOW MAIN SWITCH WHEN POWER-CUT SWITCH IS AT OFF 09-03A-5
NO.7 POWER WINDOWS (EXCEPT AT DRIVER'S DOOR) CAN BE OPERATED BY POWER WINDOW SUBSWITCHES WHEN POWER-CUT SWITCH IS AT OFF 09-03A-5

FOREWORD [POWER WINDOW SYSTEM]

Z6U090358000W01

- Thoroughly read and understand the basic flow of troubleshooting in order to properly perform the procedures. (See 00-00-5 Troubleshooting Procedure.)

TROUBLESHOOTING INDEX [POWER WINDOW SYSTEM]

Z6U090358000W02

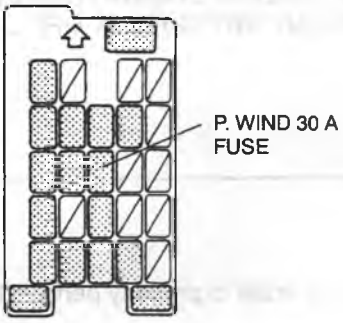
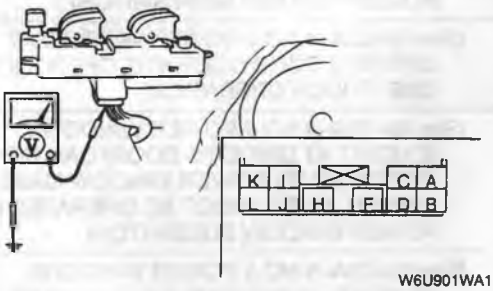
No.	TROUBLESHOOTING ITEM	PAGE
1	Power windows do not operate.	(See 09-03A-2 NO.1 POWER WINDOWS DO NOT OPERATE)
2	Power window at driver's door cannot be operated by power window main switch.	(See 09-03A-3 NO.2 POWER WINDOW AT DRIVER'S DOOR CANNOT BE OPERATED BY POWER WINDOW MAIN SWITCH)
3	Power window at driver's door does not operate with one-touch operation.	(See 09-03A-4 NO.3 POWER WINDOW AT DRIVER'S DOOR DOES NOT OPERATE WITH ONE-TOUCH OPERATION)
4	Power windows (except at driver's door) can be operated by power window main switch, but cannot be operated by power window subswitch.	(See 09-03A-4 NO.4 POWER WINDOWS (EXCEPT AT DRIVER'S DOOR) CAN BE OPERATED BY POWER WINDOW MAIN SWITCH, BUT CANNOT BE OPERATED BY POWER WINDOW SUBSWITCH)
5	Power windows (except at driver's door) can be operated by power window subswitches, but cannot be operated by power window main switch.	(See 09-03A-5 NO.5 POWER WINDOWS (EXCEPT AT DRIVER'S DOOR) CAN BE OPERATED BY POWER WINDOW SUBSWITCHES, BUT CANNOT BE OPERATED BY POWER WINDOW MAIN SWITCH)
6	Power windows (except at driver's door) can be operated by power window main switch when power-cut switch is at OFF.	(See 09-03A-5 NO.6 POWER WINDOWS (EXCEPT AT DRIVER'S DOOR) CAN BE OPERATED BY POWER WINDOW MAIN SWITCH WHEN POWER-CUT SWITCH IS AT OFF)
7	Power windows (except at driver's door) can be operated by power window subswitches when power-cut switch is at OFF.	(See 09-03A-5 NO.7 POWER WINDOWS (EXCEPT AT DRIVER'S DOOR) CAN BE OPERATED BY POWER WINDOW SUBSWITCHES WHEN POWER-CUT SWITCH IS AT OFF)

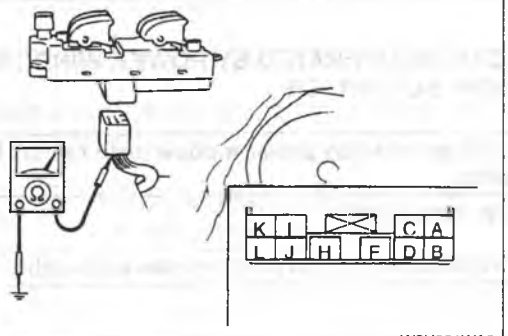
NO.1 POWER WINDOWS DO NOT OPERATE

Z6U090358000W03

1	Power windows do not operate
POSSIBLE CAUSE	• Malfunction in power window main switch power supply/ground circuit — P.WIND 30 A fuse malfunction — Power window main switch malfunction — Malfunction in wiring harness between P.WIND 30 A fuse and power window main switch — Malfunction in wiring harness between power window main switch and ground

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT FUSE** • Is P.WIND 30 A fuse okay?  W6U901WA0	Yes	Go to next step.
		No	Replace fuse after repairing wiring harness.
2	**INSPECT WIRING HARNESS BETWEEN POWER WINDOW MAIN SWITCH POWER SUPPLY AND POWER WINDOW MAIN SWITCH FOR CONTINUITY** • Remove driver's side front door trim. • Turn ignition switch to ON. • Measure voltage at terminal H at power window main switch connector of wiring harness. • Is voltage **B+**?  W6U901WA1	Yes	Go to next step.
		No	Repair wiring harness between P.WIND 30 A fuse and power window main switch.

STEP	INSPECTION		ACTION
3	**VERIFY THAT POWER WINDOW MAIN SWITCH CONNECTOR TERMINAL F IS GROUNDED** • Turn ignition switch to LOCK. • Disconnect power window main switch connector. • Check for continuity between terminal F at power window main switch connector of wiring harness and ground. • Is there continuity?  W6U901WA2	Yes	Replace power window main switch.
		No	Repair wiring harness between power window main switch and ground.

NO.2 POWER WINDOW AT DRIVER'S DOOR CANNOT BE OPERATED BY POWER WINDOW MAIN SWITCH

Z6U090358000W04

2	**Power window at driver's door cannot be operated by power window main switch**
POSSIBLE CAUSE	• Malfunction in power window main switch input signal circuit — Power window main switch malfunction — Malfunction in wiring harness between power window main switch and driver's side power window regulator • Malfunction in power window regulator operation circuit — Driver's side power window regulator malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT POWER WINDOW MAIN SWITCH** • Inspect power window main switch. (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION) • Is power window main switch okay?	Yes	Go to next step.
		No	Replace power window main switch.
2	**VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN POWER WINDOW MAIN SWITCH AND DRIVER'S SIDE POWER WINDOW REGULATOR) OR DRIVER'S SIDE POWER WINDOW REGULATOR** • Inspect driver's side power window regulator. (See 09-12-3 FRONT POWER WINDOW REGULATOR INSPECTION) • Is driver's side power window regulator okay?	Yes	Repair wiring harness between power window main switch and driver's side power window regulator.
		No	Replace driver's side power window regulator.

NO.3 POWER WINDOW AT DRIVER'S DOOR DOES NOT OPERATE WITH ONE-TOUCH OPERATION

Z6U090358000W05

3	**Power window at driver's door does not operate with one-touch operation**
POSSIBLE CAUSE	• Malfunction in power window main switch input signal circuit — Power window main switch malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
—	—	—	Replace power window main switch.

NO.4 POWER WINDOWS (EXCEPT AT DRIVER'S DOOR) CAN BE OPERATED BY POWER WINDOW MAIN SWITCH, BUT CANNOT BE OPERATED BY POWER WINDOW SUBSWITCH

Z6U090358000W06

4	**Power windows (except at driver's door) can be operated by power window main switch, but cannot be operated by power window subswitch**
POSSIBLE CAUSE	• Malfunction in power window subswitch power supply circuit — Power window subswitch malfunction — Malfunction in wiring harness between P.WIND 30 A fuse and power window subswitch

Diagnostic procedure

STEP	INSPECTION		ACTION
—	**VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN P.WIND 30 A FUSE AND POWER WINDOW SUBSWITCH) OR POWER WINDOW SUBSWITCH** • Remove passenger-side front door trim or rear door trim. (See 09-17-9 FRONT DOOR TRIM REMOVAL/INSTALLATION) (See 09-17-10 REAR DOOR TRIM REMOVAL/INSTALLATION) • Turn ignition switch to ON. • Measure voltage at terminal B at power window subswitch connector of wiring harness. • Is voltage **B+**?  W6U901WA3	Yes	Replace power window subswitch.
		No	Repair wiring harness between P.WIND 30 A fuse and power window subswitch.

NO.5 POWER WINDOWS (EXCEPT AT DRIVER'S DOOR) CAN BE OPERATED BY POWER WINDOW SUBSWITCHES, BUT CANNOT BE OPERATED BY POWER WINDOW MAIN SWITCH

Z6U090358000W07

5	**Power windows (except at driver's door) can be operated by power window subswitches, but cannot be operated by power window main switch**
POSSIBLE CAUSE	• Malfunction in power window main switch power supply circuit — Power window main switch malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
—	—	—	Replace power window main switch.

NO.6 POWER WINDOWS (EXCEPT AT DRIVER'S DOOR) CAN BE OPERATED BY POWER WINDOW MAIN SWITCH WHEN POWER-CUT SWITCH IS AT OFF

Z6U090358000W08

6	**Power windows (except at driver's door) can be operated by power window main switch when power-cut switch is at OFF**
POSSIBLE CAUSE	• Malfunction in power window main switch input signal circuit — Power window main switch malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
—	—	—	Replace power window main switch.

NO.7 POWER WINDOWS (EXCEPT AT DRIVER'S DOOR) CAN BE OPERATED BY POWER WINDOW SUBSWITCHES WHEN POWER-CUT SWITCH IS AT OFF

Z6U090358000W09

7	**Power windows (except at driver's door) can be operated by power window subswitches when power-cut switch is at OFF**
POSSIBLE CAUSE	• Malfunction in power window main switch input signal circuit — Power window main switch malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
—	—	—	Replace power window main switch.

09-03B SYMPTOM TROUBLESHOOTING [REAR WINDOW DEFROSTER]

FOREWORD [REAR WINDOW DEFROSTER] 09-03B-1
TROUBLESHOOTING INDEX [REAR WINDOW DEFROSTER] 09-03B-1
NO.1 REAR WINDOW DEFROSTER DOES NOT FUNCTION 09-03B-1
NO.2 REAR WINDOW DEFROSTER DOES NOT CONTINUOUSLY OPERATE FOR 15 MINUTES (THREE CYCLES OF THREE MINUTES OFF AND TWO MINUTES ON) 09-03B-6

FOREWORD [REAR WINDOW DEFROSTER]

Z6U090363000W01

- Thoroughly read and understand the basic flow of troubleshooting in order to properly perform the procedures. (See 00-00-5 Troubleshooting Procedure.)

TROUBLESHOOTING INDEX [REAR WINDOW DEFROSTER]

Z6U090363000W02

No.	TROUBLESHOOTING ITEM	PAGE
1	Rear window defroster does not function.	(See 09-03B-1 NO.1 REAR WINDOW DEFROSTER DOES NOT FUNCTION)
2	Rear window defroster does not continuously operate for 15 minutes (three cycles of three minutes off and two minutes on).	(See 09-03B-6 NO.2 REAR WINDOW DEFROSTER DOES NOT CONTINUOUSLY OPERATE FOR 15 MINUTES (THREE CYCLES OF THREE MINUTES OFF AND TWO MINUTES ON))

NO.1 REAR WINDOW DEFROSTER DOES NOT FUNCTION

Z6U090363000W03

1	Rear window defroster does not function
POSSIBLE CAUSE	• Malfunction in CPU power supply/ground circuit — ROOM 15 A fuse malfunction — Malfunction in wiring harness between ROOM 15 A fuse and CPU — Malfunction in wiring harness between CPU and ground • Malfunction in rear window defroster relay power supply circuit — METER 10 A fuse malfunction — DEFOG 40 A fuse malfunction — Malfunction in wiring harness between METER 10 A fuse and rear window defroster relay — Malfunction in wiring harness between DEFOG 40 A fuse and rear window defroster relay • Malfunction in CPU input signal circuit — CPU malfunction — Rear window defroster switch malfunction — Malfunction in wiring harness between CPU and rear window defroster switch — Malfunction in wiring harness between rear window defroster switch and ground • Malfunction in rear window defroster operation circuit — CPU malfunction — Rear window defroster relay malfunction — Malfunction in wiring harness between rear window defroster relay and CPU — Malfunction in wiring harness between rear window defroster relay and filament — Malfunction in wiring harness between filament and ground

09-03B SYMPTOM TROUBLESHOOTING [REAR WINDOW DEFROSTER]

FOREWORD [REAR WINDOW DEFROSTER] 09-03B-1
TROUBLESHOOTING INDEX [REAR WINDOW DEFROSTER] 09-03B-1
NO.1 REAR WINDOW DEFROSTER DOES NOT FUNCTION 09-03B-1
NO.2 REAR WINDOW DEFROSTER DOES NOT CONTINUOUSLY OPERATE FOR 15 MINUTES (THREE CYCLES OF THREE MINUTES OFF AND TWO MINUTES ON) 09-03B-6

FOREWORD [REAR WINDOW DEFROSTER]

Z6U090363000W01

- Thoroughly read and understand the basic flow of troubleshooting in order to properly perform the procedures. (See 00-00-5 Troubleshooting Procedure.)

TROUBLESHOOTING INDEX [REAR WINDOW DEFROSTER]

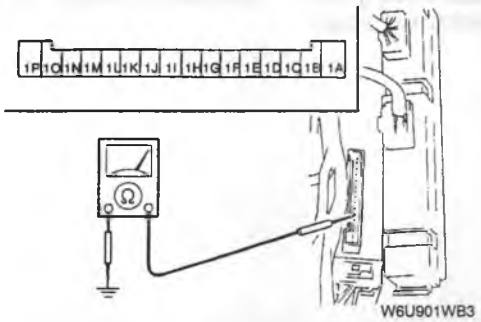
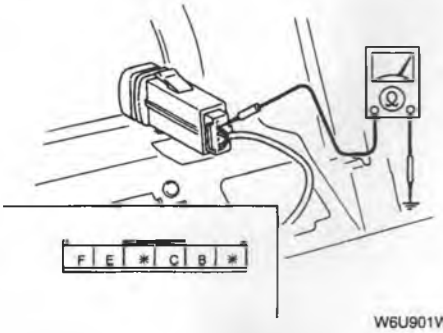
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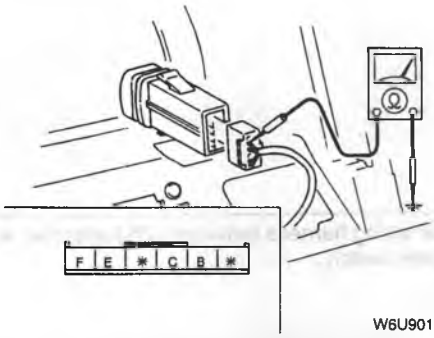
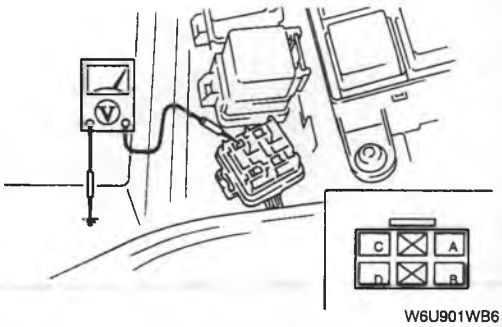
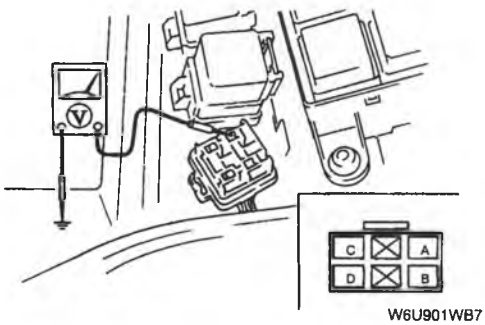
No.	TROUBLESHOOTING ITEM	PAGE
1	Rear window defroster does not function.	(See 09-03B-1 NO.1 REAR WINDOW DEFROSTER DOES NOT FUNCTION)
2	Rear window defroster does not continuously operate for 15 minutes (three cycles of three minutes off and two minutes on).	(See 09-03B-6 NO.2 REAR WINDOW DEFROSTER DOES NOT CONTINUOUSLY OPERATE FOR 15 MINUTES (THREE CYCLES OF THREE MINUTES OFF AND TWO MINUTES ON))

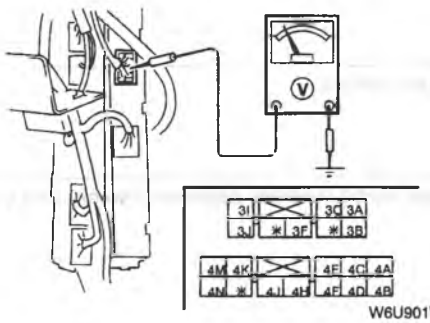
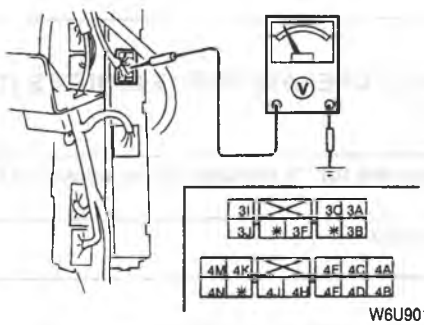
NO.1 REAR WINDOW DEFROSTER DOES NOT FUNCTION

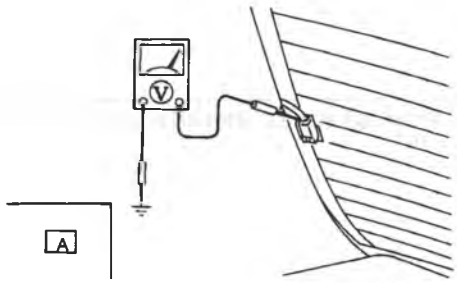
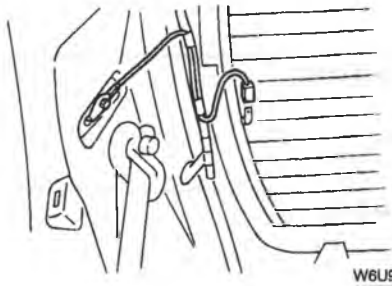
Z6U090363000W03

1	Rear window defroster does not function
POSSIBLE CAUSE	• Malfunction in CPU power supply/ground circuit — ROOM 15 A fuse malfunction — Malfunction in wiring harness between ROOM 15 A fuse and CPU — Malfunction in wiring harness between CPU and ground • Malfunction in rear window defroster relay power supply circuit — METER 10 A fuse malfunction — DEFOG 40 A fuse malfunction — Malfunction in wiring harness between METER 10 A fuse and rear window defroster relay — Malfunction in wiring harness between DEFOG 40 A fuse and rear window defroster relay • Malfunction in CPU input signal circuit — CPU malfunction — Rear window defroster switch malfunction — Malfunction in wiring harness between CPU and rear window defroster switch — Malfunction in wiring harness between rear window defroster switch and ground • Malfunction in rear window defroster operation circuit — CPU malfunction — Rear window defroster relay malfunction — Malfunction in wiring harness between rear window defroster relay and CPU — Malfunction in wiring harness between rear window defroster relay and filament — Malfunction in wiring harness between filament and ground

STEP	INSPECTION		ACTION
4	**VERIFY THAT JOINT BOX CONNECTOR TERMINAL 1N IS GROUNDED** ● Press rear window defroster switch on. ● Check for continuity between terminal 1N at joint box and ground. ● Is there continuity?  W6U901WB3	Yes	Go to Step 7.
		No	Go to next step.
5	**VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN CPU AND REAR WINDOW DEFROSTER SWITCH) OR ELSEWHERE** ● Remove meter hood. ● Remove rear window defroster switch without disconnecting rear window defroster switch connector. ● Check for continuity between terminal B at rear window defroster switch connector of wiring harness and ground with rear window defroster switch on. ● Is there continuity?  W6U901WB4	Yes	Repair wiring harness between CPU and rear window defroster switch.
		No	Go to next step.

STEP	INSPECTION		ACTION
6	**VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN REAR WINDOW DEFROSTER SWITCH AND GROUND) OR REAR WINDOW DEFROSTER SWITCH** ● Disconnect rear window defroster switch connector. ● Check for continuity between terminal C at rear window defroster switch connector of wiring harness and ground. ● Is there continuity?  W6U901WB5	Yes	Replace rear window defroster switch.
		No	Repair wiring harness between rear window defroster switch and ground.
7	**INSPECT WIRING HARNESS BETWEEN REAR WINDOW DEFROSTER RELAY POWER SUPPLY AND REAR WINDOW DEFROSTER RELAY FOR CONTINUITY** ● Remove rear window defroster relay. ● Turn ignition switch to ON. ● Measure voltage at terminal A at rear window defroster relay connector of wiring harness. ● Is voltage **B+**?  W6U901WB6	Yes	Go to next step.
		No	Repair wiring harness between METER 10 A fuse and rear window defroster relay.
8	**INSPECT WIRING HARNESS BETWEEN REAR WINDOW DEFROSTER RELAY POWER SUPPLY AND REAR WINDOW DEFROSTER RELAY FOR CONTINUITY** ● Measure voltage at terminal B at rear window defroster relay connector of wiring harness. ● Is voltage **B+**?  W6U901WB7	Yes	Go to next step.
		No	Repair wiring harness between DEFOG 40 A fuse and rear window defroster relay.

STEP	INSPECTION		ACTION
9	**INSPECT REAR WINDOW DEFROSTER RELAY** • Inspect rear window defroster relay. (See 09-12-20 REAR WINDOW DEFROSTER RELAY INSPECTION) • Is rear window defroster relay okay?	Yes	Go to next step.
		No	Replace rear window defroster relay.
10	**INSPECT WIRING HARNESS BETWEEN CPU AND REAR WINDOW DEFROSTER RELAY FOR CONTINUITY** • Install rear window defroster relay and CPU. • Measure voltage at terminal 3F (USA) or 4J (CANADA) at CPU connector and terminal D at rear window defroster relay of wiring harness with rear window defroster switch off. • Is voltage **B+**?  W6U901WB8	Yes	Go to next step.
		No	Repair wiring harness between rear window defroster relay and CPU.
11	**INSPECT WIRING HARNESS BETWEEN CPU AND REAR WINDOW DEFROSTER RELAY FOR CONTINUITY** • Measure voltage at terminal 3F (USA) or 4J (CANADA) at CPU connector and terminal D at rear window defroster relay of wiring harness with rear window defroster switch on. • Is voltage **0 V**?  W6U901WB9	Yes	Go to next step.
		No	Replace CPU.

STEP	INSPECTION		ACTION
12	**INSPECT WIRING HARNESS BETWEEN REAR WINDOW DEFROSTER RELAY AND FILAMENT FOR CONTINUITY** • Press rear window defroster switch on. • Measure voltage at terminal A at filament connector of wiring harness. • Is voltage **B**+?  W6U901WBA	Yes	Go to next step.
		No	Repair wiring harness between rear window defroster relay and filament.
13	**VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN FILAMENT AND GROUND) OR FILAMENT** • Disconnect filament connector. • Remove the C-pillar trim. • Is filament installed to body ground securely?  W6U901WBB	Yes	Repair filament.
		No	Repair wiring harness between filament and ground.

NO.2 REAR WINDOW DEFROSTER DOES NOT CONTINUOUSLY OPERATE FOR 15 MINUTES (THREE CYCLES OF THREE MINUTES OFF AND TWO MINUTES ON)

Z6U090363000W04

2	**Rear window defroster does not continuously operate for 15 minutes (three cycles of three minutes off and two minutes on)**
POSSIBLE CAUSE	• Malfunction in rear window defroster operation circuit — CPU malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
—	—	—	Replace CPU.

09-03C SYMPTOM TROUBLESHOOTING [POWER OUTSIDE MIRROR]

FOREWORD [POWER OUTSIDE MIRROR] 09-03C-1
TROUBLESHOOTING INDEX [POWER OUTSIDE MIRROR] 09-03C-1
NO.1 POWER OUTSIDE MIRRORS DO NOT OPERATE 09-03C-1
NO.2 LEFT POWER OUTSIDE MIRROR DOES NOT OPERATE VERTICALLY OR HORIZONTALLY (RIGHT POWER OUTSIDE MIRROR OPERATES) 09-03C-3
NO.3 RIGHT POWER OUTSIDE MIRROR DOES NOT OPERATE VERTICALLY OR HORIZONTALLY (LEFT POWER OUTSIDE MIRROR OPERATES) 09-03C-4
NO.4 HEATED OUTSIDE MIRROR DOES NOT FUNCTION 09-03C-6
NO.5 HEATED OUTSIDE MIRROR DOES NOT CONTINUOUSLY OPERATE FOR 15 MINUTES (THREE CYCLES OF THREE MINUTES OFF AND TWO MINUTES ON) 09-03C-10

FOREWORD [POWER OUTSIDE MIRROR]

Z6U090369110W01

- Thoroughly read and understand the basic flow of troubleshooting in order to properly perform the procedures. (See 00-00-5 Troubleshooting Procedure.)

TROUBLESHOOTING INDEX [POWER OUTSIDE MIRROR]

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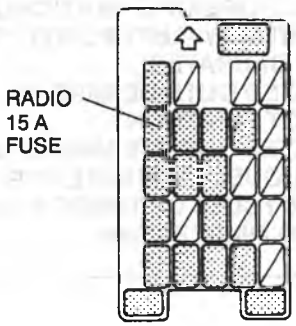
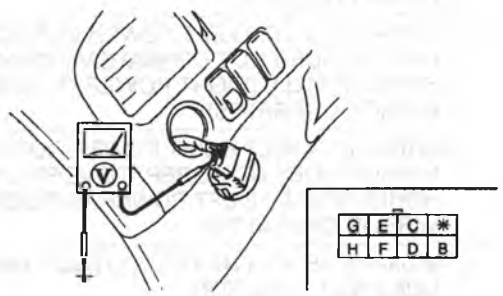
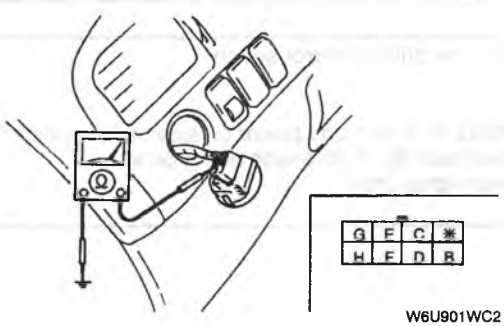
No.	TROUBLESHOOTING INDEX	PAGE
1	Power outside mirrors do not operate.	(See 09-03C-1 NO.1 POWER OUTSIDE MIRRORS DO NOT OPERATE)
2	Left power outside mirror does not operate vertically or horizontally (Right power outside mirror operates).	(See 09-03C-3 NO.2 LEFT POWER OUTSIDE MIRROR DOES NOT OPERATE VERTICALLY OR HORIZONTALLY (RIGHT POWER OUTSIDE MIRROR OPERATES))
3	Right power outside mirror does not operate vertically or horizontally (Left power outside mirror operates).	(See 09-03C-4 NO.3 RIGHT POWER OUTSIDE MIRROR DOES NOT OPERATE VERTICALLY OR HORIZONTALLY (LEFT POWER OUTSIDE MIRROR OPERATES))
4	Heated outside mirror does not function.	(See 09-03C-6 NO.4 HEATED OUTSIDE MIRROR DOES NOT FUNCTION)
5	Heated outside mirror does not continuously operate for 15 minutes (three cycles of three minutes off and two minutes on).	(See 09-03C-10 NO.5 HEATED OUTSIDE MIRROR DOES NOT CONTINUOUSLY OPERATE FOR 15 MINUTES (THREE CYCLES OF THREE MINUTES OFF AND TWO MINUTES ON))

NO.1 POWER OUTSIDE MIRRORS DO NOT OPERATE

Z6U090369110W03

1	Power outside mirrors do not operate
POSSIBLE CAUSE	• Malfunction in power supply/ground circuit of power outside mirror switch — RADIO 15 A fuse malfunction — Power outside mirror switch malfunction — Malfunction in wiring harness between RADIO 15 A fuse and power outside mirror switch — Malfunction in wiring harness between power outside mirror switch and ground • Malfunction in power outside mirror switch input signal circuit — Power outside mirror switch malfunction

Diagnostic procedure

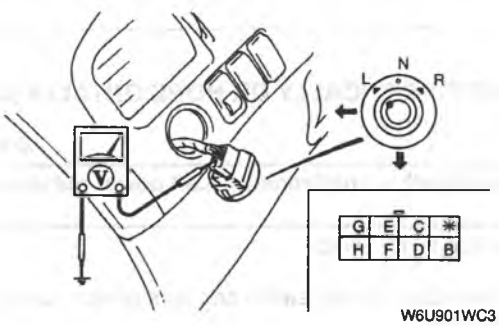
STEP	INSPECTION		ACTION
1	**INSPECT FUSE** • Is RADIO 15 A fuse okay?  W6U901WC0	Yes	Go to next step.
		No	Replace fuse after repairing wiring harness.
2	**INSPECT WIRING HARNESS BETWEEN POWER OUTSIDE MIRROR POWER SUPPLY AND POWER OUTSIDE MIRROR SWITCH FOR CONTINUITY** • Remove power outside mirror switch. • Turn ignition switch to ACC. • Measure voltage at terminal C at power outside mirror switch connector of wiring harness. • Is voltage **B+**?  W6U901WC1	Yes	Go to next step.
		No	Repair wiring harness between RADIO 15 A fuse and power outside mirror switch.
3	**VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN POWER OUTSIDE MIRROR SWITCH AND GROUND) OR POWER OUTSIDE MIRROR SWITCH** • Turn ignition switch to LOCK. • Check for continuity between terminal E at power outside mirror switch connector of wiring harness and ground. • Is there continuity?  W6U901WC2	Yes	Replace power outside mirror switch.
		No	Repair wiring harness between power outside mirror switch and ground.

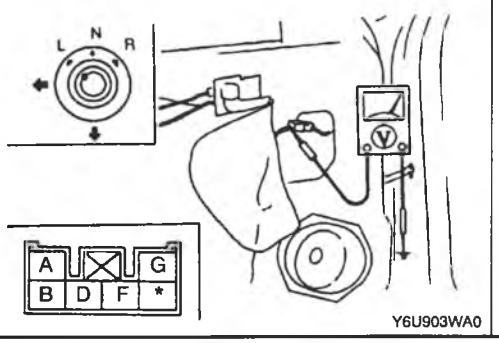
NO.2 LEFT POWER OUTSIDE MIRROR DOES NOT OPERATE VERTICALLY OR HORIZONTALLY (RIGHT POWER OUTSIDE MIRROR OPERATES)

Z6U090369110W04

2	**Left power outside mirror does not operate vertically or horizontally (Right power outside mirror operates)**
POSSIBLE CAUSE	• Malfunction in input signal circuit of power outside mirror switch — Power outside mirror switch malfunction — Malfunction in wiring harness between power outside mirror switch and left power outside mirror • Malfunction in power outside mirror operation circuit — Left power outside mirror malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT WIRING HARNESS BETWEEN POWER OUTSIDE MIRROR POWER SUPPLY AND POWER OUTSIDE MIRROR SWITCH FOR CONTINUITY** • Remove power outside mirror switch without disconnecting power outside mirror switch connector. • Turn ignition switch to ACC. • Turn power outside mirror switch to left side position and turn it to left or to down position. • Measure voltage at terminal F at power outside mirror switch connector of wiring harness. • Is voltage **B**+?  W6U901WC3	Yes	Go to next step.
		No	Replace power outside mirror switch.

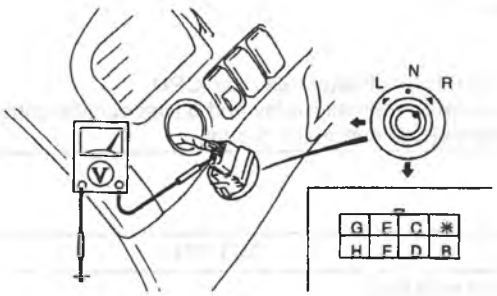
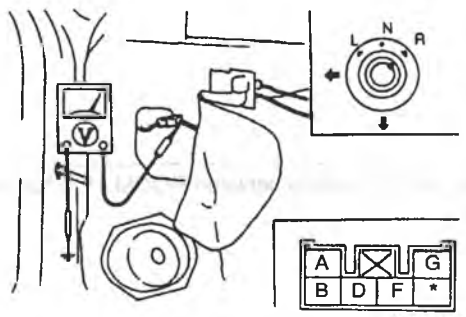
STEP	INSPECTION		ACTION
2	**VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN POWER OUTSIDE MIRROR SWITCH AND LEFT POWER OUTSIDE MIRROR) OR LEFT POWER OUTSIDE MIRROR** • Remove driver-side front door trim. • Partially peel off driver-side front door screen. • Turn ignition switch to ACC. • Turn power outside mirror switch to left side position and turn it to left or to down position. • Measure voltage at terminal D at left power outside mirror connector of wiring harness. • Is voltage **B**+?  Y6U903WA0	Yes	Replace left power outside mirror.
		No	Repair wiring harness between power outside mirror switch and left power outside mirror.

NO.3 RIGHT POWER OUTSIDE MIRROR DOES NOT OPERATE VERTICALLY OR HORIZONTALLY (LEFT POWER OUTSIDE MIRROR OPERATES)

Z6U090369110W05

3	**Right power outside mirror does not operate vertically or horizontally (Left power outside mirror operates)**
POSSIBLE CAUSE	• Malfunction in input signal circuit of power outside mirror switch — Power outside mirror switch malfunction — Malfunction in wiring harness between power outside mirror switch and right power outside mirror • Malfunction in power outside mirror operation circuit — Right power outside mirror malfunction

Diagnostic procedure

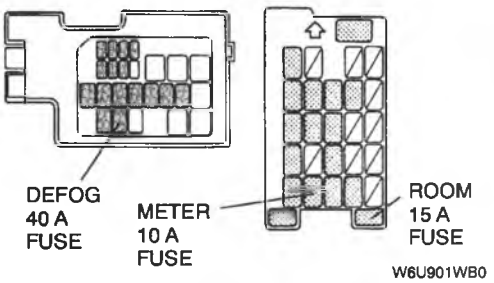
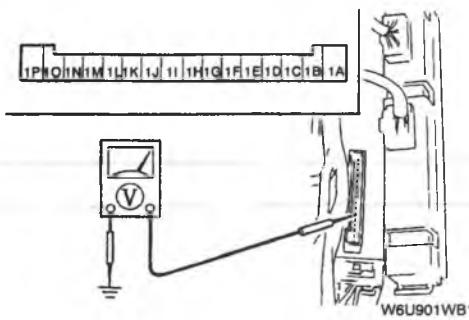
STEP	INSPECTION		ACTION
1	**INSPECT WIRING HARNESS BETWEEN POWER OUTSIDE MIRROR POWER SUPPLY AND POWER OUTSIDE MIRROR SWITCH FOR CONTINUITY** • Remove power outside mirror switch without disconnecting power outside mirror switch connector. • Turn ignition switch to ACC. • Turn power outside mirror switch to right side position and turn it to left or to down position. • Measure voltage at terminal F at power outside mirror switch connector of wiring harness. • Is voltage **B**+?  W6U901WC5	Yes	Go to next step.
		No	Replace power outside mirror switch.
2	**VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN POWER OUTSIDE MIRROR SWITCH AND RIGHT POWER OUTSIDE MIRROR) OR RIGHT POWER OUTSIDE MIRROR** • Remove passenger-side front door trim. • Partially peel off passenger-side front door screen. • Turn ignition switch to ACC. • Turn power outside mirror switch to right side position and turn it to left or to down position. • Measure voltage at terminal D at right power outside mirror connector of wiring harness. • Is voltage **B**+?  Y6U903WA1	Yes	Replace right power outside mirror.
		No	Repair wiring harness between power outside mirror switch and right power outside mirror.

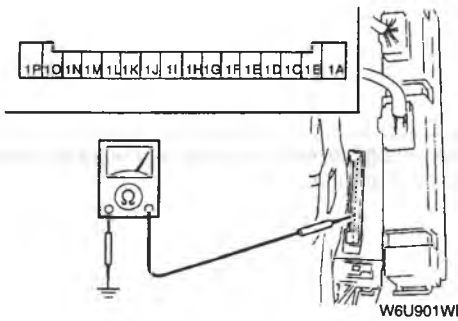
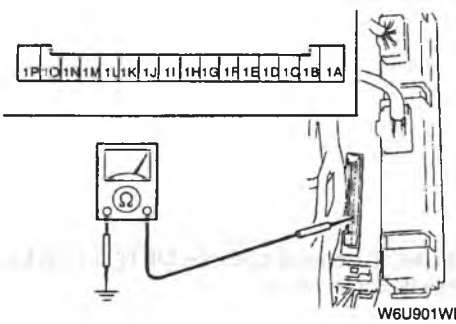
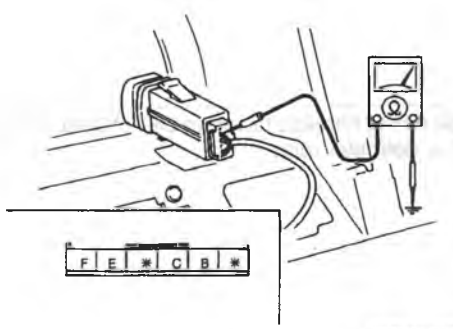
NO.4 HEATED OUTSIDE MIRROR DOES NOT FUNCTION

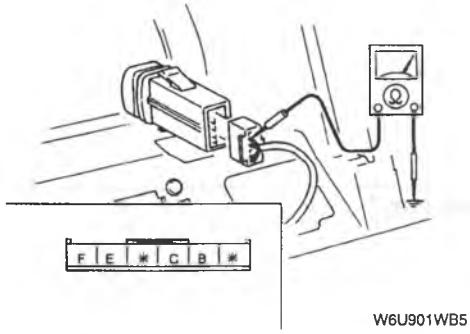
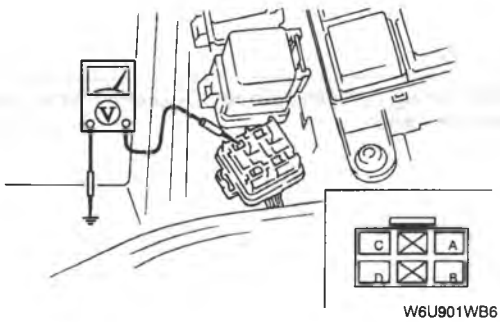
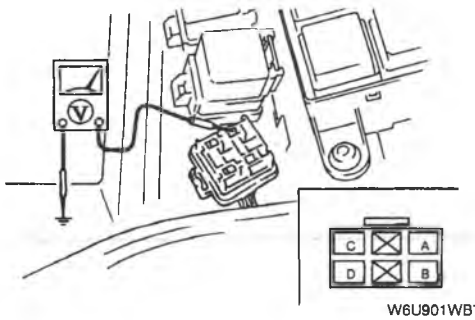
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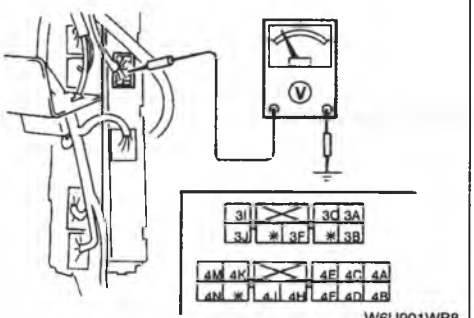
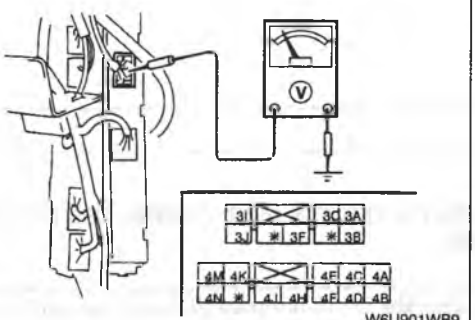
4	Heated outside mirror does not function
POSSIBLE CAUSE	• Malfunction in CPU power supply/ground circuit — ROOM 15 A fuse malfunction — Malfunction in wiring harness between ROOM 15 A fuse and CPU — Malfunction in wiring harness between CPU and ground • Malfunction in rear window defroster relay power supply circuit — METER 10 A fuse malfunction — DEFOG 40 A fuse malfunction — Malfunction in wiring harness between METER 10 A fuse and rear window defroster relay — Malfunction in wiring harness between DEFOG 40 A fuse and rear window defroster relay • Malfunction in CPU input signal circuit — CPU malfunction — Rear window defroster switch malfunction — Malfunction in wiring harness between CPU and rear window defroster switch — Malfunction in wiring harness between rear window defroster switch and ground • Malfunction in heated outside mirror operation circuit — CPU malfunction — Rear window defroster relay malfunction — Malfunction in wiring harness between rear window defroster relay and CPU — Malfunction in wiring harness between rear window defroster relay and power outside mirror — Malfunction in wiring harness between power outside mirror and ground

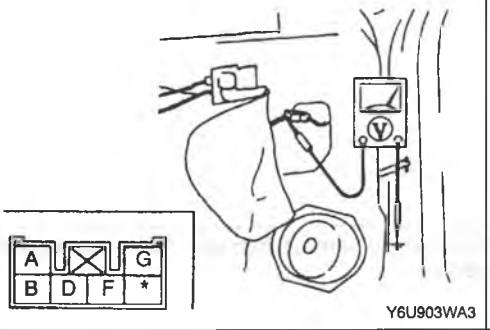
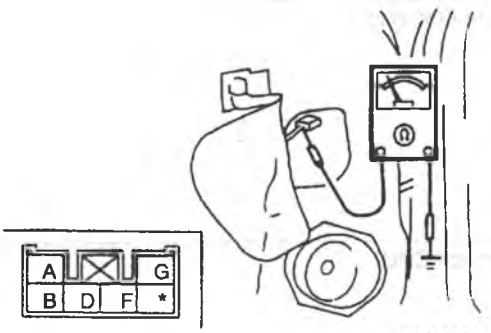
Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT FUSES** • Are ROOM 15 A, DEFOG 40 A and METER 10 A fuses okay?  W6U901WB0	Yes	Go to next step.
		No	Replace fuse after repairing wiring harness.
2	**INSPECT WIRING HARNESS BETWEEN CPU POWER SUPPLY AND CPU FOR CONTINUITY** • Remove driver-side front scuff plate. • Remove driver-side front side trim. • Remove nut fixed in joint box and remove CPU from joint box. • Measure voltage at terminal 1J at joint box. • Is voltage **B+**?  W6U901WB1	Yes	Go to next step.
		No	Repair wiring harness between ROOM 15 A fuse and CPU.

STEP	INSPECTION		ACTION
3	**VERIFY THAT JOINT BOX CONNECTOR TERMINAL IG IS GROUNDED** • Check for continuity between terminal 1G at joint box and ground. • Is there continuity?  W6U901WB2	Yes	Go to next step.
		No	Repair wiring harness between CPU and ground.
4	**VERIFY THAT JOINT BOX CONNECTOR TERMINAL IN IS GROUNDED** • Press rear window defroster switch on. • Check for continuity between terminal 1N at joint box and ground. • Is there continuity?  W6U901WB3	Yes	Go to step 7.
		No	Go to next step.
5	**VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN CPU AND REAR WINDOW DEFROSTER SWITCH) OR ELSEWHERE** • Remove meter hood. • Remove rear window defroster switch without disconnecting rear window defroster switch connector. • Check for continuity between terminal B at rear window defroster switch connector of wiring harness and ground with rear window defroster switch on. • Is there continuity?  W6U901WB4	Yes	Repair wiring harness between CPU and rear window defroster switch.
		No	Go to next step.

STEP	INSPECTION		ACTION
6	**VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN REAR WINDOW DEFROSTER SWITCH AND GROUND) OR REAR WINDOW DEFROSTER SWITCH** • Disconnect rear window defroster switch connector. • Check for continuity between terminal C at rear window defroster switch connector of wiring harness and ground. • Is there continuity?  W6U901WB5	Yes	Replace rear window defroster switch.
		No	Repair wiring harness between rear window defroster switch and ground.
7	**INSPECT WIRING HARNESS BETWEEN REAR WINDOW DEFROSTER RELAY POWER SUPPLY AND REAR WINDOW DEFROSTER RELAY FOR CONTINUITY** • Remove rear window defroster relay. • Turn ignition switch to ON. • Measure voltage at terminal A at rear window defroster relay connector of wiring harness. • Is voltage **B+**?  W6U901WB6	Yes	Go to next step.
		No	Repair wiring harness between METER 10 A fuse and rear window defroster relay.
8	**INSPECT WIRING HARNESS BETWEEN REAR WINDOW DEFROSTER RELAY POWER SUPPLY AND REAR WINDOW DEFROSTER RELAY FOR CONTINUITY** • Measure voltage at terminal B at rear window defroster relay connector of wiring harness. • Is voltage **B+**?  W6U901WB7	Yes	Go to next step.
		No	Repair wiring harness between DEFOG 40 A fuse and rear window defroster relay.

STEP	INSPECTION		ACTION
9	**INSPECT REAR WINDOW DEFROSTER RELAY** • Inspect rear window defroster relay. (See 09-12-20 REAR WINDOW DEFROSTER RELAY INSPECTION) • Is rear window defroster relay okay?	Yes	Go to next step.
		No	Replace rear window defroster relay.
10	**INSPECT WIRING HARNESS BETWEEN CPU AND REAR WINDOW DEFROSTER RELAY FOR CONTINUITY** • Install rear window defroster relay and CPU. • Measure voltage at terminal 3F (USA) or 4J (CANADA) at CPU connector and terminal D at rear window defroster relay of wiring harness with rear window defroster switch off. • Is voltage **B+**?  W6U901WB8	Yes	Go to next step.
		No	Repair wiring harness between rear window defroster relay and CPU.
11	**INSPECT WIRING HARNESS BETWEEN CPU AND REAR WINDOW DEFROSTER RELAY FOR CONTINUITY** • Measure voltage at terminal 3F (USA) or 4J (CANADA) at CPU connector and terminal D at rear window defroster relay of wiring harness with rear window defroster switch on. • Is voltage **0 V**?  W6U901WB9	Yes	Go to next step.
		No	Replace CPU.

STEP	INSPECTION		ACTION
12	**INSPECT WIRING HARNESS BETWEEN REAR WINDOW DEFROSTER RELAY AND POWER OUTSIDE MIRROR FOR CONTINUITY** • Press rear window defroster switch on. • Measure voltage at terminal A at power outside mirror connector of wiring harness. • Is voltage **B**+?  Y6U903WA3	Yes	Go to next step.
		No	Repair wiring harness between rear window defroster relay and power outside mirror.
13	**VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN POWER OURSIDE AND GROUND) OR POWER OUTSIDE MIRROR** • Disconnect power outside mirror connector. • Check for continuity between terminal G at power outside mirror connector of wiring harness and ground.  Y6U903WA2	Yes	Repair power outside mirror.
		No	Repair wiring harness between power outside mirror and ground.

NO.5 HEATED OUTSIDE MIRROR DOES NOT CONTINUOUSLY OPERATE FOR 15 MINUTES (THREE CYCLES OF THREE MINUTES OFF AND TWO MINUTES ON)

Z6U090369110W07

5	**Heated outside mirror does not continuously operate for 15 minutes (three cycles of three minutes off and two minutes on)**
POSSIBLE CAUSE	• Malfunction in heated outside mirror operation circuit — CPU malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
—	—	—	Replace CPU.

09-03D SYMPTOM TROUBLESHOOTING [POWER SEAT]

FOREWORD [POWER SEAT] 09-03D-1
TROUBLESHOOTING INDEX [POWER SEAT] 09-03D-1
NO.1 POWER SEAT DOES NOT OPERATE 09-03D-1
NO.2 POWER SEAT DOES NOT SLIDE FORWARD OR BACKWARD (OTHER FUNCTIONS OPERATE NORMALLY) . 09-03D-2
NO.3 FRONT OF DRIVER'S SEAT DOES NOT MOVE UP OR DOWN (OTHER FUNCTIONS OPERATE NORMALLY) . 09-03D-3
NO.4 REAR OF DRIVER'S SEAT DOES NOT MOVE UP OR DOWN (OTHER FUNCTIONS OPERATE NORMALLY) 09-03D-3

FOREWORD [POWER SEAT]

Z6U090358000W10

- Thoroughly read and understand the basic flow of troubleshooting in order to properly perform the procedures. (See 00-00-5 Troubleshooting Procedure.)

TROUBLESHOOTING INDEX [POWER SEAT]

Z6U090358000W11

- Use the chart below to verify the symptoms of the trouble in order to diagnose the appropriate area.

No.	TROUBLESHOOTING ITEM	PAGE
1	Power seat does not operate at all.	(See 09-03D-1 NO.1 POWER SEAT DOES NOT OPERATE)
2	Power seat does not slide forward or backward (Other functions operate normally).	(See 09-03D-2 NO.2 POWER SEAT DOES NOT SLIDE FORWARD OR BACKWARD (OTHER FUNCTIONS OPERATE NORMALLY))
3	Front of driver's seat does not move up or down (Other functions operate normally).	(See 09-03D-3 NO.3 FRONT OF DRIVER'S SEAT DOES NOT MOVE UP OR DOWN (OTHER FUNCTIONS OPERATE NORMALLY))
4	Rear of driver's seat does not move up or down (Other functions operate normally).	(See 09-03D-3 NO.4 REAR OF DRIVER'S SEAT DOES NOT MOVE UP OR DOWN (OTHER FUNCTIONS OPERATE NORMALLY))

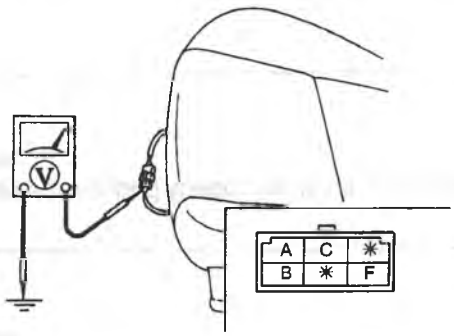
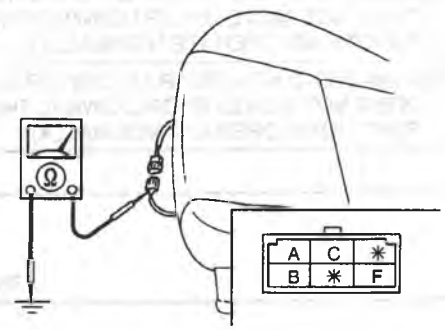
NO.1 POWER SEAT DOES NOT OPERATE

Z6U090358000W12

1	Power seat does not operate
POSSIBLE CAUSE	• Malfunction in power seat power supply/ground circuit — P.SEAT 30 A fuse malfunction — Power seat switch malfunction — Malfunction of wiring harness between P.SEAT 30 A fuse and power seat switch — Malfunction of wiring harness between power seat switch and ground

Diagnostic procedure

STEP	INSPECTION		ACTION
1	INSPECT FUSE • Is P.SEAT 30 A fuse okay?	Yes	Go to next step.
		No	Replace fuse after repairing wiring harness.

STEP	INSPECTION		ACTION
2	**INSPECT WIRING HARNESS BETWEEN POWER SEAT SWITCH POWER SUPPLY AND POWER SEAT SWITCH FOR CONTINUITY** • Measure voltage at terminal A at power seat switch connector of wiring harness. • Is voltage **B+**?  W6U901WD0	Yes	Go to next step.
		No	Repair wiring harness between P.SEAT 30 A fuse and power seat switch.
3	**VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN POWER SEAT SWITCH AND GROUND) OR POWER SEAT SWITCH** • Disconnect power seat switch connector. • Check for continuity between terminal F at power seat switch connector of wiring harness and ground. • Is there continuity?  W6U901WD1	Yes	Replace power seat switch. (See 09-13-2 FRONT SEAT DISASSEMBLY/ASSEMBLY)
		No	Repair wiring harness between power seat switch and ground.

NO.2 POWER SEAT DOES NOT SLIDE FORWARD OR BACKWARD (OTHER FUNCTIONS OPERATE NORMALLY)

Z6U090358000W13

2	**Power seat does not slide forward or backward (Other functions operate normally)**
POSSIBLE CAUSE	• Malfunction in slide motor circuit — Power seat switch malfunction — Slide motor malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
—	**INSPECT POWER SEAT SWITCH** • Inspect power seat switch. (See 09-13-9 POWER SEAT SWITCH INSPECTION) • Is power seat switch okay?	Yes	Replace slide motor. (See 09-13-2 FRONT SEAT DISASSEMBLY/ASSEMBLY)
		No	Replace power seat switch. (See 09-13-2 FRONT SEAT DISASSEMBLY/ASSEMBLY)

NO.3 FRONT OF DRIVER'S SEAT DOES NOT MOVE UP OR DOWN (OTHER FUNCTIONS OPERATE NORMALLY)

Z6U090358000W14

3	Front of driver's seat does not move up or down (Other functions operate normally)
POSSIBLE CAUSE	• Malfunction in front tilt motor circuit — Power seat switch malfunction — Front tilt motor malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
—	**INSPECT POWER SEAT SWITCH** • Inspect power seat switch. (See 09-13-9 POWER SEAT SWITCH INSPECTION) • Is power seat switch okay?	Yes	Replace front tilt motor. (See 09-13-2 FRONT SEAT DISASSEMBLY/ASSEMBLY)
		No	Replace power seat switch. (See 09-13-2 FRONT SEAT DISASSEMBLY/ASSEMBLY)

NO.4 REAR OF DRIVER'S SEAT DOES NOT MOVE UP OR DOWN (OTHER FUNCTIONS OPERATE NORMALLY)

Z6U090358000W15

4	Rear of driver's seat does not move up or down (Other functions operate normally)
POSSIBLE CAUSE	• Malfunction in rear tilt motor circuit — Power seat switch malfunction — Rear tilt motor malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
—	**INSPECT POWER SEAT SWITCH** • Inspect power seat switch. (See 09-13-9 POWER SEAT SWITCH INSPECTION) • Is power seat switch okay?	Yes	Replace rear tilt motor. (See 09-13-2 FRONT SEAT DISASSEMBLY/ASSEMBLY)
		No	Replace power seat switch. (See 09-13-2 FRONT SEAT DISASSEMBLY/ASSEMBLY)

09-03E SYMPTOM TROUBLESHOOTING [POWER DOOR LOCK SYSTEM]

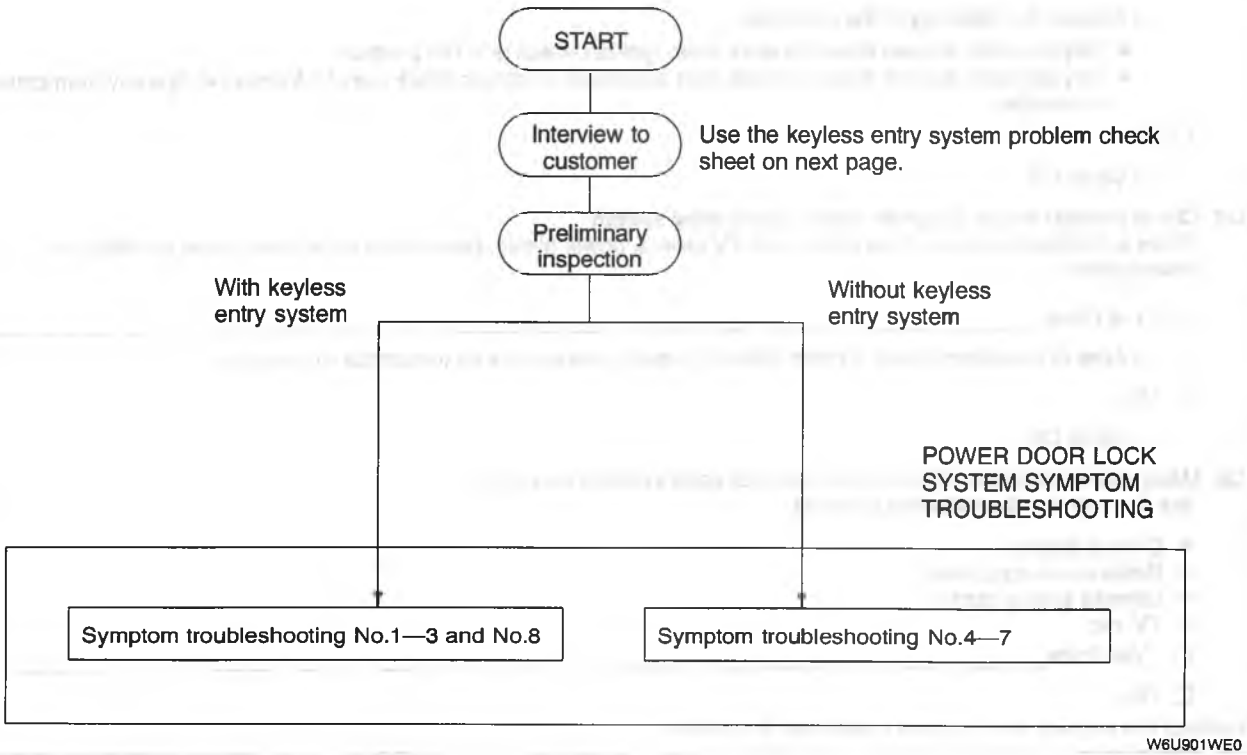
FOREWORD [POWER DOOR LOCK SYSTEM] 09-03E-1
Flowchart 09-03E-1
KEYLESS ENTRY SYSTEM PROBLEM CHECK 09-03E-2
KEYLESS ENTRY SYSTEM PRELIMINARY INSPECTION 09-03E-3
KEYLESS ENTRY SYSTEM ON-BOARD DIAGNOSTIC 09-03E-5
On-board Diagnostic Function 1 ..... 09-03E-5
On-board Diagnostic Function 2 ..... 09-03E-6
POWER DOOR LOCK AND KEYLESS ENTRY SYSTEM SYMPTOM TROUBLESHOOTING 09-03E-8
NO.1 ON-BOARD DIAGNOSTIC FUNCTION 1 AND/OR 2 INOPERATIVE 09-03E-9
NO.2 ON-BOARD DIAGNOSTIC FUNCTION 1 INOPERATIVE 09-03E-16
NO.3 TRANSMITTER ID CODE CANNOT BE REPROGRAMMED 09-03E-17
NO.4 ALL DOORS DO NOT UNLOCK OR LOCK WITH DOOR LOCK SWITCH 09-03E-18
NO.5 PASSENGER'S SIDE AND REAR DOORS DO NOT LOCK OR UNLOCK WITH DOOR LOCK SWITCH (DRIVER'S SIDE DOOR LOCK IS OKAY) 09-03E-21
NO.6 DRIVER'S SIDE DOOR DOES NOT LOCK OR UNLOCK WITH DOOR LOCK SWITCH (PASSENGER'S SIDE AND REAR SIDE POWER DOORS ARE OKAY) 09-03E-22
NO.7 TRUNK LID DOES NOT UNLOCK WITH TRUNK LID OPENER SWITCH (POWER DOOR LOCK SYSTEM IS OKAY) 09-03E-24
NO.8 LOCK MONITOR FUNCTION DOES NOT OPERATE 09-03E-26

FOREWORD [POWER DOOR LOCK SYSTEM]

Z6U090366000W01

- When there is malfunction in power door lock system without keyless entry system, perform troubleshooting No.4—7 according to symptom.
- For malfunction in power door lock system with keyless entry system, perform preliminary inspection first, then perform troubleshooting No.1—3 and No.8.

Flowchart



W6U901WE0

KEYLESS ENTRY SYSTEM PROBLEM CHECK

Z6U090366000W02

Note

- Use the sheet below as a customer interview sheet when accepting a vehicle for service.
- If the symptom is "Power door lock system does not operate with transmitter at all", find out how the customer uses the keyless entry system according by following the check sheet below.

Keyless Entry System Check Sheet

Perform the following inspection with customer:

Q1. What's the customer complaint?

☐ Power door lock system does not operate with transmitter (door does not lock/unlock)

☐ Other _____

→ Go to Q2.

Q2. Is system factory-installed or after-market?

☐ Factory-installed system

→ Go to Q3.

☐ After-market system

→ Perform troubleshooting according to after-market keyless entry system manual.

Q3. Operate transmitter with customer from 15 m (49 ft) away from center of vehicle. (Make sure the ignition key is either in the LOCK position or removed.)
Does keyless entry system work?

☐ Yes

→ Explain the following to the customer:

- Keyless entry system does not work when ignition switch is in ON position.
- Keyless entry system does not work from excessive distances (more than 15 meters {49 ft} away from center of vehicle).

☐ No

→ Go to Q4.

Q4. Check location where customer uses keyless entry system.
Does a particular area, such as being near TV towers, power plants, power lines or factories, have an effect on malfunction?

☐ Yes Place_____

→ Area of operation is bad. Explain effect of outside interference on transmitter to customer.

☐ No

→ Go to Q5.

Q5. Make sure there are no after-market electrical parts installed on vehicle.
Are there any of the following present?

- Cellular phone
- Radio-wave equipment
- Remote engine starter
- TV, etc.

☐ Yes Parts_____

☐ No

Perform the keyless entry system preliminary inspection.

Y6U903WE0

KEYLESS ENTRY SYSTEM PRELIMINARY INSPECTION

Z6U090366000W03

- Perform the following preliminary inspection before performing the symptom troubleshooting.

STEP	INSPECTION		ACTION
1	• Is system after-market system?	Yes	Perform troubleshooting according to after market keyless entry system manual.
		No	Go to next Step.
2	• Operate transmitter **within 15 m {49 ft}** of vehicle. • Does keyless entry system work?	Yes	Make sure keyless entry system does not work from excessive distance (**more than 15 m {49 ft}** from vehicle). Explain to customer that effective range is **within 15 m {49 ft}**.
		No	• If neither door nor trunk lid lock or unlock with transmitter, operate transmitter **within 1 m {3 ft}** of vehicle. **If keyless entry system does not work:** Check transmitter battery, then go to next step. **If keyless entry system works:** Check transmitter battery. • Go to Step 4 for following symptoms: Trunk lid does not unlock with transmitter. All doors do not unlock or lock with transmitter. Driver's side door only does not unlock with transmitter. • Go to Step 5 for other symptoms.
3	• Attempt to change transmitter ID code. • Can transmitter ID code be changed?	Yes	Attempt to operate keyless entry system. **If system works:** System is normal now. **If system does not work:** Go to next step.
		No	Go to Step 2 of symptom troubleshooting No.3.
4	• Did customer or you use keyless entry system in particular area, such as being near TV towers, power plants, power lines or factories?	Yes	Attempt to lock or unlock doors with transmitter in non-interference area. **If system operates:** Area of operation is bad. Explain effect of outside interference on transmitter to customer. **If system does not operate:** go to next step.
		No	Go to next step.
5	• Are there any after-market electrical parts on vehicle?	Yes	Disconnect after-market electrical parts connectors and attempt to lock or unlock doors with transmitter. **If system operates:** after-market electrical parts are interfering with keyless entry system. **If system does not operate:** go to next step.
		No	Go to next step.
6	• Is there another piece of radio-wave equipment, such as cellular phone, on vehicle?	Yes	Disconnect radio-wave equipment connector and attempt to lock or unlock doors with transmitter. **If system operates:** radio-wave equipment is interfering with keyless entry system. **If system does not operate:** go to next step.
		No	• Go to next step for following symptoms: Neither door nor trunk lid do not lock or unlock with transmitter at all, Trunk lid does not unlock with transmitter. All doors do not unlock or lock with transmitter. Driver's side door only does not unlock with transmitter. • Go to troubleshooting index and select appropriate troubleshooting flow chart for other symptoms.
7	• Perform on-board diagnostic function 1. (See 09-03E-5 On-board Diagnostic Function 1) • Does on-board diagnostic activate verification buzzer sound once during on-board diagnostic function 1?	Yes	Go to Step 9.
		No	Go to next step.

STEP	INSPECTION		ACTION
8	• Verify that following fuses are okay. — ROOM 15 A fuse — RADIO 15 A fuse — METER 10 A fuse • Are all fuses okay?	Yes	Check that all door switches are installed securely on chassis. **If all door switches are installed securely:** Go to Step 1 of symptom troubleshooting No.1. **If any door switch is not installed securely:** Install door switch on chassis securely. Return to Step 7.
		No	Check for short to ground circuit on blown fuse's circuit. Repair or replace as necessary. Install appropriate amperage fuse.
9	• Do all of following items operate sequentially **every 3 seconds** during on-board diagnostic function 1? — Trunk lid to unlock — All doors to lock — Driver's side door to unlock — All doors to unlock **Note** • Trunk lid opener unlocks simultaneously when buzzer sounds one time.	Yes	Go to Step 12.
		No	Verify malfunction judgment buzzer sounds 1 time. **If buzzer sounds one time but power door lock system does not operate:** Go to next step. **If buzzer sounds one time but trunk lid does not unlock:** Go to Step 11. **If buzzer sounds two times:** Go to Step 14 of symptom troubleshooting No.1.
10	• Operate inner door lock knob and make sure door locks and unlocks manually. • Do all doors' door lock systems work?	Yes	Go to step 1 of symptom troubleshooting No.2.
		No	Troubleshoot door lock linkage.
11	• Does trunk lid open when trunk lid opener switch is turned on?	Yes	Check wiring harness continuity between terminal 2D at CPU connector and trunk lid opener switch. If wiring harness is okay, go to Step 1 of symptom troubleshooting No.2.
		No	Go to Step 1 of symptom troubleshooting No.2.
12	• Perform on-board diagnostic function 2. (See 09-03E-6 On-board Diagnostic Function 2) • Does number of buzzer sound 4 times on all three tests (LOCK, UNLOCK and TRUNK signal inspections)?	Yes	System is normal.
		No	**If buzzer sounds two times:** Replace keyless control module. **If buzzer sounds three times on all three tests:** Go to Step 1 of symptom troubleshooting No.3. **If buzzer sounds combination of three and four times:** Replace transmitter.

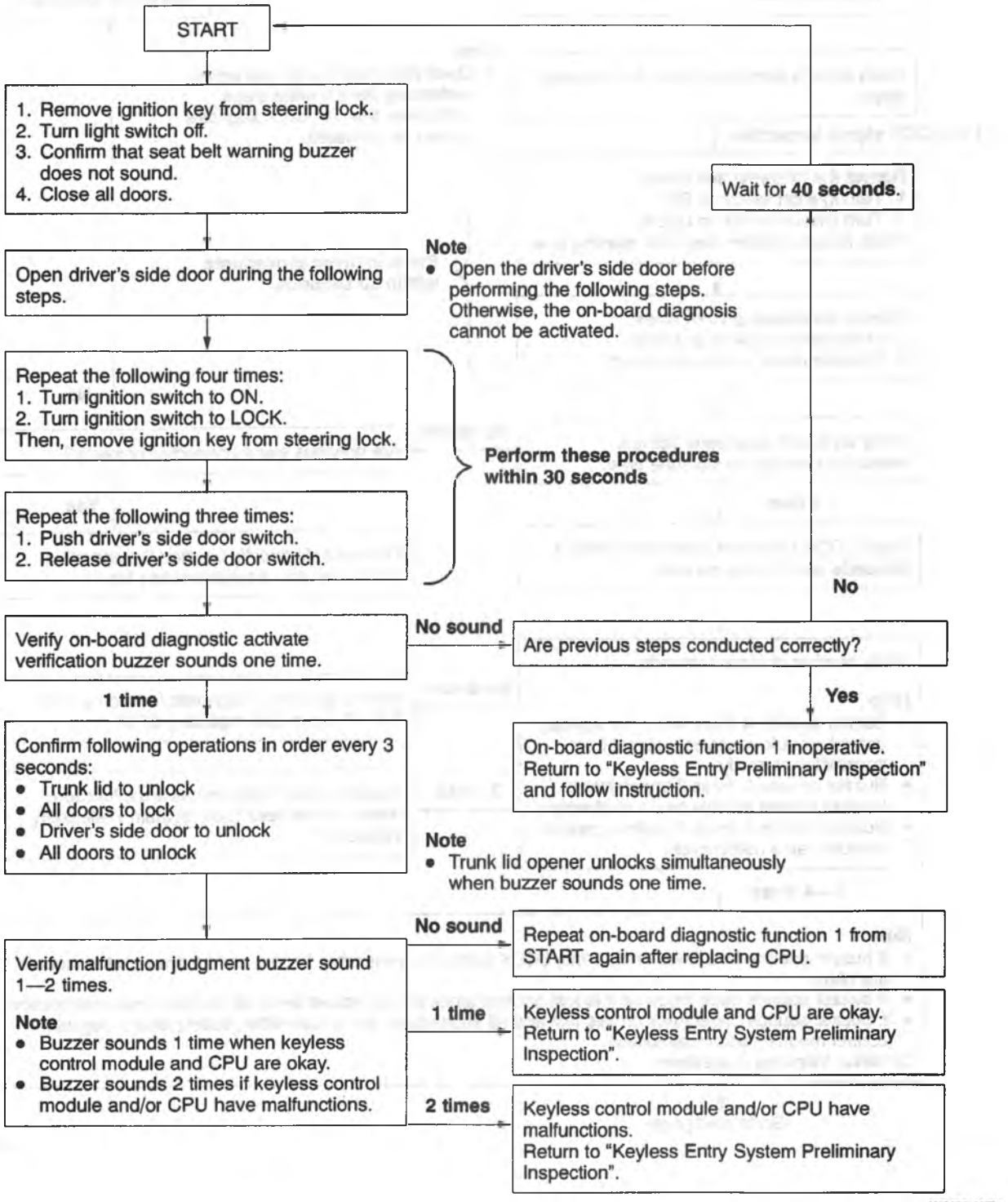
KEYLESS ENTRY SYSTEM ON-BOARD DIAGNOSTIC

Z6U090366000W04

- There are two functions for the keyless entry system on-board diagnostic (OBD). OBD function 1 tells the keyless control module and CPU to activate the power door lock and trunk lid opener systems without the transmitter. OBD function 2 monitors a keyless entry demand signal sent from the transmitter and used inside the keyless control module. OBD function 2 diagnoses the transmitter, integrated antenna and the keyless control module.

On-board Diagnostic Function 1

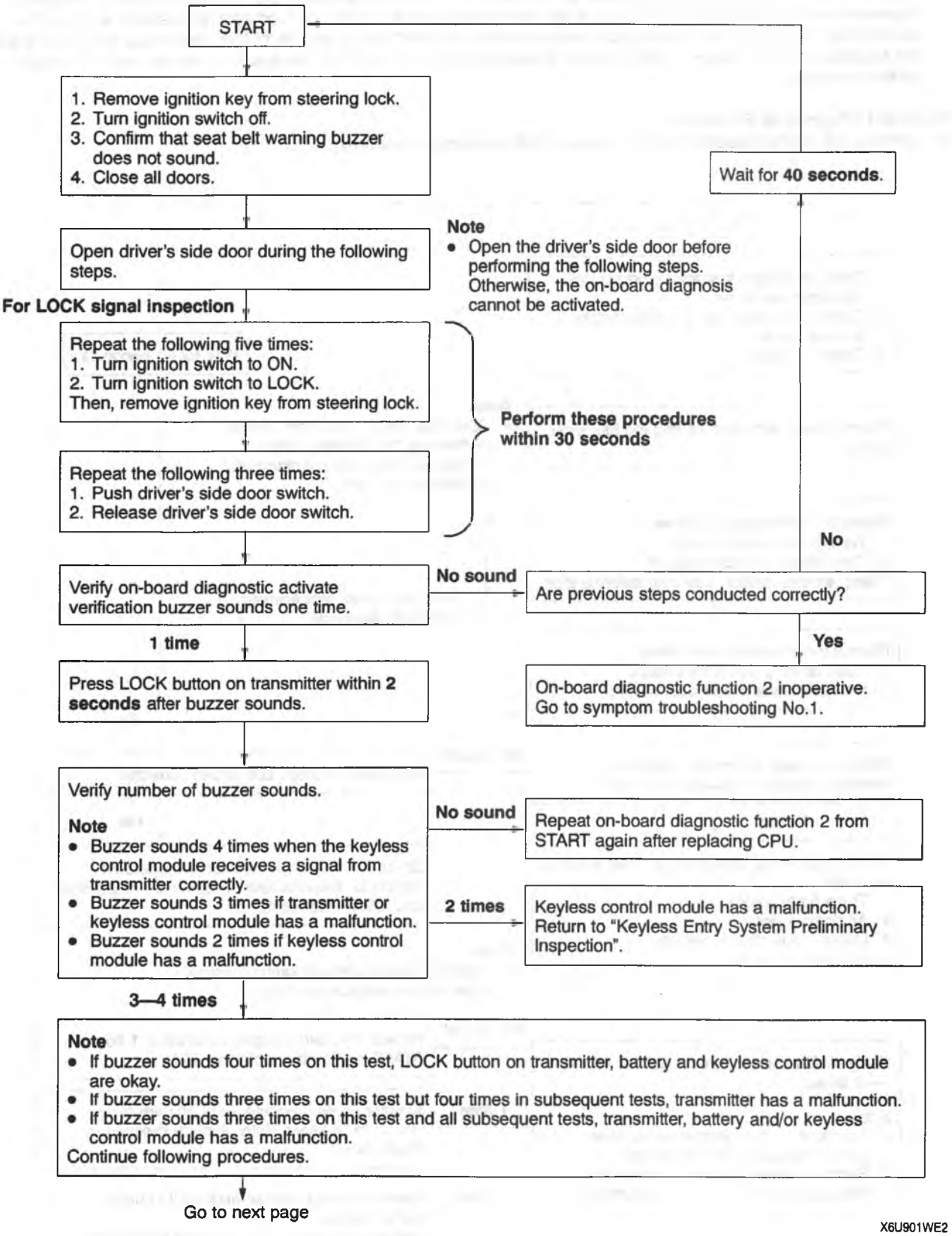
- Before performing troubleshooting, conduct the following procedure.



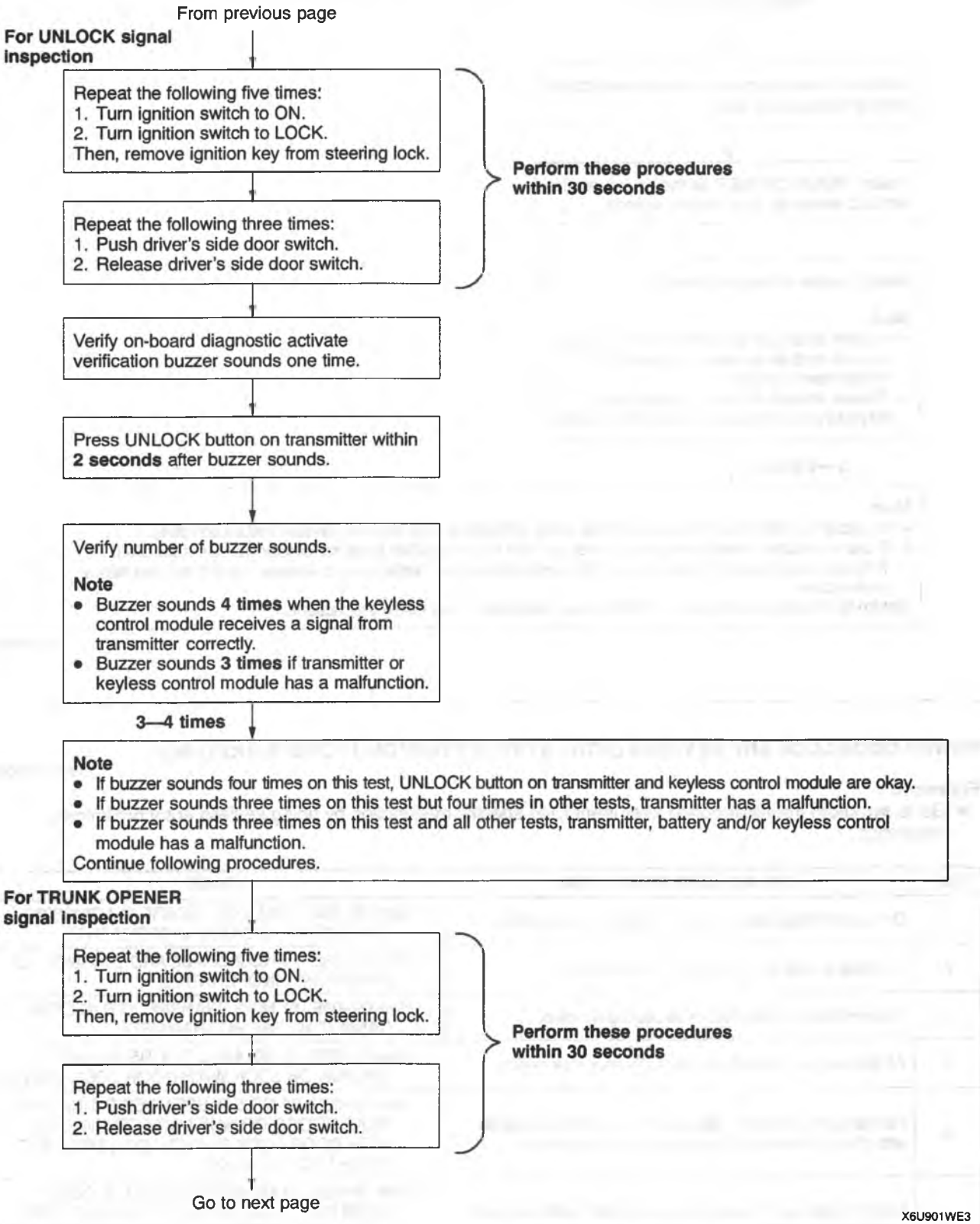
X6U901WE1

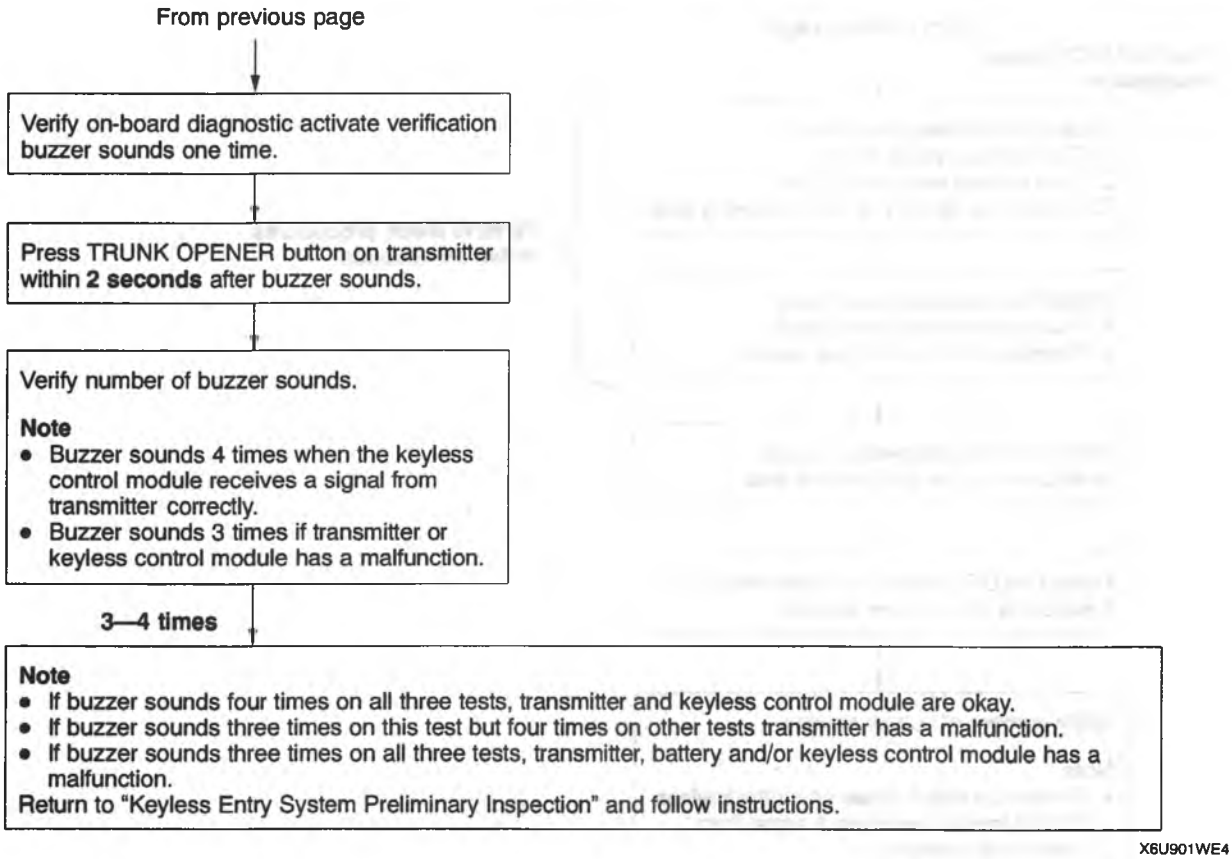
On-board Diagnostic Function 2

- Before performing troubleshooting, conduct the following procedure.



X6U901WE2


From previous page
For UNLOCK signal inspection
Repeat the following five times:
1. Turn ignition switch to ON.
2. Turn ignition switch to LOCK.
Then, remove ignition key from steering lock.
Repeat the following three times:
1. Push driver's side door switch.
2. Release driver's side door switch.
Perform these procedures within 30 seconds
Verify on-board diagnostic activate verification buzzer sounds one time.
Press UNLOCK button on transmitter within 2 seconds after buzzer sounds.
Verify number of buzzer sounds.
Note
• Buzzer sounds 4 times when the keyless control module receives a signal from transmitter correctly.
• Buzzer sounds 3 times if transmitter or keyless control module has a malfunction.
3—4 times
Note
• If buzzer sounds four times on this test, UNLOCK button on transmitter and keyless control module are okay.
• If buzzer sounds three times on this test but four times in other tests, transmitter has a malfunction.
• If buzzer sounds three times on this test and all other tests, transmitter, battery and/or keyless control module has a malfunction.
Continue following procedures.
For TRUNK OPENER signal inspection
Repeat the following five times:
1. Turn ignition switch to ON.
2. Turn ignition switch to LOCK.
Then, remove ignition key from steering lock.
Repeat the following three times:
1. Push driver's side door switch.
2. Release driver's side door switch.
Perform these procedures within 30 seconds
Go to next page
X6U901WE3



X6U901WE4

POWER DOOR LOCK AND KEYLESS ENTRY SYSTEM SYMPTOM TROUBLESHOOTING

Z6U090366000W05

Foreword

- Go to symptom troubleshooting after identifying specific malfunction by doing keyless entry preliminary inspection.

No.	TROUBLESHOOTING ITEM	PAGE
1	On-board diagnostic function 1 and/or 2 inoperative.	(See 09-03E-9 NO.1 ON-BOARD DIAGNOSTIC FUNCTION 1 AND/OR 2 INOPERATIVE)
2	On-board diagnostic function 1 inoperative.	(See 09-03E-16 NO.2 ON-BOARD DIAGNOSTIC FUNCTION 1 INOPERATIVE)
3	Transmitter ID code cannot be reprogrammed.	(See 09-03E-17 NO.3 TRANSMITTER ID CODE CANNOT BE REPROGRAMMED)
4	All doors do not unlock or lock with door lock switch.	(See 09-03E-18 NO.4 ALL DOORS DO NOT UNLOCK OR LOCK WITH DOOR LOCK SWITCH)
5	Passenger's side and rear doors do not lock or unlock with door lock switch (Driver's side door is okay).	(See 09-03E-21 NO.5 PASSENGER'S SIDE AND REAR DOORS DO NOT LOCK OR UNLOCK WITH DOOR LOCK SWITCH (DRIVER'S SIDE DOOR LOCK IS OKAY))
6	Driver's side door does not lock or unlock with door lock switch (Passenger's side and rear doors are okay).	(See 09-03E-22 NO.6 DRIVER'S SIDE DOOR DOES NOT LOCK OR UNLOCK WITH DOOR LOCK SWITCH (PASSENGER'S SIDE AND REAR SIDE POWER DOORS ARE OKAY))
7	Trunk lid opener does not unlock with trunk lid opener switch (Power door lock system is okay).	(See 09-03E-24 NO.7 TRUNK LID DOES NOT UNLOCK WITH TRUNK LID OPENER SWITCH (POWER DOOR LOCK SYSTEM IS OKAY))
8	Lock monitor function does not operate.	(See 09-03E-26 NO.8 LOCK MONITOR FUNCTION DOES NOT OPERATE)

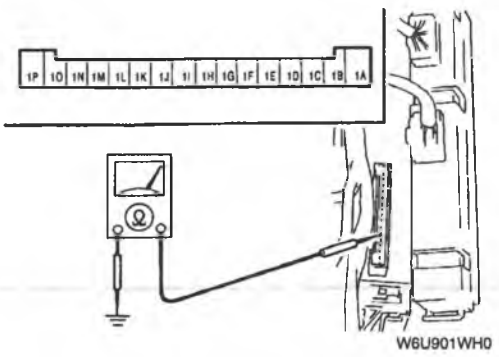
NO.1 ON-BOARD DIAGNOSTIC FUNCTION 1 AND/OR 2 INOPERATIVE

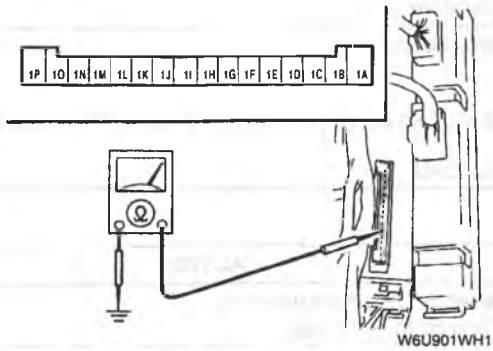
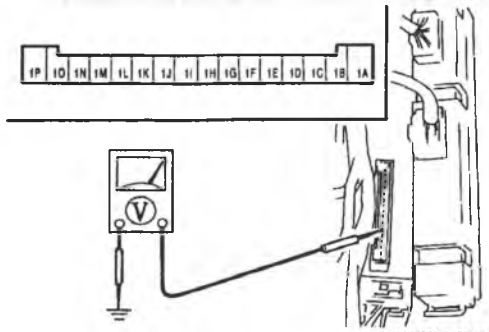
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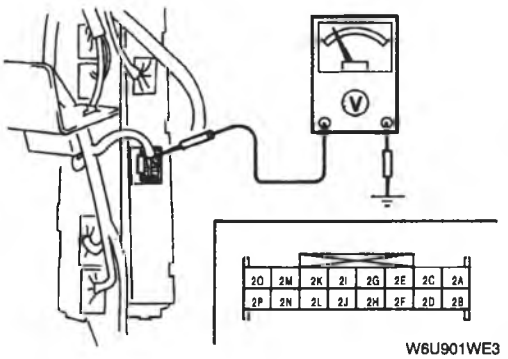
- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

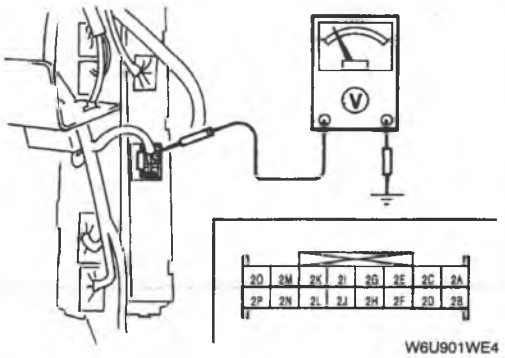
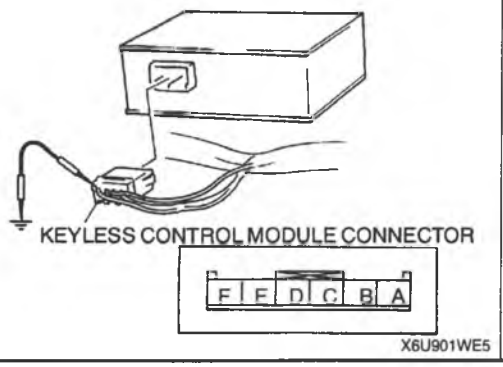
1	On-board diagnostic function 1 and/or 2 inoperative
POSSIBLE CAUSE	• Door switches and related wiring harness malfunctions • Keyless control module malfunction • CPU malfunction • Open or short circuit between keyless control module connector terminal E and CPU connector terminal 2O • Poor ground for keyless control module and/or CPU

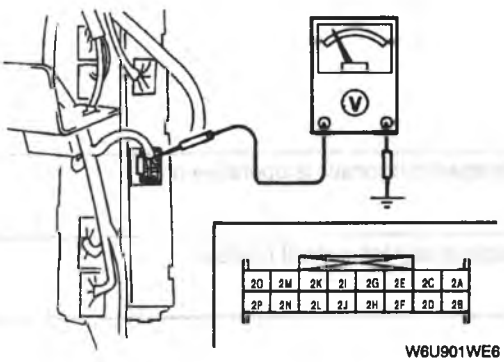
Diagnostic procedure

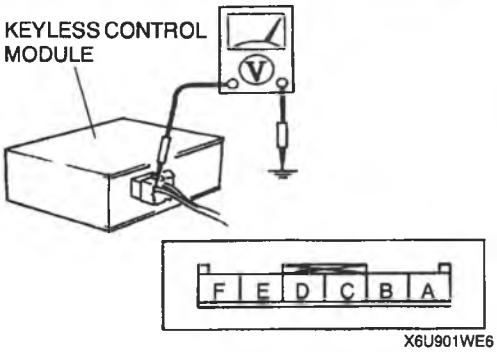
STEP	INSPECTION		ACTION
1	**INSPECT CPU INSTALLATION** • Is CPU installed to joint box securely?	Yes	Remove CPU from joint box. Then go to next step.
		No	Install CPU to joint box securely. Confirm on-board diagnostic function 1 activation.
2*	**INSPECT WIRING HARNESS BETWEEN JOINT BOX AND DRIVER'S SIDE DOOR SWITCH FOR CONTINUITY** • Turn ignition switch to off. • Open driver's side door only. • Make sure that passenger's side and rear doors are closed. • Check continuity between joint box terminal 1I and ground. • Is there continuity?  W6U901WH0	Yes	Go to next step.
		No	Check door switch. If door switch is okay, check for open circuit between joint box terminal 1I and driver's side door switch.
3*	**INSPECT WIRING HARNESS BETWEEN JOINT BOX AND EACH DOOR SWITCH FOR SHORT TO GROUND** • Push driver's side door switch. • Is there continuity between joint box terminal 1I and ground?	Yes	Check door switches. If door switches are okay, check for short to ground circuit between joint box terminal 1I and each door switch.
		No	Go to next step.

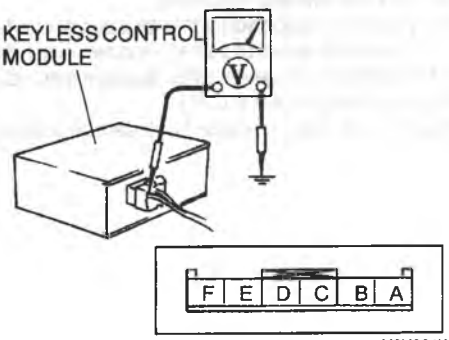
STEP	INSPECTION		ACTION
4*	**INSPECT WIRING HARNESS BETWEEN JOINT BOX AND GROUND FOR CONTINUITY** • Is there continuity between joint box terminal 1G and ground?  W6U901WH1	Yes	Go to next step.
		No	Repair ground.
5*	**INSPECT WIRING HARNESS BETWEEN FUSE PANEL AND JOINT BOX FOR CONTINUITY** • Measure voltage at joint box terminals 1C and 1J. **Terminal 1C: B+ (IG ON), 0 V (IG LOCK)** **Terminal 1J: B+ (constantly)** • Are voltages okay?  W6U901WH2	Yes	Turn ignition switch off and install CPU to joint box securely. If on-board diagnostic function 1 is inoperative, go to next step. If on-board diagnostic function 2 is inoperative, go to Step 7.
		No	Check ignition switch. If it is okay, check for open circuit between fuse panel and joint box terminal 1C or 1J.

STEP	INSPECTION		ACTION
6*	**INSPECT ON-BOARD DIAGNOSTIC FUNCTION 1 CONTROL OF CPU** ● Make sure that driver's side door is open. ● Connect volt-meter between CPU connector terminal 2O and ground. ● Perform following procedures **within 30 seconds**: 1. Repeat following four times: ● Turn ignition switch to ON. ● Turn ignition switch to LOCK. 2. Remove ignition key from steering lock. 3. Repeat following three times: ● Push driver's side door switch. ● Release driver's side door switch. ● Measure voltage at CPU connector terminal 2O. — **5 V (during performing the above procedures) → 0 V (until on-board diagnostic activate verification buzzer sounds)** ● Is voltage **0 V**?  W6U901WE3	Yes	Go to Step 8.
		No	Visually check for bents or other damage to CPU connector terminals. If terminals are okay, replace CPU.

STEP	INSPECTION		ACTION
7*	**INSPECT ON-BOARD DIAGNOSTIC FUNCTION 2 CONTROL OF CPU** • Make sure that driver's side door is opened. • Connect volt-meter between CPU connector terminal 2O and ground. • Perform following procedures **within 30 seconds**: 1. Repeat following five times: • Turn ignition switch to ON. • Turn ignition switch to LOCK. 2. Remove ignition key from steering lock. • Repeat following three times: • Push driver's side door switch. 3. Repeat following three times: • Push driver's side door switch. • Release driver's side door switch. • Measure voltage at CPU connector terminal 2O. — **5 V (during performing the above procedures) → 0 V (until on-board diagnostic activate verification buzzer sounds)** • Is voltage **0 V**?  W6U901WE4	Yes	Go to next step.
		No	Visually check for bents or other damage to CPU connector terminals. If terminals are okay, replace CPU.
8	**CHECK TO SEE WHETHER MALFUNCTION IS IN CPU OR ELSEWHERE** • Turn ignition switch to ON. • Connect jumper wire between CPU connector terminal 2O and ground. • Does buzzer sound?	Yes	Replace CPU.
		No	Disconnect keyless control module connector. Go to next step.
9*	**INSPECT WIRING HARNESS BETWEEN KEYLESS CONTROL MODULE AND GROUND** • Turn ignition switch to LOCK. • Is there continuity between keyless control module connector B terminal and ground?  KEYLESS CONTROL MODULE CONNECTOR F E D C B A X6U901WE5	Yes	Go to next step.
		No	Repair ground.

STEP	INSPECTION		ACTION
10*	**INSPECT WIRING HARNESS FOR CONTINUITY BETWEEN FUSE PANEL AND KEYLESS CONTROL MODULE** ● Connect keyless control module connector. ● Turn ignition switch to ON. ● Measure voltage at keyless control module connector terminal A. ● Is voltage **B+**?	Yes	If on-board diagnostic function 1 is inoperative, go to next step. If on-board diagnostic function 2 is inoperative, go to Step 12.
		No	Check for open circuit between fuse panel and keyless control module connector terminal A.
11*	**INSPECT WIRING HARNESS FOR CONTINUITY OR SHORTS BETWEEN KEYLESS CONTROL MODULE AND CPU** ● Make sure that driver's side door is opened. ● Connect keyless control module connector. ● Connect volt-meter between keyless control module connector terminal **E** and ground. ● Perform following procedures **within 30 seconds**: 1. Repeat following four times: ● Turn ignition switch to ON. ● Turn ignition switch to LOCK. 2. Remove ignition key from steering lock. 3. Repeat following three times: ● Push driver's side door switch. ● Release driver's side door switch. ● Measure voltage at keyless control module connector terminal E. — **5 V (while performing the above procedures) → 0 V (until on-board diagnostic activate verification buzzer sounds)** ● Is voltage **0 V**?  W6U901WE6	Yes	Go to Step 13.
		No	Visually check for bents or other damage to keyless control module connector terminals. Check for open or short circuit between keyless control module terminal E and CPU connector terminal 2O.

STEP	INSPECTION		ACTION
12*	**INSPECT WIRING HARNESS FOR CONTINUITY OR SHORTS BETWEEN KEYLESS CONTROL MODULE AND CPU** • Make sure that driver's side door is opened. • Connect keyless control module connector. • Connect volt-meter between keyless control module connector terminal E and ground. • Perform following procedures **within 30 seconds**: 1. Repeat following five times: • Turn ignition switch to ON. • Turn ignition switch to LOCK. 2. Remove ignition key from steering lock. 3. Repeat following three times: • Push driver's side door switch. • Release driver's side door switch. • Measure voltage at keyless control module connector terminal E. — **5 V (during performing the above procedures) → 0 V (until on-board diagnostic activate verification buzzer sounds)** • Is voltage **0 V**? 	Yes	Go to next step.
		No	Visually check for bents or other damage to keyless control module connector terminals. Check for open or short circuit between keyless control module terminal E and CPU connector terminal 2O.
13	**VERIFY THAT ON-BOARD DIAGNOSTIC FUNCTIONS 1 AND 2 ACTIVATE** • Attempt to activate on-board diagnostic function 1 or 2 again. • Does on-board diagnostic function 1 or 2 activate?	Yes	On-board diagnostic is operative now.
		No	Replace keyless control module.

STEP	INSPECTION		ACTION
14*	**CHECK TO SEE WHETHER MALFUNCTION IS IN CPU OR KEYLESS CONTROL MODULE** ● Make sure that driver's side door is opened. ● Connect volt-meter between keyless control module connector terminal E and ground. ● Perform following procedures **within 30 seconds**: 1. Repeat following four times: ● Turn ignition switch to ON. ● Turn ignition switch to LOCK. 2. Remove ignition key from steering lock. 3. Repeat following three times: ● Push driver's side door switch. ● Release driver's side door switch. ● Measure voltage at keyless control module connector terminal E. — **5 V → 0 V (while on-board diagnostic activate verification buzzer sounds)** — **5 V → 3.5 V (3 seconds later after buzzer sounded)** — **5 V → 1.7 V (6 and 9 seconds later after buzzer sounded)** ● Are voltages okay?  X6U901WE7	Yes	Verify buzzer sounds 1 time. If not, replace CPU.
		No	Replace keyless control module.

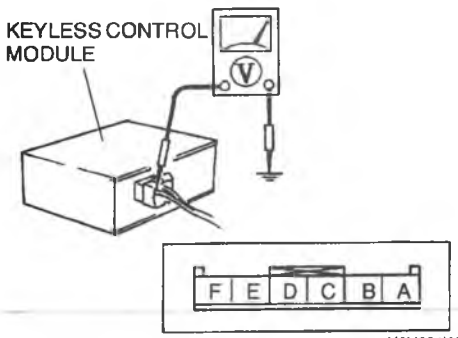
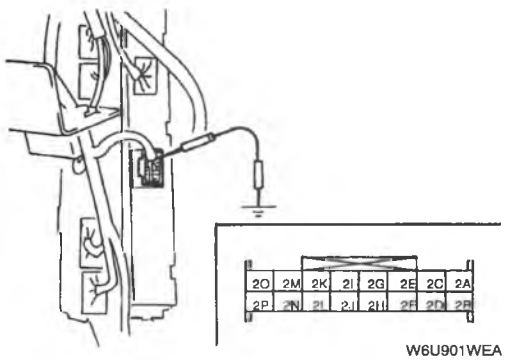
NO.2 ON-BOARD DIAGNOSTIC FUNCTION 1 INOPERATIVE

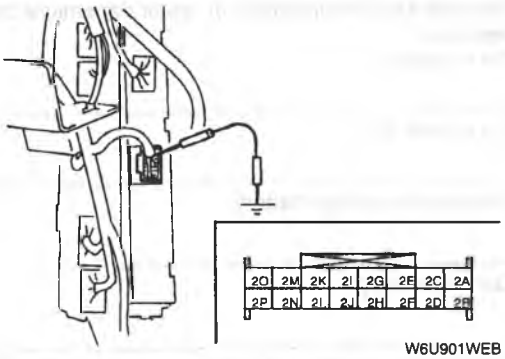
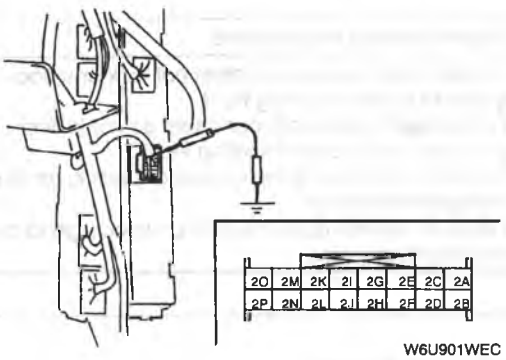
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- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

2	**On-board diagnostic function 1 inoperative.**
POSSIBLE CAUSE	• Keyless control module malfunction • CPU malfunction • Power door lock system malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1*	**VERIFY THAT MALFUNCTION JUDGMENT BUZZER SOUNDS FOR ON-BOARD DIAGNOSTIC FUNCTION 1** **Note** • Monitor voltage at keyless control module connector terminal E while performing on-board diagnostic function 1. • Did malfunction judgment buzzer in on-board diagnostic function 1 sound one time?  X6U901WE8	Yes	If driver's side door does not unlock, go to next step. If passenger's side and rear doors do not unlock, go to Step 3. If no doors lock, go to Step 4.
		No	Is voltage at keyless control module connector terminal E okay? • **0 V (during on-board diagnostic activate verification buzzer sounds)** • **3.5 V (after 3 seconds after buzzer sounded)** • **1.7 V (after 6 seconds after buzzer sounded)** • **1.7 V (after 9 seconds after buzzer sounded)** If voltage is okay, replace CPU. If voltage is not okay, replace keyless control module.
2	**VERIFY THAT DRIVER'S SIDE DOOR UNLOCKS** • Turn ignition switch to ON. • Connect jumper wire between CPU connector 2F terminal and ground. • Does driver's side door unlock?  W6U901WEA	Yes	Check CPU. (terminal 2F)
		No	Go to symptom troubleshooting No.6.

STEP	INSPECTION		ACTION
3	**VERIFY THAT PASSENGER'S SIDE AND REAR DOORS UNLOCK** • Turn ignition switch to ON. • Connect jumper wire between CPU connector 2H terminal and ground. • Do passenger's side and rear doors unlock?  W6U901WEB	Yes	Check CPU. (terminal 2H)
		No	Go to symptom troubleshooting No.5.
4	**VERIFY THAT ALL DOORS LOCK** • Turn ignition switch to ON. • Connect jumper wire between CPU connector 2B terminal and ground. • Do all doors lock?  W6U901WEC	Yes	Check CPU. (terminal 2B)
		No	Go to symptom troubleshooting No.4.

NO.3 TRANSMITTER ID CODE CANNOT BE REPROGRAMMED

Z6U090366000W08

3	**Transmitter ID code cannot be reprogrammed.**
POSSIBLE CAUSE	• Keyless control module malfunction • CPU malfunction • Transmitter and/or battery malfunction **Note** • If transmitter ID code cannot be reprogrammed, go to step 2. • For other symptoms, go to step 1.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**VERIFY THAT BUZZER SOUNDS FOR ON-BOARD DIAGNOSTIC FUNCTION 2** • Perform on-board diagnostic function 2. • Does buzzer sound four times on LOCK, UNLOCK, and TRUNK OPENER signal tests?	Yes	Attempt to change transmitter ID code. If transmitter ID code cannot be changed, go to next step.
		No	If buzzer sounds two times, replace keyless control module. If buzzer sounds three times on all three tests, go to Step 5. For different number of buzzer sounds, go to next step.

STEP	INSPECTION		ACTION
2	**INSPECT TRANSMITTER BATTERY INSTALLATION AND TYPE** • Visually inspect transmitter battery. • Are following items okay? — Transmitter battery installation (correct polarity) — Battery type (CR2025)	Yes	Go to next step.
		No	Set transmitter battery properly or replace with specified transmitter battery. (CR2025) Go to Step 6.
3	**INSPECT TRANSMITTER BATTERY TERMINALS FOR RUST AND POOR CONNECTIONS** • Visually inspect transmitter. • Is there rust on transmitter battery terminal or poor connection between battery terminal and battery?	Yes	Replace transmitter battery or repair transmitter battery terminal. Go to Step 6.
		No	Go to next step.
4	**CHECK TO SEE WHETHER MALFUNCTION IS IN TRANSMITTER BATTERY OR ELSEWHERE** • Replace known good transmitter battery. • Does keyless entry system operate properly?	Yes	Replace transmitter battery.
		No	Go to next step.
5	**CHECK TO SEE WHETHER MALFUNCTION IS IN TRANSMITTER OF KEYLESS CONTROL MODULE** • Change transmitter ID code by using another known good transmitter. • Does keyless entry system operate properly?	Yes	Replace transmitter and change transmitter ID code. Go to next step.
		No	Replace keyless control module and change transmitter ID code. Go to next step.
6	**CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT REOCCUR AFTER REPAIR** • Does keyless entry system operate properly?	Yes	Troubleshooting is completed.
		No	If power door lock system does not lock or unlock, go to symptom troubleshooting No.4. If passenger's side and rear doors do not lock or unlock, go to symptom troubleshooting No.5. If driver's side door does not lock or unlock, go to symptom troubleshooting No.6. If trunk lid opener does not lock or unlock, go to symptom troubleshooting No.7.

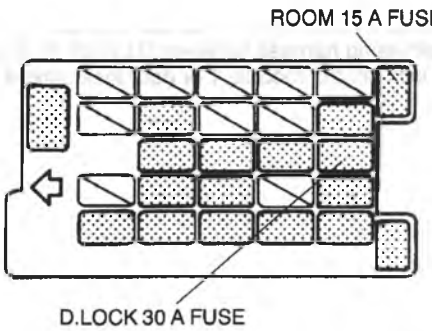
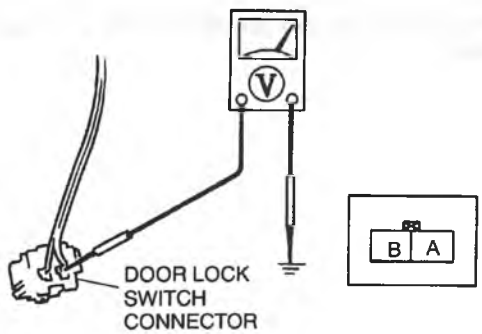
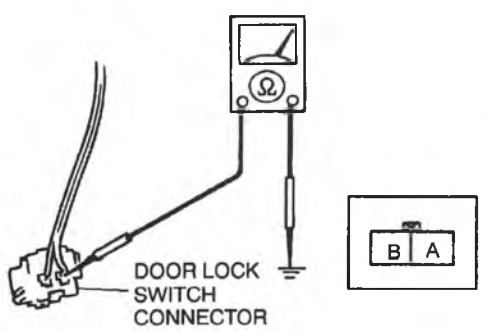
NO.4 ALL DOORS DO NOT UNLOCK OR LOCK WITH DOOR LOCK SWITCH

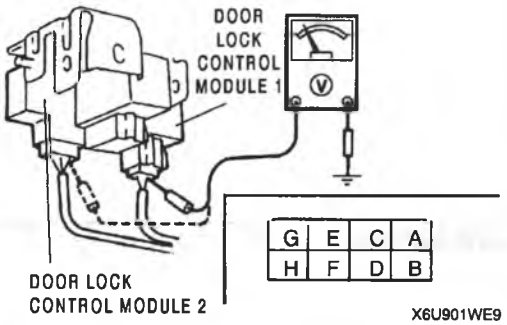
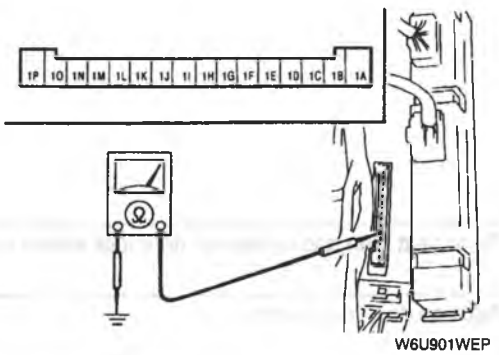
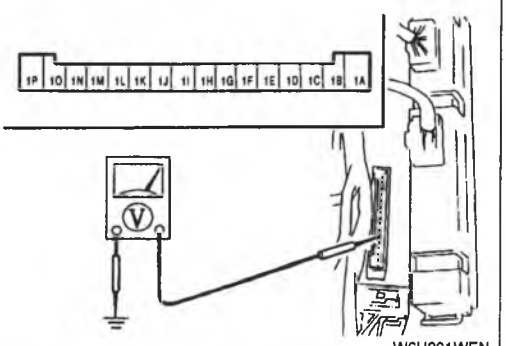
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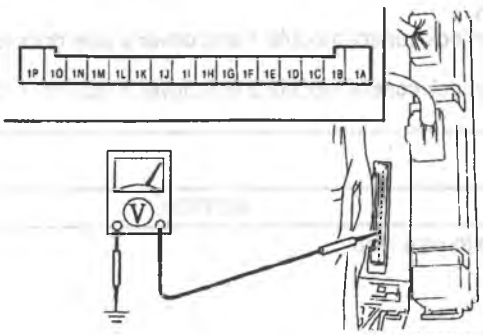
- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

4	**All doors do not unlock or lock with door lock switch.**
POSSIBLE CAUSE	• Malfunction in CPU power supply/ground circuit — ROOM 15 A fuse malfunction — CPU malfunction — Malfunction in wiring harness between ROOM 15 A fuse and CPU — Malfunction in wiring harness between CPU and ground • Malfunction in door lock control module 1 and door lock control module 2 power supply/ground circuit — D.LOCK 30 A fuse malfunction — Malfunction in wiring harness between D.LOCK 30 A fuse and door lock control module 1 or door lock control module 2 • Malfunction in power door lock system input signal circuit — CPU malfunction — Door lock switch malfunction — Malfunction in wiring harness between CPU and door lock switch — Malfunction in wiring harness between door lock switch and ground • Malfunction in power door lock system operation circuit — CPU malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT FUSES** • Are ROOM 15 A fuse and D.LOCK 30 A fuse okay?  W6U901WEJ	Yes	Go to next step.
		No	Repair wiring harness. Replace fuse.
2	**INSPECT WIRING HARNESS BETWEEN DOOR LOCK SWITCH POWER SUPPLY AND DOOR LOCK SWITCH FOR** • Remove driver's side front door trim. • Disconnect door lock switch connector. • Measure voltage at door lock switch connector terminal A? • Is voltage **5 V**?  W6U901WEK	Yes	Go to next step.
		No	Go to Step 6.
3	**INSPECT DOOR LOCK SWITCH** • Inspect door lock switch. (See 09-14-6 DOOR LOCK SWITCH INSPECTION) • Is door lock switch okay?	Yes	Go to next step and reconnect door lock switch connector.
		No	Replace door lock switch.
4	**VERIFY THAT DOOR LOCK SWITCH CONNECTOR TERMINAL B IS GROUNDED** • Check for continuity between terminal B at door lock switch connector and ground? • Is there continuity?  W6U901WEL	Yes	Go to next step.
		No	Repair wiring harness between door lock switch and ground.

STEP	INSPECTION		ACTION
5	**INSPECT WIRING HARNESS BETWEEN DOOR LOCK CONTROL MODULE 1 (OR 2) POWER SUPPLY AND DOOR LOCK CONTROL MODULE 1 (OR 2) FOR CONTINUITY** • Check for continuity between D.LOCK 30 A fuse and terminal C at door lock control module 1 connector and terminal C at door lock control module 2 connector? • Is there continuity? 	Yes	Check for open or short circuit between terminal D at door lock control module 1 and terminal B at door lock actuator. When there is continuity, replace CPU.
		No	Repair wiring harness between D.LOCK 30 A fuse and door lock control module 1 or door lock control module 2.
6	**INSPECT WIRING HARNESS BETWEEN CPU POWER SUPPLY AND CPU FOR CONTINUITY** • Remove driver's side front scuff plate. • Remove driver's side front side trim. • Remove nut fixed in joint box and remove CPU from joint box. • Measure voltage at joint box terminal 1J? • Is voltage **B+**? 	Yes	Go to next step.
		No	Repair wiring harness between ROOM 15 A fuse and CPU.
7	**VERIFY THAT JOINT BOX CONNECTOR TERMINAL 1G IS GROUNDED** • Check for continuity between terminal 1G at joint box and ground? • Is the continuity? 	Yes	Go to next step.
		No	Repair wiring harness between CPU and ground.

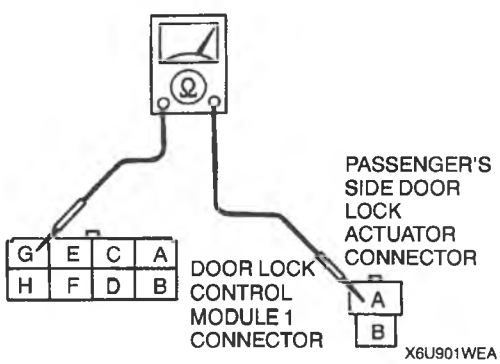
STEP	INSPECTION		ACTION
8	**VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN DOOR LOCK SWITCH AND CPU) OR CPU** • Measure voltage at joint box terminal 1K? • Is voltage **5 V**?  W6U901WEQ	Yes	Repair wiring harness between door lock switch and CPU.
		No	Replace CPU.

NO.5 PASSENGER'S SIDE AND REAR DOORS DO NOT LOCK OR UNLOCK WITH DOOR LOCK SWITCH (DRIVER'S SIDE DOOR LOCK IS OKAY)

Z6U090366000W10

5	**Passenger's side and rear doors do not lock or unlock with door lock switch (Driver's side door lock is okay).**
POSSIBLE CAUSE	• Malfunction in power door lock system operation circuit — Door lock control module 1 malfunction — Malfunction in wiring harness between door lock control module 1 and door lock actuator

Diagnostic procedure

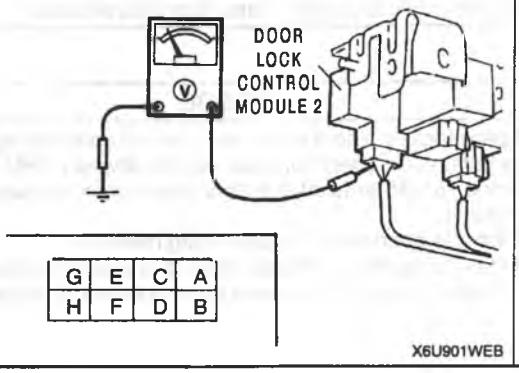
STEP	INSPECTION		ACTION
—	**VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN DOOR LOCK CONTROL MODULE 1 AND PASSENGER'S SIDE DOOR LOCK ACTUATOR) OR DOOR LOCK CONTROL MODULE 1 OR OPEN CIRCUIT (BETWEEN CPU AND DOOR LOCK CONTROL MODULE1)** • Remove passenger's side front door trim. • Partially peel off passenger's side door screen. • Check for continuity between terminal A at passenger's side door lock actuator connector and terminal G at door lock control module 1 connector? • Is there continuity?  X6U901WEA	Yes	If passenger's side and rear side power door lock systems do not unlock, check for open circuit between CPU connector 2H terminal and door lock control module 1E terminal. If there is open circuit, repair wiring harness. If there is continuity, replace door lock control module 1. For other symptoms, replace door lock control module 1.
		No	Repair wiring harness between door lock control module 1 and passenger's side door lock actuator.

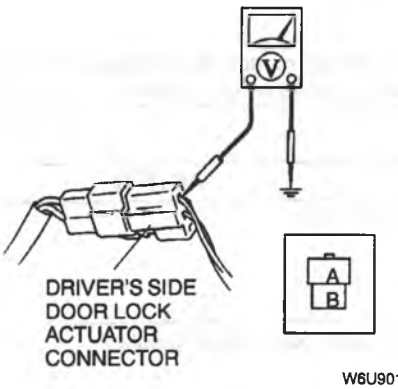
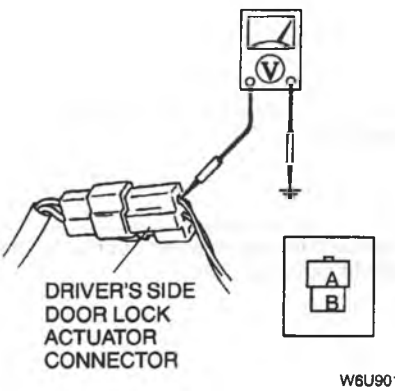
NO.6 DRIVER'S SIDE DOOR DOES NOT LOCK OR UNLOCK WITH DOOR LOCK SWITCH (PASSENGER'S SIDE AND REAR SIDE POWER DOORS ARE OKAY)

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6	**Driver's side door does not lock or unlock with door lock switch (Passenger's side and rear side power doors are okay).**
POSSIBLE CAUSE	• Malfunction in power door lock system operation circuit — Door lock control module 2 malfunction — Driver's side door lock actuator malfunction — Malfunction in wiring harness between door lock control module 1 and driver's side door lock actuator — Malfunction in wiring harness between door lock control module 2 and driver's side door lock actuator

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT DOOR LOCK CONTROL MODULE CONNECTOR TERMINAL G** **Note** • If driver's side door lock system does not unlock with transmitter only, replace CPU.	Yes	Go to next step.
	• Remove driver's side side panel. • Remove lower panel. • Is voltage at door lock control module 2 connector terminal G as follows? — Door lock switch to unlock: **0 V → B+ → 0 V** — Other: **0 V** 	No	Check door lock control module 2.

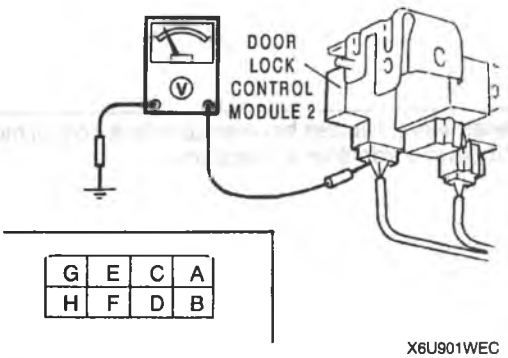
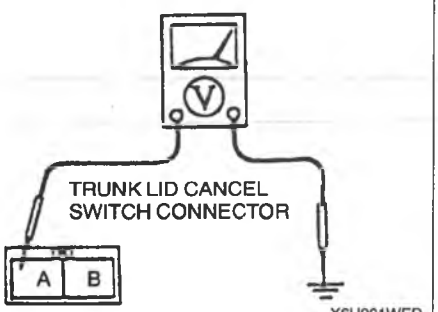
STEP	INSPECTION		ACTION
2	**INSPECT WIRING HARNESS BETWEEN DOOR LOCK CONTROL MODULE 2 AND DRIVER'S SIDE DOOR LOCK ACTUATOR** ● Remove driver's side door trim. ● Partially remove driver's side door screen. ● Is voltage at driver's side door lock actuator connector terminal A as follows? — Door lock switch to unlock: **0 V** → **B+** → **0 V** — Other: **0 V**  	Yes	Go to next step.
		No	Repair wiring harness between door lock control module 2 and driver's side door lock actuator.
3	**VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN DOOR LOCK CONTROL MODULE 1 AND DRIVER'S SIDE DOOR LOCK ACTUATOR) OR DOOR LOCK ACTUATOR** ● Is voltage at driver's side door lock actuator connector terminal B as follows? — Door lock switch to unlock: **0 V** → **B+** → **0 V** — Other: **0 V**  	Yes	Replace door lock actuator.
		No	Repair wiring harness between door lock control module 1 and driver's side door lock actuator.

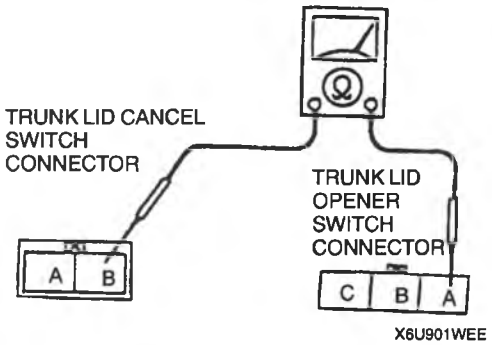
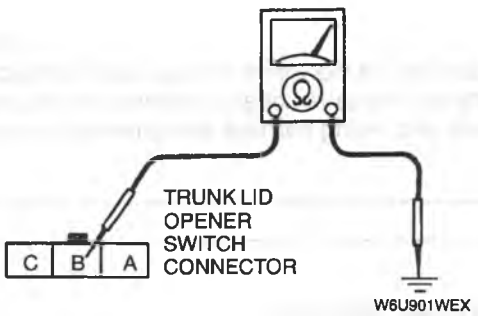
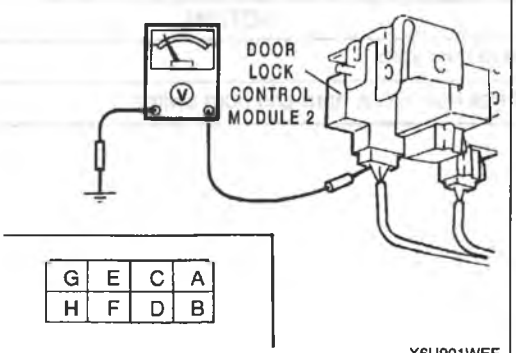
NO.7 TRUNK LID DOES NOT UNLOCK WITH TRUNK LID OPENER SWITCH (POWER DOOR LOCK SYSTEM IS OKAY)

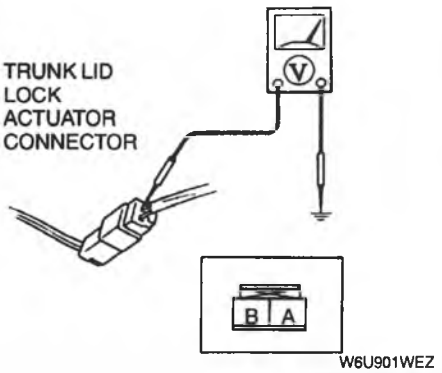
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7	Trunk lid does not unlock with trunk lid opener switch (Power door lock system is okay).
POSSIBLE CAUSE	● Malfunction in trunk lid unlock system input signal circuit — Door lock control module 2 malfunction — Trunk lid cancel switch malfunction — Trunk lid opener switch malfunction — Malfunction in wiring harness between door lock control module 2 and trunk lid cancel switch — Malfunction in wiring harness between trunk lid cancel switch and trunk lid opener switch — Malfunction in wiring harness between trunk lid opener switch and ground ● Malfunction in trunk lid lock actuator operation circuit — Trunk lid lock actuator malfunction — Door lock control module 2 malfunction — Malfunction in wiring harness between door lock control module 2 and trunk lid lock actuator — Malfunction in wiring harness between trunk lid lock actuator and ground

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT DOOR LOCK CONTROL MODULE 2** ● Remove driver's side side panel. ● Remove lower panel. ● Measure voltage at door lock control module 2 connector terminal B with trunk lid opener switch at neutral? ● Is voltage **B**+?  X6U901WEC	Yes	Go to next step.
		No	Replace door lock control module 2.
2	**INSPECT WIRING HARNESS BETWEEN DOOR LOCK CONTROL MODULE 2 AND TRUNK LID CANCEL SWITCH** ● Remove trunk lid cancel switch. ● Measure voltage at trunk lid cancel switch connector terminal A. ● Is voltage **B**+?  X6U901WED	Yes	Go to next step.
		No	Repair wiring harness between door lock control module 2 and trunk lid cancel switch.
3	**INSPECT TRUNK LID CANCEL SWITCH** ● Inspect trunk lid cancel switch. (See 09-14-26 TRUNK LID CANCEL SWITCH INSPECTION) ● Is trunk lid cancel switch okay?	Yes	Go to next step.
		No	Replace trunk lid cancel switch.

STEP	INSPECTION		ACTION
4	**INSPECT WIRING HARNESS BETWEEN TRUNK LID CANCEL SWITCH AND TRUNK LID OPENER SWITCH** • Check for continuity between terminal B at trunk lid cancel switch and terminal A at trunk lid opener switch. • Is there continuity?  X6U901WEE	Yes	Go to next step.
		No	Repair wiring harness between trunk lid cancel switch and trunk lid opener switch.
5	**INSPECT TRUNK LID OPENER SWITCH** • Inspect trunk lid opener switch. (See 09-14-25 TRUNK LID OPENER SWITCH INSPECTION) • Is trunk lid opener switch okay?	Yes	Go to next step.
		No	Replace trunk lid opener switch.
6	**VERIFY THAT TRUNK LID OPENER SWITCH CONNECTOR TERMINAL B IS GROUNDED** • Check for continuity between terminal B at trunk lid opener switch connector and ground? • Is there continuity?  W6U901WEX	Yes	Go to next step.
		No	Repair wiring harness between trunk lid opener switch and ground.
7	**INSPECT DOOR LOCK CONTROL MODULE CONNECTOR TERMINAL D** • Is voltage at door lock control module 2 connector terminal D as follows? — Trunk lid opener switch in unlock position: **0 V → B+ → 0 V** — Other: **0 V**  X6U901WEF	Yes	Go to next step.
		No	Replace door lock control module 2.

STEP	INSPECTION		ACTION
8	**INSPECT WIRING HARNESS BETWEEN DOOR LOCK CONTROL MODULE 2 AND TRUNK LID LOCK ACTUATOR** • Is voltage at trunk lid lock actuator connector terminal A as follows? — Trunk opener switch in unlock position: **0 V → B+ → 0 V** — Other: **0 V**  W6U901WEZ	Yes	Go to next step.
		No	Repair wiring harness between door lock control module 2 and trunk lid lock actuator.
9	**VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN TRUNK LID LOCK ACTUATOR AND GROUND) OR TRUNK LID LOCK ACTUATOR** • Inspect trunk lid lock actuator. (See 09-14-24 TRUNK LID LOCK ACTUATOR INSPECTION) • Is trunk lid lock actuator okay?	Yes	Repair wiring harness between trunk lid lock actuator and ground.
		No	Replace trunk lid lock actuator.

NO.8 LOCK MONITOR FUNCTION DOES NOT OPERATE

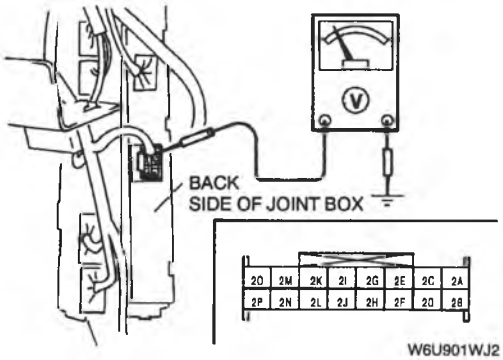
Z6U090366000W13

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

8	**Lock monitor function does not operate.**
POSSIBLE CAUSE	• CPU malfunction • Horn system malfunction • Open circuit between CPU connector terminal 2A and horn relay **Note** • Horn sounds once as a part of door lock monitor function system when lock button on transmitter is depressed two times within **approximately 5 seconds**.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT HORN SYSTEM** • Does horn sound when depressing horn switch on vehicle?	Yes	Go to next step.
		No	Check horn relay, horn and horn switch.

STEP	INSPECTION		ACTION
2*	**CHECK TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY BETWEEN CPU AND HORN RELAY) IS IN CPU OR WIRING HARNESS** ● Measure voltage at CPU connector terminal 2A after depressing lock button on transmitter two times **within 5 seconds**. ● Is voltage okay? **— 12 V → 0 V → 12 V** 	Yes	Check for open circuit between CPU connector terminal 2A and horn relay.
		No	Replace CPU.

09-03G SYMPTOM TROUBLESHOOTING [THEFT-DETERRENT (KEYLESS ENTRY SECURITY) SYSTEM]

FOREWORD [THEFT-DETERRENT (KEYLESS ENTRY SECURITY) SYSTEM] 09-03G-1
TROUBLESHOOTING INDEX [THEFT-DETERRENT (KEYLESS ENTRY SECURITY) SYSTEM] 09-03G-1
NO.1 SECURITY LIGHT DOES NOT FLASH AT 3 SECOND INTERVAL AFTER VEHICLE IS ARMED 09-03G-2
NO.2 SECURITY LIGHT DOES NOT FLASH AT 0.3 SECOND INTERVAL WHEN ANY DOOR IS OPENED WITHOUT USING TRANSMITTER AFTER VEHICLE IS ARMED 09-03G-4
NO.3 HORN DOES NOT SOUND BUT OTHER WARNINGS (HEADLIGHT AND TURN LIGHT) ARE OKAY WHILE ALARM OPERATES ... 09-03G-5
NO.4 HEADLIGHT DOES NOT FLASH BUT OTHER WARNINGS (HORN AND TURN LIGHT) ARE OKAY WHILE ALARM OPERATES ... 09-03G-5
NO.5 TURN LIGHT DOES NOT FLASH BUT OTHER WARNINGS (HORN AND HEADLIGHT) ARE OKAY WHILE ALARM OPERATES ... 09-03G-6
NO.6 ALARM DOES NOT STOP WHEN DOOR IS UNLOCKED BY TRANSMITTER WHILE ALARM OPERATES 09-03G-6
NO.7 ALARM DOES NOT STOP WHEN TRUNK LID IS UNLOCKED BY TRANSMITTER WHILE ALARM OPERATES 09-03G-7
NO.8 ALARM DOES NOT STOP WHEN TRUNK LID IS UNLOCKED WITH KEY WHILE ALARM OPERATES 09-03G-7
NO.9 ALARM DOES NOT STOP WHEN TURN KEY TO ON WHILE ALARM OPERATES .. 09-03G-8
NO.10 ALARM DOES NOT CONTINUE FOR 2.5 MINUTES 09-03G-9
NO.11 ALARM DOES NOT STOP AFTER 2.5 MINUTES 09-03G-9

FOREWORD [THEFT-DETERRENT (KEYLESS ENTRY SECURITY) SYSTEM]

Z6U090350000W01

- Thoroughly read and understand the basic flow of troubleshooting in order to properly perform the procedures. (See 00-00-2 HOW TO USE THIS MANUAL.)

TROUBLESHOOTING INDEX [THEFT-DETERRENT (KEYLESS ENTRY SECURITY) SYSTEM]

Z6U090350000W02

No.	TROUBLESHOOTING ITEM	PAGE
1	Security light does not flash at 3 second interval after vehicle is armed.	(See 09-03G-2 NO.1 SECURITY LIGHT DOES NOT FLASH AT 3 SECOND INTERVAL AFTER VEHICLE IS ARMED)
2	Security light does not flash at 0.3 second interval when any door is opened without using transmitter after vehicle is armed.	(See 09-03G-4 NO.2 SECURITY LIGHT DOES NOT FLASH AT 0.3 SECOND INTERVAL WHEN ANY DOOR IS OPENED WITHOUT USING TRANSMITTER AFTER VEHICLE IS ARMED)
3	Horn does not sound but other warnings (headlight and turn light) are okay while alarm operates.	(See 09-03G-5 NO.3 HORN DOES NOT SOUND BUT OTHER WARNINGS (HEADLIGHT AND TURN LIGHT) ARE OKAY WHILE ALARM OPERATES)
4	Headlight does not flash but other warnings (horn and turn light) are okay while alarm operates.	(See 09-03G-5 NO.4 HEADLIGHT DOES NOT FLASH BUT OTHER WARNINGS (HORN AND TURN LIGHT) ARE OKAY WHILE ALARM OPERATES)
5	Turn light does not flash but other warnings (horn and headlight) are okay while alarm operates.	(See 09-03G-6 NO.5 TURN LIGHT DOES NOT FLASH BUT OTHER WARNINGS (HORN AND HEADLIGHT) ARE OKAY WHILE ALARM OPERATES)
6	Alarm does not stop when door is unlocked by transmitter while alarm operates.	(See 09-03G-6 NO.6 ALARM DOES NOT STOP WHEN DOOR IS UNLOCKED BY TRANSMITTER WHILE ALARM OPERATES)
7	Alarm does not stop when trunk lid is unlocked by transmitter while alarm operates.	(See 09-03G-7 NO.7 ALARM DOES NOT STOP WHEN TRUNK LID IS UNLOCKED BY TRANSMITTER WHILE ALARM OPERATES)
8	Alarm does not stop when trunk lid is unlocked with key while alarm operates.	(See 09-03G-7 NO.8 ALARM DOES NOT STOP WHEN TRUNK LID IS UNLOCKED WITH KEY WHILE ALARM OPERATES)

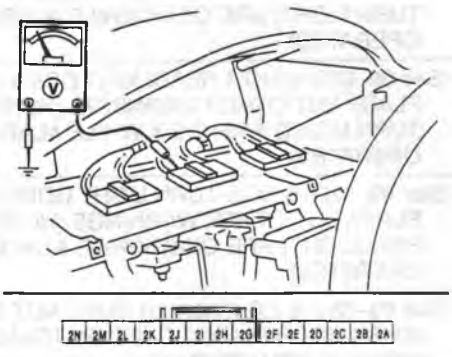
No.	TROUBLESHOOTING ITEM	PAGE
9	Alarm does not stop when turn key to ON while alarm operates.	(See 09-03G-8 NO.9 ALARM DOES NOT STOP WHEN TURN KEY TO ON WHILE ALARM OPERATES)
10	Alarm does not continue for 2.5 minutes.	(See 09-03G-9 NO.10 ALARM DOES NOT CONTINUE FOR 2.5 MINUTES)
11	Alarm does not stop after 2.5 minutes.	(See 09-03G-9 NO.11 ALARM DOES NOT STOP AFTER 2.5 MINUTES)

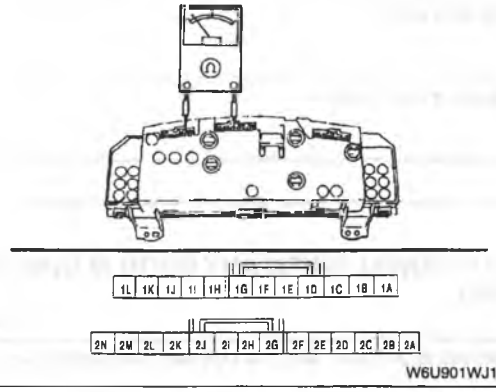
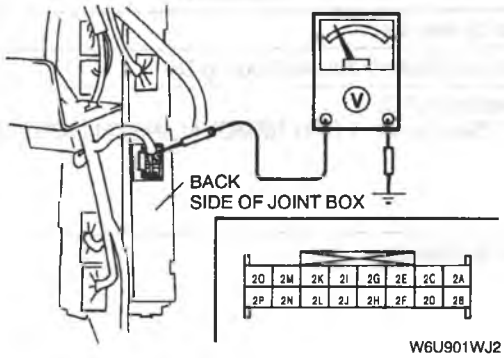
NO.1 SECURITY LIGHT DOES NOT FLASH AT 3 SECOND INTERVAL AFTER VEHICLE IS ARMED

Z6U090350000W03

1	Security light does not flash at 3 second interval after vehicle is armed
POSSIBLE CAUSE	• Malfunction in theft-deterrent system input signal circuit — Key reminder switch malfunction — CPU malfunction — Door switch malfunction — Trunk compartment light switch malfunction — Trunk key cylinder switch malfunction — Hood switch malfunction • Malfunction in theft-deterrent system operation circuit — Security light bulb malfunction — Print plate No.1 malfunction — CPU malfunction — Malfunction in wiring harness between ROOM 15 A fuse and instrument cluster — Malfunction in wiring harness between instrument cluster and CPU

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Are following power door lock systems okay? — Keyless entry system — Power door lock one-touch system — Trunk lid unlocked with trunk lid opener switch	Yes	Go to next step.
		No	Go to symptom troubleshooting of power door lock system. (See 09-03A-1 FOREWORD [POWER WINDOW SYSTEM])
2	**INSPECT POWER SUPPLY CIRCUIT OF INSTRUMENT CLUSTER** • Remove meter hood. • Remove instrument cluster. • Measure voltage at instrument cluster connector terminal 2K. • Is voltage **B**+?  W6U901WJ0	Yes	Go to next step.
		No	Repair wiring harness between ROOM 15 A fuse and instrument cluster.
3	**INSPECT BULB** • Remove security light bulb from instrument cluster. • Inspect security light bulb. • Is security light bulb okay?	Yes	Go to next step after installing security light bulb to instrument cluster.
		No	Replace security light bulb.

STEP	INSPECTION		ACTION
4	**INSPECT INSTRUMENT CLUSTER INNER CIRCUIT** ● Check for continuity between terminals 1D and 2K at instrument cluster connectors. ● Is there continuity?  W6U901WJ1	Yes	Go to next step after installing instrument cluster.
		No	Replace print plate No.1. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
5	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND CPU** ● Remove driver's side front scuff plate. ● Remove driver's side front side trim. ● Remove nut fixed in joint box. ● Measure voltage at terminal 2C at CPU connector B. ● Is voltage **B**+?  W6U901WJ2	Yes	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION)
		No	Repair wiring harness between instrument cluster and CPU.
6	**INSPECT KEY REMINDER SWITCH** ● Remove column cover. ● Inspect key reminder switch. (See 09-21-2 KEY REMINDER SWITCH INSPECTION) ● Is key reminder switch okay?	Yes	Go to next step.
		No	Replace key reminder switch. (See 06-12-5 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION)
7	**INSPECT TRUNK COMPARTMENT LIGHT SWITCH** ● Disconnect trunk compartment light switch connector. ● Inspect trunk compartment light switch. (See 09-18-14 TRUNK COMPARTMENT LIGHT SWITCH INSPECTION) ● Is trunk compartment light switch okay?	Yes	Go to next step.
		No	Replace trunk lid lock. (See 09-14-24 TRUNK LID LOCK AND OPENER REMOVAL/INSTALLATION)
8	**INSPECT DOOR SWITCH** ● Remove door switches. ● Inspect door switches. (See 09-18-14 DOOR SWITCH INSPECTION) ● Are door switches okay?	Yes	Go to next step.
		No	Replace door switch. (See 09-18-13 DOOR SWITCH REMOVAL/INSTALLATION)

STEP	INSPECTION		ACTION
9	**INSPECT TRUNK KEY CYLINDER SWITCH** • Remove rear finisher. • Inspect trunk key cylinder switch. (See 09-14-23 TRUNK KEY CYLINDER SWITCH INSPECTION) • Is trunk key cylinder switch okay?	Yes	Go to next step.
		No	Replace trunk key cylinder. (See 09-14-24 TRUNK LID LOCK AND OPENER REMOVAL/INSTALLATION)
10	**INSPECT HOOD SWITCH** • Open hood. • Inspect hood switch. (See 09-14-23 HOOD SWITCH INSPECTION) • Is hood switch okay?	Yes	Replace CPU.
		No	Replace hood switch.

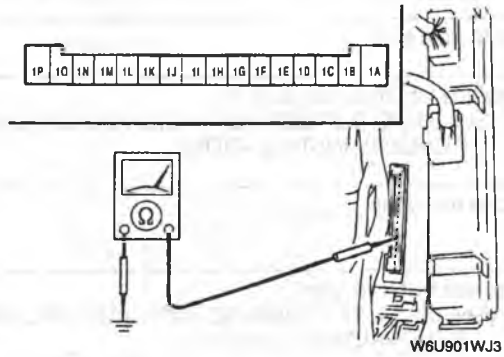
NO.2 SECURITY LIGHT DOES NOT FLASH AT 0.3 SECOND INTERVAL WHEN ANY DOOR IS OPENED WITHOUT USING TRANSMITTER AFTER VEHICLE IS ARMED

Z6U090350000W04

2	**Security light does not flash at 0.3 second interval when any door is opened without using transmitter after vehicle is armed**
POSSIBLE CAUSE	• Malfunction in theft-deterrent system input signal circuit — CPU malfunction — Door switch malfunction — Malfunction in poor installed door switch — Malfunction in wiring harness between door switch and CPU

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Does security light flash at 3 seconds interval after vehicle is armed?	Yes	Go to next step.
		No	Go to symptom troubleshooting No.1.
2	**INSPECT JOINT BOX** • Remove driver's side front scuff plate. • Remove driver's side front side trim. • Remove nut fixed in joint box and remove CPU from joint box. • Open any door. • Check for continuity between terminal 1I at joint box and ground. • Is there continuity?	Yes	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION)
		No	Go to next step.
3	**INSPECT DOOR SWITCH** • Remove door switch. • Inspect door switch. (See 09-18-14 DOOR SWITCH INSPECTION) • Is door switch okay?	Yes	Go to next step.
		No	Replace door switch. (See 09-18-13 DOOR SWITCH REMOVAL/INSTALLATION)
4	• Is door switch installed securely?	Yes	Repair wiring harness between door switch and CPU.
		No	Install door switch securely.



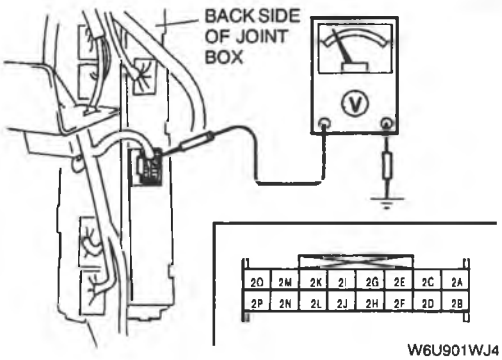
W6U901WJ3

NO.3 HORN DOES NOT SOUND BUT OTHER WARNINGS (HEADLIGHT AND TURN LIGHT) ARE OKAY WHILE ALARM OPERATES

Z6U090350000W05

3	Horn does not sound but other warnings (headlight and turn light) are okay while alarm operates
POSSIBLE CAUSE	• Malfunction in theft-deterrent system operation circuit — CPU malfunction — Malfunction in wiring harness between horn relay and CPU

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Do horns sound with horn switch on?	Yes	Go to next step.
		No	Inspect horn circuit.
2	**INSPECT WIRING HARNESS BETWEEN HORN RELAY AND CPU** • Remove driver's side front scuff plate. • Remove driver's side front side trim. • Remove nut fixed in joint box. • Measure voltage at terminal 2A at CPU connector with horn switch OFF. • Is voltage **B+**?  W6U901WJ4	Yes	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION)
		No	Repair wiring harness between horn relay and CPU.

NO.4 HEADLIGHT DOES NOT FLASH BUT OTHER WARNINGS (HORN AND TURN LIGHT) ARE OKAY WHILE ALARM OPERATES

Z6U090350000W06

4	Headlight does not flash but other warnings (horn and turn light) are okay while alarm operates
POSSIBLE CAUSE	• Malfunction in theft-deterrent system operation circuit — CPU malfunction

Diagnostic procedure

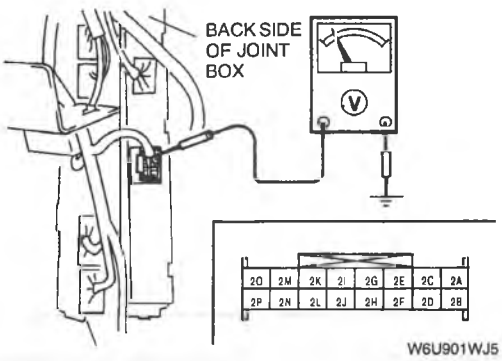
STEP	ACTION
—	Go to symptom troubleshooting of exterior lighting system. (See 09-03J-1 FOREWORD [EXTERIOR LIGHTING SYSTEM])

NO.5 TURN LIGHT DOES NOT FLASH BUT OTHER WARNINGS (HORN AND HEADLIGHT) ARE OKAY WHILE ALARM OPERATES

Z6U090350000W07

5	Turn light does not flash but other warnings (horn and headlight) are okay while alarm operates
POSSIBLE CAUSE	• Malfunction in theft-deterrent system operation circuit — CPU malfunction — Malfunction in wiring harness between flasher control module and CPU

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Do turn lights flash when hazard warning switch is ON?	Yes	Go to next step.
		No	Go to symptom troubleshooting of signal lighting system. (See 09-03J-1 FOREWORD [EXTERIOR LIGHTING SYSTEM])
2	**INSPECT WIRING HARNESS BETWEEN FLASHER CONTROL MODULE AND CPU** • Remove driver's side front scuff plate. • Remove driver's side front side trim. • Remove nut fixed in joint box. • Measure voltage at terminal 2E at CPU connector with hazard warning switch OFF. • Is voltage **B**+? 	Yes	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION)
		No	Repair wiring harness between flasher control module and CPU.

NO.6 ALARM DOES NOT STOP WHEN DOOR IS UNLOCKED BY TRANSMITTER WHILE ALARM OPERATES

Z6U090350000W08

6	Alarm does not stop when door is unlocked by transmitter while alarm operates
POSSIBLE CAUSE	• Malfunction in theft-deterrent system operation circuit — CPU malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
—	• Was door unlocked by transmitter?	Yes	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION)
		No	Go to symptom troubleshooting of power door lock system. (See 09-03A-1 FOREWORD [POWER WINDOW SYSTEM])

NO.7 ALARM DOES NOT STOP WHEN TRUNK LID IS UNLOCKED BY TRANSMITTER WHILE ALARM OPERATES

Z6U090350000W09

7	Alarm does not stop when trunk lid is unlocked by transmitter while alarm operates
POSSIBLE CAUSE	• Malfunction in theft-deterrent system operation circuit — CPU malfunction

Diagnostic procedure

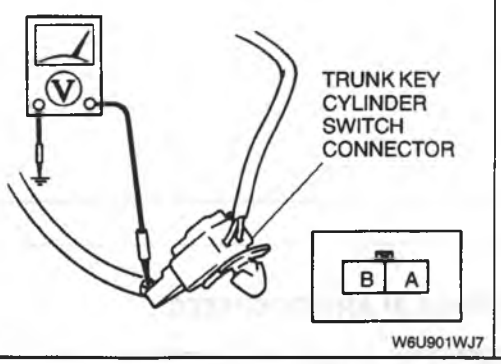
STEP	INSPECTION		ACTION
—	• Was trunk lid unlocked by transmitter?	Yes	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION)
		No	Go to symptom troubleshooting of power door lock system. (See 09-03A-1 FOREWORD [POWER WINDOW SYSTEM])

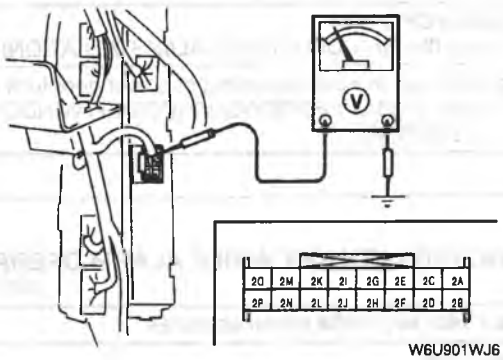
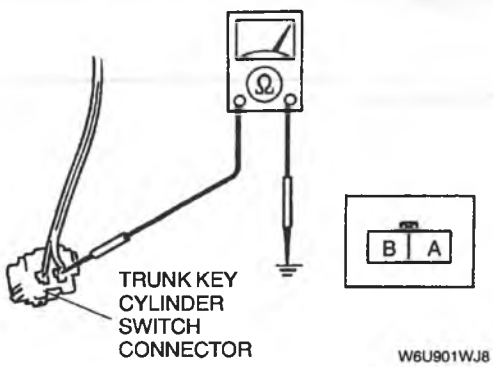
NO.8 ALARM DOES NOT STOP WHEN TRUNK LID IS UNLOCKED WITH KEY WHILE ALARM OPERATES

Z6U090350000W10

8	Alarm does not stop when trunk lid is unlocked with key while alarm operates
POSSIBLE CAUSE	• Malfunction in theft-deterrent system operation circuit — CPU malfunction — Trunk key cylinder switch malfunction — Malfunction in wiring harness between CPU and trunk key cylinder switch — Malfunction in wiring harness between trunk key cylinder switch and ground

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT SIGNAL OF TRUNK KEY CYLINDER SWITCH** • Measure voltage at terminal A at trunk key cylinder switch connector of wiring harness. • Is voltage **5 V**?  W6U901WJ7	Yes	Go to step 3.
		No	Go to next step.

STEP	INSPECTION		ACTION
2	**INSPECT WIRING HARNESS BETWEEN TRUNK KEY CYLINDER SWITCH AND CPU** • Remove driver's side front scuff plate. • Remove driver's side front side trim. • Remove nut fixed in joint box. • Measure voltage at terminal 2J at CPU connector. • Is voltage **5 V**?  W6U901WJ6	Yes	Repair wiring harness between CPU and trunk key cylinder switch.
		No	Replace CPU.
3	**INSPECT WIRING HARNESS BETWEEN TRUNK KEY CYLINDER SWITCH AND GND** • Disconnect trunk key cylinder switch connector. • Check for continuity between trunk key cylinder switch connector terminal B and ground. • Is there continuity?  W6U901WJ8	Yes	Replace trunk key cylinder.
		No	Repair wiring harness between trunk key cylinder switch and ground.

NO.9 ALARM DOES NOT STOP WHEN TURN KEY TO ON WHILE ALARM OPERATES

Z6U090350000W11

9	**Alarm does not stop when turn key to ON while alarm operates**
POSSIBLE CAUSE	• Malfunction in theft-deterrent system operation circuit — CPU malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
—	• Does key reminder warning buzzer operate okay?	Yes	Replace CPU.
		No	Go to symptom troubleshooting of instrumentation/driver info. (See 09-03P-1 FOREWORD [INSTRUMENTATION/DRIVER INFO.])

NO.10 ALARM DOES NOT CONTINUE FOR 2.5 MINUTES

Z6U090350000W12

10	Alarm does not continue for 2.5 minutes
POSSIBLE CAUSE	• Malfunction in theft-deterrent system operation circuit — CPU malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
—	—	—	Replace CPU.

NO.11 ALARM DOES NOT STOP AFTER 2.5 MINUTES

Z6U090350000W13

11	Alarm does not stop after 2.5 minutes
POSSIBLE CAUSE	• Malfunction in theft-deterrent system operation circuit — CPU malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
—	—	—	Replace CPU.

09-03H SYMPTOM TROUBLESHOOTING [SUNROOF]

FOREWORD [SUNROOF] 09-03H-1
TROUBLESHOOTING INDEX [SUNROOF] 09-03H-1
NO.1 SLIDING SUNROOF DOES NOT MOVE 09-03H-1

FOREWORD [SUNROOF]

Z6U090301049W01

- Thoroughly read and understand the basic flow of troubleshooting in order to properly perform the procedures. (See 00-00-5 Troubleshooting Procedure.)

TROUBLESHOOTING INDEX [SUNROOF]

Z6U090301049W02

- Use the chart below to verify the symptoms of the trouble in order to diagnose the appropriate area.

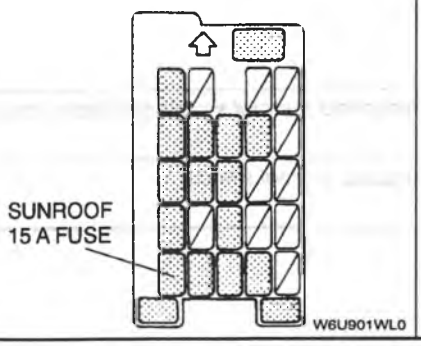
No.	TROUBLESHOOTING INDEX	PAGE
1	Sliding sunroof does not move.	(See 09-03H-1 NO.1 SLIDING SUNROOF DOES NOT MOVE)

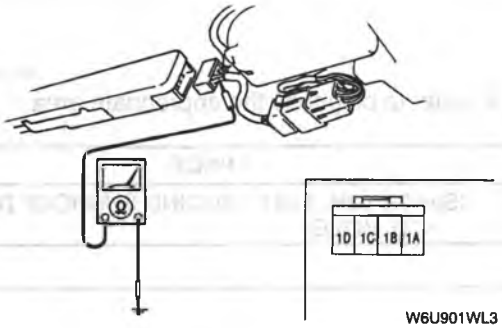
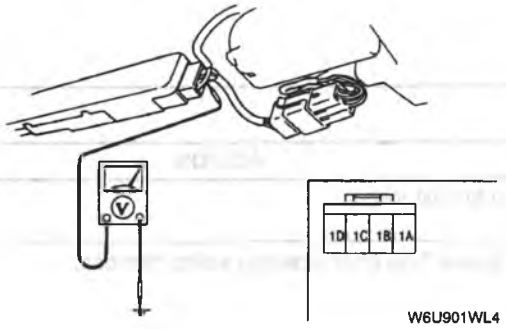
NO.1 SLIDING SUNROOF DOES NOT MOVE

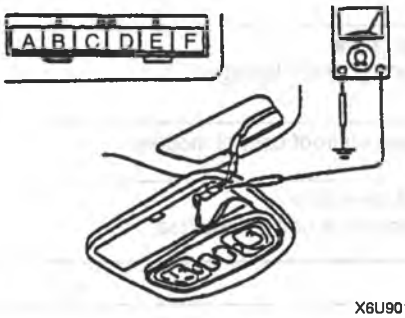
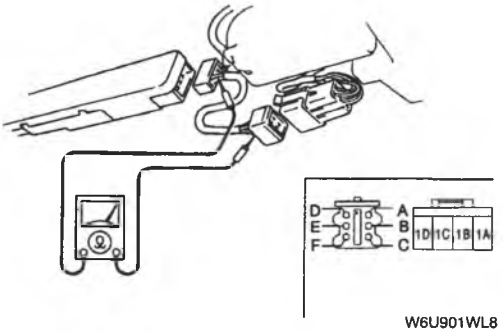
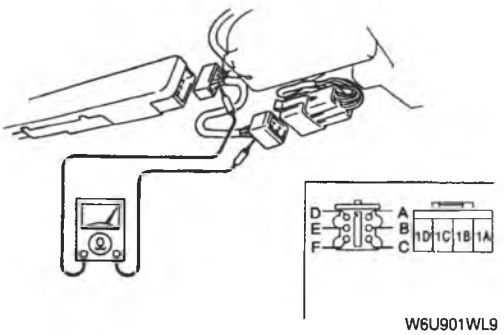
Z6U090301049W03

1	Sliding sunroof does not move
POSSIBLE CAUSE	• SUNROOF 15 A fuse malfunction • Malfunction in wiring harness between SUNROOF 15 A fuse and sunroof control module • Malfunction in wiring harness between sunroof control module and ground • Malfunction in wiring harness between sunroof switch and ground • Malfunction in wiring harness between sunroof control module and sunroof motor • Sunroof motor malfunction • Sunroof control module malfunction • Guide malfunction • Drive unit malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT FUSE** • Is SUNROOF 15 A fuse okay? 	Yes	Go to next step.
		No	Replace fuse after repairing wiring harness.

STEP	INSPECTION		ACTION
2	**VERIFY THAT SUNROOF CONTROL MODULE CONNECTOR TERMINAL 1A IS GROUNDED** • Remove the headliner. (See 09-17-15 HEADLINER REMOVAL/INSTALLATION) • Disconnect sunroof control module connector. • Inspect continuity between terminal 1A of sunroof control module connector of wiring harness and ground. • Is there continuity?  W6U901WL3	Yes	Reconnect sunroof control module connector, then go to next step.
		No	Repair wiring harness between sunroof control module and ground.
3	**INSPECT WIRING HARNESS BETWEEN SUNROOF CONTROL MODULE POWER SUPPLY AND SUNROOF CONTROL MODULE FOR CONTINUITY** • Turn ignition switch to ON. • Measure voltage at terminal 1C of sunroof control module connector of wiring harness. • Is voltage **B+**?  W6U901WL4	Yes	Go to next step.
		No	Repair wiring harness between SUNROOF 15 A fuse and sunroof control module.
4	**INSPECT SUNROOF SWITCH** • Inspect sunroof switch. (See 09-15-8 SUNROOF SWITCH INSPECTION) • Is sunroof switch okay?	Yes	Reconnect sunroof switch connector, then go to next step.
		No	Replace sunroof switch.

STEP	INSPECTION		ACTION
5	**VERIFY THAT SUNROOF SWITCH CONNECTOR TERMINAL C IS GROUNDED** ● Inspect continuity between terminal C of sunroof switch connector of wiring harness and ground. ● Is there continuity?  X6U901WH0	Yes	Go to next step.
		No	Repair wiring harness between sunroof switch and ground.
6	**INSPECT WIRING HARNESS BETWEEN SUNROOF MOTOR AND SUNROOF CONTROL MODULE** ● Disconnect sunroof control module connector. ● Inspect continuity between terminal E of sunroof motor connector of wiring harness and terminal 1B of sunroof control module connector of wiring harness. ● Is there continuity?  W6U901WL8	Yes	Go to next step.
		No	Repair wiring harness between sunroof motor and sunroof control module.
7	**INSPECT WIRING HARNESS BETWEEN SUNROOF MOTOR AND SUNROOF CONTROL MODULE** ● Inspect continuity between terminal F of sunroof motor connector of wiring harness and terminal 1D of sunroof control module connector of wiring harness. ● Is there continuity?  W6U901WL9	Yes	Go to next step.
		No	Repair wiring harness between sunroof motor and sunroof control module.

STEP	INSPECTION		ACTION
8	**INSPECT SUNROOF MOTOR** • Remove sunroof motor. • Inspect sunroof motor. (See 09-15-6 Motor) • Is sunroof motor okay?	Yes	Install sunroof motor, then go to next step.
		No	Replace sunroof motor.
9	**INSPECT SUNROOF GUIDE** • Remove sunroof unit. (See 09-15-1 SUNROOF UNIT REMOVAL/INSTALLATION) • Does guide move along sunroof frame smoothly?	Yes	Go to next step.
		No	Adjust guide. Replace guide if damaged.
10	**VERIFY WHETHER MALFUNCTION IS IN SUNROOF CONTROL MODULE OR DRIVE UNIT** • Does drive unit move along sunroof frame smoothly?	Yes	Replace sunroof control module.
		No	Adjust drive unit. Replace drive unit if damaged.

09-03J SYMPTOM TROUBLESHOOTING [EXTERIOR LIGHTING SYSTEM]

FOREWORD [EXTERIOR LIGHTING SYSTEM] 09-03J-1
TROUBLESHOOTING INDEX [EXTERIOR LIGHTING SYSTEM] 09-03J-1
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NO.2 HEADLIGHT DO NOT ILLUMINATE 09-03J-5
NO.3 LOW BEAM HEADLIGHTS DO NOT ILLUMINATE 09-03J-11
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NO.7 DAYTIME RUNNING LIGHTS DO NOT TURN OFF WHEN IGNITION SWITCH IS TURNED TO LOCK OR ACC (CANADA) 09-03J-17
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NO.11 PARKING LIGHTS DO NOT ILLUMINATE 09-03J-23

FOREWORD [EXTERIOR LIGHTING SYSTEM]

Z6U090301052W01

- Thoroughly read and understand the basic flow of troubleshooting in order to properly perform the procedures. (See 00-00-2 HOW TO USE THIS MANUAL.)

TROUBLESHOOTING INDEX [EXTERIOR LIGHTING SYSTEM]

Z6U090301052W02

- Use the chart below to verify that the symptoms of the trouble in order to diagnose the appropriate area.

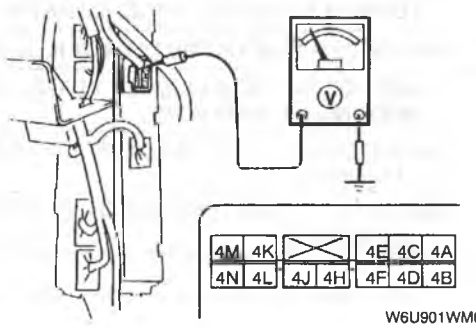
No.	TROUBLESHOOTING ITEM	PAGE
1	Headlight auto light-off does not operate	(See 09-03J-2 NO.1 HEADLIGHT AUTO LIGHT-OFF DOES NOT OPERATE)
2	Headlights do not illuminate	(See 09-03J-5 NO.2 HEADLIGHT DO NOT ILLUMINATE)
3	Low beam headlights do not illuminate	(See 09-03J-11 NO.3 LOW BEAM HEADLIGHTS DO NOT ILLUMINATE)
4	High beam headlights do not illuminate	(See 09-03J-12 NO.4 HIGH BEAM HEADLIGHTS DO NOT ILLUMINATE)
5	Daytime running lights do not illuminate (Canada)	(See 09-03J-15 NO.5 DAYTIME RUNNING LIGHTS DO NOT ILLUMINATE (CANADA))
6	Daytime running lights do not turn off when parking brake lever is set (Canada)	(See 09-03J-16 NO.6 DAYTIME RUNNING LIGHTS DO NOT TURN OFF WHEN PARKING BRAKE LEVER IS SET (CANADA))
7	Daytime running lights do not turn off when ignition switch is turned to LOCK or ACC (Canada)	(See 09-03J-17 NO.7 DAYTIME RUNNING LIGHTS DO NOT TURN OFF WHEN IGNITION SWITCH IS TURNED TO LOCK OR ACC (CANADA))
8	TNS do not illuminate	(See 09-03J-18 NO.8 TNS DO NOT ILLUMINATE)
9	License plate light does not illuminate	(See 09-03J-21 NO.9 LICENSE PLATE LIGHT DOES NOT ILLUMINATE)
10	Taillights do not illuminate	(See 09-03J-22 NO.10 TAILLIGHTS DO NOT ILLUMINATE)
11	Parking lights do not illuminate	(See 09-03J-23 NO.11 PARKING LIGHTS DO NOT ILLUMINATE)

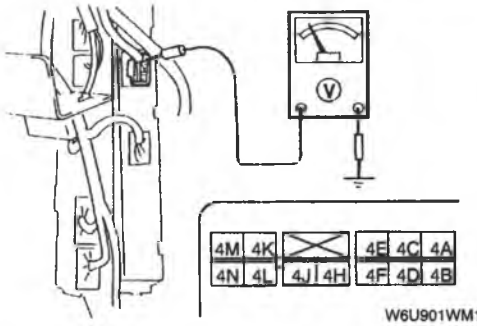
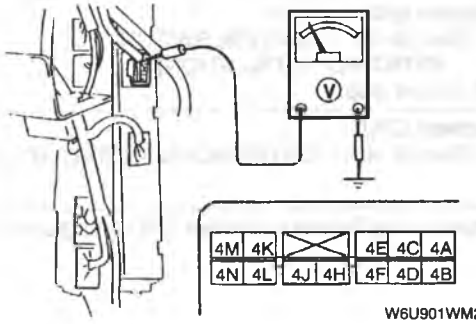
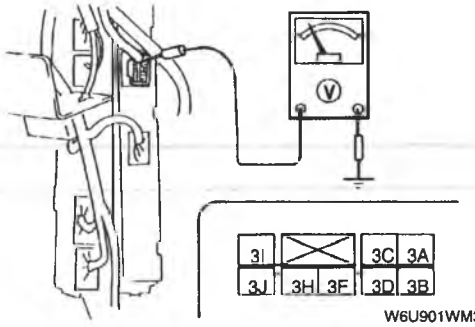
NO.1 HEADLIGHT AUTO LIGHT-OFF DOES NOT OPERATE

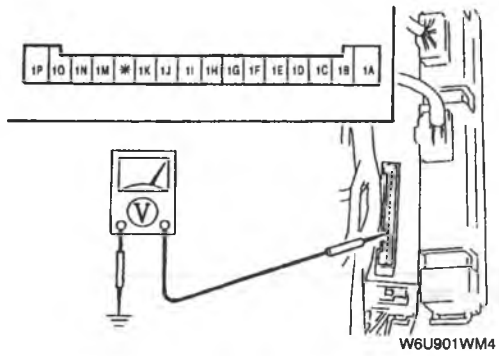
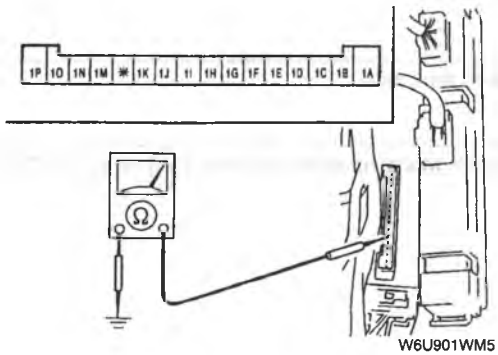
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1	Headlight auto light-off does not operate
POSSIBLE CAUSE	• Malfunction in headlight auto light-off ground circuit — Headlight auto light-off does not operate • Malfunction in wiring harness between CPU and ground • Malfunction in headlight auto light-off input signal circuit — Headlight auto light-off does not operate • Headlight high relay malfunction (With DRL) • Headlight relay malfunction • TNS relay malfunction • Ignition switch malfunction • Malfunction in wiring harness between headlight high relay and CPU (With DRL) • Malfunction in wiring harness between headlight relay and CPU • Malfunction in wiring harness between TNS relay and CPU • Malfunction in wiring harness between ignition switch and CPU • Malfunction in headlight auto light-off operation circuit — Headlight auto light-off does not operate • CPU malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is it equipped with DRL?	Yes	Go to next step.
		No	Go to step 3.
2	**INSPECT HEADLIGHT HIGH RELAY** • Remove headlight high relay. • Inspect headlight high relay. (See 09-18-8 HEADLIGHT HIGH RELAY INSPECTION) • Is headlight high relay okay?	Yes	Go to next step.
		No	Replace headlight high relay. (See 09-18-8 HEADLIGHT HIGH RELAY REMOVAL/INSTALLATION)
3	**INSPECT HEADLIGHT RELAY** • Remove headlight relay. • Inspect headlight relay. (See 09-18-9 HEADLIGHT RELAY INSPECTION) • Is headlight relay okay?	Yes	Go to next step.
		No	Replace headlight relay.
4	**INSPECT TNS RELAY** • Remove TNS relay. • Inspect TNS relay. (See 09-18-9 TNS RELAY INSPECTION) • Is TNS relay okay?	Yes	With DRL: Go to next step. Without DRL: Go to step 8.
		No	Replace TNS relay.
5	**INSPECT WIRING HARNESS BETWEEN HEADLIGHT HIGH RELAY AND CPU** • Remove driver-side front scuff plate. • Remove driver-side front side trim. • Measure voltage at terminal 4K at CPU connector D of wiring harness. • Is voltage **B+**?  W6U901WM0	Yes	Go to next step.
		No	Repair wiring harness between headlight high relay and CPU.

STEP	INSPECTION		ACTION
6	**INSPECT WIRING HARNESS BETWEEN HEADLIGHT RELAY AND CPU** • Measure voltage at terminal 4E at CPU connector D of wiring harness. • Is voltage **B**+? 	Yes	Go to next step.
		No	Repair wiring harness between headlight relay and CPU.
7	**INSPECT WIRING HARNESS BETWEEN TNS RELAY AND CPU** • Measure voltage at terminal 4N at CPU connector D of wiring harness. • Is voltage **B**+? 	Yes	Go to step 9.
		No	Repair wiring harness between TNS relay and CPU.
8	**INSPECT WIRING HARNESS BETWEEN TNS RELAY AND CPU** • Measure voltage at terminal 3J at CPU connector C of wiring harness. • Is voltage **B**+? 	Yes	Go to next step.
		No	Repair wiring harness between TNS relay and CPU.

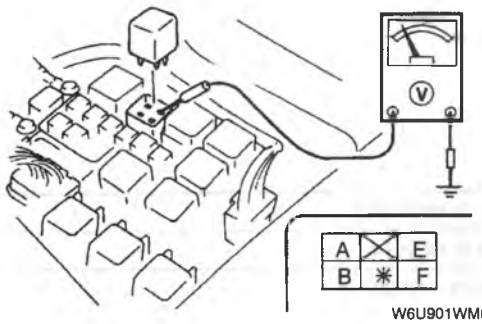
STEP	INSPECTION		ACTION
9	**INSPECT SIGNAL OF IGNITION SWITCH** • Remove nut fixed in joint box and remove CPU from joint box. • Turn ignition switch to ACC or ON. • Measure voltage at terminal 1C at joint box. • Is voltage **B**+?  W6U901WM4	Yes	Go to step 11.
		No	Go to next step.
10	**INSPECT IGNITION SWITCH** • Remove column cover. • Inspect ignition switch. (See 09-21-2 IGNITION SWITCH INSPECTION) • Is ignition switch okay?	Yes	Repair wiring harness between ignition switch and CPU, then go to next step.
		No	Replace ignition switch. (See 09-21-1 IGNITION SWITCH REMOVAL/INSTALLATION) Go to next step.
11	**INSPECT WIRING HARNESS BETWEEN IGNITION SWITCH AND GND** • Check for continuity between terminal 1G at joint box and ground. • Is there continuity?  W6U901WM5	Yes	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION)
		No	Repair wiring harness between CPU and ground.

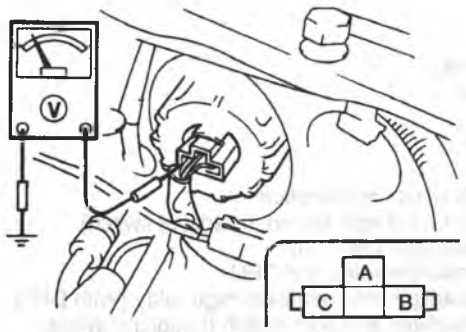
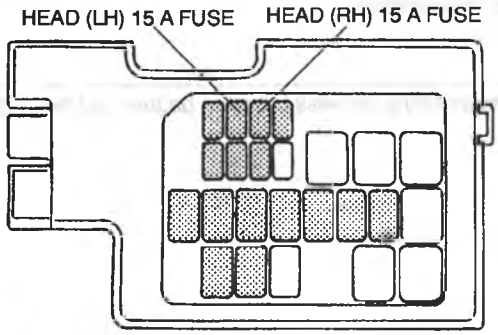
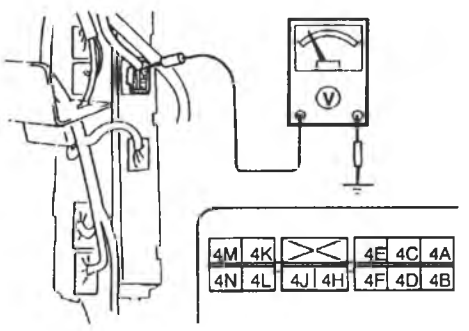
NO.2 HEADLIGHT DO NOT ILLUMINATE

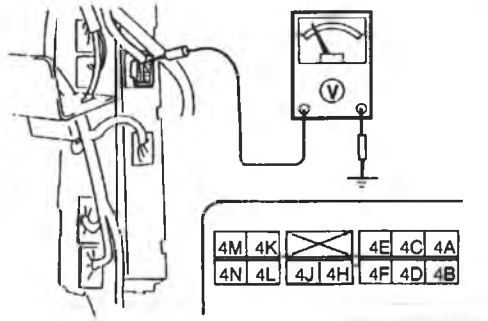
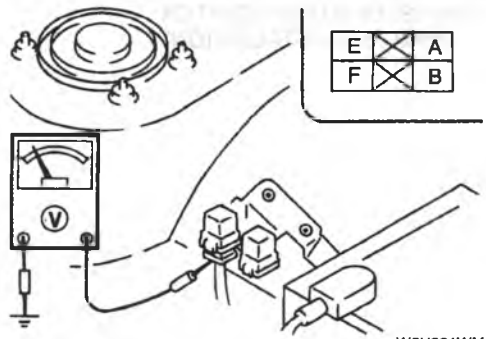
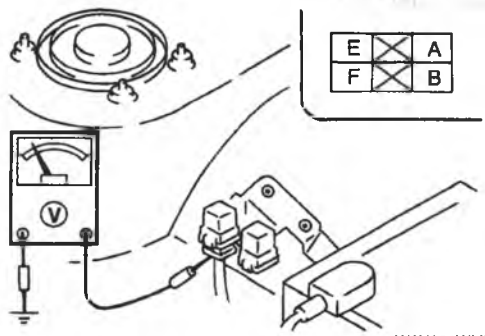
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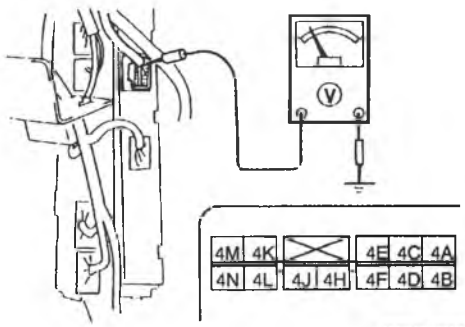
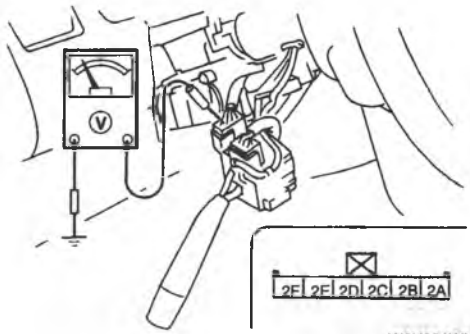
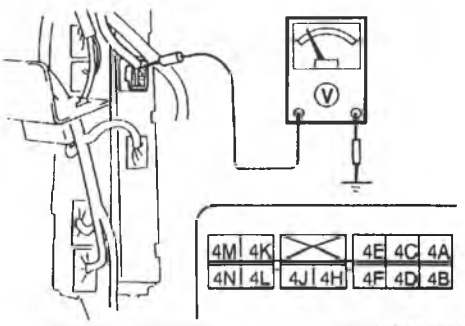
2	Headlights do not illuminate
POSSIBLE CAUSE	• Malfunction in headlight power supply/ground circuit — Headlights do not illuminate • Malfunction in wiring harness between battery and headlight relay • Malfunction in wiring harness between headlight high relay and ground (With DRL) • Malfunction in wiring harness between battery and headlight high relay • Malfunction in headlight input signal circuit — Headlights do not illuminate • Headlight relay malfunction • Headlight high relay malfunction (With DRL) • Light switch (headlight switch) malfunction • Malfunction in headlight operation circuit — Headlights do not illuminate • CPU malfunction • HEAD (LH) 15 A fuse and HEAD (RH) 15 A fuse malfunction • Malfunction in wiring harness between CPU and light switch (headlight switch) • Malfunction in wiring harness between headlight and CPU • Malfunction in wiring harness between headlight relay and CPU • Malfunction in wiring harness between headlight and headlight high relay (With DRL) • Malfunction in wiring harness between headlight and light switch (headlight switch) • Malfunction in wiring harness between headlight relay and headlight • Malfunction in wiring harness between headlight high relay and CPU

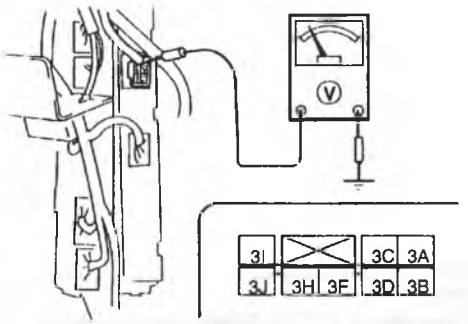
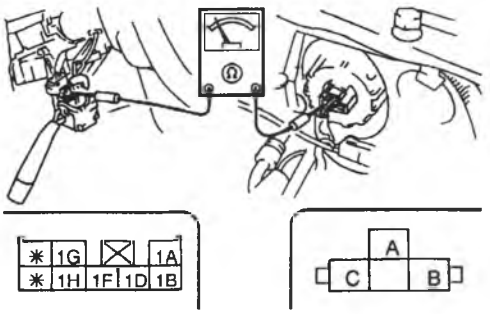
Diagnostic procedure

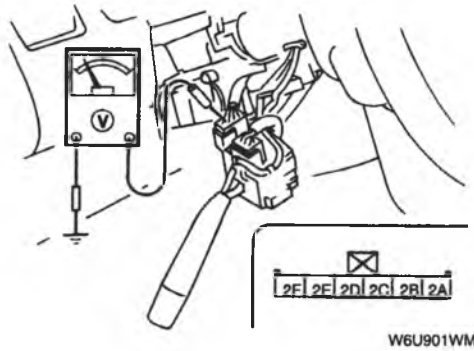
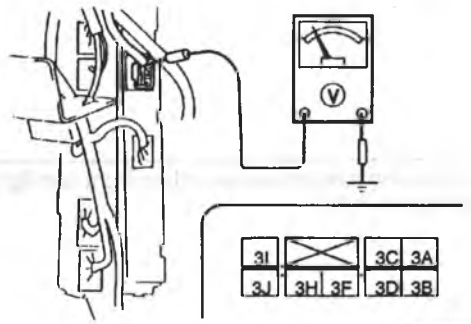
STEP	INSPECTION		ACTION
1	**INSPECT POWER SUPPLY CIRCUIT OF HEADLIGHT RELAY** • Remove headlight relay. • Measure voltage at terminals A and B at headlight relay connector. • Is voltage **B+**?  W6U901WM6	Yes	Go to next step.
		No	Repair wiring harness between battery and headlight relay.
2	**INSPECT HEADLIGHT RELAY** • Inspect headlight relay. (See 09-18-9 HEADLIGHT RELAY INSPECTION) • Is headlight relay okay?	Yes	Go to next step.
		No	Replace headlight relay.

STEP	INSPECTION		ACTION
3	**INSPECT POWER SUPPLY CIRCUIT OF HEADLIGHT** • Install headlight relay. • Turn headlight switch to second position. • Measure voltage at terminal C at headlight connector of wiring harness. • Is voltage **B+**?  W6U901WM8	Yes	Go to step 5.
		No	Go to next step.
4	**INSPECT FUSE** • Turn headlight switch to OFF. • Are HEAD (LH) 15 A fuse and HEAD (RH) 15 A fuse okay?  W6U901WM9	Yes	Repair wiring harness between headlight relay and headlight, then go to next step.
		No	Replace fuse after repairing wiring harness.
5	• Is it equipped with DRL?	Yes	Go to next step.
		No	Go to step 14.
6	**INSPECT WIRING HARNESS BETWEEN HEADLIGHT RELAY AND CPU** • Remove driver-side front scuff plate. • Remove driver-side front side trim. • Turn headlight switch to OFF. • Measure voltage at terminal 4E at CPU connector D of wiring harness. • Is voltage **B+**?  W6U901WMA	Yes	Go to next step.
		No	Repair wiring harness between headlight relay and CPU.

STEP	INSPECTION		ACTION
7	**INSPECT WIRING HARNESS BETWEEN HEADLIGHT AND CPU** • Remove nut fixed in joint box and remove CPU from joint box. • Turn headlight switch to second position. • Measure voltage at terminals 4A and 4C at CPU connector D of wiring harness. • Is voltage **B**+?  W6U901WMB	Yes	Go to next step.
		No	Repair wiring harness between headlight and CPU.
8	**INSPECT POWER SUPPLY CIRCUIT OF HEADLIGHT HIGH RELAY** • Remove nuts to move main fuse block to side. • Remove headlight high relay. • Measure voltage at terminal A at headlight high relay connector. • Is voltage **B**+?  W6U901WMC	Yes	Go to next step.
		No	Repair wiring harness between battery and headlight high relay.
9	**INSPECT WIRING HARNESS BETWEEN HEADLIGHT AND HEADLIGHT HIGH RELAY** • Turn headlight switch to second position. • Measure voltage at terminal E at headlight high relay connector. • Is voltage **B**+?  W6U901WMD	Yes	Go to next step.
		No	Repair wiring harness between headlight and headlight high relay.

STEP	INSPECTION		ACTION
10	**INSPECT WIRING HARNESS BETWEEN HEADLIGHT HIGH RELAY AND CPU** ● Install CPU in joint box. ● Measure voltage at terminal 4K at CPU connector D of wiring harness. ● Is voltage **B+**?  W6U901WME	Yes	Go to next step.
		No	Repair wiring harness between headlight high relay and CPU.
11	**INSPECT LIGHT SWITCH** ● Remove column cover. ● Inspect light switch (headlight switch). (See 09-18-7 LIGHT SWITCH INSPECTION) ● Is light switch (headlight switch) okay?	Yes	Go to next step.
		No	Replace light switch (headlight switch). (See 09-18-6 LIGHT SWITCH REMOVAL/INSTALLATION)
12	**INSPECT LIGHT SWITCH INNER CIRCUIT** ● Measure voltage at terminal 2F at light switch (headlight switch) connector of wiring harness. ● Is voltage **0 V**?  W6U901WMF	Yes	Go to next step.
		No	Replace light switch (headlight switch). (See 09-18-6 LIGHT SWITCH REMOVAL/INSTALLATION)
13	**INSPECT WIRING HARNESS BETWEEN HEADLIGHT SWITCH AND CPU** ● Measure voltage at terminal 4F at CPU connector D of wiring harness. ● Is voltage **0 V**?  W6U901WMG	Yes	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION)
		No	Repair wiring harness between light switch (headlight switch) and CPU.

STEP	INSPECTION		ACTION
14	**INSPECT WIRING HARNESS BETWEEN HEADLIGHT RELAY AND CPU** ● Remove driver-side front scuff plate. ● Remove driver-side front side trim. ● Turn headlight switch to OFF. ● Measure voltage at terminal 3A at CPU connector C of wiring harness. ● Is voltage **B**+?  W6U901WMH	Yes	Go to next step.
		No	Repair wiring harness between headlight relay and CPU.
15	**INSPECT WIRING HARNESS BETWEEN HEADLIGHT AND LIGHT SWITCH** ● Remove column cover. ● Inspect wiring harness between terminal A at headlight (LH) connector and 1B at light switch (headlight switch) connector, between terminal B at headlight (LH) connector and terminal 1A at light switch (headlight switch) connector, between terminal A at headlight (RH) connector and terminal 1F at light switch (headlight switch) connector, between terminal B at headlight (RH) connector and terminal 1H at light switch (headlight switch) connector for following. — Short or ground — Is wiring harness okay? ● Is wiring harness okay?  W6U901WMJ	Yes	Go to next step.
		No	Repair wiring harness between headlight and light switch (headlight switch).
16	**INSPECT LIGHT SWITCH** ● Remove column cover. ● Inspect light switch (headlight switch). (See 09-18-7 LIGHT SWITCH INSPECTION) ● Is light switch (headlight switch) okay?	Yes	Go to next step.
		No	Replace light switch (headlight switch). (See 09-18-6 LIGHT SWITCH REMOVAL/INSTALLATION)

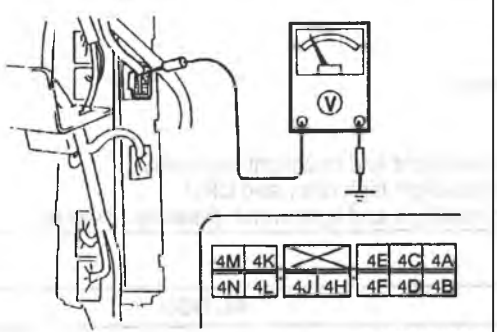
STEP	INSPECTION		ACTION
17	**INSPECT LIGHT SWITCH INNER CIRCUIT** • Measure voltage at terminal 2F at light switch (headlight switch) connector of wiring harness. • Is voltage **5 V**?  W6U901WMK	Yes	Replace light switch (headlight switch). (See 09-18-6 LIGHT SWITCH REMOVAL/INSTALLATION)
		No	Go to next step.
18	**INSPECT WIRING HARNESS BETWEEN LIGHT SWITCH AND CPU** • Measure voltage at terminal 3B at CPU connector C of wiring harness. • Is voltage **0 V**?  W6U901WML	Yes	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION)
		No	Repair wiring harness between light switch (headlight switch) and CPU.

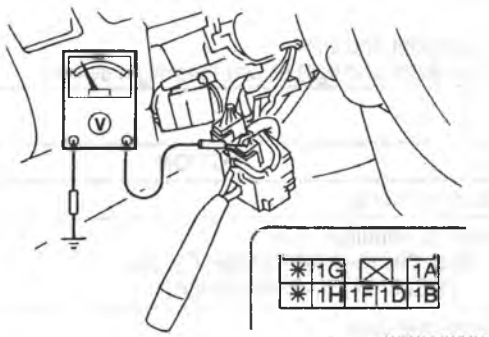
NO.3 LOW BEAM HEADLIGHTS DO NOT ILLUMINATE

Z6U090301052W05

3	Low beam headlights do not illuminate
POSSIBLE CAUSE	• Malfunction in headlight ground circuit — Low beam headlights do not illuminate • Malfunction in wiring harness between light switch (headlight switch) and ground • Malfunction in headlight operation circuit — Low beam headlights do not illuminate • CPU malfunction • Light switch (headlight switch) malfunction • Headlight bulb malfunction • Malfunction in wiring harness between headlight and CPU • Malfunction in wiring harness between headlight and light switch (headlight switch)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT BULB** • Inspect headlight (low beam) bulb. • Is headlight (low beam) bulb okay?	Yes	Go to next step.
		No	Replace headlight bulb. (See 09-18-2 HEADLIGHT BULB REMOVAL/INSTALLATION)
2	• Is it equipped with DRL?	Yes	Go to next step.
		No	Go to step 5.
3	**INSPECT LIGHT SWITCH** • Remove column cover. • Inspect light switch (headlight switch). (See 09-18-7 LIGHT SWITCH INSPECTION) • Is light switch (headlight switch) okay?	Yes	Go to next step.
		No	Replace light switch (headlight switch). (See 09-18-6 LIGHT SWITCH REMOVAL/INSTALLATION)
4	**INSPECT WIRING HARNESS BETWEEN HEADLIGHT AND CPU** • Remove driver-side front scuff plate. • Remove driver-side front side trim. • Disconnect CPU connectors. • Turn headlight switch to second position. • Measure voltage at terminals 4A and 4C at CPU connector D of wiring harness. • Is voltage **B+**?  W6U901WMM	Yes	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION)
		No	Repair wiring harness between headlights (low beam) and CPU.

STEP	INSPECTION		ACTION
5	**INSPECT WIRING HARNESS BETWEEN HEADLIGHT AND LIGHT SWITCH** • Remove column cover. • Set dimmer switch to HI. • Measure voltage at terminals 1B and 1F at light switch (headlight switch) connector of wiring harness. • Is voltage **B+**?  W6U901WMN	Yes	Go to next step.
		No	Repair wiring harness between headlights (low beam) and light switch (headlight switch).
6	**INSPECT LIGHT SWITCH** • Inspect light switch (headlight switch). (See 09-18-7 LIGHT SWITCH INSPECTION) • Is light switch (headlight switch) okay?	Yes	Repair wiring harness between light switch (headlight switch) and ground.
		No	Replace light switch (headlight switch). (See 09-18-6 LIGHT SWITCH REMOVAL/INSTALLATION)

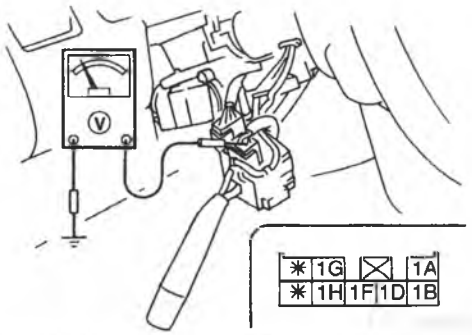
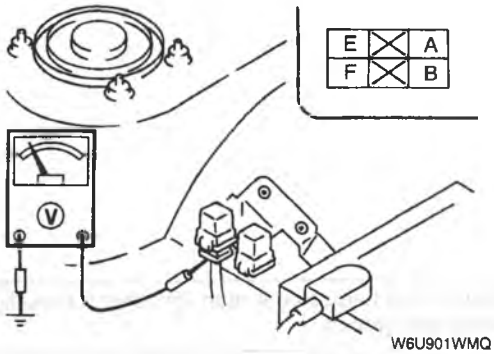
NO.4 HIGH BEAM HEADLIGHTS DO NOT ILLUMINATE

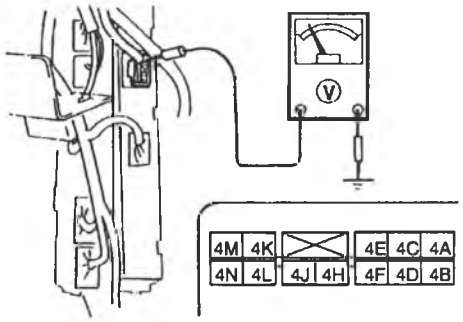
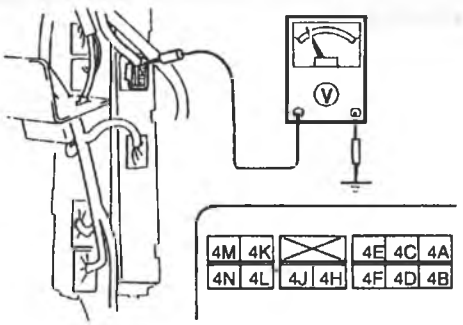
Z6U090301052W06

4	**High beam headlights do not illuminate**
POSSIBLE CAUSE	• Malfunction in headlight ground circuit — High beam headlights do not illuminate • Malfunction in wiring harness between headlight high relay and ground • Malfunction in wiring harness between light switch (headlight switch) and ground • Malfunction in headlight operation circuit — High beam headlights do not illuminate • CPU malfunction • Light switch (headlight switch) malfunction • Headlight bulb malfunction • Headlight high relay malfunction • Malfunction in wiring harness between headlight and headlight high relay • Malfunction in wiring harness between headlight high relay and CPU • Malfunction in wiring harness between headlight and light switch (headlight switch)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT BULB** • Inspect headlight (high beam) bulb. • Is headlight (high beam) bulb okay?	Yes	Go to next step.
		No	Replace headlight bulb. (See 09-18-2 HEADLIGHT BULB REMOVAL/INSTALLATION)
2	• Is it equipped with DRL?	Yes	Go to step 4.
		No	Go to next step.

STEP	INSPECTION		ACTION
3	**INSPECT WIRING HARNESS BETWEEN HEADLIGHT AND LIGHT SWITCH** ● Remove column cover. ● Turn headlight switch to second position. ● Set dimmer switch to LO. ● Measure voltage at terminals 1A and 1H at light switch (headlight switch) connector of wiring harness. ● Is voltage **B**+?  W6U901WMP	Yes	Go to step 8.
		No	Repair wiring harness between headlights (high beam) and light switch (headlight switch).
4	**INSPECT WIRING HARNESS BETWEEN HEADLIGHT AND HEADLIGHT HIGH RELAY** ● Remove nuts to move main fuse block to the side. ● Measure voltage at terminals A and E at headlight high relay connector. ● Is voltage **B**+?  W6U901WMQ	Yes	Go to next step.
		No	Repair wiring harness between headlight (high beam) and headlight high relay.
5	**INSPECT HEADLIGHT HIGH RELAY** ● Turn headlight switch to OFF. ● Inspect headlight high relay. (See 09-18-8 HEADLIGHT HIGH RELAY INSPECTION) ● Is headlight high relay okay?	Yes	Repair wiring harness between headlight high relay and ground.
		No	Replace headlight high relay. (See 09-18-8 HEADLIGHT HIGH RELAY REMOVAL/INSTALLATION)

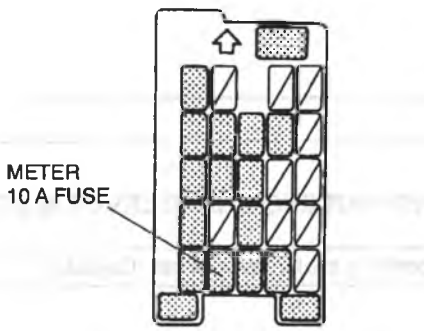
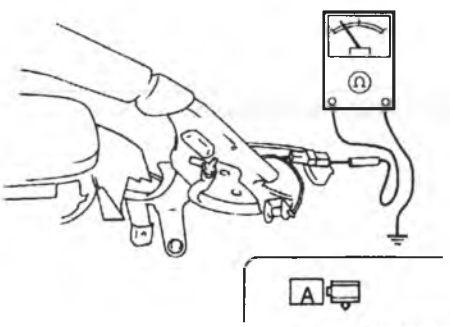
STEP	INSPECTION		ACTION
6	**INSPECT WIRING HARNESS BETWEEN HEADLIGHT HIGH RELAY AND CPU** ● Remove driver-side front scuff plate. ● Remove driver-side front side trim. ● Measure voltage at terminal 4K at CPU connector D of wiring harness. ● Is voltage **B+**?  W6U901WMR	Yes	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION) Go to next step.
		No	Repair wiring harness between headlight high relay and CPU, then go to next step.
7	**INSPECT CPU** ● Turn headlight switch to second position. ● Set dimmer switch to LO. ● Measure voltage at terminal 4H at CPU connector D of wiring harness. ● Is voltage **0 V**?  W6U901WMS	Yes	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION)
		No	Go to next step.
8	**INSPECT LIGHT SWITCH** ● Remove column cover. ● Inspect light switch (headlight switch). (See 09-18-7 LIGHT SWITCH INSPECTION) ● Is light switch (headlight switch) okay?	Yes	Repair wiring harness between light switch (headlight switch) and ground.
		No	Replace light switch (headlight switch). (See 09-18-6 LIGHT SWITCH REMOVAL/INSTALLATION)

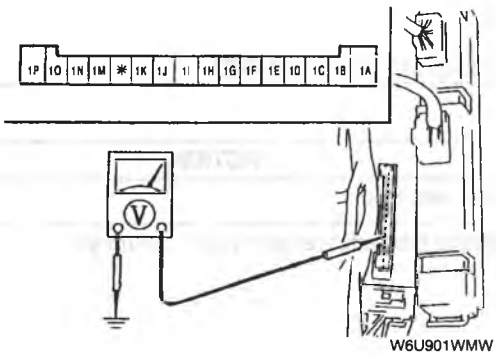
NO.5 DAYTIME RUNNING LIGHTS DO NOT ILLUMINATE (CANADA)

Z6U090301052W07

5	Daytime running lights do not illuminate (Canada)
POSSIBLE CAUSE	• Malfunction in headlight input signal circuit — Daytime running lights do not illuminate • Parking brake switch malfunction • Ignition switch malfunction • METER 10 A fuse malfunction • Malfunction in headlight operation circuit — Daytime running lights do not illuminate • CPU malfunction • Malfunction in wiring harness between METER 10 A fuse and CPU.

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT FUSE** • Is METER 10 A fuse okay?  W6U901WMU	Yes	Go to next step.
		No	Replace fuse after repairing wiring harness.
2	**INSPECT WIRING HARNESS BETWEEN PARKING BRAKE SWITCH AND GND** • Remove rear console. (See 09-17-5 REAR CONSOLE REMOVAL/INSTALLATION) • Pull parking brake lever. • Check for continuity between terminal A at parking brake switch connector of wiring harness and ground. • Is there continuity?  W6U901WMV	Yes	Go to next step.
		No	Replace parking brake switch.
3	**INSPECT LIGHT SWITCH** • Remove column cover. • Inspect ignition switch. (See 09-21-2 IGNITION SWITCH INSPECTION) • Is ignition switch okay?	Yes	Go to next step.
		No	Replace ignition switch. (See 09-21-1 IGNITION SWITCH REMOVAL/INSTALLATION)

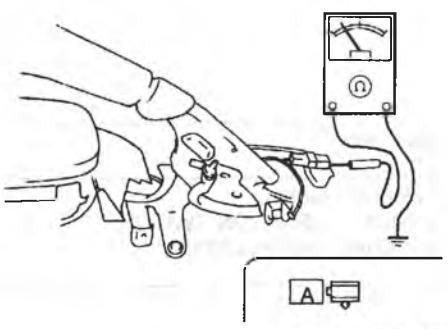
STEP	INSPECTION		ACTION
4	**INSPECT POWER SUPPLY CIRCUIT OF CPU** ● Remove nut fixed in joint box and remove CPU from joint box. ● Turn ignition switch to ON. ● Measure voltage at terminal 1M at joint box. ● Is voltage **B**+?  W6U901WMW	Yes	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION)
		No	Repair wiring harness between METER 10 A fuse and CPU.

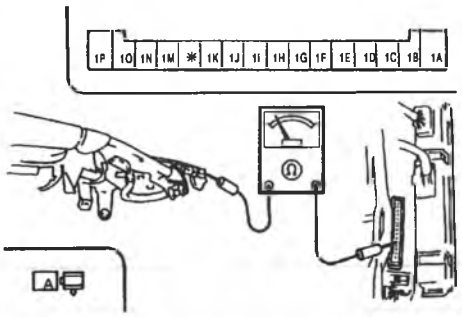
NO.6 DAYTIME RUNNING LIGHTS DO NOT TURN OFF WHEN PARKING BRAKE LEVER IS SET (CANADA)

Z6U090301052W08

6	**Daytime running lights do not turn off when parking brake lever is set (Canada)**
POSSIBLE CAUSE	● Malfunction in headlight input signal circuit — Daytime running lights do not turn off ● Parking brake switch malfunction ● Malfunction in headlight operation circuit — Daytime running lights do not turn off ● CPU malfunction ● Malfunction in wiring harness between CPU and parking brake switch ● Malfunction in wiring harness between parking brake switch and ground

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT WIRING HARNESS BETWEEN PARKING BRAKE SWITCH AND GND** ● Remove rear console. (See 09-17-5 REAR CONSOLE REMOVAL/INSTALLATION) ● Pull parking brake lever. ● Check for continuity between terminal A at parking brake switch connector of wiring harness and ground. ● Is there continuity?  W6U901WMX	Yes	Go to next step.
		No	Replace parking brake switch.

STEP	INSPECTION		ACTION
2	**INSPECT WIRING HARNESS BETWEEN CPU AND PARKING BRAKE SWITCH** • Remove driver-side front scuff plate. • Remove driver-side front side trim. • Remove nut fixed in joint box and remove CPU from joint box. • Release parking brake lever. • Check for continuity between terminal 1P at joint box and terminal A of parking brake switch connector. • Is there continuity?  W6U901WMY	Yes	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION)
		No	Repair wiring harness between CPU and parking brake switch.

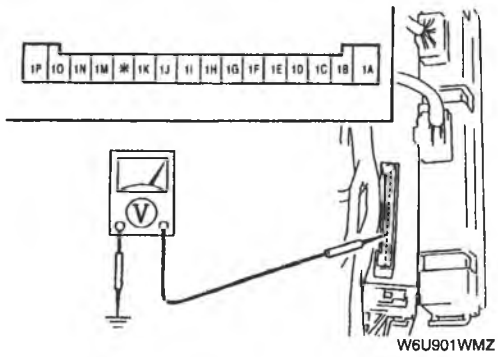
NO.7 DAYTIME RUNNING LIGHTS DO NOT TURN OFF WHEN IGNITION SWITCH IS TURNED TO LOCK OR ACC (CANADA)

Z6U090301052W09

7	Daytime running lights do not turn off when ignition switch is turned to LOCK or ACC (Canada)
POSSIBLE CAUSE	• Malfunction in headlight input signal circuit — Daytime running lights do not illuminate • Ignition switch malfunction • Malfunction in headlight operation circuit — Daytime running lights do not illuminate • CPU malfunction • Malfunction in wiring harness between ignition switch and CPU

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT LIGHT SWITCH** • Remove column cover. • Inspect ignition switch. (See 09-21-2 IGNITION SWITCH INSPECTION) • Is ignition switch okay?	Yes	Go to next step.
		No	Replace ignition switch. (See 09-21-1 IGNITION SWITCH REMOVAL/INSTALLATION)

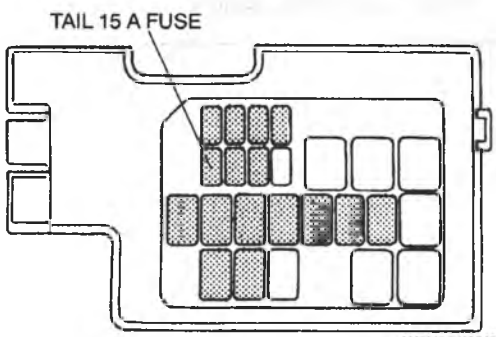
STEP	INSPECTION		ACTION
2	**INSPECT WIRING HARNESS BETWEEN IGNITION SWITCH AND CPU** • Remove nut fixed in joint box and remove CPU from joint box. • Turn ignition switch to ACC or ON. • Measure voltage at terminal 1C at joint box. • Is voltage **B+**?  W6U901WMZ	Yes	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION)
		No	Repair wiring harness between terminal F of ignition switch and terminal 1C of CPU.

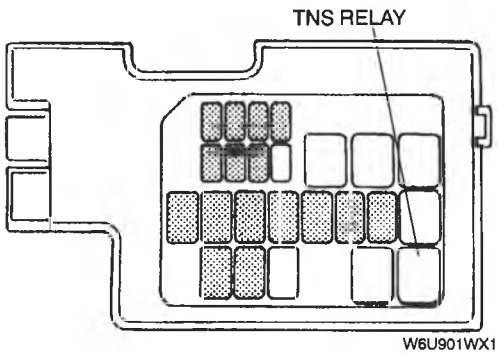
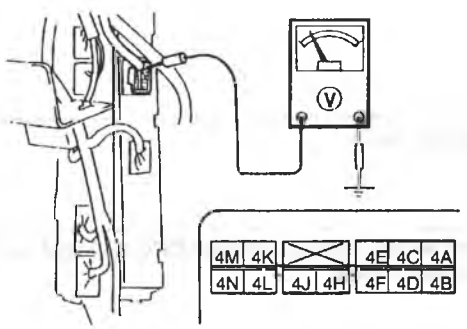
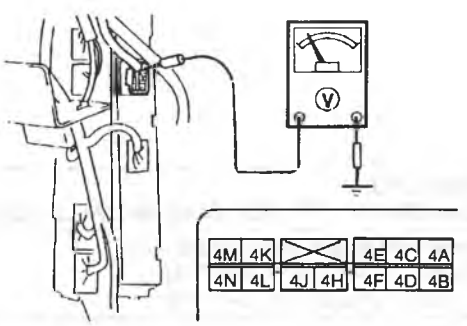
NO.8 TNS DO NOT ILLUMINATE

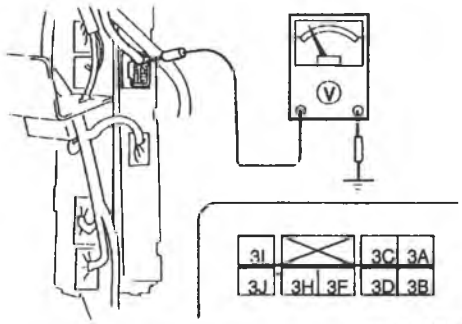
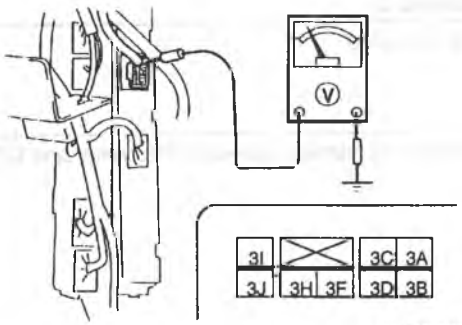
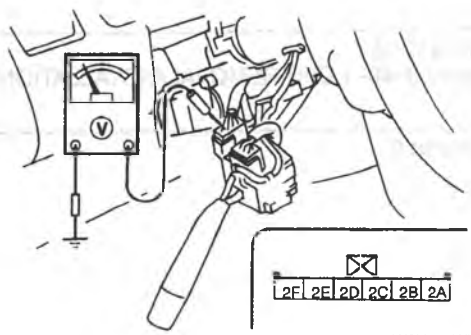
Z6U090301052W10

8	TNS do not illuminate
POSSIBLE CAUSE	• Malfunction in TNS power supply/ground circuit — TNS do not illuminate • TAIL 15 A fuse malfunction • Malfunction in wiring harness between TAIL 15 A fuse and TNS relay • Malfunction in wiring harness between each TNS bulb and ground • Malfunction in headlight input signal circuit — TNS do not illuminate • Malfunction in wiring harness between TNS relay and CPU • Malfunction in headlight operation circuit — TNS do not illuminate • CPU malfunction • Light switch (headlight switch) malfunction • Malfunction in wiring harness between CPU and light switch (headlight switch)

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT FUSE** • Is TAIL 15 A fuse okay?  W6U901WX0	Yes	Go to next step.
		No	Replace fuse after repairing wiring harness.

STEP	INSPECTION		ACTION
2	**INSPECT POWER SUPPLY CIRCUIT OF TNS RELAY** • Remove TNS relay. • Measure voltage at terminals A and B at TNS relay connector. • Is voltage **B+**?  W6U901WX1	Yes	Go to next step.
		No	Repair wiring harness between TAIL 15 A fuse and TNS relay.
3	**INSPECT TNS RELAY** • Inspect TNS relay. (See 09-18-9 TNS RELAY INSPECTION) • Is TNS relay okay?	Yes	Go to next step.
		No	Replace TNS relay.
4	• Is it equipped with DRL?	Yes	Go to step 5.
		No	Go to step 6.
5	**INSPECT WIRING HARNESS BETWEEN TNS RELAY AND CPU** • Remove driver-side front scuff plate. • Remove driver-side front side trim. • Measure voltage at terminal 4N at CPU connector D of wiring harness. • Is voltage **B+**?  W6U901WX2	Yes	Go to next step.
		No	Repair wiring harness between TNS relay and CPU.
6	**INSPECT CPU** • Set headlight switch to OFF. • Measure voltage at terminal 4M at CPU connector D of wiring harness. • Is voltage **0 V**?  W6U901WX3	Yes	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION)
		No	Go to step 9.

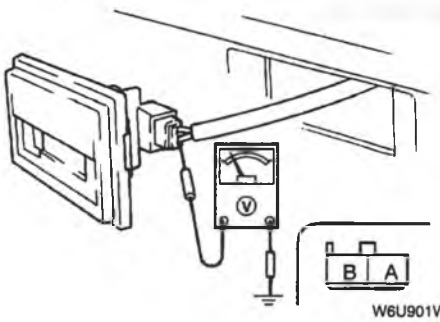
STEP	INSPECTION		ACTION
7	**INSPECT WIRING HARNESS BETWEEN TNS RELAY AND CPU** • Remove driver-side front scuff plate. • Remove driver-side front side trim. • Measure voltage at terminal 3J at CPU connector C of wiring harness. • Is voltage **5 V**?  W6U901WX4	Yes	Go to next step.
		No	Repair wiring harness between TNS relay and CPU.
8	**INSPECT CPU** • Measure voltage at terminal 3I at CPU connector C of wiring harness. • Is voltage **0 V**?  W6U901WX5	Yes	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION)
		No	Go to step 9.
9	**INSPECT WIRING HARNESS BETWEEN CPU AND LIGHT SWITCH** • Remove column cover. • Measure voltage at terminal 2E at light switch (headlight switch) connector of wiring harness. • Is voltage **5 V**?  W6U901WX6	Yes	Go to next step.
		No	Repair wiring harness between CPU and light switch (headlight switch).
10	**INSPECT LIGHT SWITCH** • Inspect light switch (headlight switch). (See 09-18-7 LIGHT SWITCH INSPECTION) • Is light switch (headlight switch) okay?	Yes	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION)
		No	Replace light switch (headlight switch). (See 09-18-6 LIGHT SWITCH REMOVAL/INSTALLATION)

NO.9 LICENSE PLATE LIGHT DOES NOT ILLUMINATE

Z6U090301052W11

9	License plate light does not illuminate
POSSIBLE CAUSE	• Malfunction in license plate light ground circuit — License plate light does not illuminate • Malfunction in wiring harness between license plate light and ground • Malfunction in license plate light operation circuit — License plate light does not illuminate • License plate light bulb malfunction • Malfunction in wiring harness between TNS relay and license plate light

Diagnostic procedure

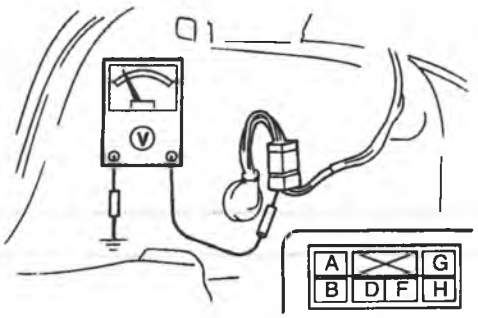
STEP	INSPECTION		ACTION
1	**INSPECT BULB** • Inspect license plate light bulb. • Is bulb okay?	Yes	Go to next step.
		No	Replace license plate light bulb.
2	**INSPECT WIRING HARNESS BETWEEN LICENSE PLATE LIGHT AND GND** • Remove license plate light. • Connect license plate light connector. • Turn headlight switch to first position. • Measure voltage at terminal A at license plate light connector of wiring harness. • Is voltage **B**+?  W6U901WX7	Yes	Repair wiring harness between license plate light and ground.
		No	Repair wiring harness between TNS relay and license plate light.

NO.10 TAILLIGHTS DO NOT ILLUMINATE

Z6U090301052W12

10	Taillights do not illuminate
POSSIBLE CAUSE	• Malfunction in taillight ground circuit — Taillights do not illuminate • Malfunction in wiring harness between rear combination light and ground • Malfunction in taillight operation circuit — Taillights do not illuminate • Brake light/taillight bulb malfunction • Malfunction in wiring harness between TNS relay and rear combination light

Diagnostic procedure

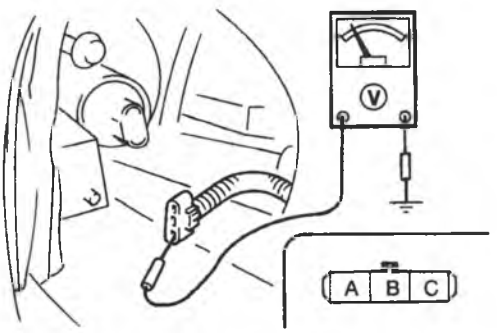
STEP	INSPECTION		ACTION
1	**INSPECT BULB** • Inspect brake light/taillight bulb. • Is bulb okay?	Yes	Go to next step.
		No	Replace brake light/taillight bulb.
2	**INSPECT WIRING HARNESS BETWEEN REAR COMBINATION LIGHT AND GND** • Partially peel off trunk compartment covering. (See 09-17-14 TRUNK COMPARTMENT COVERING REMOVAL/INSTALLATION) • Remove rear combination light. • Turn headlight switch to first or second position. • Measure voltage at terminal F at rear combination light connector of wiring harness. • Is voltage **B+**?  W6U901WX8	Yes	Repair wiring harness between rear combination light and ground.
		No	Repair wiring harness between TNS relay and rear combination light.

NO.11 PARKING LIGHTS DO NOT ILLUMINATE

Z6U090301052W13

11	Parking lights do not illuminate
POSSIBLE CAUSE	• Malfunction in parking light ground circuit — Parking lights do not illuminate • Malfunction in wiring harness between parking light and ground • Malfunction in parking light operation circuit — Parking lights do not illuminate • Front combination light bulb malfunction • Malfunction in wiring harness between TNS relay and front combination light

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT BULB** • Inspect front combination light bulb. • Is bulb okay?	Yes	Go to next step.
		No	Replace front combination light bulb.
2	**INSPECT WIRING HARNESS BETWEEN FRONT COMBINATION LIGHT AND GND** • Remove front combination light. • Connect front combination light connector. • Turn headlight switch to first position. • Measure voltage at terminal A at front combination light connector of wiring harness. • Is voltage **B**+?  W6U901WX9	Yes	Repair wiring harness between front combination light and ground.
		No	Repair wiring harness between TNS relay and front combination light.

09-03K SYMPTOM TROUBLESHOOTING [INTERIOR LIGHTING SYSTEM]

FOREWORD [INTERIOR LIGHTING SYSTEM] 09-03K-1
TROUBLESHOOTING INDEX [INTERIOR LIGHTING SYSTEM] 09-03K-1
NO.1 MAP LIGHT DOES NOT ILLUMINATE 09-03K-1
NO.2 INTERIOR LIGHT DOES NOT ILLUMINATE 09-03K-3
NO.3 WHEN INTERIOR LIGHT SWITCH IS AT DOOR, INTERIOR LIGHT DOES NOT ILLUMINATE (WHEN INTERIOR LIGHT SWITCH IS AT ON, INTERIOR LIGHT ILLUMINATES) 09-03K-4
NO.4 WHEN INTERIOR LIGHT SWITCH IS AT DOOR, INTERIOR LIGHTING CONTROL SYSTEM DOES NOT OPERATE PROPERLY ... 09-03K-6
NO.5 VANITY MIRROR ILLUMINATION DOES NOT TURN ON 09-03K-6

FOREWORD [INTERIOR LIGHTING SYSTEM]

Z6U090301053W01

- Thoroughly read and understand the basic flow of troubleshooting in order to properly perform the procedures. (See 00-00-2 HOW TO USE THIS MANUAL.)

TROUBLESHOOTING INDEX [INTERIOR LIGHTING SYSTEM]

Z6U090301053W02

- Use the chart below to verify the symptoms of the trouble in order to diagnose the appropriate area.

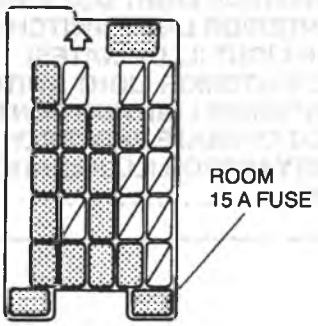
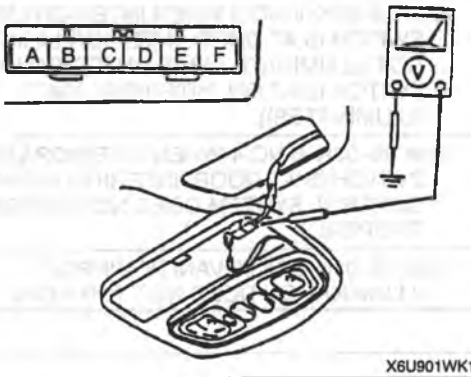
No.	TROUBLESHOOTING ITEM	PAGE
1	Map light does not illuminate	(See 09-03K-1 NO.1 MAP LIGHT DOES NOT ILLUMINATE)
2	Interior light does not illuminate	(See 09-03K-3 NO.2 INTERIOR LIGHT DOES NOT ILLUMINATE)
3	When interior light switch is at DOOR, interior light does not illuminate (When interior light switch is at ON, interior light illuminates)	(See 09-03K-4 NO.3 WHEN INTERIOR LIGHT SWITCH IS AT DOOR, INTERIOR LIGHT DOES NOT ILLUMINATE (WHEN INTERIOR LIGHT SWITCH IS AT ON, INTERIOR LIGHT ILLUMINATES))
4	When interior light switch is at DOOR, interior lighting control system does not operate properly	(See 09-03K-6 NO.4 WHEN INTERIOR LIGHT SWITCH IS AT DOOR, INTERIOR LIGHTING CONTROL SYSTEM DOES NOT OPERATE PROPERLY)
5	Vanity mirror illumination does not turn on	(See 09-03K-6 NO.5 VANITY MIRROR ILLUMINATION DOES NOT TURN ON)

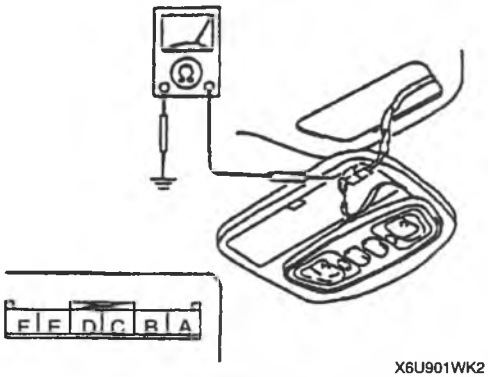
NO.1 MAP LIGHT DOES NOT ILLUMINATE

Z6U090301053W03

1	Map light does not illuminate
POSSIBLE CAUSE	• Malfunction in map light power supply — Map light does not illuminate • ROOM 15 A fuse malfunction • Malfunction in wiring harness between ROOM 15 A fuse and map light • Malfunction in map light operation circuit — Map light does not illuminate • Map light malfunction • Map light bulb malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT FUSE** ● Is ROOM 15 A fuse okay?  X6U901WK0	Yes	Go to next step.
		No	Replace fuse after repairing wiring harness.
2	**INSPECT BULB** ● Inspect map light bulb. ● Is map light bulb okay?	Yes	Go to next step.
		No	Replace map light bulb. (See 09-18-11 MAP LIGHT REMOVAL/INSTALLATION)
3	**INSPECT POWER SUPPLY CIRCUIT OF MAP LIGHT** ● Remove map light without disconnecting connector. (See 09-18-11 MAP LIGHT REMOVAL/INSTALLATION) ● Measure voltage at terminal B at map light connector of wiring harness. ● Is voltage **B+**?  X6U901WK1	Yes	Go to next step.
		No	Repair wiring harness between ROOM 15 A fuse and map light.

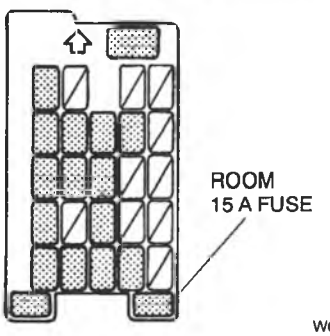
STEP	INSPECTION		ACTION
4	**INSPECT WIRING HARNESS BETWEEN MAP LIGHT AND GND** • Remove the map light. (See 09-18-11 MAP LIGHT REMOVAL/INSTALLATION) • Check for continuity between terminal C of map light connector and ground. • Is there continuity?  X6U901WK2	Yes	Replace map light. (See 09-18-11 MAP LIGHT REMOVAL/INSTALLATION)
		No	Repair wiring harness between map light and ground.

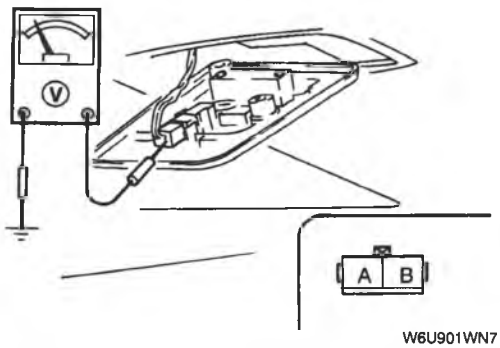
NO.2 INTERIOR LIGHT DOES NOT ILLUMINATE

Z6U090301053W04

2	Interior light does not illuminate
POSSIBLE CAUSE	• Malfunction in interior light power supply — Interior light does not illuminate • ROOM 15 A fuse malfunction • Malfunction in wiring harness between ROOM 15 A fuse and interior light • Malfunction in interior light operation circuit — Interior light does not illuminate • Interior light malfunction • Interior light bulb malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT FUSE** • Is ROOM 15 A fuse okay?  W6U901WN0	Yes	Go to next step.
		No	Replace fuse after repairing wiring harness.
2	**INSPECT BULB** • Inspect interior light bulb. • Is interior light bulb okay?	Yes	Go to next step.
		No	Replace interior light bulb. (See 09-18-11 INTERIOR LIGHT REMOVAL/INSTALLATION)

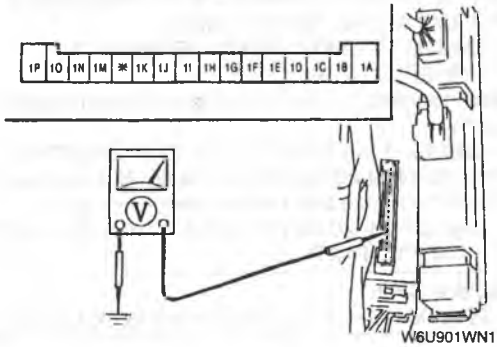
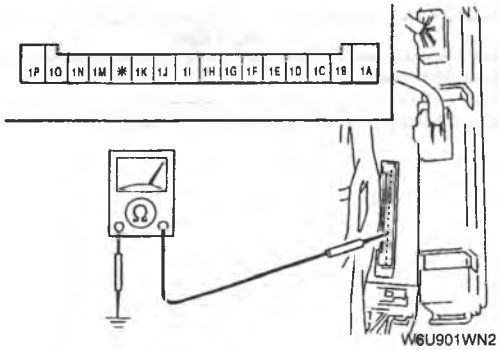
STEP	INSPECTION		ACTION
3	**INSPECT POWER SUPPLY CIRCUIT OF INTERIOR LIGHT** • Remove interior light without disconnecting connector. (See 09-18-11 INTERIOR LIGHT REMOVAL/INSTALLATION) • Measure voltage at terminal B at interior light connector of wiring harness. • Is voltage **B+**?  W6U901WN7	Yes	Go to next step.
		No	Repair wiring harness between ROOM 15 A fuse and interior light.
4	**INSPECT INTERIOR LIGHT** • Inspect interior light. (See 09-18-12 INTERIOR LIGHT INSPECTION) • Is interior light okay?	Yes	Repair wiring harnesses between interior light and ground, interior light and CPU.
		No	Replace interior light. (See 09-18-11 INTERIOR LIGHT REMOVAL/INSTALLATION)

NO.3 WHEN INTERIOR LIGHT SWITCH IS AT DOOR, INTERIOR LIGHT DOES NOT ILLUMINATE (WHEN INTERIOR LIGHT SWITCH IS AT ON, INTERIOR LIGHT ILLUMINATES)

Z6U090301053W05

3	**When interior light switch is at DOOR, interior light does not illuminate (When interior light switch is at ON, interior light illuminates)**
POSSIBLE CAUSE	• Malfunction in interior light timer operation circuit — Interior light does not illuminate • CPU malfunction • Door switch malfunction • Malfunction in wiring harness between CPU and door switch • Interior light malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT SIGNAL TO CPU** ● Remove driver's side front scuff plate. ● Remove driver's side front side trim. ● Remove nut fixed in joint box and remove CPU from joint box. ● Set interior light switch at DOOR. ● Measure voltage at terminal 1F at joint box. ● Is voltage **B**+?  W6U901WN1	Yes	Go to step 3.
		No	Go to step 2.
2	**INSPECT INTERIOR LIGHT** ● Inspect interior light. (See 09-18-12 INTERIOR LIGHT INSPECTION) ● Is interior light okay?	Yes	Repair wiring harness between interior light and CPU.
		No	Replace interior light. (See 09-18-11 INTERIOR LIGHT REMOVAL/INSTALLATION)
3	**INSPECT CPU** ● Inspect CPU. (See 09-40-1 CPU INSPECTION) ● Is CPU okay?	Yes	Go to next step.
		No	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION)
4	**INSPECT WIRING HARNESS BETWEEN JOINT BOX AND DOOR SWITCH** ● Open all doors. ● Check for continuity between 1I at joint box and door switch. ● Is there continuity?  W6U901WN2	Yes	Go to next step.
		No	Repair wiring harness between joint box and door switch.
5	**INSPECT DOOR SWITCH** ● Inspect door switch. (See 09-18-14 DOOR SWITCH INSPECTION) ● Is door switch okay?	Yes	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION)
		No	Replace door switch. (See 09-18-13 DOOR SWITCH REMOVAL/INSTALLATION)

NO.4 WHEN INTERIOR LIGHT SWITCH IS AT DOOR, INTERIOR LIGHTING CONTROL SYSTEM DOES NOT OPERATE PROPERLY

Z6U090301053W06

4	When interior light switch is at DOOR, interior lighting control system does not operate properly
POSSIBLE CAUSE	• Malfunction in interior lighting control system operation circuit — Interior lighting control system does not operate properly • CPU malfunction

Diagnostic procedure

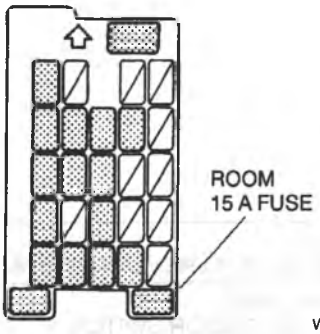
STEP	INSPECTION		ACTION
—	INSPECT CPU • Remove driver's side front scuff plate. • Remove driver's side front side trim. • Remove nut fixed in joint box and remove CPU from joint box. • Inspect terminal 1B and 1K of joint box, terminal 2O of CPU connector. (See 09-40-1 CPU INSPECTION) • Is each terminal okay?	Yes	When terminal 1B at joint box is not okay, inspect ROOM 15 A fuse and key reminder switch. (See 09-21-2 KEY REMINDER SWITCH INSPECTION) When terminal 1K at joint box is not okay, inspect door lock switch. (See 09-14-6 DOOR LOCK SWITCH INSPECTION) When terminal 2O at CPU connector B is not okay, inspect ROOM 15 A fuse and keyless control module. (See 09-14-20 KEYLESS CONTROL MODULE INSPECTION)
		No	Replace CPU. (See 09-40-1 CPU REMOVAL/INSTALLATION)

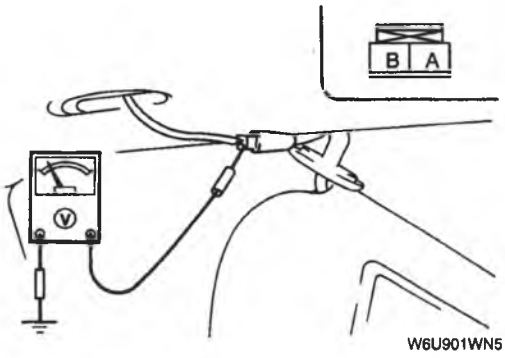
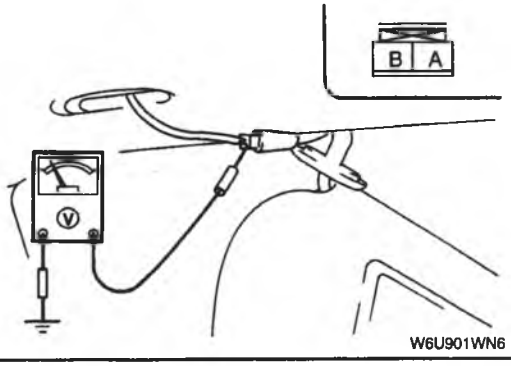
NO.5 VANITY MIRROR ILLUMINATION DOES NOT TURN ON

Z6U090301053W07

5	Vanity mirror illumination does not turn on
POSSIBLE CAUSE	• Malfunction in vanity mirror illumination power supply/ground circuit — Vanity mirror illumination does not turn on • ROOM 15 A fuse malfunction • Malfunction in wiring harness between ROOM 15 A fuse and vanity mirror illumination • Malfunction in wiring harness between vanity mirror illumination and ground • Malfunction in vanity mirror illumination operation circuit — Vanity mirror illumination does not turn on • Vanity mirror illumination bulb malfunction • Vanity mirror illumination malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	INSPECT FUSE • Is ROOM 15 A fuse okay?  W6U901WN4	Yes	Go to next step.
		No	Replace fuse after repairing wiring harness.

STEP	INSPECTION		ACTION
2	**INSPECT POWER SUPPLY CIRCUIT OF VANITY MIRROR ILLUMINATION** • Remove sunvisor without disconnecting vanity mirror illumination connector. • Measure voltage at terminal A at vanity mirror illumination connector of wiring harness. • Is voltage **B+**?  W6U901WN5	Yes	Go to next step.
		No	Repair wiring harness between ROOM 15 A fuse and vanity mirror illumination.
3	**INSPECT BULB** • Inspect vanity mirror illumination bulb. • Is bulb okay?	Yes	Go to next step.
		No	Replace vanity mirror illumination bulb. (See 09-18-13 VANITY MIRROR ILLUMINATION REMOVAL/INSTALLATION)
4	**INSPECT WIRING HARNESS BETWEEN VANITY MIRROR ILLUMINATION AND GND** • Open vanity mirror cover. • Measure voltage at terminal B at vanity mirror illumination connector of wiring harness. • Is voltage **B+**?  W6U901WN6	Yes	Repair wiring harness between vanity mirror illumination and ground.
		No	Replace sunvisor. (See 09-17-15 HEADLINER REMOVAL/INSTALLATION)

09-03L SYMPTOM TROUBLESHOOTING [SIGNAL LIGHTING SYSTEM]

FOREWORD [SIGNAL LIGHTING SYSTEM] 09-03L-1
TROUBLESHOOTING INDEX [SIGNAL LIGHTING SYSTEM] 09-03L-1
NO.1 TURN AND HAZARD WARNING FUNCTIONS DO NOT OPERATE 09-03L-2
NO.2 TURN SIGNAL FUNCTION DOES NOT OPERATE (HAZARD WARNING FUNCTION OPERATES) 09-03L-5
NO.3 HAZARD WARNING FUNCTION DOES NOT OPERATE (TURN SIGNAL FUNCTION OPERATES) 09-03L-6
NO.4 LEFT OR RIGHT TURN SIGNAL FUNCTION DOES NOT OPERATE (HAZARD WARNING FUNCTION OPERATES) 09-03L-7
NO.5 BRAKE LIGHTS DO NOT ILLUMINATE 09-03L-8
NO.6 BRAKE LIGHT ON ONE SIDE DOES NOT ILLUMINATE 09-03L-9
NO.7 HIGH-MOUNT BRAKE LIGHT DOES NOT ILLUMINATE 09-03L-10
NO.8 BACK-UP LIGHTS DO NOT ILLUMINATE 09-03L-11
NO.9 ONE BACK-UP LIGHT DOES NOT ILLUMINATE 09-03L-12

FOREWORD [SIGNAL LIGHTING SYSTEM]

Z6U090301054W01

- Refer to 00-00 GENERAL INFORMATION and thoroughly read and understand the basic flow of troubleshooting to properly perform the procedures.

TROUBLESHOOTING INDEX [SIGNAL LIGHTING SYSTEM]

Z6U090301054W02

- Use the chart below to verify the symptoms of the trouble in order to diagnose the appropriate area.

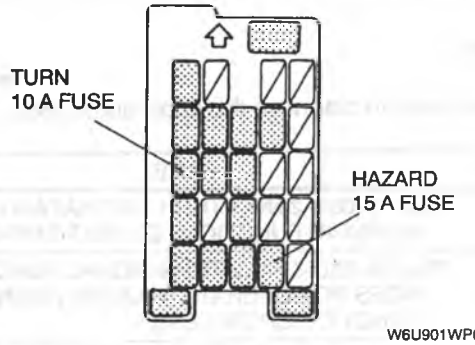
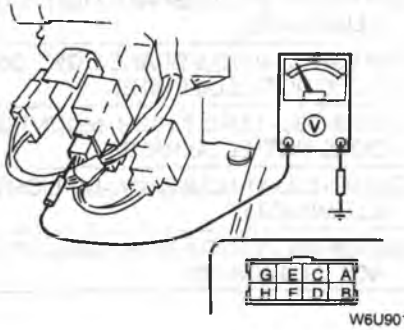
No.	TROUBLESHOOTING ITEM	PAGE
1	Turn and hazard warning functions do not operate	(See 09-03L-2 NO.1 TURN AND HAZARD WARNING FUNCTIONS DO NOT OPERATE)
2	Turn signal function does not operate (Hazard warning function operates)	(See 09-03L-5 NO.2 TURN SIGNAL FUNCTION DOES NOT OPERATE (HAZARD WARNING FUNCTION OPERATES))
3	Hazard warning function does not operate (Turn signal function operates)	(See 09-03L-6 NO.3 HAZARD WARNING FUNCTION DOES NOT OPERATE (TURN SIGNAL FUNCTION OPERATES))
4	Left or right turn signal function does not operate (Hazard warning function operates)	(See 09-03L-7 NO.4 LEFT OR RIGHT TURN SIGNAL FUNCTION DOES NOT OPERATE (HAZARD WARNING FUNCTION OPERATES))
5	Brake lights do not illuminate	(See 09-03L-8 NO.5 BRAKE LIGHTS DO NOT ILLUMINATE)
6	Brake light on one side does not illuminate	(See 09-03L-9 NO.6 BRAKE LIGHT ON ONE SIDE DOES NOT ILLUMINATE)
7	High-mount brake light does not illuminate	(See 09-03L-10 NO.7 HIGH-MOUNT BRAKE LIGHT DOES NOT ILLUMINATE)
8	Back-up lights do not illuminate	(See 09-03L-11 NO.8 BACK-UP LIGHTS DO NOT ILLUMINATE)
9	One back-up light does not illuminate	(See 09-03L-12 NO.9 ONE BACK-UP LIGHT DOES NOT ILLUMINATE)

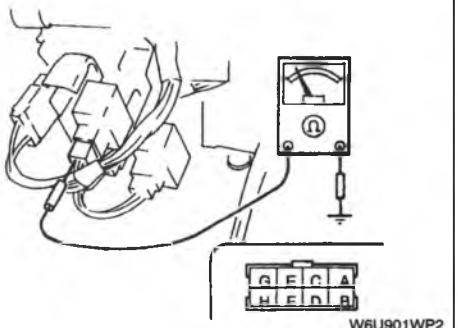
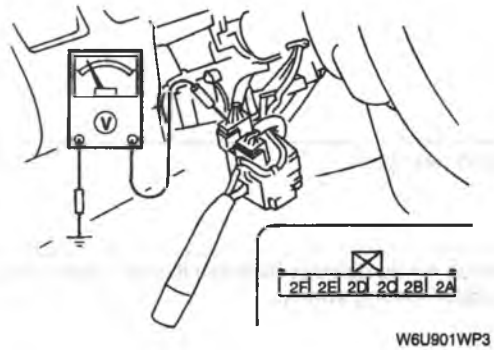
NO.1 TURN AND HAZARD WARNING FUNCTIONS DO NOT OPERATE

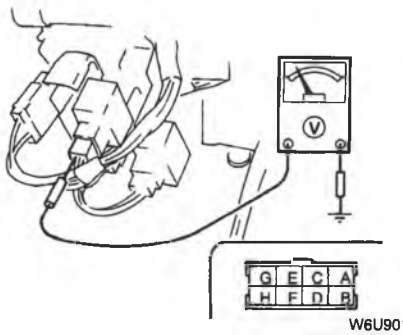
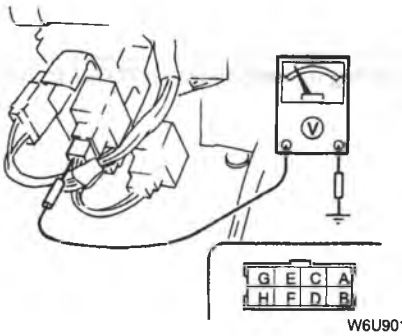
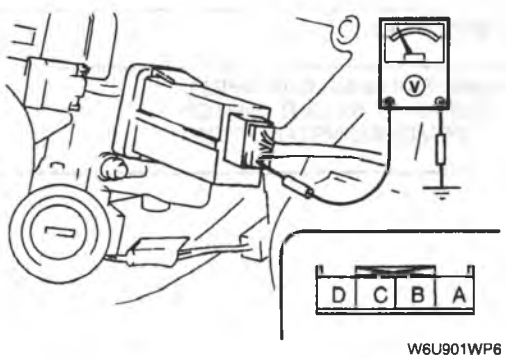
Z6U090301054W03

1	Turn and hazard warning functions do not operate
POSSIBLE CAUSE	• Malfunction in turn and hazard warning functions power supply/ground circuit — Turn signal and hazard warning lights do not illuminate • HAZARD 15 A fuse malfunction • TURN 10 A fuse malfunction • Malfunction in wiring harness between HAZARD 15 A fuse and flasher control module • Malfunction in wiring harness between TURN 10 A fuse and light switch (turn switch) • Malfunction in wiring harness between flasher control module and ground • Malfunction in wiring harness between hazard warning switch and ground • Malfunction in turn and hazard warning functions operation circuit — Turn signal and hazard warning lights do not illuminate • Light switch (turn switch) malfunction • Flasher control module malfunction • Hazard warning switch malfunction • Malfunction in wiring harness between light switch (turn switch) and flasher control module • Malfunction in wiring harness between flasher control module and hazard warning switch

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT FUSE** • Are HAZARD 15 A fuse and TURN 10 A fuse okay?  W6U901WP0	Yes	Go to next step.
		No	Replace fuse after repairing wiring harness.
2	**INSPECT POWER SUPPLY CIRCUIT OF FLASHER CONTROL MODULE** • Measure voltage at terminal A at flasher control module connector of wiring harness. • Is voltage **B+**?  W6U901WP1	Yes	Go to next step.
		No	Repair wiring harness between HAZARD 15 A fuse and flasher control module.

STEP	INSPECTION		ACTION
3	**INSPECT WIRING HARNESS BETWEEN FLASHER CONTROL MODULE AND GND** ● Disconnect the flasher control module connector. ● Check for continuity between terminal B at flasher control module connector of wiring harness and ground. ● Is there continuity?  W6U901WP2	Yes	Go to next step.
		No	Repair wiring harness between flasher control module and ground.
4	**INSPECT FLASHER CONTROL MODULE** ● Connect flasher control module connector. ● Inspect flasher control module. (See 09-18-10 FLASHER CONTROL MODULE INSPECTION) ● Is flasher control module okay?	Yes	Go to next step.
		No	Replace flasher control module. (See 09-18-9 FLASHER CONTROL MODULE REMOVAL/INSTALLATION)
5	**INSPECT POWER SUPPLY CIRCUIT OF TURN SWITCH** ● Remove column cover. ● Remove light switch (turn switch) without disconnecting connectors. ● Turn ignition switch to ON. ● Measure voltage at terminal 2C at light switch (turn switch) connector of wiring harness. ● Is voltage **B+**?  W6U901WP3	Yes	Go to next step.
		No	Repair wiring harness between TURN 10 A fuse and turn switch.
6	**INSPECT LIGHT SWITCH** ● Turn ignition switch to LOCK. ● Inspect light switch (turn switch). (See 09-18-7 LIGHT SWITCH INSPECTION) ● Is light switch (turn switch) okay?	Yes	Go to next step.
		No	Replace light switch (turn switch). (See 09-18-6 LIGHT SWITCH REMOVAL/INSTALLATION)

STEP	INSPECTION		ACTION
7	**INSPECT WIRING HARNESS BETWEEN LIGHT SWITCH AND FLASHER CONTROL MODULE** • Turn ignition switch to ON. • Turn turn switch to left. • Measure voltage at terminal F at flasher control module connector of wiring harness. • Is voltage **B**+?  W6U901WP4	Yes	Go to next step.
		No	Repair wiring harness between light switch (turn switch) and flasher control module.
8	**INSPECT WIRING HARNESS BETWEEN LIGHT SWITCH AND FLASHER CONTROL MODULE** • Turn turn switch to right. • Measure voltage at terminal D at flasher control module connector of wiring harness. • Is voltage **B**+?  W6U901WP5	Yes	Turn ignition switch to LOCK. Go to next step.
		No	Repair wiring harness between light switch (turn switch) and flasher control module.
9	**INSPECT WIRING HARNESS BETWEEN FLASHER CONTROL MODULE AND HAZARD WARNING SWITCH** • Measure voltage at terminal A at hazard warning switch connector of wiring harness. • Is voltage **B**+?  W6U901WP6	Yes	Go to next step.
		No	Repair wiring harness between flasher control module and hazard warning switch.

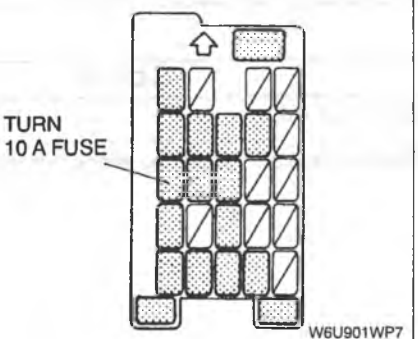
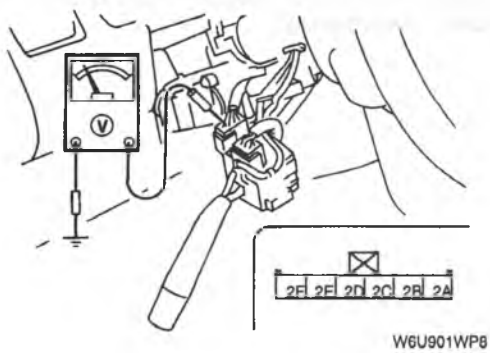
STEP	INSPECTION		ACTION
10	**INSPECT HAZARD WARNING SWITCH** ● Inspect hazard warning switch. (See 09-18-8 HAZARD WARNING SWITCH INSPECTION) ● Is hazard warning switch okay?	Yes	Repair wiring harness between hazard warning switch and ground.
		No	Replace hazard warning switch. (See 09-18-7 HAZARD WARNING SWITCH REMOVAL/INSTALLATION)

NO.2 TURN SIGNAL FUNCTION DOES NOT OPERATE (HAZARD WARNING FUNCTION OPERATES)

Z6U090301054W04

2	Turn signal function does not operate (Hazard warning function operates)
POSSIBLE CAUSE	● Malfunction in turn signal function power supply circuit — Turn signal lights do not illuminate (Hazard warning lights illuminate) ● TURN 10 A fuse malfunction ● Malfunction in wiring harness between TURN 10 A fuse and light switch (turn switch) ● Malfunction in turn signal function operation circuit — Turn signal lights do not illuminate (Hazard warning lights illuminate) ● Light switch (turn switch) malfunction ● Flasher control module malfunction ● Malfunction in wiring harness between light switch (turn switch) and flasher control module

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT FUSE** ● Is TURN 10 A fuse okay?  W6U901WP7	Yes	Go to next step.
		No	Replace fuse after repairing wiring harness.
2	**INSPECT POWER SUPPLY CIRCUIT OF LIGHT SWITCH** ● Remove column cover. ● Remove light switch (turn switch) without disconnecting connectors. ● Turn ignition switch to ON. ● Measure voltage at terminal 2C at light switch (turn switch) connector of wiring harness. ● Is voltage **B**+?  W6U901WP8	Yes	Go to next step.
		No	Repair wiring harness between TURN 10 A fuse and light switch (turn switch).

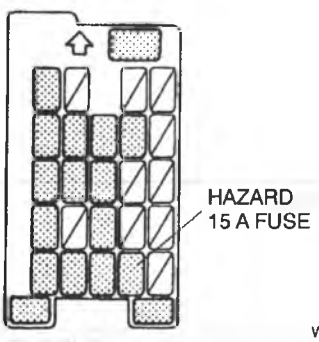
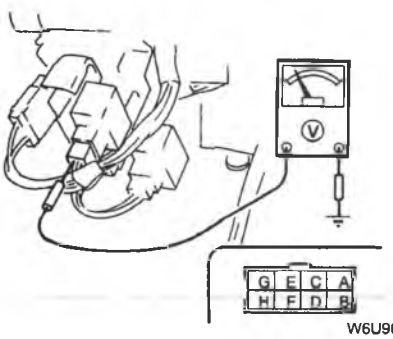
STEP	INSPECTION		ACTION
3	**INSPECT LIGHT SWITCH** • Inspect light switch (turn switch). (See 09-18-7 LIGHT SWITCH INSPECTION) • Is light switch (turn switch) okay?	Yes	Go to next step.
		No	Replace light switch (turn switch). (See 09-18-6 LIGHT SWITCH REMOVAL/INSTALLATION)
4	**INSPECT FLASHER CONTROL MODULE** • Inspect flasher control module. (See 09-18-10 FLASHER CONTROL MODULE INSPECTION) • Is flasher control module okay?	Yes	Repair wiring harness between light switch (turn switch) and flasher control module.
		No	Replace flasher control module. (See 09-18-9 FLASHER CONTROL MODULE REMOVAL/INSTALLATION)

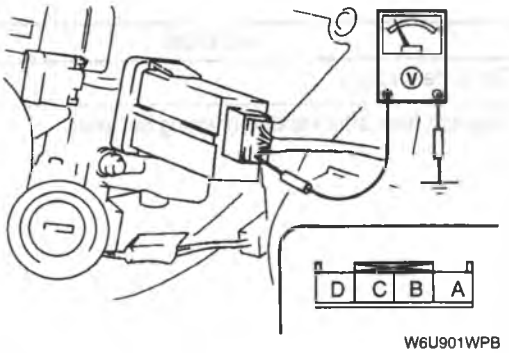
NO.3 HAZARD WARNING FUNCTION DOES NOT OPERATE (TURN SIGNAL FUNCTION OPERATES)

Z6U090301054W05

3	**Hazard warning function does not operate (Turn signal function operates)**
POSSIBLE CAUSE	• Malfunction in hazard warning function power supply circuit — Hazard warning lights do not illuminate (Turn signal lights illuminate) • HAZARD 15 A fuse malfunction • Malfunction in wiring harness between HAZARD 15 A fuse and flasher control module • Malfunction in hazard warning function operation circuit — Hazard warning lights do not illuminate (Turn signal lights illuminate) • Flasher control module malfunction • Hazard warning switch malfunction • Malfunction in wiring harness between flasher control module and hazard warning switch • Malfunction in wiring harness between hazard warning switch and ground

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT FUSE** • Is HAZARD 15 A fuse okay?  W6U901WP9	Yes	Go to next step.
		No	Replace fuse after repairing wiring harness.
2	**INSPECT POWER SUPPLY CIRCUIT OF FLASHER CONTROL MODULE** • Measure voltage at terminal A at flasher control module connector of wiring harness. • Is voltage **B+**?  W6U901WPA	Yes	Go to next step.
		No	Repair wiring harness between HAZARD 15 A fuse and flasher control module.

STEP	INSPECTION		ACTION
3	**INSPECT FLASHER CONTROL MODULE** • Inspect flasher control module. (See 09-18-10 FLASHER CONTROL MODULE INSPECTION) • Is flasher control module okay?	Yes	Go to next step.
		No	Replace flasher control module. (See 09-18-9 FLASHER CONTROL MODULE REMOVAL/INSTALLATION)
4	**INSPECT WIRING HARNESS BETWEEN FLASHER CONTROL MODULE AND HAZARD WARNING SWITCH** • Measure voltage at terminal A at hazard warning switch connector of wiring harness. • Is voltage **B+**?  W6U901WPB	Yes	Go to next step.
		No	Repair wiring harness between flasher control module and hazard warning switch.
5	**INSPECT HAZARD WARNING SWITCH** • Inspect hazard warning switch. (See 09-18-8 HAZARD WARNING SWITCH INSPECTION) • Is hazard warning switch okay?	Yes	Repair wiring harness between hazard warning switch and ground.
		No	Replace hazard warning switch. (See 09-18-7 HAZARD WARNING SWITCH REMOVAL/INSTALLATION)

NO.4 LEFT OR RIGHT TURN SIGNAL FUNCTION DOES NOT OPERATE (HAZARD WARNING FUNCTION OPERATES)

Z6U090301054W06

4	**Left or right turn signal function does not operate (Hazard warning function operates)**
POSSIBLE CAUSE	• Malfunction in turn signal function operation circuit — Left or right turn signal light does not illuminate (Hazard warning lights illuminate) • Light switch (turn switch) malfunction • Flasher control module malfunction • Malfunction in wiring harness between turn switch and flasher control module

Diagnostic procedure

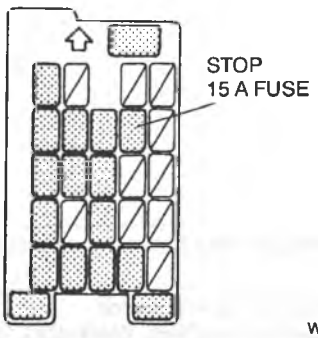
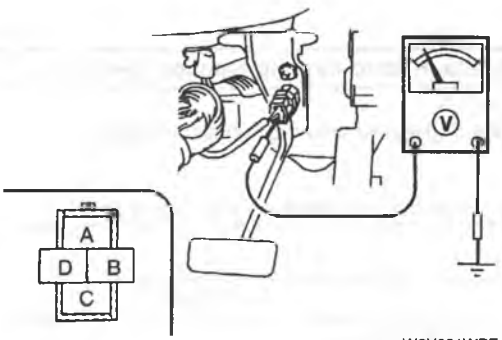
STEP	INSPECTION		ACTION
1	**INSPECT LIGHT SWITCH** • Inspect light switch (turn switch). (See 09-18-7 LIGHT SWITCH INSPECTION) • Is light switch (turn switch) okay?	Yes	Go to next step.
		No	Replace light switch (turn switch). (See 09-18-6 LIGHT SWITCH REMOVAL/INSTALLATION)
2	**INSPECT FLASHER CONTROL MODULE** • Inspect flasher control module. (See 09-18-10 FLASHER CONTROL MODULE INSPECTION) • Is flasher control module okay?	Yes	Repair wiring harness between turn switch and flasher control module.
		No	Replace flasher control module. (See 09-18-9 FLASHER CONTROL MODULE REMOVAL/INSTALLATION)

NO.5 BRAKE LIGHTS DO NOT ILLUMINATE

Z6U090301054W07

5	Brake lights do not illuminate
POSSIBLE CAUSE	• Malfunction in brake lights power supply/ground circuit — Brake lights do not illuminate • STOP 15 A fuse malfunction • Malfunction in wiring harness between STOP 15 A fuse and brake switch • Malfunction in wiring harness between brake light and ground • Malfunction in brake lights operation circuit — Brake lights do not illuminate • Brake switch malfunction • Brake light bulb malfunction • Malfunction in wiring harness between brake switch and brake lights

Diagnostic procedure

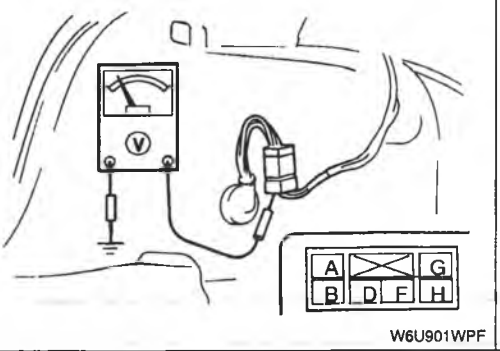
STEP	INSPECTION		ACTION
1	**INSPECT FUSE** • Is STOP 15 A fuse okay?  W6U901WPD	Yes	Go to next step.
		No	Replace fuse after repairing wiring harness.
2	**INSPECT CONTINUITY BETWEEN FUSE AND BRAKE SWITCH** • Measure voltage at terminal A at brake switch connector of wiring harness. • Is voltage **B+**?  W6U901WPE	Yes	Go to next step.
		No	Repair wiring harness between STOP 15 A fuse and brake switch.
3	**INSPECT BRAKE SWITCH** • Inspect brake switch. (See 04-11-6 BRAKE SWITCH INSPECTION) • Is brake switch okay?	Yes	Repair wiring harness between brake switch and brake lights.
		No	Replace brake switch. (See 04-11-5 BRAKE PEDAL REMOVAL/INSTALLATION)

NO.6 BRAKE LIGHT ON ONE SIDE DOES NOT ILLUMINATE

Z6U090301054W08

6	Brake light on one side does not illuminate
POSSIBLE CAUSE	• Malfunction in brake lights operation circuit — Brake light on one side does not illuminate • Brake light bulb malfunction • Malfunction in wiring harness between brake switch and brake light • Malfunction in brake lights ground circuit — Brake light on one side does not illuminate • Malfunction in wiring harness between brake light and ground

Diagnostic procedure

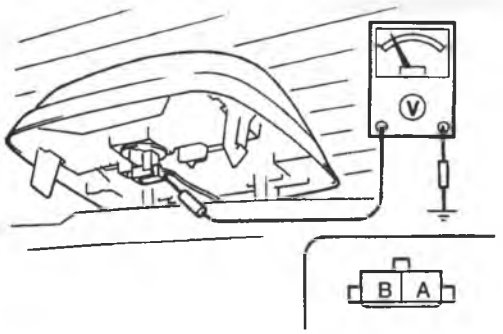
STEP	INSPECTION		ACTION
1	**INSPECT BULB** • Partially peel off trunk compartment covering. (See 09-17-14 TRUNK COMPARTMENT COVERING REMOVAL/INSTALLATION) • Remove rear combination light. • Inspect brake light bulb. • Is brake light bulb okay?	Yes	Go to next step.
		No	Replace brake light/taillight bulb. (See 09-18-3 REAR COMBINATION LIGHT REMOVAL/INSTALLATION)
2	**INSPECT WIRING HARNESS BETWEEN REAR COMBINATION LIGHT AND GND** • Press brake pedal. • Measure voltage at terminal B at rear combination light connector of wiring harness. • Is voltage B + ?  W6U901WPF	Yes	Repair wiring harness between rear combination light and ground.
		No	Repair wiring harness between brake switch and rear combination light.

NO.7 HIGH-MOUNT BRAKE LIGHT DOES NOT ILLUMINATE

Z6U090301054W09

7	High-mount brake light does not illuminate
POSSIBLE CAUSE	• Malfunction in high-mount brake light operation circuit — High-mount brake light does not illuminate • High-mount brake light bulb malfunction • Malfunction in wiring harness between brake switch and high-mount brake light • Malfunction in high-mount brake light ground circuit — High-mount brake light does not illuminate • Malfunction in wiring harness between high-mount brake light and ground

Diagnostic procedure

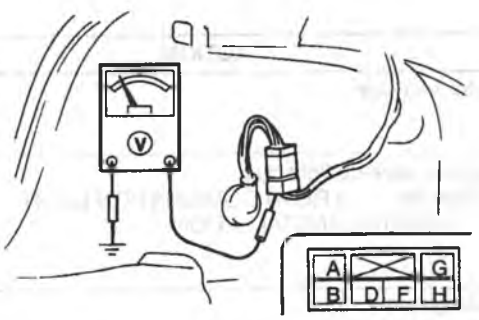
STEP	INSPECTION		ACTION
1	**INSPECT BULB** • Remove high-mount brake light bulb. (See 09-18-4 HIGH-MOUNT BRAKE LIGHT BULB REMOVAL/INSTALLATION) • Inspect high-mount brake light bulb. • Is high-mount brake light bulb okay?	Yes	Go to next step.
		No	Replace high-mount brake light bulb. (See 09-18-4 HIGH-MOUNT BRAKE LIGHT BULB REMOVAL/INSTALLATION)
2	**INSPECT WIRING HARNESS BETWEEN HIGH-MOUNT BRAKE SWITCH AND GND** • Press brake pedal. • Measure voltage at terminal A at high-mount brake light connector of wiring harness. • Is voltage **B+**?  W6U901WPG	Yes	Repair wiring harness between high-mount brake light and ground.
		No	Repair wiring harness between brake switch and high-mount brake light.

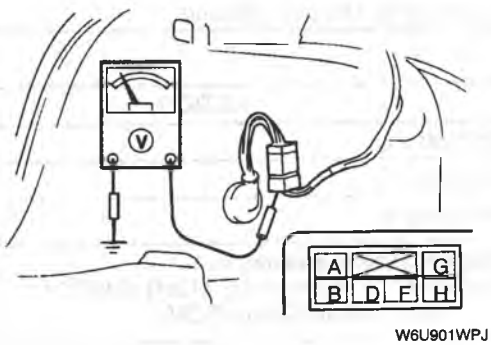
NO.8 BACK-UP LIGHTS DO NOT ILLUMINATE

Z6U090301054W10

8	Back-up lights do not illuminate.
POSSIBLE CAUSE	• Malfunction in back-up lights operation circuit — Back-up lights do not illuminate • Back-up light switch or transaxle range switch malfunction • Back-up light bulb malfunction • Malfunction in wiring harness between back-up light switch, transaxle range switch and back-up light bulb • Malfunction in back-up lights ground circuit — Back-up lights do not illuminate • Malfunction in wiring harness between back-up light bulb and ground

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is it a MTX vehicle?	Yes	Go to step 2.
		No	Go to step 3.
2	**INSPECT BACK-UP LIGHT SWITCH** • Inspect back-up light switch. (See 09-18-5 BACK-UP LIGHT SWITCH INSPECTION) • Is back-up light switch okay?	Yes	Go to step 4.
		No	Replace back-up light switch. (See 09-18-5 BACK-UP LIGHT SWITCH REMOVAL/INSTALLATION)
3	**INSPECT TRANSAXLE RANGE SWITCH** • Inspect transaxle range switch. (See 05-17A-29 Transaxle Range Switch Instruction) (See 05-17B-23 TRANSAXLE RANGE SWITCH INSPECTION [GF4A-EL]) • Is transaxle range switch okay?	Yes	Go to step 5.
		No	Replace transaxle range switch. (See 05-17A-31 TRANSAXLE RANGE SWITCH REMOVAL/INSTALLATION [LA4A-EL]) (See 05-17B-24 TRANSAXLE RANGE SWITCH REMOVAL/INSTALLATION [GF4A-EL])
4	**INSPECT WIRING HARNESS BETWEEN BACK-UP LIGHT SWITCH AND GND** • Turn ignition switch to ON. • Move shift lever knob to reverse position. • Measure voltage at terminal D at rear combination light connector of wiring harness. • Is voltage **B+**?  W6U901WPH	Yes	Repair wiring harness between back-up light and ground.
		No	Repair wiring harness between back-up light switch and back-up light.

STEP	INSPECTION		ACTION
5	**INSPECT WIRING HARNESS BETWEEN BACK-UP LIGHT SWITCH AND BACK-UP LIGHT** ● Turn ignition switch to ON. ● Move selector lever to reverse position. ● Measure voltage at terminal D at rear combination light connector of wiring harness. ● Is voltage B+?  W6U901WPJ	Yes	Repair wiring harness between back-up light switch and back-up light.
		No	Repair wiring harness between transaxle range switch and back-up light.

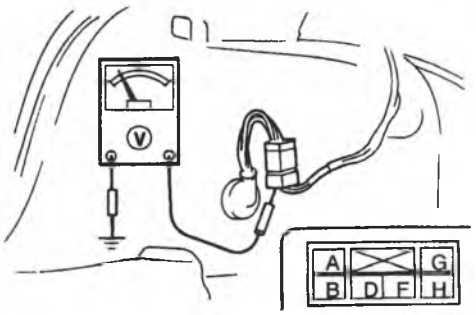
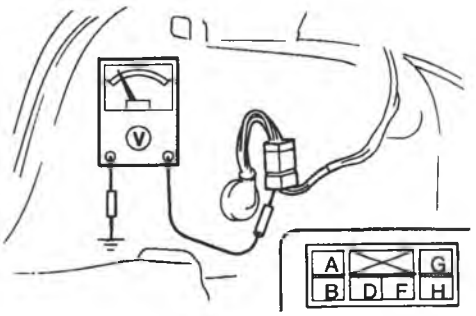
NO.9 ONE BACK-UP LIGHT DOES NOT ILLUMINATE

Z6U090301054W11

9	**One back-up light does not illuminate.**
POSSIBLE CAUSE	● Malfunction in back-up light operation circuit — One back-up light does not illuminate ● Back-up light bulb malfunction ● Malfunction in wiring harness between back-up light switch or transaxle range switch malfunction and back-up light bulb ● Malfunction in back-up light ground circuit — One back-up light does not illuminate ● Malfunction in wiring harness between back-up light bulb and ground

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT BULB** ● Partially peel off trunk compartment covering. (See 09-17-14 TRUNK COMPARTMENT COVERING REMOVAL/INSTALLATION) ● Remove rear combination light. ● Inspect back-up light bulb not illuminating. ● Is back-up light bulb okay?	Yes	Go to next step.
		No	Replace back-up light bulb. (See 09-18-3 REAR COMBINATION LIGHT REMOVAL/INSTALLATION)
2	● Is it a MTX vehicle?	Yes	Go to step 3.
		No	Go to step 4.

STEP	INSPECTION		ACTION
3	**INSPECT WIRING HARNESS BETWEEN BACK-UP LIGHT AND GND** ● Turn ignition switch to ON. ● Move shift lever knob to reverse position. ● Measure voltage at terminal D at rear combination light connector of wiring harness. (Inspect only back-up light which is not illuminating.) ● Is voltage **B**+?  W6U901WPK	Yes	Repair wiring harness between back-up light and ground.
		No	Repair wiring harness between back-up light switch and back-up light.
4	**INSPECT WIRING HARNESS BETWEEN BACK-UP LIGHT AND GND** ● Turn ignition switch to ON. ● Move selector lever to reverse position. ● Measure voltage at terminal D at rear combination light connector of wiring harness. (Inspect only back-up light which is not illuminating.) ● Is voltage **B**+?  W6U901WPL	Yes	Repair wiring harness between back-up light and ground.
		No	Repair wiring harness between transaxle range switch and back-up light.

09-03M SYMPTOM TROUBLESHOOTING [WIPER/WASHER SYSTEMS]

FOREWORD [WIPER/WASHER SYSTEMS] 09-03M-1
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NO.11 WASHER FLUID-LEVEL WARNING LIGHT REMAINS ILLUMINATED WHEN WASHER FLUID LEVEL IS ABOVE LOW (ENGINE IS RUNNING) 09-03M-8
NO.12 WASHER FLUID-LEVEL WARNING LIGHT DOES NOT ILLUMINATE WHEN WASHER FLUID LEVEL IS BELOW LOW (ENGINE IS RUNNING) 09-03M-8

FOREWORD [WIPER/WASHER SYSTEMS]

Z6U090301063W01

- Thoroughly read and understand the basic flow of troubleshooting in order to properly perform the procedures. (See 00-00-2 HOW TO USE THIS MANUAL.)

TROUBLESHOOTING INDEX [WIPER/WASHER SYSTEMS]

Z6U090301063W02

No.	TROUBLESHOOTING ITEM	PAGE
1	Wipers and washer do not operate	(See 09-03M-2 NO.1 WIPERS AND WASHER DO NOT OPERATE)
2	Low speed wiper operation is not possible (Other functions operate normally)	(See 09-03M-3 NO.2 LOW SPEED WIPER OPERATION IS NOT POSSIBLE (OTHER FUNCTIONS OPERATE NORMALLY))
3	High speed wiper operation is not possible (Other functions operate normally)	(See 09-03M-3 NO.3 HIGH SPEED WIPER OPERATION IS NOT POSSIBLE (OTHER FUNCTIONS OPERATE NORMALLY))
4	Wipers continue operation after windshield wiper and washer switch is turned to OFF	(See 09-03M-4 NO.4 WIPERS CONTINUE OPERATION AFTER WINDSHIELD WIPER AND WASHER SWITCH IS TURNED TO OFF)
5	Intermittent wiper operation is not possible (Other functions operate normally)	(See 09-03M-4 NO.5 INTERMITTENT WIPER OPERATION IS NOT POSSIBLE (OTHER FUNCTIONS OPERATE NORMALLY))
6	Wipers continue intermittent operation	(See 09-03M-4 NO.6 WIPERS CONTINUE INTERMITTENT OPERATION)
7	One-touch wiper operation is not possible (Other functions operate normally)	(See 09-03M-5 NO.7 ONE-TOUCH WIPER OPERATION IS NOT POSSIBLE (OTHER FUNCTIONS OPERATE NORMALLY))
8	Autostop operation does not work (Wipers immediately stop when windshield wiper and washer switch is turned to OFF)	(See 09-03M-5 NO.8 AUTOSTOP OPERATION DOES NOT WORK (WIPERS IMMEDIATELY STOP WHEN WINDSHIELD WIPER AND WASHER SWITCH IS TURNED TO OFF))
9	Washer does not operate (Wipers operate)	(See 09-03M-6 NO.9 WASHER DOES NOT OPERATE (WIPERS OPERATE))
10	Washer operates with windshield washer switch turned to OFF	(See 09-03M-7 NO.10 WASHER OPERATES WITH WINDSHIELD WASHER SWITCH TURNED TO OFF)

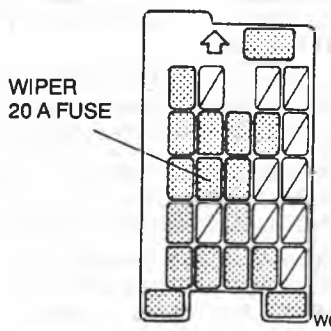
No.	TROUBLESHOOTING ITEM	PAGE
11	Washer fluid-level warning light remains illuminated when washer fluid level is above LOW (Engine is running)	(See 09-03M-8 NO.11 WASHER FLUID-LEVEL WARNING LIGHT REMAINS ILLUMINATED WHEN WASHER FLUID LEVEL IS ABOVE LOW (ENGINE IS RUNNING))
12	Washer fluid-level warning light does not illuminate when washer fluid level is below LOW (Engine is running)	(See 09-03M-8 NO.12 WASHER FLUID-LEVEL WARNING LIGHT DOES NOT ILLUMINATE WHEN WASHER FLUID LEVEL IS BELOW LOW (ENGINE IS RUNNING))

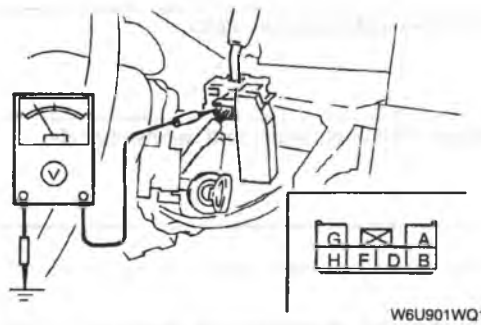
NO.1 WIPERS AND WASHER DO NOT OPERATE

Z6U090301063W03

1	Wipers and washer do not operate
POSSIBLE CAUSE	• Malfunction in windshield wiper and washer switch power supply circuit — Wipers do not operate • WIPER 20 A fuse malfunction • Windshield wiper and washer switch malfunction • Malfunction in wiring harness between WIPER 20 A fuse and windshield wiper and washer switch — Washer does not operate • WIPER 20 A fuse malfunction • Windshield wiper and washer switch malfunction • Malfunction in wiring harness between WIPER 20 A fuse and windshield wiper and washer switch • Malfunction in windshield wiper and washer switch input signal circuit — Wipers do not operate • Windshield wiper and washer switch malfunction — Washer does not operate • Windshield wiper and washer switch malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT FUSE** • Is WIPER 20 A fuse okay?  W6U901WQ0	Yes	Go to next step.
		No	Replace fuse after repairing wiring harness.

STEP	INSPECTION		ACTION
2	**INSPECT POWER SUPPLY CIRCUIT OF WINDSHIELD WIPER AND WASHER SWITCH** ● Remove column cover. ● Remove windshield wiper and washer switch without disconnecting windshield wiper and washer switch connector. ● Turn ignition switch to ON. ● Measure voltage at terminal B at windshield wiper and washer switch connector of wiring harness. ● Is voltage **B +** ?  W6U901WQ1	Yes	Replace windshield wiper and washer switch.
		No	Repair wiring harness between WIPER 20 A fuse and windshield wiper and washer switch.

NO.2 LOW SPEED WIPER OPERATION IS NOT POSSIBLE (OTHER FUNCTIONS OPERATE NORMALLY)

Z6U090301063W04

2	**Low speed wiper operation is not possible (Other functions operate normally)**
POSSIBLE CAUSE	● Malfunction in windshield wiper and washer switch Input signal circuit — Low speed wiper operation is not possible ● Windshield wiper and washer switch malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
—	—	—	Replace windshield wiper and washer switch.

NO.3 HIGH SPEED WIPER OPERATION IS NOT POSSIBLE (OTHER FUNCTIONS OPERATE NORMALLY)

Z6U090301063W05

3	**High speed wiper operation is not possible (Other functions operate normally)**
POSSIBLE CAUSE	● Malfunction in windshield wiper and washer switch input signal circuit — High speed wiper operation is not possible ● Windshield wiper and washer switch malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
—	—	—	Replace windshield wiper and washer switch.

NO.4 WIPERS CONTINUE OPERATION AFTER WINDSHIELD WIPER AND WASHER SWITCH IS TURNED TO OFF

Z6U090301063W06

4	Wipers continue operation after windshield wiper and washer switch is turned to OFF
POSSIBLE CAUSE	• Malfunction in windshield wiper and washer switch input signal circuit — Wipers continue operation • Windshield wiper and washer switch malfunction • Malfunction in windshield wiper motor input signal circuit — Wipers continue operation • Windshield wiper motor malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
—	**INSPECT WINDSHIELD WIPER AND WASHER SWITCH** • Inspect windshield wiper and washer switch. (See 09-19-7 WINDSHIELD WIPER AND WASHER SWITCH INSPECTION) • Is windshield wiper and washer switch okay?	Yes	Replace windshield wiper motor.
		No	Replace windshield wiper and washer switch.

NO.5 INTERMITTENT WIPER OPERATION IS NOT POSSIBLE (OTHER FUNCTIONS OPERATE NORMALLY)

Z6U090301063W07

5	Intermittent wiper operation is not possible (Other functions operate normally)
POSSIBLE CAUSE	• Malfunction in windshield wiper and washer switch ground circuit — Intermittent wiper operation is not possible • Windshield wiper and washer switch malfunction • Malfunction in wiring harness between windshield wiper and washer switch and ground • Malfunction in windshield wiper and washer switch input signal circuit — Intermittent wiper operation is not possible • Windshield wiper and washer switch malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
—	**INSPECT WINDSHIELD WIPER AND WASHER SWITCH** • Inspect windshield wiper and washer switch. (See 09-19-7 WINDSHIELD WIPER AND WASHER SWITCH INSPECTION) • Is windshield wiper and washer switch okay?	Yes	Repair wiring harness between windshield wiper and washer switch and ground.
		No	Replace windshield wiper and washer switch.

NO.6 WIPERS CONTINUE INTERMITTENT OPERATION

Z6U090301063W08

6	Wipers continue intermittent operation
POSSIBLE CAUSE	• Malfunction in windshield wiper and washer switch input signal circuit — Wipers continue intermittent operation • Windshield wiper and washer switch malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
—	—	—	Replace windshield wiper and washer switch.

NO.7 ONE-TOUCH WIPER OPERATION IS NOT POSSIBLE (OTHER FUNCTIONS OPERATE NORMALLY)

Z6U090301063W09

7	One-touch wiper operation is not possible (Other functions operate normally)
POSSIBLE CAUSE	• Malfunction in windshield wiper and washer switch input signal circuit — One-touch wiper operation is not possible • Windshield wiper and washer switch malfunction

Diagnostic procedure

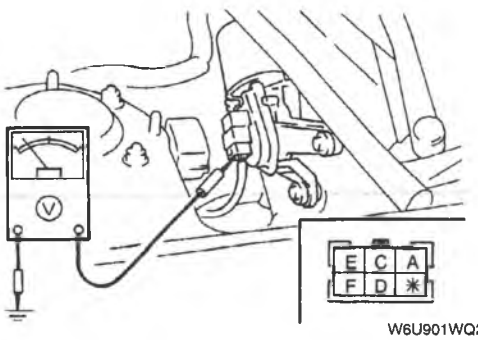
STEP	INSPECTION		ACTION
—	—	—	Replace windshield wiper and washer switch.

NO.8 AUTOSTOP OPERATION DOES NOT WORK (WIPERS IMMEDIATELY STOP WHEN WINDSHIELD WIPER AND WASHER SWITCH IS TURNED TO OFF)

Z6U090301063W10

8	Autostop operation does not work (Wipers immediately stop when windshield wiper and washer switch is turned to OFF)
POSSIBLE CAUSE	• Malfunction in windshield wiper motor power supply circuit — Autostop operation does not work • Windshield wiper motor malfunction • Malfunction in wiring harness between WIPER 20 A fuse and windshield wiper motor • Malfunction in windshield wiper and washer switch input signal circuit — Autostop operation does not work • Windshield wiper and washer switch malfunction • Malfunction in wiring harness between windshield wiper and washer switch and windshield wiper motor • Malfunction in windshield wiper motor operation circuit — Autostop operation does not work • Windshield wiper motor malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT POWER SUPPLY CIRCUIT OF WINDSHIELD WIPER MOTOR** • Turn ignition switch to ON. • Measure voltage at terminal F at windshield wiper motor connector of wiring harness. • Is voltage B+?  W6U901WQ2	Yes	Go to next step.
		No	Repair wiring harness between WIPER 20 A fuse and windshield wiper motor.
2	**INSPECT WINDSHIELD WIPER AND WASHER SWITCH** • Inspect windshield wiper and washer switch. (See 09-19-7 WINDSHIELD WIPER AND WASHER SWITCH INSPECTION) • Is windshield wiper and washer switch okay?	Yes	Go to next step.
		No	Replace windshield wiper and washer switch.

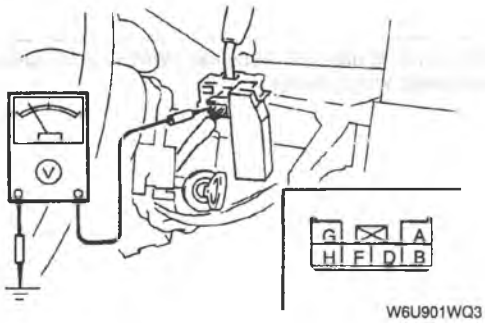
STEP	INSPECTION		ACTION
3	**INSPECT WINDSHIELD WIPER MOTOR** • Inspect windshield wiper motor. (See 09-19-7 WINDSHIELD WIPER AND WASHER SWITCH INSPECTION) • Is windshield wiper motor okay?	Yes	Repair wiring harness between windshield wiper and washer switch and windshield wiper motor.
		No	Replace windshield wiper motor.

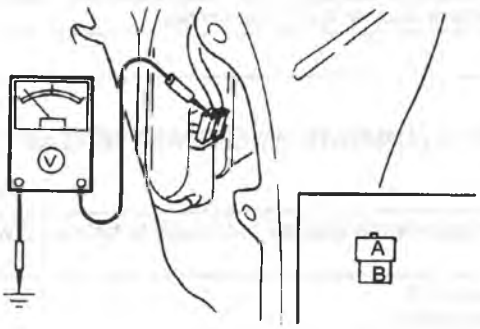
NO.9 WASHER DOES NOT OPERATE (WIPERS OPERATE)

Z6U090301063W11

9	**Washer does not operate (Wipers operate)**
POSSIBLE CAUSE	• Malfunction in windshield wiper and washer switch input signal circuit — Washer does not operate • Windshield wiper and washer switch malfunction • Malfunction in wiring harness between windshield wiper and washer switch and windshield washer motor • Malfunction in windshield washer motor operation circuit — Washer does not operate • Windshield washer motor malfunction • Malfunction in wiring harness between windshield washer motor and ground

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT WINDSHIELD WIPER AND WASHER SWITCH INNER CIRCUIT** • Remove column cover. • Remove windshield wiper and washer switch without disconnecting windshield wiper and washer switch connector. • Turn ignition switch to ON. • Turn windshield washer switch on. • Measure voltage at terminal G at windshield wiper and washer switch connector of wiring harness. • Is voltage **B**+?  W6U901WQ3	Yes	Go to next step.
		No	Replace windshield wiper and washer switch.

STEP	INSPECTION		ACTION
2	**INSPECT WIRING HARNESS BETWEEN WINDSHIELD WIPER AND WASHER SWITCH AND WINDSHIELD WASHER MOTOR** • Partially peel off right side mud guard. • Turn windshield washer switch on. • Measure voltage at terminal B at windshield washer motor connector of wiring harness. • Is voltage **B**+?  W6U901WQ4	Yes	Go to next step.
		No	Repair wiring harness between windshield wiper and washer switch and windshield washer motor.
3	**INSPECT WINDSHIELD WASHER MOTOR** • Inspect windshield washer motor. (See 09-19-5 WINDSHIELD WASHER MOTOR INSPECTION) • Is windshield washer motor okay?	Yes	Repair wiring harness between windshield washer motor and ground.
		No	Replace windshield washer motor.

NO.10 WASHER OPERATES WITH WINDSHIELD WASHER SWITCH TURNED TO OFF

Z6U090301063W12

10	**Washer operates with windshield washer switch turned to OFF**
POSSIBLE CAUSE	• Malfunction in windshield wiper and washer switch input signal circuit — Washer operates with windshield washer switch turned to OFF • Windshield wiper and washer switch malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
—	**INSPECT WINDSHIELD WIPER AND WASHER SWITCH** • Inspect windshield wiper and washer switch. (See 09-19-7 WINDSHIELD WIPER AND WASHER SWITCH INSPECTION) • Is windshield wiper and washer switch okay?	Yes	Repair wiring harness from windshield wiper and washer switch to windshield washer motor.
		No	Replace windshield wiper and washer switch.

NO.11 WASHER FLUID-LEVEL WARNING LIGHT REMAINS ILLUMINATED WHEN WASHER FLUID LEVEL IS ABOVE LOW (ENGINE IS RUNNING)

Z6U090301063W13

11	**Washer fluid-level warning light remains illuminated when washer fluid level is above LOW (Engine is running)**
POSSIBLE CAUSE	• Malfunction in washer fluid-level sensor operation circuit — Washer fluid-level warning light remains illuminated • Washer fluid-level sensor malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
—	—	—	Replace washer fluid-level sensor.

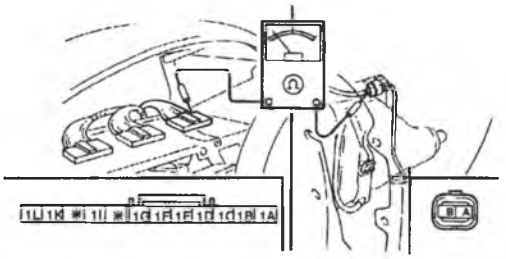
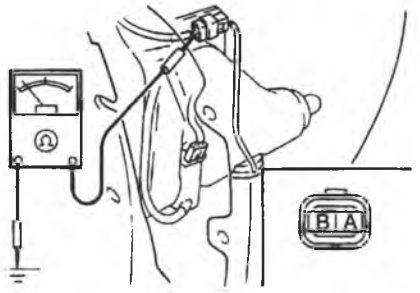
NO.12 WASHER FLUID-LEVEL WARNING LIGHT DOES NOT ILLUMINATE WHEN WASHER FLUID LEVEL IS BELOW LOW (ENGINE IS RUNNING)

Z6U090301063W14

12	**Washer fluid-level warning light does not illuminate when washer fluid level is below LOW (Engine is running)**
POSSIBLE CAUSE	• Malfunction in instrument cluster power supply circuit — Washer fluid-level warning light does not illuminate • Instrument cluster malfunction • Malfunction in instrument cluster input signal circuit — Washer fluid-level warning light does not illuminate • Instrument cluster malfunction • Malfunction of wiring harness between instrument cluster and washer fluid-level sensor • Malfunction in washer fluid-level sensor operation circuit — Washer fluid-level warning light does not illuminate • Washer fluid-level sensor malfunction • Malfunction of wiring harness between washer fluid-level sensor and ground • Malfunction in washer fluid-level warning light operation circuit — Washer fluid-level warning light does not illuminate • Washer fluid-level warning light bulb malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Do other warning lights illuminate with ignition switch at ON? (Engine is stopped.)	Yes	Go to next step.
		No	Inspect instrument cluster power supply. (See 09-03P-1 TROUBLESHOOTING INDEX [INSTRUMENTATION/DRIVER INFO.])
2	**INSPECT BULB** • Remove and inspect washer fluid-level warning light bulb. (See 09-22-8 WARNING AND INDICATOR LIGHT BULB REMOVAL/INSTALLATION) • Is washer fluid-level warning light bulb okay?	Yes	Go to next step.
		No	Replace washer fluid-level warning light bulb.

STEP	INSPECTION		ACTION
3	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND WASHER FLUID-LEVEL SENSOR** • Check for continuity between terminal 1K at instrument cluster connector of wiring harness and terminal A at washer fluid-level sensor connector of wiring harness. • Is there continuity?  W6U901WQ5	Yes	Go to next step.
		No	Repair wiring harness between instrument cluster and washer fluid-level sensor.
4	**INSPECT WASHER FLUID-LEVEL SENSOR** • Inspect washer fluid-level sensor. (See 09-19-6 WASHER FLUID-LEVEL SENSOR INSPECTION) • Is washer fluid-level sensor okay?	Yes	Go to next step.
		No	Replace washer fluid-level sensor.
5	**INSPECT WIRING HARNESS BETWEEN WASHER FLUID-LEVEL SENSOR AND GND** • Check for continuity between terminal B at washer fluid-level sensor connector of wiring harness and ground. • Is there continuity?  W6U901WQ6	Yes	Replace print plate No.1. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
		No	Repair wiring harness between washer fluid-level sensor and ground.

09-03P SYMPTOM TROUBLESHOOTING [INSTRUMENTATION/DRIVER INFO.]

FOREWORD [INSTRUMENTATION/DRIVER INFO.] 09-03P-1
TROUBLESHOOTING INDEX [INSTRUMENTATION/DRIVER INFO.] 09-03P-1
NO.1 ALL METERS AND GAUGES (SPEEDOMETER, TACHOMETER, FUEL GAUGE, WATER TEMPERATURE GAUGE) DO NOT OPERATE 09-03P-3
NO.2 SPEEDOMETER DOES NOT OPERATE 09-03P-6
NO.3 SPEEDOMETER NEEDLE FLUCTUATES OR IS INCORRECT 09-03P-8
NO.4 TACHOMETER DOES NOT OPERATE 09-03P-9
NO.5 TACHOMETER NEEDLE FLUCTUATES OR IS INCORRECT 09-03P-11
NO.6 FUEL GAUGE DOES NOT OPERATE OR IS INCORRECT 09-03P-12
NO.7 WATER TEMPERATURE GAUGE DOES NOT OPERATE OR IS INCORRECT .. 09-03P-14
NO.8 ALL WARNING LIGHTS DO NOT ILLUMINATE WITH IGNITION SWITCH AT ON (ENGINE STOPPED) 09-03P-16
NO.9 GENERATOR WARNING LIGHT DOES NOT ILLUMINATE WITH IGNITION SWITCH AT ON (ENGINE RUNNING) 09-03P-17
NO.10 BRAKE SYSTEM WARNING LIGHT DOES NOT ILLUMINATE WITH PARKING BRAKE LEVER SET 09-03P-18
NO.11 OIL PRESSURE WARNING LIGHT DOES NOT ILLUMINATE WITH IGNITION SWITCH AT ON (ENGINE STOPPED) 09-03P-20
NO.12 FUEL-LEVEL WARNING LIGHT REMAINS ILLUMINATED (ENGINE RUNNING) .. 09-03P-21
NO.13 FUEL-LEVEL WARNING LIGHT DOES NOT ILLUMINATE WITH FUEL TANK ALMOST EMPTY (ENGINE RUNNING) 09-03P-23
NO.14 OIL PRESSURE WARNING LIGHT REMAINS ILLUMINATED (ENGINE RUNNING) .. 09-03P-25
NO.15 DOOR AJAR WARNING LIGHT DOES NOT ILLUMINATE WITH ANY DOOR OPEN 09-03P-26
NO.16 DOOR AJAR WARNING LIGHT REMAINS ILLUMINATED WITH ALL DOOR CLOSED 09-03P-28
NO.17 BRAKE SYSTEM WARNING LIGHT REMAINS ILLUMINATED WITH PARKING BRAKE RELEASED AND BRAKE FLUID LEVEL ABOVE MIN 09-03P-30
NO.18 BRAKE SYSTEM WARNING LIGHT DOES NOT ILLUMINATE WITH BRAKE FLUID IN RESERVOIR BELOW MIN 09-03P-31
NO.19 EVEN IF IGNITION KEY IS LEFT IN STEERING LOCK, KEY REMINDER WARNING BUZZER DOES NOT SOUND WHEN ANY DOOR IS OPENED 09-03P-32
NO.20 EVEN IF IGNITION KEY IS REMOVED FROM STEERING LOCK, KEY REMINDER WARNING BUZZER WILL SOUND WHEN ANY DOOR IS OPENED 09-03P-35

FOREWORD [INSTRUMENTATION/DRIVER INFO.]

Z6U090301067W01

- Thoroughly read and understand the basic flow of troubleshooting in order to properly perform the procedures. (See 00-00-2 HOW TO USE THIS MANUAL.)

TROUBLESHOOTING INDEX [INSTRUMENTATION/DRIVER INFO.]

Z6U090301067W02

- Use the chart below to verify that the symptoms of the concern in order to diagnose the appropriate area.

No.	TROUBLESHOOTING ITEM	PAGE
1	All meters and gauges (speedometer, tachometer, fuel gauge, water temperature gauge) do not operate	(See 09-03P-3 NO.1 ALL METERS AND GAUGES (SPEEDOMETER, TACHOMETER, FUEL GAUGE, WATER TEMPERATURE GAUGE) DO NOT OPERATE)
2	Speedometer does not operate	(See 09-03P-6 NO.2 SPEEDOMETER DOES NOT OPERATE)
3	Speedometer needle fluctuates or is incorrect	(See 09-03P-8 NO.3 SPEEDOMETER NEEDLE FLUCTUATES OR IS INCORRECT)
4	Tachometer does not operate	(See 09-03P-9 NO.4 TACHOMETER DOES NOT OPERATE)
5	Tachometer needle fluctuates or is incorrect	(See 09-03P-11 NO.5 TACHOMETER NEEDLE FLUCTUATES OR IS INCORRECT)
6	Fuel gauge does not operate or is incorrect	(See 09-03P-12 NO.6 FUEL GAUGE DOES NOT OPERATE OR IS INCORRECT)

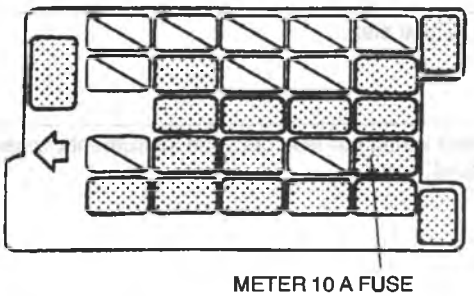
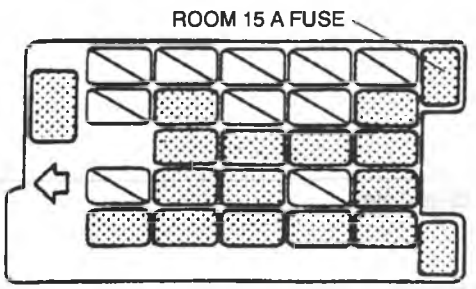
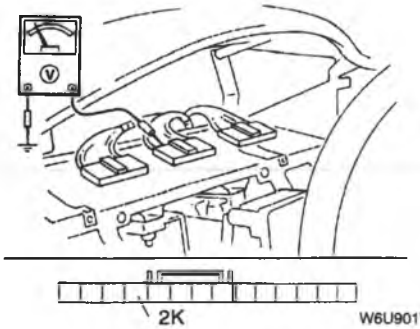
No.	TROUBLESHOOTING ITEM	PAGE
7	Water temperature gauge does not operate or is incorrect	(See 09-03P-14 NO.7 WATER TEMPERATURE GAUGE DOES NOT OPERATE OR IS INCORRECT)
8	All warning lights do not illuminate with ignition switch at ON (engine stopped)	(See 09-03P-16 NO.8 ALL WARNING LIGHTS DO NOT ILLUMINATE WITH IGNITION SWITCH AT ON (ENGINE STOPPED))
9	Generator warning light does not illuminate with ignition switch at ON (engine running)	(See 09-03P-17 NO.9 GENERATOR WARNING LIGHT DOES NOT ILLUMINATE WITH IGNITION SWITCH AT ON (ENGINE RUNNING))
10	Brake system warning light does not illuminate with parking brake lever set	(See 09-03P-18 NO.10 BRAKE SYSTEM WARNING LIGHT DOES NOT ILLUMINATE WITH PARKING BRAKE LEVER SET)
11	Oil pressure warning light does not illuminate with ignition switch at ON (engine stopped)	(See 09-03P-20 NO.11 OIL PRESSURE WARNING LIGHT DOES NOT ILLUMINATE WITH IGNITION SWITCH AT ON (ENGINE STOPPED))
12	Fuel-level warning light remains illuminated (engine running)	(See 09-03P-21 NO.12 FUEL-LEVEL WARNING LIGHT REMAINS ILLUMINATED (ENGINE RUNNING))
13	Fuel-level warning light does not illuminate with fuel tank almost empty (engine running)	(See 09-03P-23 NO.13 FUEL-LEVEL WARNING LIGHT DOES NOT ILLUMINATE WITH FUEL TANK ALMOST EMPTY (ENGINE RUNNING))
14	Oil pressure warning light remains illuminated (engine running)	(See 09-03P-25 NO.14 OIL PRESSURE WARNING LIGHT REMAINS ILLUMINATED (ENGINE RUNNING))
15	Door ajar warning light does not illuminate with any door open	(See 09-03P-26 NO.15 DOOR AJAR WARNING LIGHT DOES NOT ILLUMINATE WITH ANY DOOR OPEN)
16	Door ajar warning light remains illuminated with all doors closed	(See 09-03P-28 NO.16 DOOR AJAR WARNING LIGHT REMAINS ILLUMINATED WITH ALL DOOR CLOSED)
17	Brake system warning light remains illuminated with parking brake released and brake fluid level above MIN	(See 09-03P-30 NO.17 BRAKE SYSTEM WARNING LIGHT REMAINS ILLUMINATED WITH PARKING BRAKE RELEASED AND BRAKE FLUID LEVEL ABOVE MIN)
18	Brake system warning light does not illuminate with brake fluid in reservoir below MIN	(See 09-03P-31 NO.18 BRAKE SYSTEM WARNING LIGHT DOES NOT ILLUMINATE WITH BRAKE FLUID IN RESERVOIR BELOW MIN)
19	Even if ignition key is left in steering lock, key reminder warning buzzer does not sound when any door is opened	(See 09-03P-32 NO.19 EVEN IF IGNITION KEY IS LEFT IN STEERING LOCK, KEY REMINDER WARNING BUZZER DOES NOT SOUND WHEN ANY DOOR IS OPENED)
20	Even if ignition key is removed from steering lock, key reminder warning buzzer will sound when any door is opened	(See 09-03P-35 NO.20 EVEN IF IGNITION KEY IS REMOVED FROM STEERING LOCK, KEY REMINDER WARNING BUZZER WILL SOUND WHEN ANY DOOR IS OPENED)

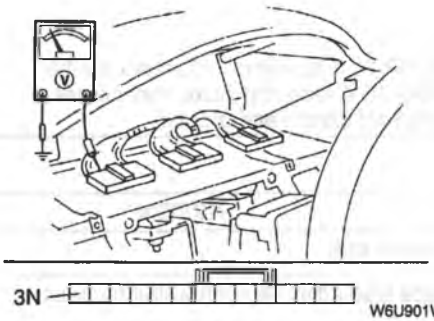
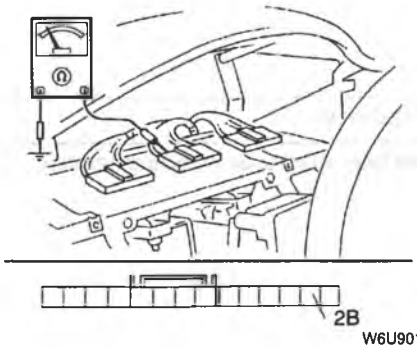
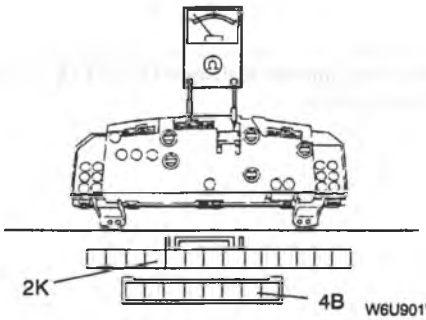
NO.1 ALL METERS AND GAUGES (SPEEDOMETER, TACHOMETER, FUEL GAUGE, WATER TEMPERATURE GAUGE) DO NOT OPERATE

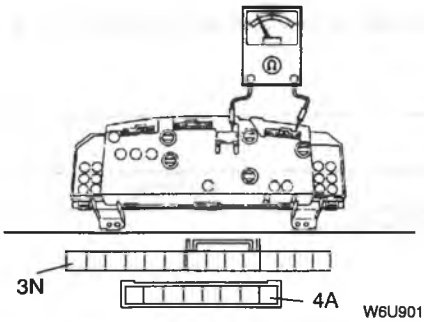
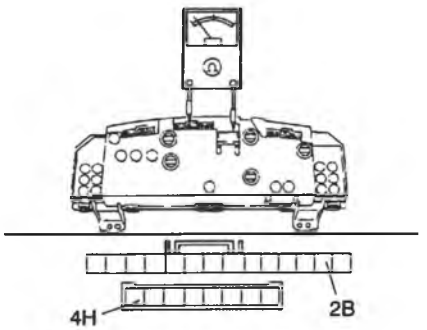
Z6U090301067W03

1	**All meters and gauges (speedometer, tachometer, fuel gauge, water temperature gauge) do not operate**
POSSIBLE CAUSE	• Malfunction in instrument cluster power supply/ground circuit — All meters and gauges do not operate • METER 10 A fusé malfunction • ROOM 15 A fuse malfunction • Print plate malfunction • Display unit assembly malfunction • Malfunction in wiring harness between METER 10 A fuse and instrument cluster • Malfunction in wiring harness between ROOM 15 A fuse and instrument cluster • Malfunction in wiring harness between instrument cluster and ground

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT FUSE** • Is METER 10 A fuse okay?  W6U901WU0	Yes	Go to next step.
		No	Replace fuse after repairing wiring harness.
2	**INSPECT FUSE** • Is ROOM 15 A fuse okay?  W6U901WU1	Yes	Go to next step.
		No	Replace fuse after repairing wiring harness.
3	**INSPECT POWER SUPPLY CIRCUIT OF INSTRUMENT CLUSTER** • Remove meter hood. • Remove instrument cluster. • Measure voltage at terminal 2K at instrument cluster (14-pin) connector of wiring harness. • Is voltage **B+**?  W6U901WU2	Yes	Go to next step.
		No	Repair wiring harness between ROOM 15 A fuse and instrument cluster.

STEP	INSPECTION		ACTION
4	**INSPECT POWER SUPPLY CIRCUIT OF INSTRUMENT CLUSTER** • Turn ignition switch to ON. • Measure voltage at terminal 3N at instrument cluster (14-pin) connector of wiring harness. • Is voltage B + ?  	Yes	Go to next step.
		No	Repair wiring harness between METER 10 A fuse and instrument cluster.
5	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND GND** • Turn ignition switch to LOCK. • Check for continuity between terminal 2B at instrument cluster (14-pin) connector of wiring harness and ground. • Is there continuity?  	Yes	Go to next step.
		No	Repair wiring harness between instrument cluster and ground.
6	**INSPECT INSTRUMENT CLUSTER INNER CIRCUIT** • Disconnect print plate connector. • Check for continuity between terminal 2K (14-pin) at print plate and print plate connector 4B (8-pin) terminal. • Is there continuity?  	Yes	Go to next step.
		No	Replace print plate. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)

STEP	INSPECTION		ACTION
7	**INSPECT INSTRUMENT CLUSTER INNER CIRCUIT** • Check for continuity between terminal 3N (14-pin) at print plate and print plate connector 4A (8-pin) terminal. • Is there continuity?  W6U901WU6	Yes	Go to next step.
		No	Replace print plate. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
8	**INSPECT INSTRUMENT CLUSTER INNER CIRCUIT** • Check for continuity between terminal 2B (14-pin) at print plate and print plate connector 4H (8-pin) terminal. • Is there continuity?  W6U901WU7	Yes	Replace display unit assembly. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
		No	Replace print plate. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)

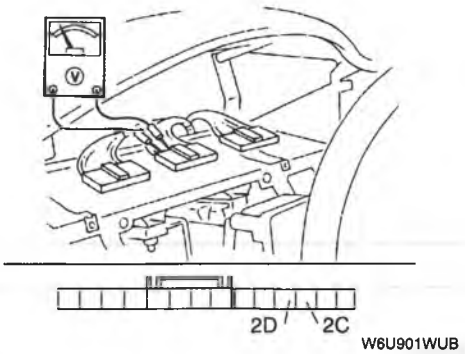
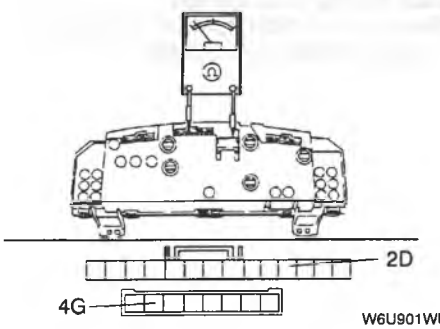
NO.2 SPEEDOMETER DOES NOT OPERATE

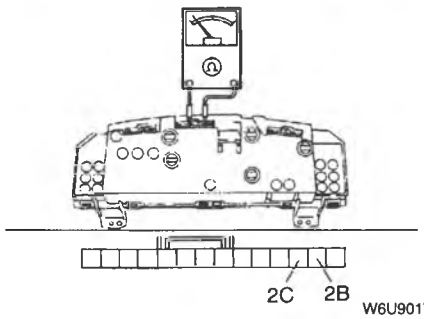
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2	Speedometer does not operate
POSSIBLE CAUSE	• Malfunction in speedometer input signal circuit — Speedometer does not operate • Vehicle speedometer sensor malfunction • Print plate malfunction • Display unit assembly malfunction • Malfunction in wiring harness between instrument cluster and vehicle speedometer sensor • Malfunction in speedometer operation circuit — Speedometer does not operate • Display unit assembly malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Turn ignition switch to LOCK. • Disconnect negative battery cable. • After **30 seconds or more**, reconnect negative battery cable. • Turn ignition switch to ON and LOCK **3 times**. • Turn ignition switch to ON. • Push odometer/tripmeter switch **3 times**.  W6U901WU8 • Select DTC 12 by pushing odometer/tripmeter switch. • Does speedometer needle move full scale and then indicate **60 mph**?	Yes	Go to next step.
		No	Replace display unit assembly. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
2	• Select DTC 10 by pushing odometer/tripmeter switch. • Start engine and drive vehicle. • Does LCD indicate "ON"?	Yes	Replace display unit assembly. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
		No	Go to next step.

STEP	INSPECTION		ACTION
3	**INSPECT SIGNAL OF VEHICLE SPEEDOMETER SENSOR** • Remove meter hood. • Remove instrument cluster. • Measure voltage between terminal 2C (14-pin) and 2D (14-pin) of instrument cluster connector of wiring harness while rotating the front wheels slowly. • Is voltage **5 V**?  W6U901WUB	Yes	Go to step 5.
		No	Go to next step.
4	**INSPECT VEHICLE SPEEDOMETER SENSOR** • Remove vehicle speedometer sensor. • Inspect vehicle speedometer sensor. (See 05-17A-32 VEHICLE SPEEDOMETER SENSOR INSPECTION [LA4A-EL]) (See 05-17B-28 VEHICLE SPEEDOMETER SENSOR INSPECTION [GF4A-EL]) • Is vehicle speedometer sensor okay?	Yes	Repair wiring harness between instrument cluster and vehicle speedometer sensor.
		No	Replace vehicle speedometer sensor.
5	**INSPECT INSTRUMENT CLUSTER INNER CIRCUIT** • Disconnect print plate connector. • Check for continuity between terminal 2D (14-pin) at print plate and print plate connector 4G (8-pin) terminal. • Is there continuity?  W6U901WUC	Yes	Go to next step.
		No	Replace print plate. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)

STEP	INSPECTION		ACTION
6	**INSPECT INSTRUMENT CLUSTER INNER CIRCUIT** • Check for continuity between terminal 2B (14-pin) at print plate and print plate connector 2C (14-pin) terminal. • Is there continuity?  W6U901WUD	Yes	Replace display unit assembly. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
		No	Replace print plate. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)

NO.3 SPEEDOMETER NEEDLE FLUCTUATES OR IS INCORRECT

Z6U090301067W05

3	**Speedometer needle fluctuates or is incorrect**
POSSIBLE CAUSE	• Malfunction in speedometer input signal circuit — Speedometer needle fluctuates or is incorrect • Vehicle speedometer sensor malfunction • Display unit assembly malfunction • Malfunction in speedometer operation signal — Speedometer needle fluctuates or is incorrect • Display unit assembly malfunction

Diagnostic procedure

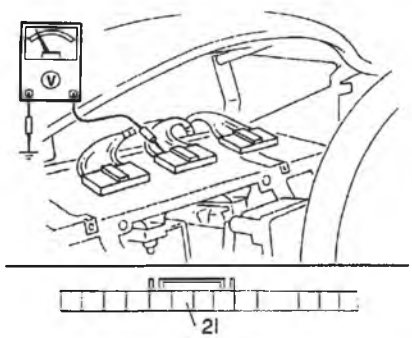
STEP	INSPECTION		ACTION
1	• Turn ignition switch to LOCK. • Disconnect negative battery cable. • After **30 seconds or more**, reconnect negative battery cable. • Turn ignition switch to ON and LOCK **3 times**. • Turn ignition switch to ON. • Push odometer/tripmeter switch **3 times**.  W6U901WUE • Select DTC 12 by pushing odometer/tripmeter switch. • Does speedometer needle move full scale and then indicate **60 mph**?	Yes	Replace vehicle speedometer sensor.
		No	Replace display unit assembly. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)

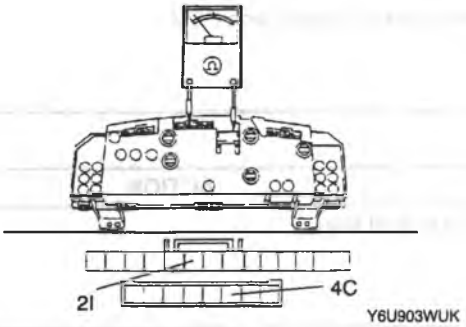
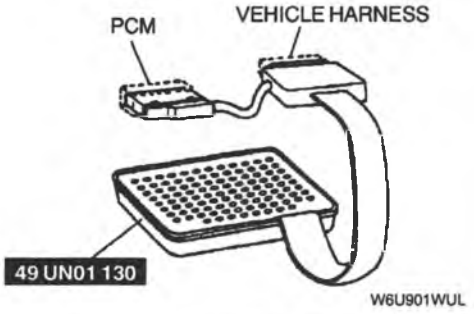
NO.4 TACHOMETER DOES NOT OPERATE

Z6U090301067W06

4	Tachometer does not operate
POSSIBLE CAUSE	• Malfunction in tachometer input signal circuit — Tachometer does not operate • PCM malfunction • Crank shaft position sensor malfunction • Print plate malfunction • Display unit assembly malfunction • Malfunction in wiring harness between instrument cluster and PCM • Malfunction in tachometer operation circuit — Tachometer does not operate • Display unit assembly malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Turn ignition switch to LOCK. • Disconnect negative battery cable. • After **30 seconds or more**, reconnect negative battery cable. • Turn ignition switch to ON and LOCK **3 times**. • Turn ignition switch to ON. • Push odometer/tripmeter switch **3 times**.  W6U901WUG • Select DTC 13 by pushing odometer/tripmeter switch. • Does tachometer needle move full scale and then indicate **3000 rpm**.	Yes	Go to next step.
		No	Replace display unit assembly. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
2	• Select DTC 11 by pushing odometer/tripmeter switch. • Start engine. • Does LCD indicate "ON"?	Yes	Replace display unit assembly. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
		No	Go to next step.
3	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND PCM** • Remove meter hood. • Remove instrument cluster. • Turn ignition switch to ON. • Measure voltage at terminal 2I at instrument cluster (14-pin) connector of wiring harness. • Is voltage **B**+?  Y6U903WUJ	Yes	Go to next step.
		No	Go to step 5.

STEP	INSPECTION		ACTION
4	**INSPECT INSTRUMENT CLUSTER INNER CIRCUIT** • Disconnect print plate connector. • Check for continuity between terminal 2I (14-pin) at print plate and print plate connector 4C (8-pin) terminal. • Is there continuity?  Y6U903WUK	Yes	Replace display unit assembly. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
		No	Replace print plate. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
5	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND PCM** • Remove rear console. • Set **SST** to PCM. • Measure voltage at terminal 48 of PCM when ignition switch ON. • Is voltage above **10 V**?  W6U901WUL	Yes	Repair wiring harness between instrument cluster and PCM.
		No	Go to next step.
6	• Carry out OBD (On-Board Diagnostic) test. (See 01-02A-8 FOREWORD [FS]) (See 01-02B-8 FOREWORD [KL]) • Is DTC P0320 outputted?	Yes	Perform diagnostic trouble code troubleshooting. (See 01-02A-8 FOREWORD [FS]) (See 01-02B-8 FOREWORD [KL])
		No	Replace display unit assembly. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)

NO.5 TACHOMETER NEEDLE FLUCTUATES OR IS INCORRECT

Z6U090301067W07

5	Tachometer needle fluctuates or is incorrect
POSSIBLE CAUSE	• Malfunction in tachometer input signal circuit — Tachometer needle fluctuates or is incorrect • PCM malfunction • Crank shaft position sensor • Display unit assembly malfunction • Malfunction in tachometer operation circuit — Tachometer needle fluctuates or is incorrect • Display unit assembly malfunction

Diagnostic procedure

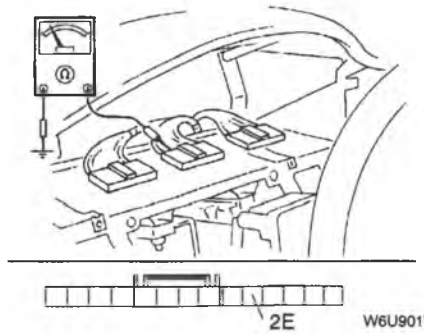
STEP	INSPECTION		ACTION
1	• Turn ignition switch to LOCK. • Disconnect negative battery cable. • After **30 seconds or more**, reconnect negative battery cable. • Turn ignition switch to ON and LOCK **3 times**. • Turn ignition switch to ON. • Push odometer/tripmeter switch **3 times**.  W6U901WUM • Select DTC 13 by pushing odometer/tripmeter switch. • Does tachometer needle move full scale and then indicate **3000 rpm**?	Yes	Go to next step.
		No	Replace display unit assembly. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
2	• Carry out OBD (On-Board Diagnostic) test. (See 01-02A-8 FOREWORD [FS]) (See 01-02B-8 FOREWORD [KL]) • Is DTC P0320 outputted?	Yes	Perform diagnostic trouble code troubleshooting. (See 01-02A-8 FOREWORD [FS]) (See 01-02B-8 FOREWORD [KL])
		No	Replace display unit assembly. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)

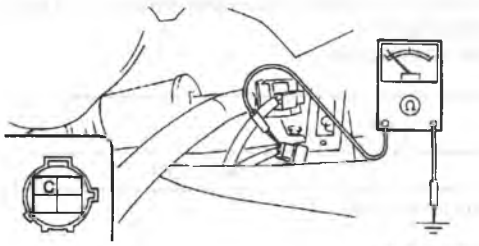
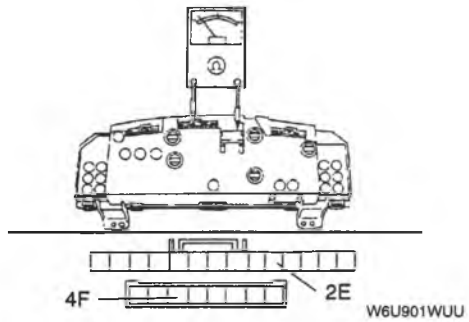
NO.6 FUEL GAUGE DOES NOT OPERATE OR IS INCORRECT

Z6U090301067W08

6	Fuel gauge does not operate or is incorrect
POSSIBLE CAUSE	• Malfunction in fuel gauge input signal circuit — Fuel gauge does not operate or is incorrect • Fuel gauge sender unit malfunction • Print plate malfunction • Display unit assembly malfunction • Malfunction in wiring harness between instrument cluster and fuel gauge sender unit • Malfunction in wiring harness between fuel gauge sender unit and ground • Malfunction in fuel gauge operation circuit — Fuel gauge does not operate or is incorrect • Display unit assembly malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Turn ignition switch to LOCK. • Disconnect negative battery cable. • After **30 seconds or more**, reconnect negative battery cable. • Turn ignition switch to ON and LOCK **3 times**. • Turn ignition switch to ON. • Push odometer/tripmeter switch **3 times**.  W6U901WUP • Select DTC 23 by pushing odometer/tripmeter switch. • Does fuel gauge needle indicate repeatedly point **F, 1/2, E**?	Yes	Go to next step.
		No	Replace display unit assembly. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
2	• Select DTC 22 by pushing odometer/tripmeter switch. • Does LCD indicate **"000" or "255"**?	Yes	Go to next step.
		No	Go to step 6.
3	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND FUEL GAUGE SENDER UNIT** • Remove meter hood. • Remove instrument cluster. • Disconnect fuel pump connector. • Check for continuity between terminal 2E at instrument cluster (14-pin) connector of wiring harness and ground. • Is there continuity?  W6U901WUR	Yes	Repair wiring harness between instrument cluster and fuel gauge sender unit.
		No	Go to next step.

STEP	INSPECTION		ACTION
4	**INSPECT WIRING HARNESS BETWEEN FUEL GAUGE SENDER UNIT AND GND** • Check for continuity between terminal C at fuel pump connector of wiring harness and ground. • Is there continuity?  W6U901WUS	Yes	Go to next step.
		No	Repair wiring harness between fuel gauge sender unit and ground.
5	**INSPECT INSTRUMENT CLUSTER INNER CIRCUIT** • Disconnect print plate connector. • Check for continuity between terminal 2E (14-pin) at print plate and print plate connector 4F (8-pin) terminal. • Is there continuity?  W6U901WUU	Yes	Go to next step.
		No	Replace print plate. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
6	**INSPECT FUEL GAUGE SENDER UNIT** • Remove fuel gauge sender unit. • Inspect fuel gauge sender unit. (See 09-22-9 FUEL GAUGE SENDER UNIT INSPECTION) • Is fuel gauge sender unit okay?	Yes	Replace display unit assembly. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
		No	Replace fuel gauge sender unit.

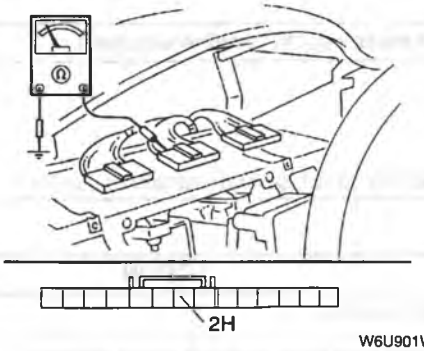
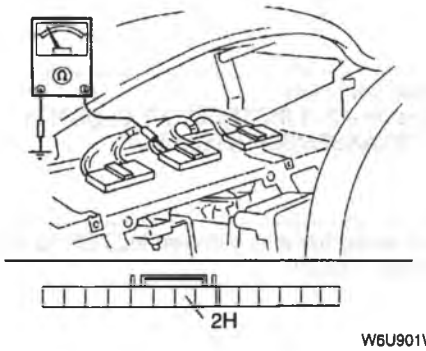
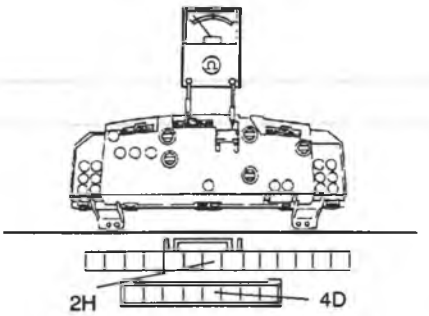
NO.7 WATER TEMPERATURE GAUGE DOES NOT OPERATE OR IS INCORRECT

Z6U090301067W09

7	Water temperature gauge does not operate or is incorrect
POSSIBLE CAUSE	• Malfunction in water temperature gauge input signal circuit — Water temperature gauge does not operate or is incorrect • Water temperature sender unit malfunction • Print plate malfunction • Display unit assembly malfunction • Malfunction in wiring harness between instrument cluster and water temperature sender unit • Malfunction in water temperature gauge operation circuit — Water temperature gauge does not operate or is incorrect • Display unit assembly malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Turn ignition switch to LOCK. • Disconnect negative battery cable. • After **30 seconds or more**, reconnect negative battery cable. • Turn ignition switch to ON and LOCK **3 times**. • Turn ignition switch to ON. • Push odometer/tripmeter switch **3 times**.  W6U901WUV • Select DTC 25 by pushing odometer/tripmeter switch. • Does water temperature gauge needle indicate repeatedly **H, neutral, C**?	Yes	Go to next step.
		No	Replace display unit assembly. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
2	• Select DTC 24 by pushing odometer/tripmeter switch. • Does LCD indicate **"000" or "255"**?	Yes	Go to next step.
		No	Go to step 6.

STEP	INSPECTION		ACTION
3	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND WATER TEMPERATURE SENDER UNIT** • Remove meter hood. • Remove instrument cluster. • Disconnect water temperature sender unit connector. • Check for continuity between terminal 2H at instrument cluster (14-pin) connector of wiring harness and ground. • Is there continuity?  W6U901WUY	Yes	Repair wiring harness between instrument cluster and water temperature sender unit.
		No	Go to next step.
4	**INSPECT WIRING HARNESS BETWEEN WATER TEMPERATURE SENDER UNIT AND GND** • Connect water temperature sender unit connector. • Check for continuity between terminal 2H at instrument cluster (14-pin) connector of wiring harness and ground. • Is there continuity?  W6U901WUZ	Yes	Go to next step.
		No	Go to step 6.
5	**INSPECT INSTRUMENT CLUSTER INNER CIRCUIT** • Disconnect print plate connector. • Check for continuity between terminal 2H (14-pin) at print plate and print plate connector 4D (8-pin) terminal. • Is there continuity?  W6U901WV0	Yes	Go to next step.
		No	Replace print plate. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)

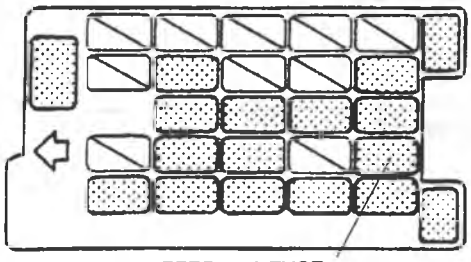
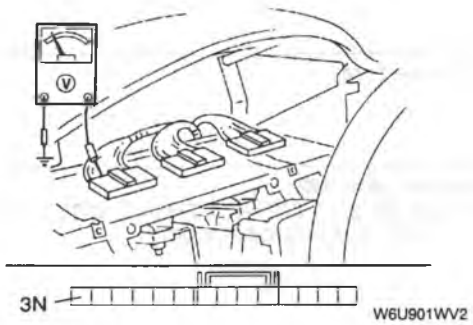
STEP	INSPECTION		ACTION
6	**INSPECT WATER TEMPERATURE SENDER UNIT** • Remove water temperature sender unit. • Inspect water temperature sender unit. (See 09-22-10 WATER TEMPERATURE SENDER UNIT INSPECTION) • Is water temperature sender unit okay?	Yes	Replace display unit assembly. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
		No	Replace water temperature sender unit.

NO.8 ALL WARNING LIGHTS DO NOT ILLUMINATE WITH IGNITION SWITCH AT ON (ENGINE STOPPED)

Z6U090301067W10

8	**All warning lights do not illuminate with ignition switch at ON (engine stopped)**
POSSIBLE CAUSE	• Malfunction in instrument cluster power supply — Warning lights do not illuminate • METER 10 A fuse malfunction • Print plate malfunction • Malfunction in wiring harness between METER 10 A fuse and instrument cluster

Diagnostic procedure

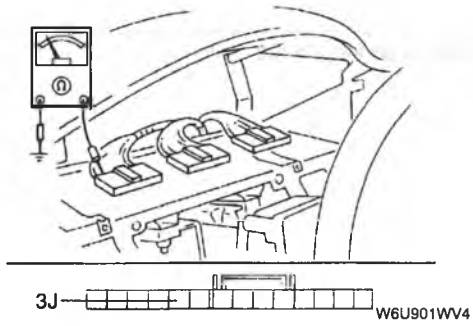
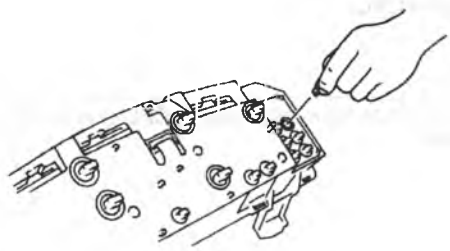
STEP	INSPECTION		ACTION
1	**INSPECT FUSE** • Is METER 10 A fuse okay?  METER 10 A FUSE W6U901WV1	Yes	Go to next step.
		No	Replace fuse after repairing wiring harness.
2	**INSPECT POWER SUPPLY CIRCUIT OF INSTRUMENT CLUSTER** • Remove meter hood. • Remove instrument cluster. • Measure voltage at terminal 3N at instrument cluster (14-pin) connector of wiring harness. • Is voltage B+?  3N W6U901WV2	Yes	Replace print plate. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
		No	Repair wiring harness between METER 10 A fuse and instrument cluster.

NO.9 GENERATOR WARNING LIGHT DOES NOT ILLUMINATE WITH IGNITION SWITCH AT ON (ENGINE RUNNING)

Z6U090301067W11

9	Generator warning light does not illuminate with ignition switch at ON (engine running)
POSSIBLE CAUSE	• Malfunction in generator warning light operation circuit — Generator warning light does not illuminate • Generator malfunction • Print plate malfunction • Generator warning light bulb malfunction • Malfunction in wiring harness between instrument cluster and generator

Diagnostic procedure

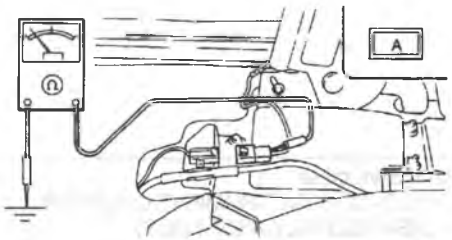
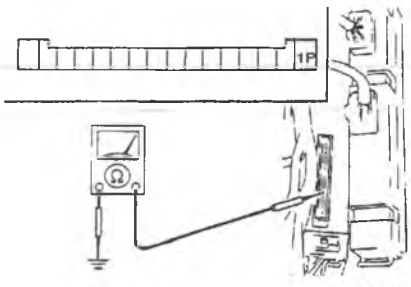
STEP	INSPECTION		ACTION
1	**INSPECT GENERATOR** • Disconnect generator connector. • Connect ground to terminal B of generator connector. • Turn ignition switch to ON. • Does generator warning light illuminate?	Yes	Replace generator.
		No	Go to next step.
2	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND GENERATOR** • Turn ignition switch to LOCK. • Remove meter hood. • Remove instrument cluster. • Check for continuity between terminal 3J at instrument cluster (14-pin) connector of wiring harness and ground. • Is there continuity?  W6U901WV4	Yes	Go to next step.
		No	Repair wiring harness between instrument cluster and generator.
3	**INSPECT BULB** • Remove generator warning light bulb. • Is generator warning light bulb okay?  W6U901WV5	Yes	Replace print plate. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
		No	Replace generator warning light bulb.

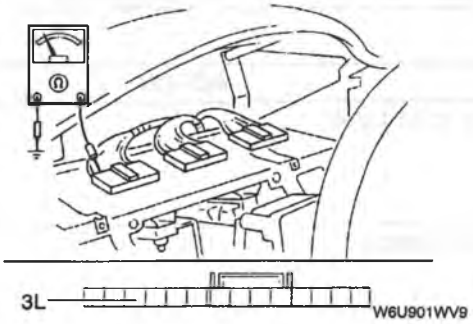
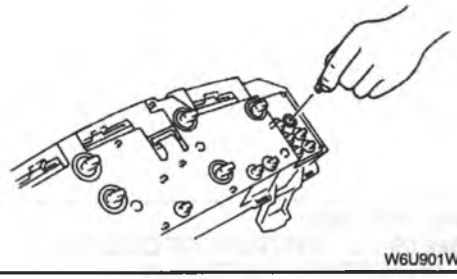
NO.10 BRAKE SYSTEM WARNING LIGHT DOES NOT ILLUMINATE WITH PARKING BRAKE LEVER SET

Z6U090301067W12

10	Brake system warning light does not illuminate with parking brake lever set
POSSIBLE CAUSE	• Malfunction in brake system warning light input signal circuit — Brake system warning light does not illuminate • Parking brake switch malfunction • CPU malfunction • Malfunction in wiring harness between CPU and parking brake switch • Malfunction in brake system warning light operation circuit — Brake system warning light does not illuminate • CPU malfunction • Print plate malfunction • Brake system warning light bulb malfunction • Malfunction in wiring harness between instrument cluster and CPU

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Remove driver's side front scuff plate. • Remove driver's side front side trim. • Remove nut fixed in joint box and remove CPU from joint box. • Connect ground to terminal 1D of joint box. • Turn ignition switch to ON. • Does brake system warning light illuminate?	Yes	Go to next step.
		No	Go to step 4.
2	**INSPECT WIRING HARNESS BETWEEN PARKING BRAKE SWITCH AND GND** • Remove rear console. • Disconnect parking brake switch connector. • Pull parking brake lever. • Check for continuity between terminal A at parking brake switch and ground. • Is there continuity?  W6U901WV7	Yes	Go to next step.
		No	Replace parking brake switch.
3	**INSPECT WIRING HARNESS BETWEEN CPU AND PARKING BRAKE SWITCH** • Connect ground to terminal A of parking brake switch connector. • Check for continuity between terminal 1P at joint box (16-pin) and ground. • Is there continuity?  W6U901WV8	Yes	Replace CPU.
		No	Repair wiring harness between CPU and parking brake switch.

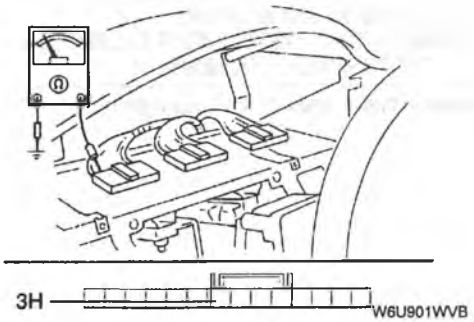
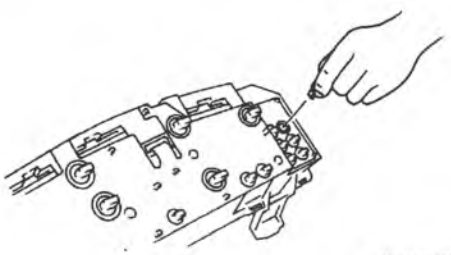
STEP	INSPECTION		ACTION
4	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND CPU** • Remove meter hood. • Remove instrument cluster. • Check for continuity between terminal 3L at instrument cluster (14-pin) connector of wiring harness and ground. • Is there continuity? 	Yes	Go to next step.
		No	Repair wiring harness between instrument cluster and CPU.
5	**INSPECT BULB** • Remove brake system warning light bulb. • Is brake system warning light bulb okay? 	Yes	Replace display unit assembly. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
		No	Replace brake system warning light bulb.

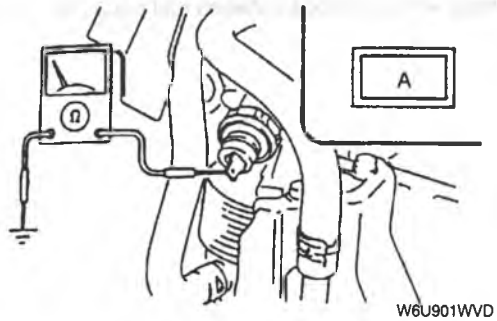
NO.11 OIL PRESSURE WARNING LIGHT DOES NOT ILLUMINATE WITH IGNITION SWITCH AT ON (ENGINE STOPPED)

Z6U090301067W13

11	Oil pressure warning light does not illuminate with ignition switch at ON (engine stopped)
POSSIBLE CAUSE	• Malfunction in oil pressure warning light operation circuit — Oil pressure warning light does not illuminate • Oil pressure switch malfunction • Print plate malfunction • Oil pressure warning light bulb malfunction • Malfunction in wiring harness between instrument cluster and oil pressure switch

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND GND** • Remove meter hood. • Remove instrument cluster. • Check for continuity between terminal 3H at instrument cluster (14-pin) connector of wiring harness and ground. • Is there continuity?  W6U901WVB	Yes	Go to next step.
		No	Go to step 3.
2	**INSPECT BULB** • Remove oil pressure warning light bulb. • Is oil pressure warning light bulb okay?  W6U901WVC	Yes	Replace print plate. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
		No	Replace oil pressure warning light bulb.

STEP	INSPECTION		ACTION
3	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND OIL PRESSURE SWITCH** • Disconnect oil pressure switch connector. • Check for continuity between terminal A at oil pressure switch and ground. • Is there continuity?  W6U901WVD	Yes	Repair wiring harness between instrument cluster and oil pressure switch.
		No	Replace oil pressure switch.

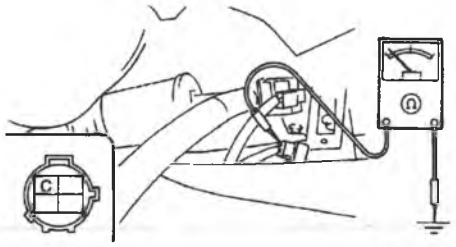
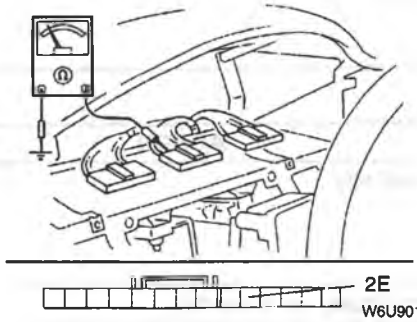
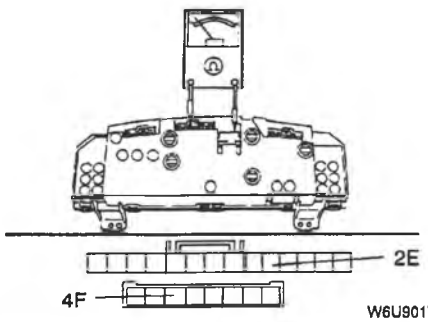
NO.12 FUEL-LEVEL WARNING LIGHT REMAINS ILLUMINATED (ENGINE RUNNING)

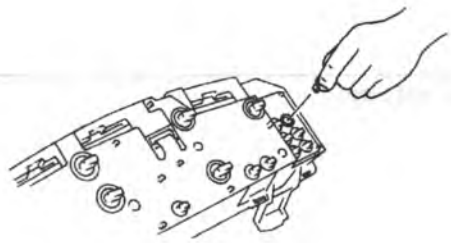
Z6U090301067W14

12	**Fuel-level warning light remains illuminated (engine running)**
POSSIBLE CAUSE	• Malfunction in fuel-level warning light input signal circuit — Fuel-level warning light remains illuminated • Fuel gauge sender unit malfunction • Print plate malfunction • Display unit assembly malfunction • Malfunction in wiring harness between instrument cluster and fuel gauge sender unit • Malfunction in fuel-level warning light operation circuit — Fuel-level warning light remains illuminated • Display unit assembly malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Turn ignition switch to LOCK. • Disconnect negative battery cable. • After **30 seconds or more**, reconnect negative battery cable. • Turn ignition switch to ON and LOCK **3 times**. • Turn ignition switch to ON. • Push odometer/tripmeter switch **3 times**.  W6U901WVE	Yes	Go to next step.
		No	Replace display unit assembly. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
	• Select DTC 16 by pushing odometer/tripmeter switch. • Does fuel-level warning light turn on and off **3 times**?		

STEP	INSPECTION		ACTION
2	• Select DTC 22 by pushing odometer/tripmeter switch. • Does LCD indicate "255"?	Yes	Go to next step.
		No	Replace fuel gauge sender unit.
3	**INSPECT WIRING HARNESS BETWEEN FUEL GAUGE AND GND** • Disconnect fuel pump connector. • Check for continuity between terminal C at fuel pump connector of wiring harness and ground. • Is there continuity?  W6U901WVM	Yes	Go to next step.
		No	Repair wiring harness between fuel gauge and ground.
4	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND FUEL GAUGE SENDER UNIT** • Connect ground to terminal B of fuel pump connector. • Remove meter hood. • Remove instrument cluster. • Check for continuity between terminal 2E at instrument cluster (14-pin) connector of wiring harness and ground. • Is there continuity?  W6U901WVN	Yes	Go to next step.
		No	Repair wiring harness between instrument cluster and fuel gauge sender unit.
5	**INSPECT INSTRUMENT CLUSTER INNER CIRCUIT** • Disconnect print plate connector. • Check for continuity between terminal 2E (14-pin) at print plate and print plate connector 4F (8-pin) terminal. • Is there continuity?  W6U901WVL	Yes	Replace display unit assembly. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
		No	Replace print plate. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)

STEP	INSPECTION		ACTION
6	**INSPECT BULB** ● Remove meter hood. ● Remove instrument cluster. ● Remove fuel-level warning light bulb. ● Is fuel-level warning light bulb okay?  W6U901WVP	Yes	Replace display unit assembly. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
		No	Replace fuel-level warning light bulb.

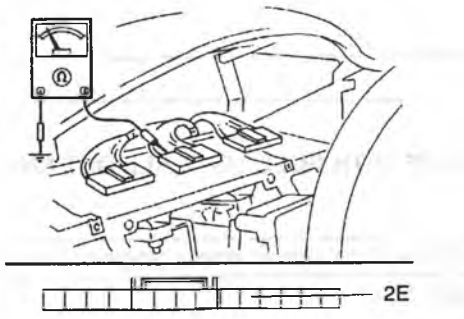
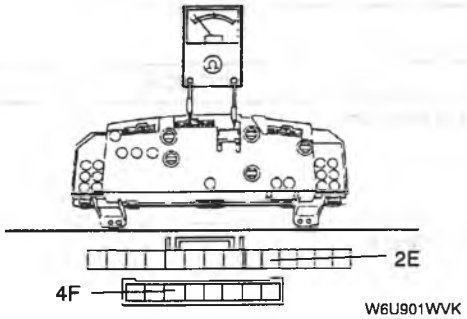
NO.13 FUEL-LEVEL WARNING LIGHT DOES NOT ILLUMINATE WITH FUEL TANK ALMOST EMPTY (ENGINE RUNNING)

Z6U090301067W15

13	**Fuel-level warning light does not illuminate with fuel tank almost empty (engine running)**
POSSIBLE CAUSE	● Malfunction in fuel-level warning light input signal circuit — Fuel-level warning light does not illuminate ● Fuel gauge sender unit malfunction ● Print plate malfunction ● Display unit assembly malfunction ● Malfunction in wiring harness between instrument cluster and fuel gauge sender unit ● Malfunction in wiring harness between fuel gauge sender unit and ground ● Malfunction in fuel-level warning light operation circuit — Fuel-level warning light does not illuminate ● Fuel-level warning light bulb malfunction ● Display unit assembly malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	● Turn ignition switch to LOCK. ● Disconnect negative battery cable. ● After **30 seconds or more**, reconnect negative battery cable. ● Turn ignition switch to ON and LOCK **3 times**. ● Turn ignition switch to ON. ● Push odometer/tripmeter switch **3 times**.  W6U901WVJ ● Select DTC 16 by pushing odometer/tripmeter switch. ● Does fuel-level warning light turn on and off **3 times**?	Yes	Go to next step.
		No	Go to step 6.

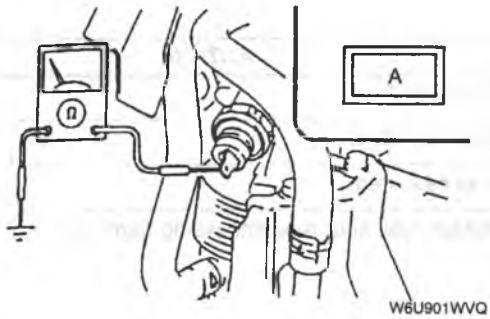
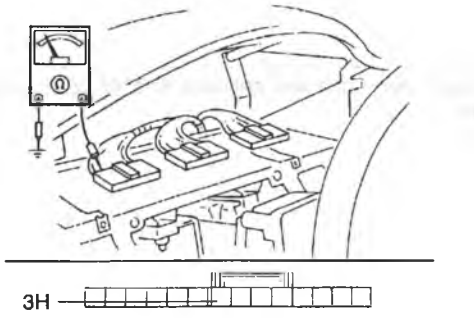
STEP	INSPECTION		ACTION
2	• Select DTC 22 by pushing odometer/tripmeter switch. • Does LCD indicate "000"?	Yes	Go to next step.
		No	Replace fuel gauge sender unit.
3	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND FUEL GAUGE SENDER UNIT** • Remove meter hood. • Remove instrument cluster. • Disconnect fuel pump connector. • Check for continuity between terminal 2E at instrument cluster (14-pin) connector of wiring harness and ground. • Is there continuity?  W6U901WVH	Yes	Repair wiring harness between instrument cluster and fuel gauge sender unit.
		No	Go to next step.
4	**INSPECT INSTRUMENT CLUSTER INNER CIRCUIT** • Disconnect print plate connector. • Check for continuity between terminal 2E (14-pin) at print plate and print plate connector 4F (8-pin) terminal. • Is there continuity?  W6U901WVK	Yes	Replace display unit assembly. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
		No	Replace print plate. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)

NO.14 OIL PRESSURE WARNING LIGHT REMAINS ILLUMINATED (ENGINE RUNNING)

Z6U090301067W16

14	Oil pressure warning light remains illuminated (engine running)
POSSIBLE CAUSE	• Malfunction in oil pressure warning light operation circuit — Oil pressure warning light remains illuminated • Oil pressure switch malfunction • Print plate malfunction • Low oil pressure • Malfunction in wiring harness between instrument cluster and oil pressure switch

Diagnostic procedure

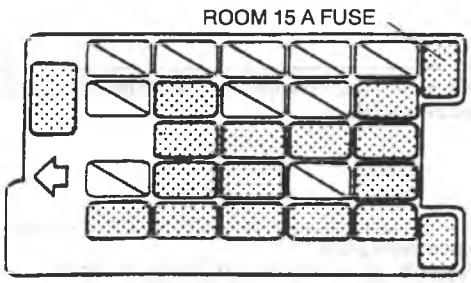
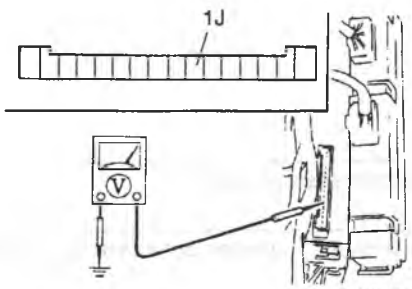
STEP	INSPECTION		ACTION
1	**INSPECT CONTINUITY BETWEEN OIL PRESSURE SWITCH AND GND** • Disconnect oil pressure switch connector. • Start engine. • Check for continuity between terminal A at oil pressure switch and ground. • Is there continuity?  W6U901WVQ	Yes	Go to step 3.
		No	Go to next step.
2	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND OIL PRESSURE SWITCH** • Stop engine. • Remove meter hood. • Remove instrument cluster. • Check for continuity between terminal 3H at instrument cluster (14-pin) connector of wiring harness and ground. • Is there continuity?  W6U901WVR	Yes	Repair wiring harness between instrument cluster and oil pressure switch.
		No	Replace print plate. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
3	**INSPECT OIL PRESSURE SWITCH** • Measure engine oil pressure. (See 01-11-2 OIL PRESSURE INSPECTION) • Is engine oil pressure okay?	Yes	Replace oil pressure switch.
		No	Check for cause and repair or replace as necessary.

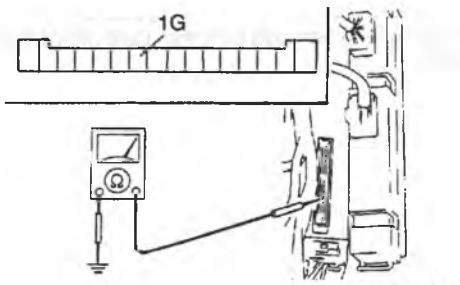
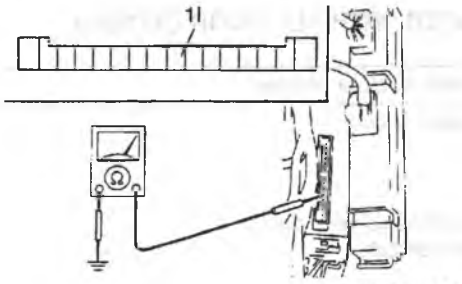
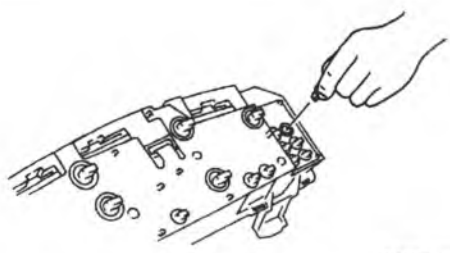
NO.15 DOOR AJAR WARNING LIGHT DOES NOT ILLUMINATE WITH ANY DOOR OPEN

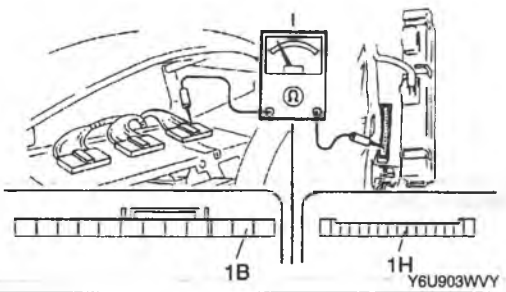
Z6U090301067W17

15	Door ajar warning light does not illuminate with any door open
POSSIBLE CAUSE	• Malfunction in CPU power supply/ground circuit — Door ajar warning light does not illuminate • ROOM 15 A fuse malfunction • CPU malfunction • Malfunction in wiring harness between ROOM 15 A fuse and CPU • Malfunction in wiring harness between CPU and ground • Malfunction in door ajar warning light input signal circuit — Door ajar warning light does not illuminate • Door switch malfunction • CPU malfunction • Malfunction in wiring harness between CPU and door switch • Malfunction in door ajar warning light operation circuit — Door ajar warning light does not illuminate • CPU malfunction • Door ajar warning light bulb malfunction • Print plate malfunction • Malfunction in wiring harness between instrument cluster and CPU

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Turn interior light switch to DOOR position. • Open any door. • Does interior light illuminate?	Yes	Go to step 7.
		No	Go to next step.
2	**INSPECT FUSE** • Is ROOM 15 A fuse okay?  W6U901WVS	Yes	Go to next step.
		No	Replace fuse after repairing wiring harness.
3	**INSPECT POWER SUPPLY CIRCUIT OF CPU** • Remove driver's side front scuff plate. • Remove driver's side front side trim. • Remove nut fixed in joint box and remove CPU from joint box. • Measure voltage at terminal 1J at joint box (16-pin). • Is voltage **B**+?  W6U901WVT	Yes	Go to next step.
		No	Repair wiring harness between ROOM 15 A fuse and CPU.

STEP	INSPECTION		ACTION
4	**INSPECT WIRING HARNESS BETWEEN CPU AND GND** • Check for continuity between terminal 1G at joint box (16-pin) and ground. • Is there continuity?  W6U901WVU	Yes	Go to next step.
		No	Repair wiring harness between CPU and ground.
5	**INSPECT CONTINUITY BETWEEN JOINT BOX AND GND** • Open any door. • Check for continuity between terminal 1I at joint box (16-pin) and ground. • Is there continuity?  W6U901WVV	Yes	Replace CPU.
		No	Go to next step.
6	**INSPECT DOOR SWITCH** • Remove door switch. • Inspect door switch. (See 09-18-14 DOOR SWITCH INSPECTION) • Is door switch okay?	Yes	Repair wiring harness between CPU and door switch.
		No	Replace door switch.
7	**INSPECT BULB** • Remove meter hood. • Remove instrument cluster. • Remove door ajar warning light bulb. • Is door ajar warning light bulb okay?  W6U901WVX	Yes	Go to next step.
		No	Replace door ajar warning light bulb.

STEP	INSPECTION		ACTION
8	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND CPU** ● Remove driver's side front scuff plate. ● Remove driver's side front side trim. ● Remove nut fixed in joint box and remove CPU from joint box. ● Check for continuity between terminal 1B at instrument cluster (12-pin) connector of wiring harness and terminal 1H at joint box (16-pin). ● Is there continuity?  	Yes	Replace print plate. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)
		No	Repair wiring harness between instrument cluster and CPU.

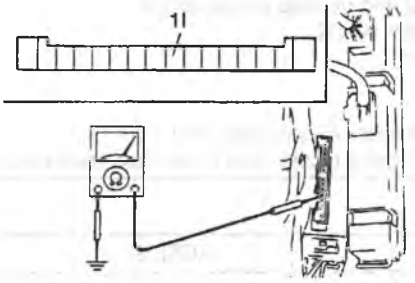
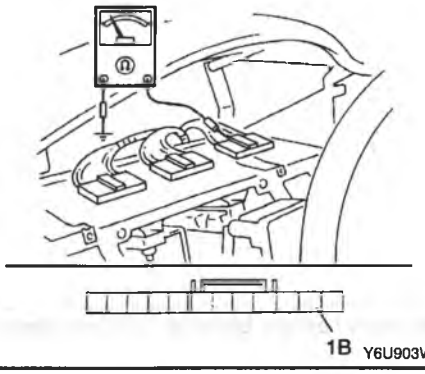
NO.16 DOOR AJAR WARNING LIGHT REMAINS ILLUMINATED WITH ALL DOOR CLOSED

Z6U090301067W18

16	Door ajar warning light remains illuminated with all door closed
POSSIBLE CAUSE	● Malfunction in door ajar warning light input signal circuit — Door ajar warning light remains on ● Door switch malfunction ● CPU malfunction ● Malfunction in wiring harness between CPU and door switch ● Malfunction in door ajar warning light operation circuit — Door ajar warning light remains on ● CPU malfunction ● Print plate malfunction ● Malfunction in wiring harness between instrument cluster and CPU

Diagnostic procedure

STEP	INSPECTION		ACTION
1	● Remove driver's side front scuff plate. ● Remove driver's side front side trim. ● Remove nut fixed in joint box and remove CPU from joint box. ● Turn ignition switch to ON. ● Does door ajar warning light illuminate?	Yes	Go to step 4.
		No	Go to next step.

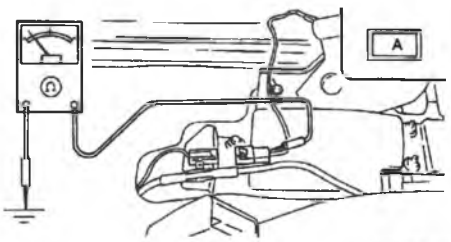
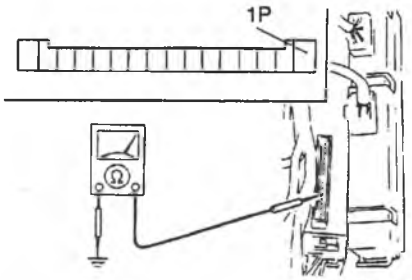
STEP	INSPECTION		ACTION
2	**INSPECT CONTINUITY BETWEEN JOINT BOX AND GND** ● Turn ignition switch to LOCK. ● Open any door. ● Check for continuity between terminal 1I at joint box (16-pin) and ground. ● Is there continuity?  W6U901WW0	Yes	Replace CPU.
		No	Go to next step.
3	**INSPECT DOOR SWITCH** ● Remove door switch. ● Inspect door switch. (See 09-18-14 DOOR SWITCH INSPECTION) ● Is door switch okay?	Yes	Repair wiring harness between CPU and door switch.
		No	Replace door switch.
4	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND CPU** ● Remove meter hood. ● Remove instrument cluster. ● Check for continuity between terminal 1B at instrument cluster (10-pin) connector of wiring harness and ground. ● Is there continuity?  Y6U903WW2	Yes	Repair wiring harness between instrument cluster and CPU.
		No	Replace print plate. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)

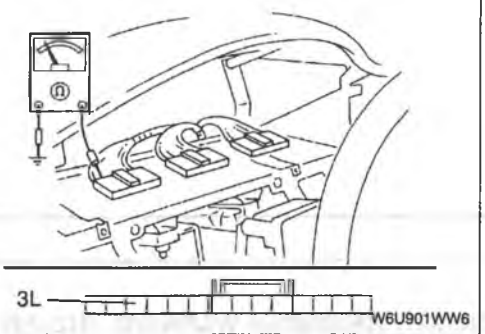
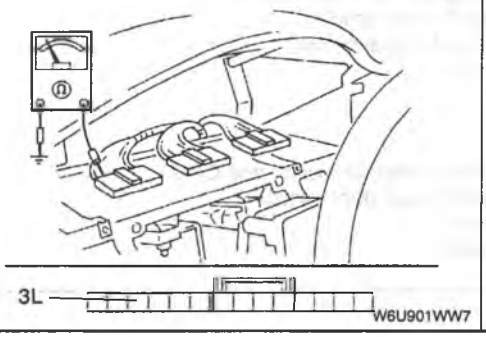
NO.17 BRAKE SYSTEM WARNING LIGHT REMAINS ILLUMINATED WITH PARKING BRAKE RELEASED AND BRAKE FLUID LEVEL ABOVE MIN

Z6U090301067W19

17	**Brake system warning light remains illuminated with parking brake released and brake fluid level above MIN**
POSSIBLE CAUSE	• Malfunction in brake system warning light input signal circuit — Brake system warning light remains illuminated • Parking brake switch malfunction • CPU malfunction • Malfunction in wiring harness between CPU and parking brake switch • Malfunction in brake system warning light operation circuit — Brake system warning light remains illuminated • CPU malfunction • Print plate malfunction • Malfunction in wiring harness between instrument cluster and CPU • Malfunction in wiring harness between instrument cluster and brake fluid level sensor

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Remove driver's side front scuff plate. • Remove driver's side front side trim. • Remove the nut fixed in joint box and remove CPU from joint box. • Turn ignition switch to ON. • Does brake system warning light illuminate?	Yes	Go to step 4.
		No	Go to next step.
2	**INSPECT CONTINUITY BETWEEN PARKING BRAKE SWITCH AND GND** • Remove rear console. • Disconnect parking brake switch connector. • Release parking brake lever. • Check for continuity between terminal A at parking brake switch and ground. • Is there continuity?  W6U901WW4	Yes	Replace parking brake switch.
		No	Go to next step.
3	**INSPECT WIRING HARNESS BETWEEN CPU AND PARKING BRAKE SWITCH** • Check for continuity between terminal 1P at joint box (16-pin) and ground. • Is there continuity?  W6U901WW5	Yes	Repair wiring harness between CPU and parking brake switch.
		No	Replace CPU.

STEP	INSPECTION		ACTION
4	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND CPU** • Remove meter hood. • Remove instrument cluster. • Check for continuity between terminal 3L at instrument cluster (14-pin) connector of wiring harness and ground. • Is there continuity? 	Yes	Repair wiring harness between instrument cluster and CPU.
		No	Go to next step.
5	**INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND BRAKE FLUID LEVEL SENSOR** • Disconnect brake fluid level sensor connector. • Check for continuity between terminal 3L at instrument cluster (14-pin) connector of wiring harness and ground. • Is there continuity? 	Yes	Repair wiring harness between instrument cluster and brake fluid level sensor.
		No	Replace print plate. (See 09-22-1 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)

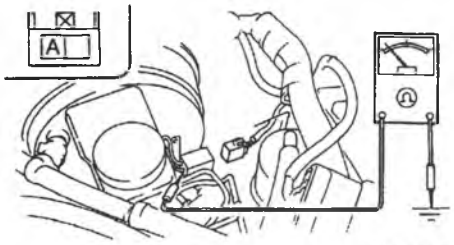
NO.18 BRAKE SYSTEM WARNING LIGHT DOES NOT ILLUMINATE WITH BRAKE FLUID IN RESERVOIR BELOW MIN

Z6U090301067W20

18	**Brake system warning light does not illuminate with brake fluid in reservoir below MIN**
POSSIBLE CAUSE	• Malfunction in brake system warning light operation circuit — Brake system warning light does not illuminate • Brake fluid level sensor malfunction • Malfunction in wiring harness between instrument cluster and brake fluid level sensor • Malfunction in wiring harness between brake fluid level sensor and ground

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Disconnect brake fluid level sensor connector. • Connect ground to terminal B of brake fluid level sensor. • Turn ignition switch to ON. • Does brake system warning light illuminate?	Yes	Go to next step.
		No	Repair wiring harness between instrument cluster and brake fluid level sensor.

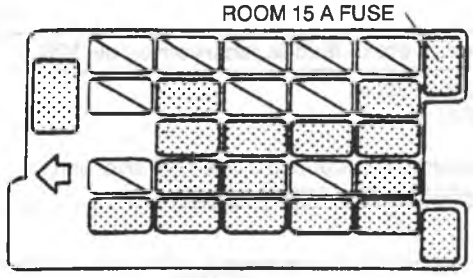
STEP	INSPECTION		ACTION
2	**INSPECT CONTINUITY BETWEEN BRAKE FLUID LEVEL SENSOR AND GND** • Check for continuity between terminal A at brake fluid level sensor and ground. • Is there continuity?  W6U901WW9	Yes	Replace brake fluid level sensor.
		No	Repair wiring harness between brake fluid level sensor and ground.

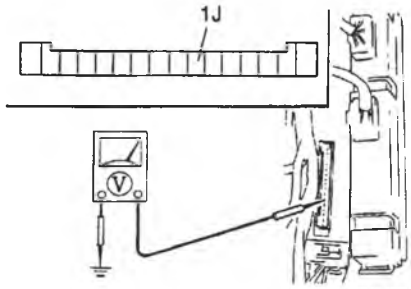
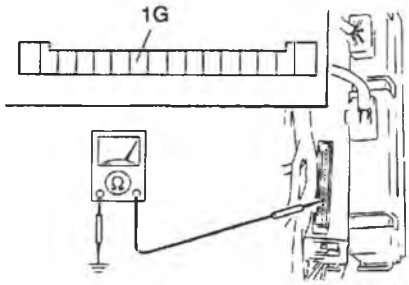
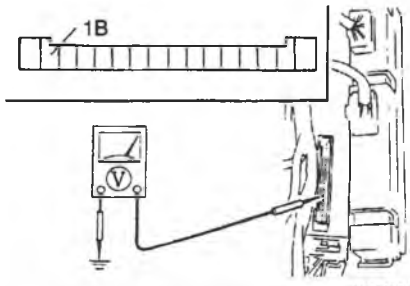
NO.19 EVEN IF IGNITION KEY IS LEFT IN STEERING LOCK, KEY REMINDER WARNING BUZZER DOES NOT SOUND WHEN ANY DOOR IS OPENED

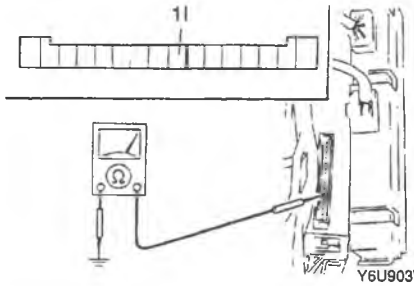
Z6U090301067W21

19	**Even if ignition key is left in steering lock, key reminder warning buzzer does not sound when any door is opened**
POSSIBLE CAUSE	• Malfunction in CPU power supply/ground circuit — Key reminder warning buzzer does not sound • ROOM 15 A fuse malfunction • CPU malfunction • Malfunction in wiring harness between ROOM 15 A fuse and CPU • Malfunction in wiring harness between CPU and ground • Malfunction in key reminder warning buzzer input signal circuit — Key reminder warning buzzer does not sound • Key reminder switch malfunction • Door switch malfunction • CPU malfunction • Malfunction in wiring harness between key reminder switch and CPU • Malfunction in wiring harness between CPU and door switch • Malfunction in warning buzzer operation circuit — Key reminder warning buzzer does not sound • CPU malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT FUSE** • Is ROOM 15 A fuse okay?  W6U901WWA	Yes	Go to next step.
		No	Replace fuse after repairing wiring harness.

STEP	INSPECTION		ACTION
2	**INSPECT POWER SUPPLY CIRCUIT OF CPU** • Remove driver's side front scuff plate. • Remove driver's side front side trim. • Remove nut fixed in joint box and remove CPU from joint box. • Measure voltage at terminal 1J at joint box (16-pin). • Is voltage **B**+?  W6U901WWB	Yes	Go to next step.
		No	Repair wiring harness between ROOM 15 A fuse and CPU.
3	**INSPECT WIRING HARNESS BETWEEN CPU AND GND** • Check for continuity between terminal 1G at joint box (16-pin) and ground. • Is there continuity?  W6U901WWC	Yes	Go to next step.
		No	Repair wiring harness between CPU and ground.
4	**INSPECT SIGNAL OF KEY REMINDER SWITCH** • Insert key into steering lock. • Measure voltage at terminal 1B at joint box (16-pin). • Is voltage **B**+?  W6U901WWD	Yes	Go to step 7.
		No	Go to next step.

STEP	INSPECTION		ACTION
5	**INSPECT WIRING HARNESS BETWEEN FUSE AND KEY REMINDER SWITCH** • Remove column cover. • Measure voltage at terminal A at key reminder switch. • Is voltage **B**+?  W6U901WWE	Yes	Go to next step.
		No	Repair wiring harness between ROOM 15 A fuse and key reminder switch.
6	**INSPECT WIRING HARNESS BETWEEN KEY REMINDER SWITCH AND CPU** • Measure voltage at terminal B at key reminder switch connector. • Is voltage **B**+?  W6U901WWF	Yes	Repair wiring harness between key reminder switch and CPU.
		No	Replace steering lock.
7	**INSPECT CPU** • Open any door. • Check for continuity between terminal 1I at joint box (16-pin) and ground. • Is there continuity?  Y6U903WWG	Yes	Replace CPU.
		No	Go to next step.
8	**INSPECT DOOR SWITCH** • Remove door switch. • Inspect door switch. (See 09-18-14 DOOR SWITCH INSPECTION) • Is door switch okay?	Yes	Repair wiring harness between door switch and CPU.
		No	Replace door switch.

NO.20 EVEN IF IGNITION KEY IS REMOVED FROM STEERING LOCK, KEY REMINDER WARNING BUZZER WILL SOUND WHEN ANY DOOR IS OPENED

Z6U090301067W22

20	**Even if ignition key is removed from steering lock, key reminder warning buzzer will sound when any door is opened**
POSSIBLE CAUSE	• Malfunction in key reminder warning buzzer input signal circuit — Key reminder warning buzzer still sounds • Key reminder switch malfunction • CPU malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT KEY REMINDER SWITCH** • Remove column cover. • Remove key reminder switch. • Inspect key reminder switch. (See 09-21-2 KEY REMINDER SWITCH INSPECTION) • Is key reminder switch okay?	Yes	Replace CPU.
		No	Replace steering lock.

09-10 BODY PANELS

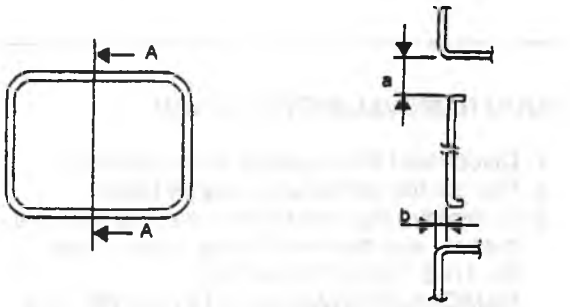
FUEL-FILLER LID ADJUSTMENT 09-10-1
FUEL-FILLER LID
REMOVAL/INSTALLATION 09-10-1
HOOD ADJUSTMENT 09-10-1
Gap 09-10-2
Height 09-10-2
HOOD REMOVAL/INSTALLATION 09-10-2
TRUNK LID ADJUSTMENT 09-10-3
Gap and Height 09-10-3
Tension 09-10-3
TRUNK LID
REMOVAL/INSTALLATION 09-10-4
Balance Spring Removal Note 09-10-4
FRONT BUMPER
REMOVAL/INSTALLATION 09-10-5
REAR BUMPER
REMOVAL/INSTALLATION 09-10-6
FRONT FENDER PANEL
REMOVAL/INSTALLATION 09-10-6

FUEL-FILLER LID ADJUSTMENT

1. Measure the gap and height between the fuel-filler lid and the body.
   - If not as specified, loosen the fuel-filler lid installation screws and reposition the fuel-filler lid. Tighten the fuel-filler lid installation screws.

Clearance	Standard (mm {in})	Minimum (mm {in})	Maximum (mm {in})
a	3.5 {0.14}	2.5 {0.10}	4.5 {0.17}
b	0.5 {0.02}	−0.3 {−0.01}	1.3 {0.05}

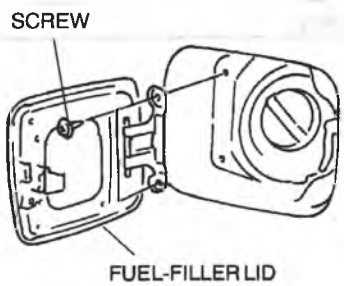
Z6U091042410W01



SEC. A-A W6U910WA0

FUEL-FILLER LID REMOVAL/INSTALLATION

1. Remove the screws, and remove the fuel-filler lid.



W6U910WA1

Z6U091042410W02

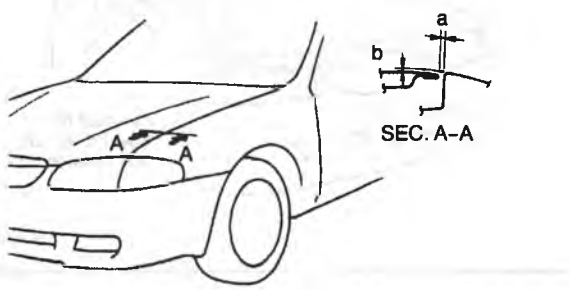
2. Install in the reverse order of removal.
3. Adjust the fuel-filler lid. (See 09-10-1 FUEL-FILLER LID ADJUSTMENT.)

HOOD ADJUSTMENT

1. Remove the hood lock.
2. Measure the gap and height between the hood and the front fender panel.
   - If not as specified, adjust the gap and height.

Clearance	Standard (mm {in})	Minimum (mm {in})	Maximum (mm {in})
a	4.5 {0.18}	3.5 {0.14}	5.5 {0.21}
b	0 {0}	−0.6 {−0.02}	1.0 {0.03}

Z6U091052310W01

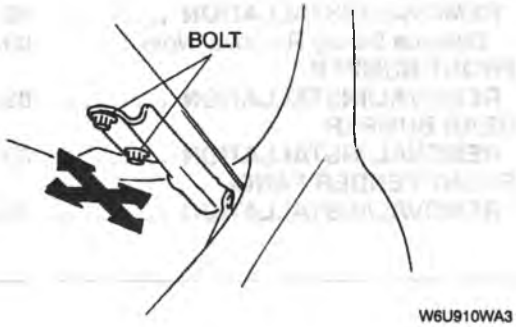


W6U910WA2

3. Install and adjust the hood lock. (See 09-14-10 HOOD LOCK ADJUSTMENT.)

Gap

1. Loosen the hood installation bolts and reposition the hood.

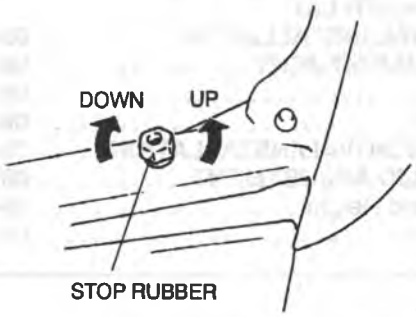


W6U910WA3

2. Tighten the hood installation bolts.

Height

- Turn the stop rubber to adjust the height of the hood.



W6U910WA4

HOOD REMOVAL/INSTALLATION

1. Disconnect the negative battery cable.
2. Pull out the windshield washer hose.
3. To remove the hood hinge, remove the front bumper and the front fender panel. (See 09-10-5 FRONT BUMPER REMOVAL/INSTALLATION.) (See 09-10-6 FRONT FENDER PANEL REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. Adjust the hood. (See 09-10-1 HOOD ADJUSTMENT.)
7. Adjust the headlight aiming. (See 09-18-1 HEADLIGHT ADJUSTMENT.)

Z6U091052310W02

1	Fastener
2	Hood insulator
3	Parting seal weatherstrip
4	Shroud seal weatherstrip
5	Bolt A
6	Hood
7	Bolt B
8	Hood hinge
9	Nut
10	Hood stay



W6U910WA5

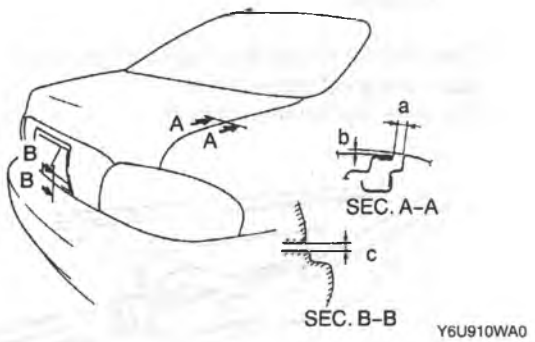
TRUNK LID ADJUSTMENT

Z6U091052610W01

Gap and Height

1. Remove the trunk lid striker.
2. Measure the gap and height between the trunk lid and the body.
   - If not as specified, loosen the trunk lid hinge installation nuts and the trunk lid striker installation bolts, and reposition the trunk lid.

Clearance	Standard (mm {in})	Minimum (mm {in})	Maximum (mm {in})
a	4.4 {0.17}	3.4 {0.14}	5.4 {0.21}
b	−0.6 {−0.02}	−1.6 {−0.06}	0.4 {0.01}
c	8.1 {0.32}	6.6 {0.26}	9.6 {0.37}



Y6U910WA0

3. Hand-tighten the trunk lid striker installation bolts.
4. Tighten the bolts and nuts.
5. Adjust the trunk lid striker. (See 09-14-27 TRUNK LID STRIKER ADJUSTMENT.)

Tension

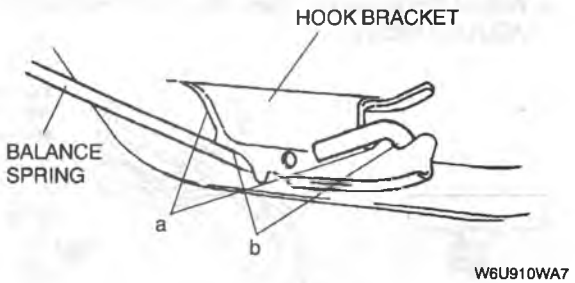
Note
- The trunk lid should raise **70—300 mm {2.8—11.8 in}** when the trunk lid is unlocked.

- Slide the balance spring to the desired position as described below by using a tape-wrapped screwdriver.

○: Position

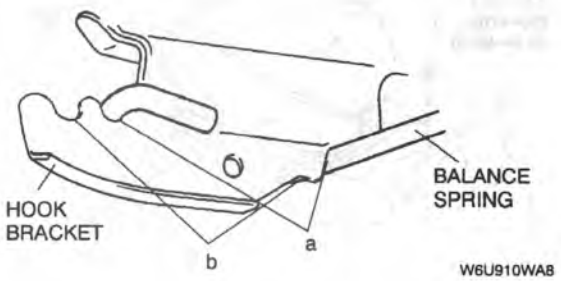
Tension	Hook bracket	Set position	
		a	b
Standard	Right side		○
	Left side	○	
Increase	Right side		○
	Left side		○
Decrease	Right side	○	
	Left side	○	

RIGHT SIDE



W6U910WA7

LEFT SIDE



W6U910WA8

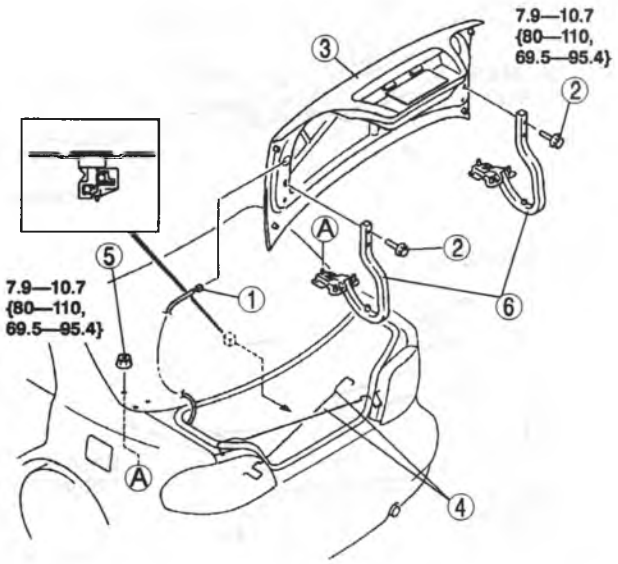
TRUNK LID REMOVAL/INSTALLATION

Z6U09105261OW02

Warning

- **Removing the balance spring without supporting the trunk lid can be dangerous. The trunk lid may fall and injure you. Open the trunk lid fully and support it before removing the balance spring. Perform these procedures together with another person.**

1. Disconnect the negative battery cable.
2. To remove the trunk lid hinge, remove the rear package trim. (See 09-17-12 REAR PACKAGE TRIM REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.
5. Adjust the trunk lid. (See 09-10-3 TRUNK LID ADJUSTMENT.)



N·m {kgf·cm, in·lbf}

W6U910WA9

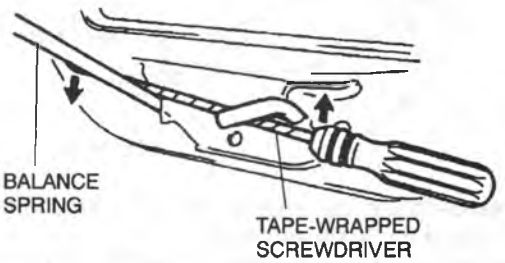
1	Connector
2	Bolt
3	Trunk lid
4	Balance spring (See 09-10-4 Balance Spring Removal Note)
5	Nut
6	Trunk lid hinge

Balance Spring Removal Note

Caution

- **The balance springs are under high tension.**

1. Carefully lift the balance spring by using a tape-wrapped screwdriver.
2. Remove the balance spring.



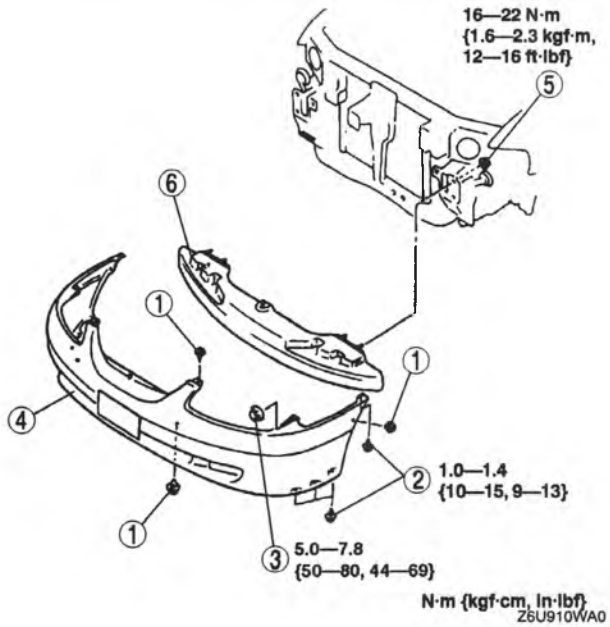
W6U910WAA

FRONT BUMPER REMOVAL/INSTALLATION

Z6U091050031W01

1. Disconnect the negative battery cable.
2. Remove the radiator grille.
3. Remove the front combination light.
4. Remove the headlight.
5. Partially peel off the mud guard.
6. Remove in the order indicated in the table.
7. Install in the reverse order of removal.
8. Adjust the headlight aiming. (See 09-18-1 HEADLIGHT ADJUSTMENT.)

1	Fastener
2	Screw
3	Nut A
4	Front bumper
5	Nut B
6	Front bumper reinforcement

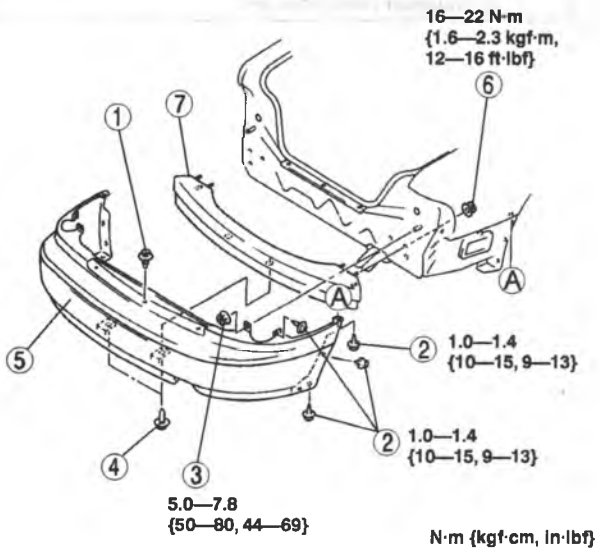


REAR BUMPER REMOVAL/INSTALLATION

1. Disconnect the negative battery cable.
2. Remove the rear combination light. (See 09-18-3 REAR COMBINATION LIGHT REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

Z6U091050221W01

1	Fastener A
2	Screw
3	Nut A
4	Fastener B
5	Rear bumper
6	Nut B
7	Rear bumper reinforcement



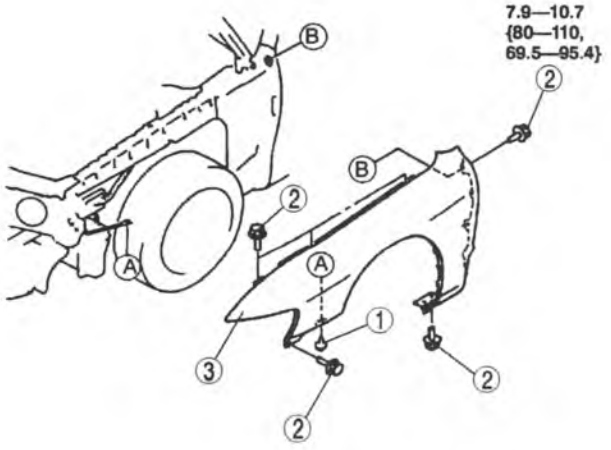
W6U910WAC

FRONT FENDER PANEL REMOVAL/INSTALLATION

1. Disconnect the negative battery cable.
2. Remove the mud guard.
3. Remove the front bumper. (See 09-10-5 FRONT BUMPER REMOVAL/INSTALLATION.)
4. Remove the front fender seal plate.
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.
7. Adjust the headlight aiming. (See 09-18-1 HEADLIGHT ADJUSTMENT.)

Z6U091052110W01

1	Screw
2	Bolt
3	Front fender panel



Y6U910WA2

09-11 DOORS AND LIFTGATE

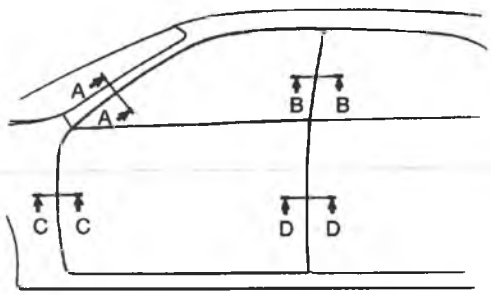
FRONT DOOR ADJUSTMENT 09-11-1
FRONT DOOR
REMOVAL/INSTALLATION 09-11-2
Connector Removal Note 09-11-2
Connector Installation Note 09-11-2
FRONT DOOR WEATHERSTRIP
REMOVAL/INSTALLATION 09-11-3
FRONT DOOR LOWER WEATHERSTRIP
REMOVAL/INSTALLATION 09-11-3
REAR DOOR ADJUSTMENT 09-11-4
REAR DOOR
REMOVAL/INSTALLATION 09-11-5
Connector Removal Note 09-11-5
Connector Installation Note 09-11-5
REAR DOOR WEATHERSTRIP
REMOVAL/INSTALLATION 09-11-5
REAR DOOR LOWER WEATHERSTRIP
REMOVAL/INSTALLATION 09-11-6

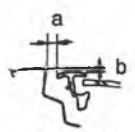
FRONT DOOR ADJUSTMENT

Z6U091158010W01

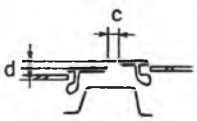
1. Remove the front door lock striker.
2. Measure the gap and height between the front door and body.

Clearance	Nominate (mm {in})	Minimum (mm {in})	Maximum (mm {in})
a	5.0 {0.20}	3.0 {0.12}	7.0 {0.27}
b	10.0 {0.40}	8.0 {0.32}	12.0 {0.47}
c	5.0 {0.20}	4.0 {0.16}	6.0 {0.23}
d	0 {0}	-1.5 {-0.05}	1.5 {0.05}
e	0 {0}	-1.0 {-0.03}	0.5 {0.01}
f	4.5 {0.18}	3.5 {0.14}	5.5 {0.21}

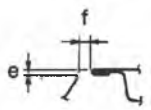




sec. A-A



sec. B-B



sec. C-C



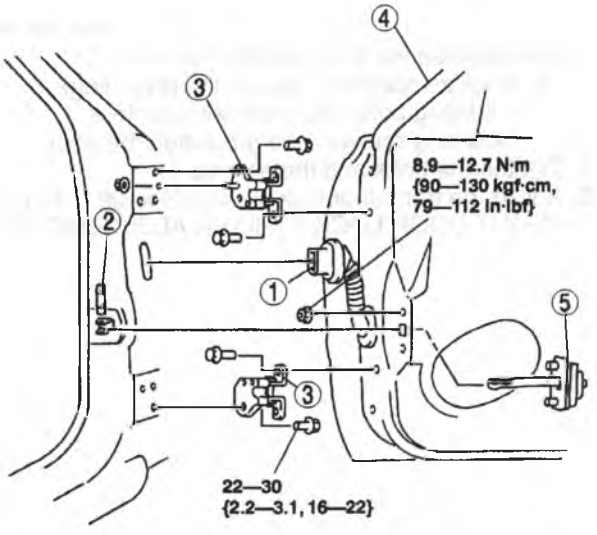
sec. D-D W6U911WA0

3. Hand tighten the front door lock striker.
   - If not as specified, loosen the door hinge mounting bolts and the front door lock mounting screws, and reposition the door.
4. Tighten the bolts and the screws.
5. Adjust the front door lock striker. (See 09-14-3 FRONT DOOR LOCK STRIKER ADJUSTMENT.)

FRONT DOOR REMOVAL/INSTALLATION

Z6U091158010W02

1. Disconnect the negative battery cable.
2. To remove the door hinge, remove the front fender panel. (See 09-10-6 FRONT FENDER PANEL REMOVAL/INSTALLATION.)
3. To remove the checker, remove the door speaker. (See 09-20-1 DOOR SPEAKER REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. Adjust the front door gap and height. (See 09-11-1 FRONT DOOR ADJUSTMENT.)



N·m {kgf·m, ft·lbf}

X6U911WA0

1	Connector (See 09-11-2 Connector Removal Note) (See 09-11-2 Connector Installation Note)
2	Checker pin
3	Door hinge
4	Front door
5	Checker

Connector Removal Note

1. Remove the rubber boot from the connector.
2. Pull out the connector from the body.
3. Pull the green pin out until it stops.
4. Disconnect the connector.

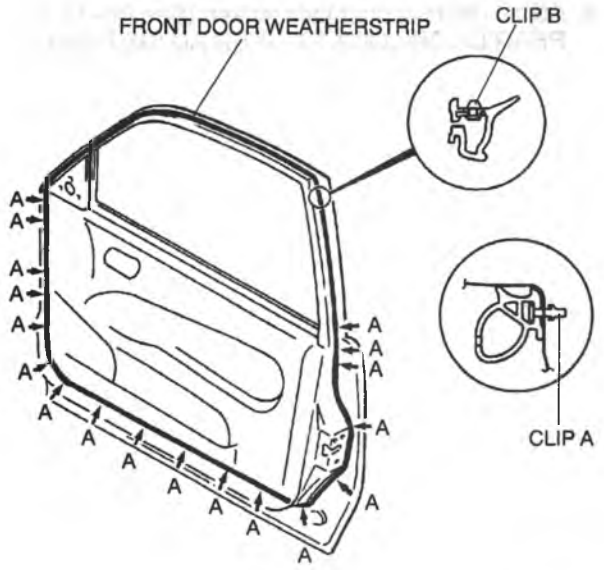
Connector Installation Note

1. Install the rubber boot on the connector.
2. Connect the connector.
3. Push the green pin in until it locks the connector.
4. Install the connector to the body while pushing on both side ribs.

FRONT DOOR WEATHERSTRIP REMOVAL/INSTALLATION

Z6U091158760W01

1. Remove the checker pin.
2. Disengage the clips by using a fastener remover.
3. Remove the front door weatherstrip.
4. Install in the reverse order of removal.

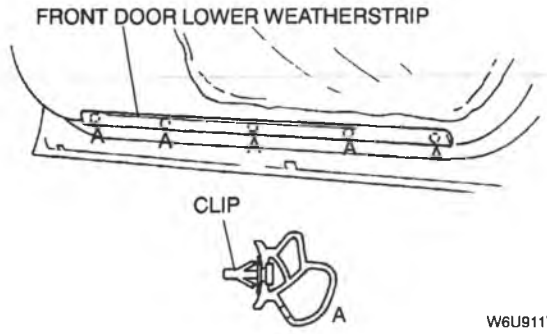


W6U911WA2

FRONT DOOR LOWER WEATHERSTRIP REMOVAL/INSTALLATION

Z6U091158761W01

1. Remove the front door trim. (See 09-17-9 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
2. Disengage the clips by using a fastener remover.
3. Remove the front door lower weatherstrip.
4. Install in the reverse order of removal.



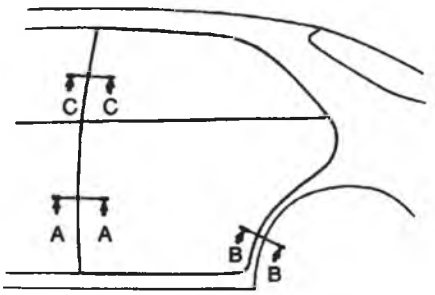
W6U911WA3

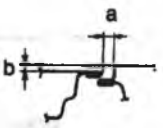
REAR DOOR ADJUSTMENT

Z6U091172010W01

1. Remove the rear door lock striker.
2. Measure the gap and height between the rear door and body.

Clearance	Nominate (mm {in})	Minimum (mm {in})	Maximum (mm {in})
a	4.5 {0.18}	3.5 {0.14}	5.5 {0.21}
b	0 {0}	−1.0 {−0.03}	0.5 {0.01}
c	0 {0}	−0.5 {−0.01}	1.0 {0.03}
d	0 {0}	−1.5 {−0.05}	1.5 {0.05}
e	5.0 {0.20}	4.0 {0.16}	6.0 {0.23}

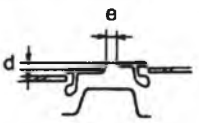




sec. A–A



sec. B–B



sec. C–C

W6U911WA4

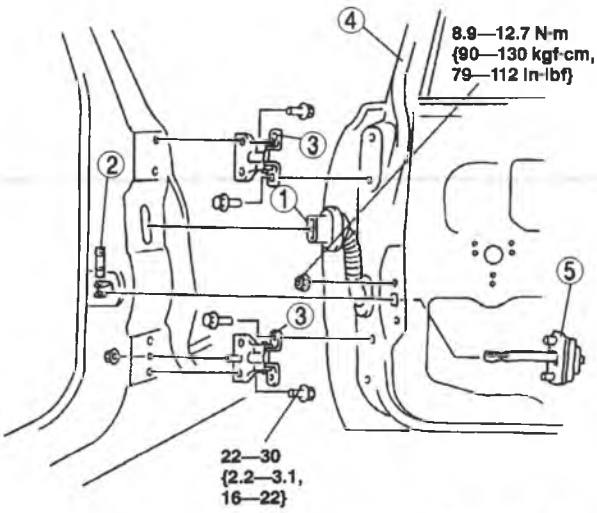
3. Hand tighten the rear door lock striker.
   - If not as specified, loosen the door hinge mounting bolts and the rear door lock mounting screws, and reposition the door.
4. Tighten the bolts and the screws.
5. Adjust the rear door lock striker. (See 09-14-5 REAR DOOR LOCK STRIKER ADJUSTMENT.)

REAR DOOR REMOVAL/INSTALLATION

Z6U091172010W02

1. Disconnect the negative battery cable.
2. To remove the checker, remove the rear door screen. (See 09-14-4 REAR DOOR LOCK AND OPENER REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.
5. Adjust the rear door gap and height. (See 09-11-4 REAR DOOR ADJUSTMENT.)

1	Connector (See 09-11-5 Connector Removal Note) (See 09-11-5 Connector Installation Note)
2	Checker pin
3	Door hinge
4	Rear door
5	Checker



X6U911WA1

Connector Removal Note

1. Remove the rubber boot from the connector.
2. Pull the green pin out until it stops.
3. Disconnect the connector.

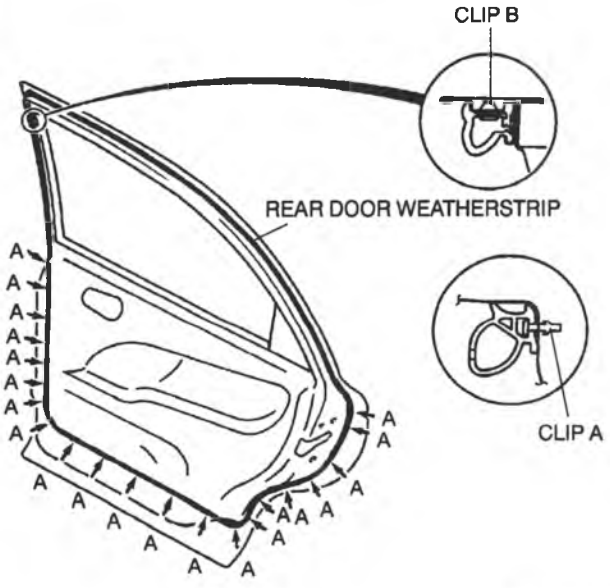
Connector Installation Note

1. Push the green pin until it stops.
2. Install the rubber boot on the connector.
3. Connect the connector.
4. Push the green pin until it locks the connector.

REAR DOOR WEATHERSTRIP REMOVAL/INSTALLATION

Z6U091172760W01

1. Remove the checker pin.
2. Disengage the clips by using a fastener remover.
3. Remove the rear door weatherstrip.
4. Install in the reverse order of removal.

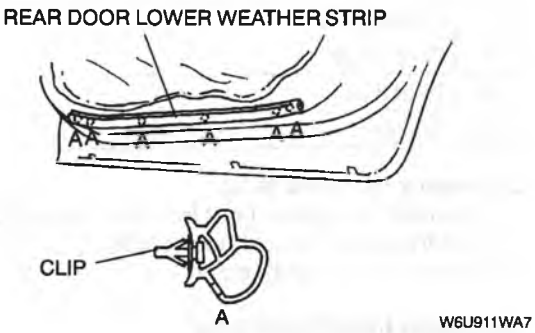


W6U911WA6

REAR DOOR LOWER WEATHERSTRIP REMOVAL/INSTALLATION

Z6U091172761W01

1. Remove the rear door trim. (See 09-17-10 REAR DOOR TRIM REMOVAL/INSTALLATION.)
2. Disengage the clips by using a fastener remover.
3. Remove the rear door lower weatherstrip.



4. Install in the reverse order of removal.

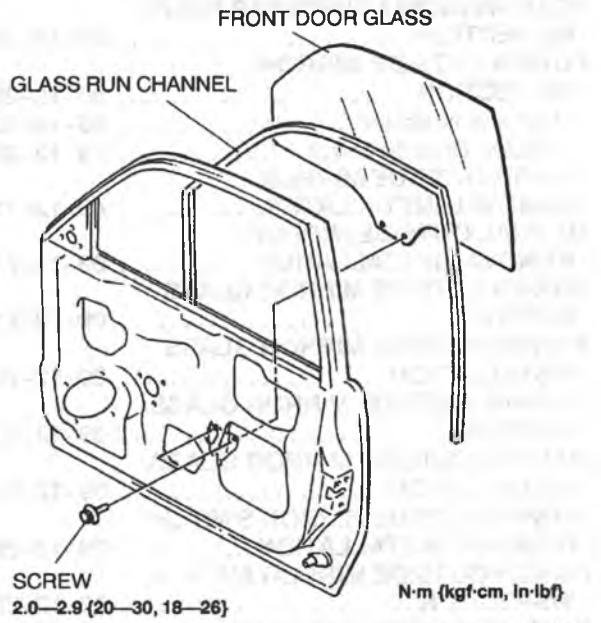
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FRONT DOOR GLASS AND GUIDE REMOVAL/INSTALLATION

Z6U091258510W01

1. Raise the rear edge of the front door glass **about 90 mm {3.5 in}** from the fully lowered position.
2. Remove the front door screen. (See 09-14-2 FRONT DOOR LOCK AND OPENER REMOVAL/INSTALLATION.)
3. Remove the screws.
4. Remove the front door glass.
5. Remove the glass run channel.
6. Install in the reverse order of removal.

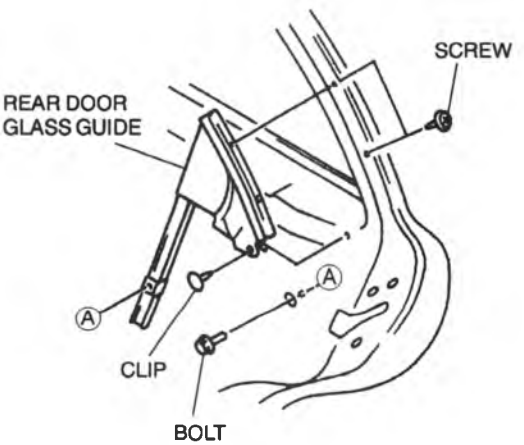


W6U912WA0

REAR DOOR GLASS AND GUIDE REMOVAL/INSTALLATION

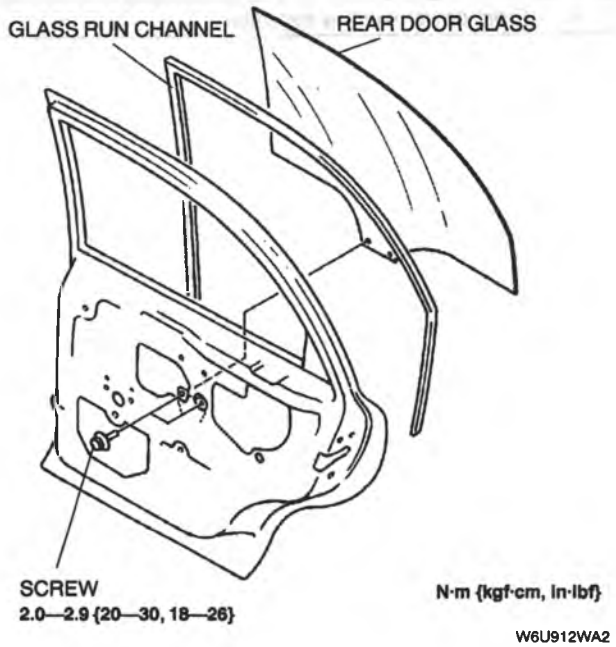
Z6U091272510W01

1. Lower the rear door glass fully.
2. Remove the rear door screen. (See 09-14-4 REAR DOOR LOCK AND OPENER REMOVAL/INSTALLATION.)
3. Remove the rear beltline molding. (See 09-16-6 REAR BELTLINE MOLDING REMOVAL/INSTALLATION.)
4. Remove the screws, bolt and clip.
5. Remove the rear door glass guide.



W6U912WA1

6. Raise the rear edge of the rear door glass **about 90 mm {3.5 in}** from the fully lowered position.
7. Remove the screws.
8. Remove the rear door glass.
9. Remove the glass run channel.
10. Install in the reverse order of removal.



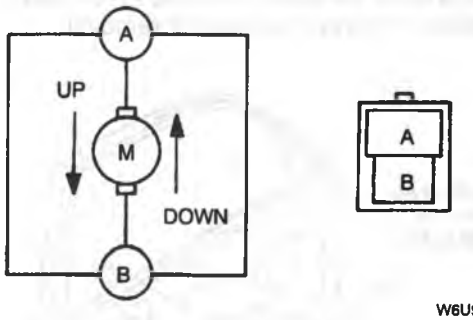
W6U912WA2

FRONT POWER WINDOW REGULATOR INSPECTION

Z6U091258560W01

1. Disconnect the negative battery cable.
2. Remove the front door trim. (See 09-17-9 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
3. Partially peel off the front door screen.
4. Disconnect the front power window regulator connector.
5. Apply battery positive voltage to the front power window regulator terminals and check the operation of the front power window regulator.
   - If not as specified, replace the front power window regulator.

Connection		Regulator operation
B+	GND	
A	B	Up
B	A	Down



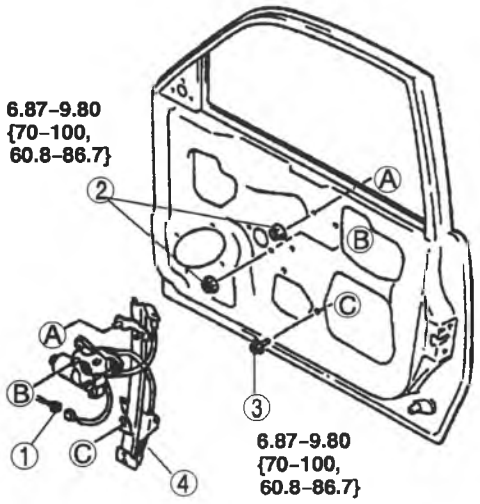
W6U912WA3

FRONT POWER WINDOW REGULATOR REMOVAL/INSTALLATION

Z6U091258560W02

1. Remove the front door glass. (See 09-12-2 FRONT DOOR GLASS AND GUIDE REMOVAL/INSTALLATION.)
2. Disconnect the negative battery cable.
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Connector
2	Nut
3	Bolt
4	Front power window regulator



N·m {kgf·cm, in·lbf}

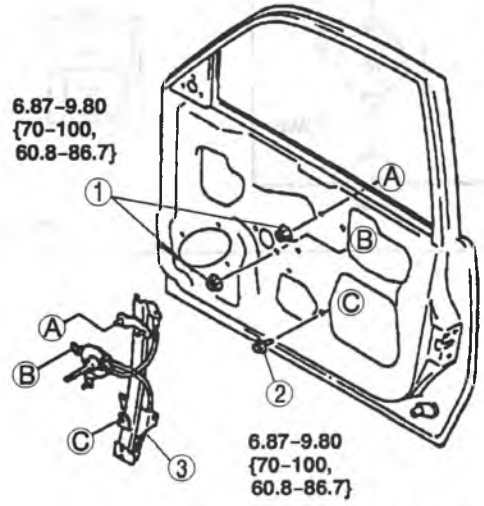
X6U912WA0

FRONT MANUAL WINDOW REGULATOR REMOVAL/INSTALLATION

Z6U091258561W01

1. Remove the regulator handle. (See 09-12-10 REGULATOR HANDLE REMOVAL.) (See 09-12-11 REGULATOR HANDLE INSTALLATION.)
2. Remove the front door glass. (See 09-12-2 FRONT DOOR GLASS AND GUIDE REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Nut
2	Bolt
3	Front manual window regulator



N·m {kgf·cm, in·lbf}

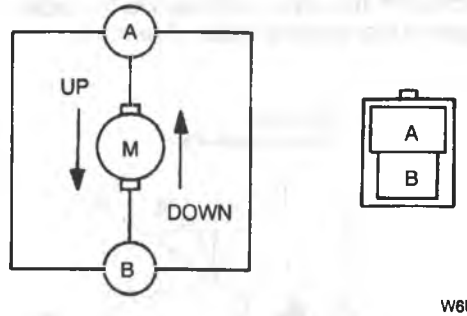
X6U912WA1

REAR POWER WINDOW REGULATOR INSPECTION

Z6U091272560W01

1. Disconnect the negative battery cable.
2. Remove the rear door trim.
3. Partially peel off the rear door screen.
4. Disconnect the rear power window regulator connector.
5. Apply battery positive voltage to the rear power window regulator terminals and check the operation of the rear power window regulator.
   - If not as specified, replace the rear power window regulator.

Connection		Regulator operation
B+	GND	
A	B	Up
B	A	Down



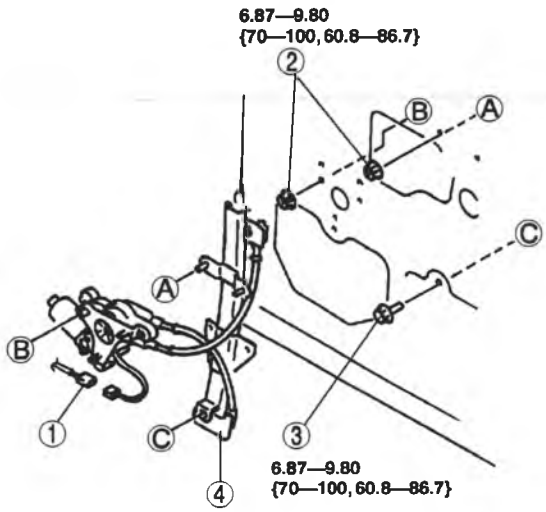
W6U912WA6

REAR POWER WINDOW REGULATOR REMOVAL/INSTALLATION

Z6U091272560W02

1. Remove the rear door glass. (See 09-12-2 REAR DOOR GLASS AND GUIDE REMOVAL/INSTALLATION.)
2. Disconnect the negative battery cable.
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Connector
2	Nut
3	Bolt
4	Rear power window regulator



N·m {kgf·cm, in·lbf}

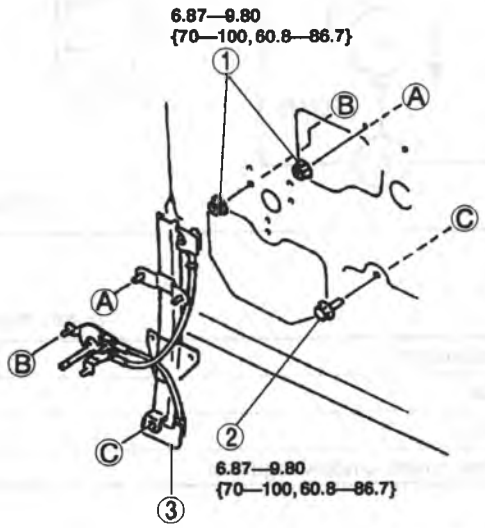
W6U912WA7

REAR MANUAL WINDOW REGULATOR REMOVAL/INSTALLATION

Z6U091272561W01

1. Remove the regulator handle. (See 09-12-10 REGULATOR HANDLE REMOVAL.) (See 09-12-11 REGULATOR HANDLE INSTALLATION.)
2. Remove the rear door glass. (See 09-12-2 REAR DOOR GLASS AND GUIDE REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Nut
2	Bolt
3	Rear manual window regulator



N·m {kgf·cm, in·lbf}

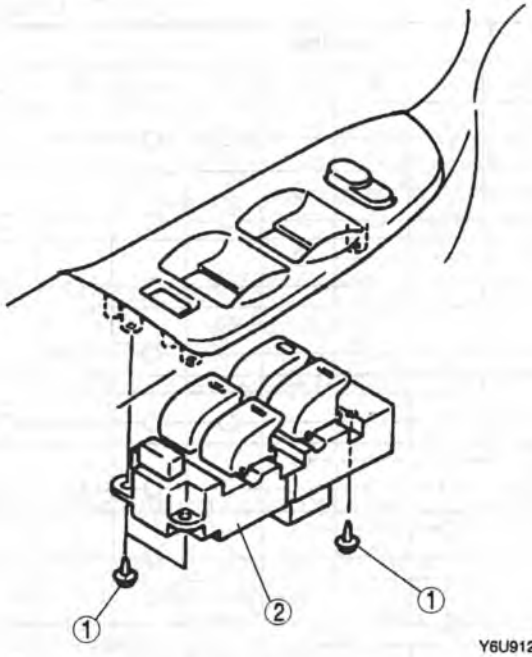
W6U912WA8

POWER WINDOW MAIN SWITCH REMOVAL/INSTALLATION

Z6U091266350W01

1. Disconnect the negative battery cable.
2. Remove the driver's side front door trim. (See 09-17-9 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Screw
2	Power window main switch



Y6U912WA3

POWER WINDOW MAIN SWITCH INSPECTION

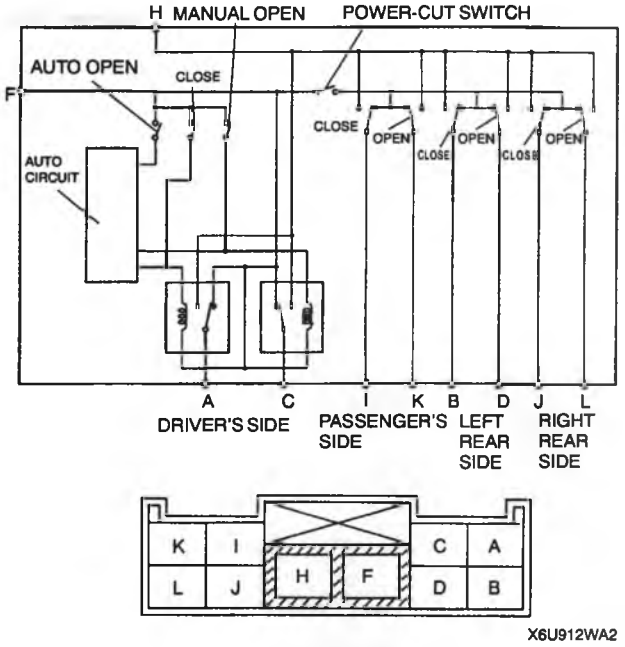
Z6U091266350W02

1. Disconnect the negative battery cable.
2. Remove the driver's side front door trim. (See 09-17-9 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
3. Inspect for the continuity between the power window main switch terminals by using an ohmmeter.
4. When checking the driver's side window switch, connect the B+ to terminal H and connect the ground to the terminal F.
   - If not as specified, replace the power window main switch.

O—O : Continuity

Power-cut switch	Switch position		Terminal									
			A	B	C	D	F	H	I	J	K	L
Released	Off		O	O	O	O	O		O	O	O	O
	Driver	Manual close	O	O	O	O	O	O	O	O	O	O
		Auto open Manual open	O	O	O	O	O	O	O	O	O	O
	Passenger	Close	O	O	O	O	O	O	O	O	O	O
		Open	O	O	O	O	O	O	O	O	O	O
	Left rear	Close	O	O	O	O	O	O	O	O	O	O
		Open	O	O	O	O	O	O	O	O	O	O
	Right rear	Close	O	O	O	O	O	O	O	O	O	O
		Open	O	O	O	O	O	O	O	O	O	O
Depressed	Off		O	O	O	O	O		O	O	O	O
	Driver	Manual close	O	O	O	O	O	O	O	O	O	O
		Auto open Manual open	O	O	O	O	O	O	O	O	O	O
	Passenger	Close	O	O	O	O	O	O	O	O	O	O
		Open	O	O	O	O	O	O	O	O	O	O
	Left rear	Close	O	O	O	O	O	O	O	O	O	O
		Open	O	O	O	O	O	O	O	O	O	O
	Right rear	Close	O	O	O	O	O	O	O	O	O	O
		Open	O	O	O	O	O	O	O	O	O	O

X6U912WA3



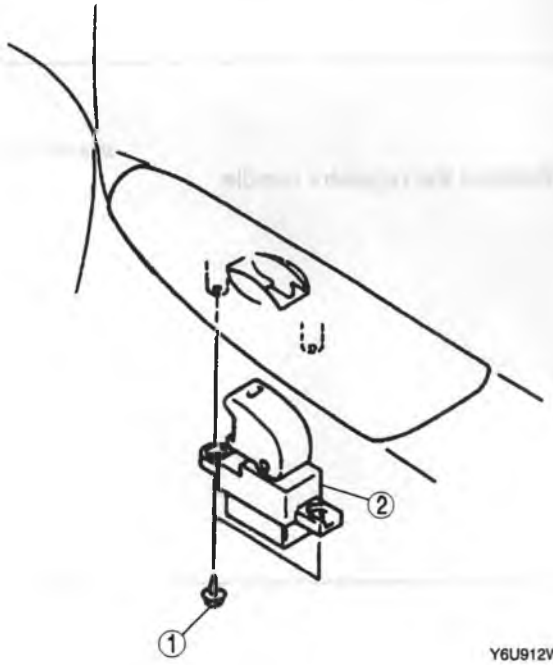
X6U912WA2

POWER WINDOW SUBSWITCH REMOVAL/INSTALLATION

Z6U091266370W01

1. Disconnect the negative battery cable.
2. Remove the passenger's side front door trim or rear door trim. (See 09-17-9 FRONT DOOR TRIM REMOVAL/INSTALLATION.) (See 09-17-10 REAR DOOR TRIM REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Screw
2	Power window subswitch



Y6U912WA4

POWER WINDOW SUBSWITCH INSPECTION

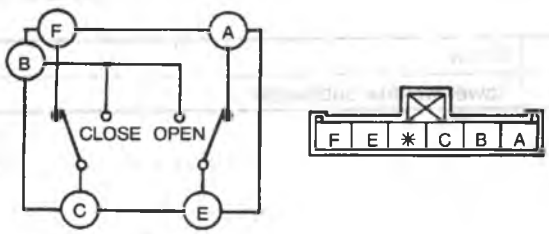
Z6U091266370W02

1. Disconnect the negative battery cable.
2. Remove the passenger's side front door trim or rear door trim. (See 09-17-9 FRONT DOOR TRIM REMOVAL/INSTALLATION.) (See 09-17-10 REAR DOOR TRIM REMOVAL/INSTALLATION.)
3. Inspect for the continuity between the power window subswitch terminals by using an ohmmeter.
   - If not as specified, replace the power window subswitch.

○—○ : Continuity

Switch position	Terminal				
	A	B	C	E	F
Close	○	○	○	○	
Off	○		○	○	○
Open		○		○	○

W6U912WAD

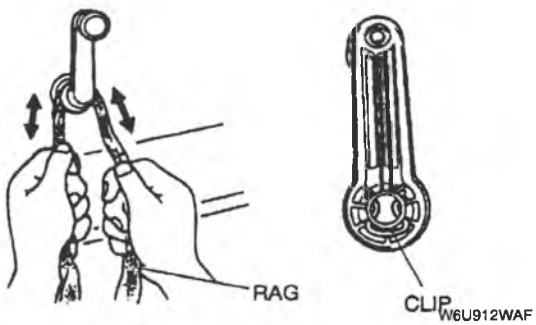


W6U912WAE

REGULATOR HANDLE REMOVAL

Z6U091258580W01

1. Remove the regulator handle clip by using a rag as shown.
2. Remove the regulator handle.

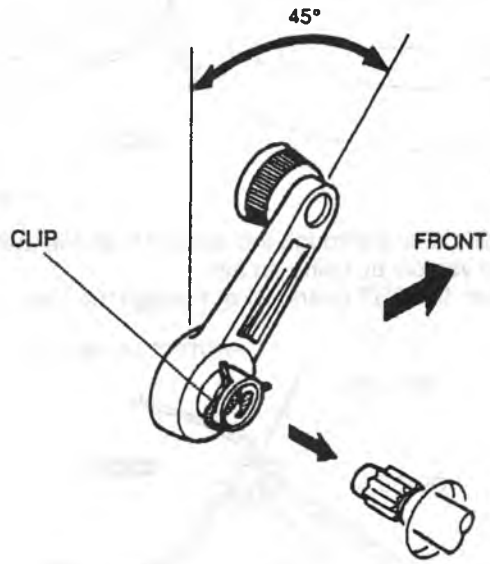


W6U912WAF

REGULATOR HANDLE INSTALLATION

Z6U091258580W02

1. Install the clip in the regulator handle.
2. Set the door glass at the fully-raised position and push the regulator handle on as shown.



W6U912WAG

REAR WINDOW GLASS REMOVAL

Z6U091263931W01

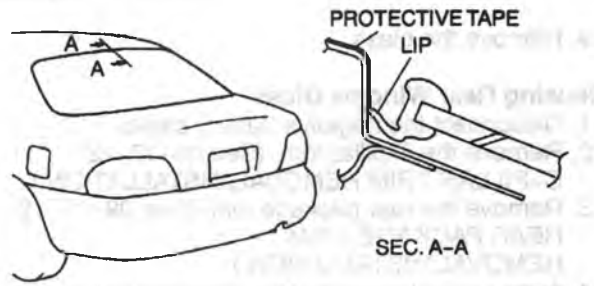
Not Reusing Rear Window Glass

1. Disconnect the negative battery cable.
2. Remove the C-pillar trim. (See 09-17-12 C-PILLAR TRIM REMOVAL/INSTALLATION.)
3. Remove the rear package trim. (See 09-17-12 REAR PACKAGE TRIM REMOVAL/INSTALLATION.)
4. Apply protective tape along the edge of the headliner to protect it from damage.
5. Apply protective tape along the edge of the body to protect it from damage.

Note

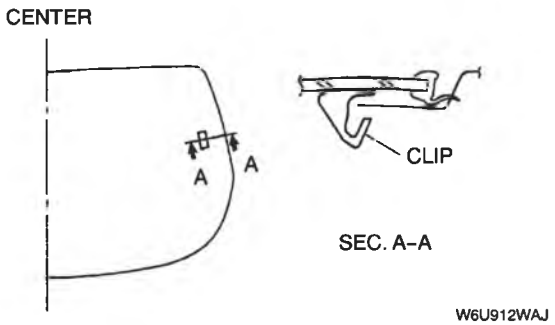
- The rear window molding is a replacement part.

6. Remove the lip of the rear window molding using a razor knife.

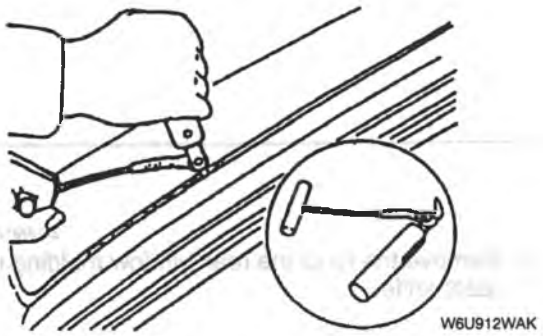


W6U912WAH

Note
- For the areas of sealant that are difficult to cut, use a piano wire and follow the procedures under "Reusing Rear Window Glass".
- There are clips installed in the areas indicated in the figure.



7. Use a tool like that shown in the figure, and insert the blade into the sealant.
8. Pull through the sealant around the edge of the glass.

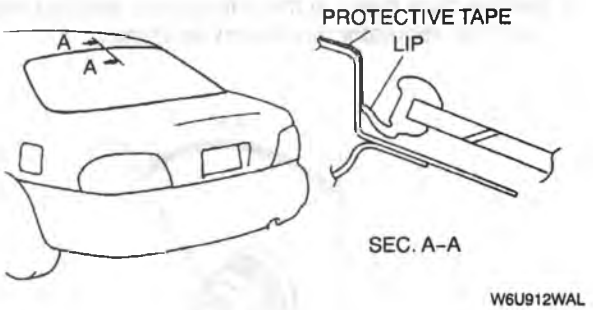


9. Remove the glass.

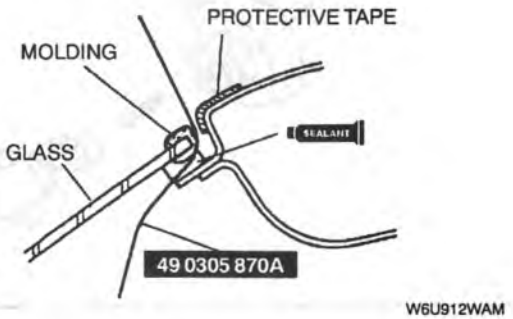
Reusing Rear Window Glass
1. Disconnect the negative battery cable.
2. Remove the C-pillar trim. (See 09-17-12 C-PILLAR TRIM REMOVAL/INSTALLATION.)
3. Remove the rear package trim. (See 09-17-12 REAR PACKAGE TRIM REMOVAL/INSTALLATION.)
4. Apply protective tape along the edge of the headliner to protect it from damage.
5. Apply protective tape along the edge of the body to protect it from damage.

Note
- The rear window molding is a replacement part.

6. Remove the lip of the rear window molding using a razor knife.



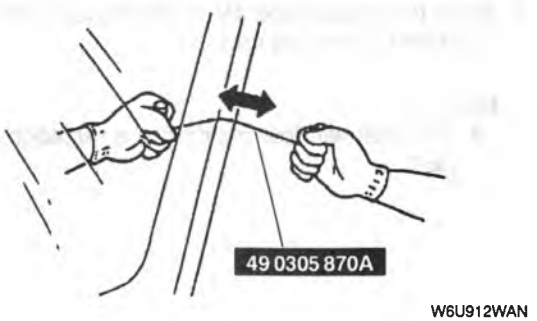
7. Make a hole through the sealant from the inside of the vehicle by using an awl.
8. Pass the **SST** (piano wire) through the hole.



9. Wind each end of the wire around bar.

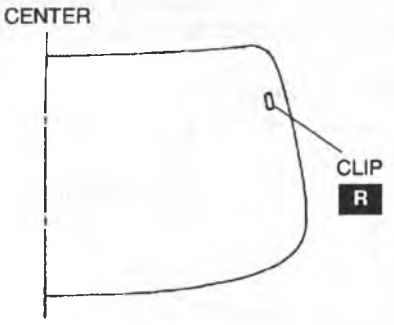
Note
- Use a long sawing action to spread the work over the whole length of the **SST** (piano wire) to prevent it from breaking.

10. Working with another person, saw through the sealant around the edge of the glass, being careful not to damage the vehicle body.



11. Remove the rear window glass.

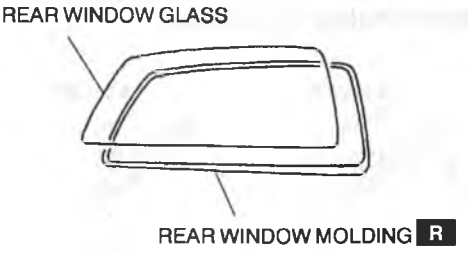
12. Remove the clips.



Y6U912WA5

13. Remove the clips from the body.

14. Remove the rear window molding from the rear window glass.



W6U912WAQ

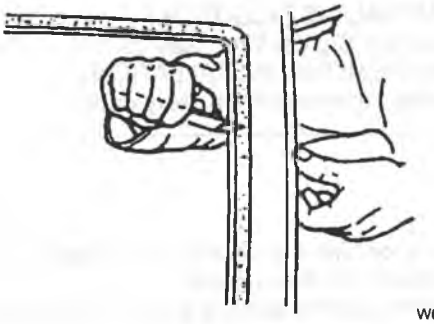
REAR WINDOW GLASS INSTALLATION

Z6U091263931W02

Caution

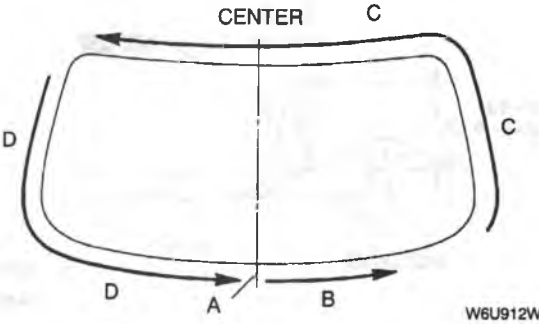
- **To prevent the sealant from cracking or the glass from being pushed out by air pressure if a door is closed, open all of the windows and leave them open until the sealant has hardened.**

1. Cut away the old sealant using a razor knife so that **1—2 mm {0.04—0.07 in}** thickness of sealant remains around the circumference of the frame. If all the sealant has come off in any one place, apply some primer after decreasing, and allow it **30 minutes** to dry. Put on new sealant to create a **2 mm {0.08 in}** layer.



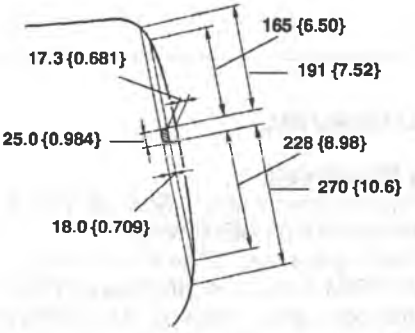
W6U912WAR

2. Clean and degrease an **approximately 50 mm {1.97 in}** wide strip around the circumference of the glass and the bonding area on the body.
3. Align the weld joint of the molding with the ceramic parting line on the glass. (A)
4. Install the lower edge, starting from the center and moving outward. (B)
5. Install the side and upper edge, starting from the lower edge and moving upward and inward, being careful not to pull out the corners. (C)
6. Install the side and lower edge, starting from the upper edge and moving downward and inward, being careful not to pull out the corners. (D)



W6U912WAS

7. Install the clips onto the glass as shown.

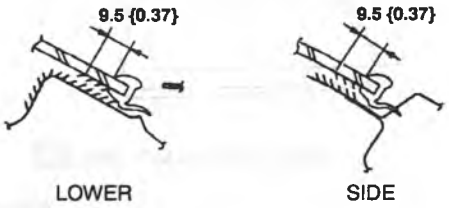


W6U912WAU

Caution

- **Keep the area free of dirt and grease, and do not touch the surface or the primer may not properly bond to the surface of the glass and body which may cause leaks to occur.**

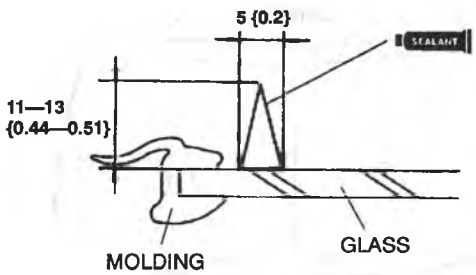
8. Use a brush to apply primer to the bonding area of the glass and body within the region shown. Use only glass primer on the glass and body primer on the body and molding. Allow it to dry for **approximately 30 minutes**.



mm {in}

Y6U912WA6

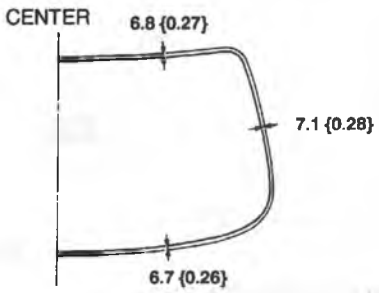
9. Once the primer is dry, apply sealant around the entire circumference to fill the gap between the dam and the edge of the molding with a **11—13 mm {0.44—0.51 in}** high **5 mm {0.2 in}** wide bead of sealant. Apply sealant beside the molding.



mm {in}

Y6U912WA7

10. Align the clips and install the glass on the body.
11. Verify that the gap is **6.8 mm {0.27 in}** along the upper edge, **6.7 mm {0.26 in}** along the lower edge and **7.1 mm {0.28 in}** along the side edges.



mm {in}

W6U912WAX

12. Press firmly inward on the glass to compress the sealant.
13. Use a scraper to smooth away any sealant that oozes out.

Hardening time of sealant

Temperature	Surface hardening time	Time required until car can be put into service
5 °C {41 °F}	Approx. 1.5 h	Approx. 12 h
20 °C {68 °F}	Approx. 1 h	Approx. 4 h
35 °C {95 °F}	Approx. 10 min	Approx. 2 h

14. Check for water leaks.
    - If the leak is found, wipe the water off well and repeat the installation.
15. Install the rear package trim. (See 09-17-12 REAR PACKAGE TRIM REMOVAL/INSTALLATION.)
16. Install the C-pillar trim. (See 09-17-12 C-PILLAR TRIM REMOVAL/INSTALLATION.)
17. Connect the negative battery cable.

WINDSHIELD REMOVAL

Z6U091263900W01

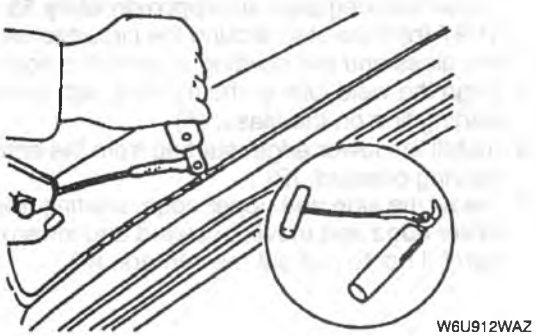
Not Reusing Windshield

1. Remove the rearview mirror. (See 09-12-24 REARVIEW MIRROR REMOVAL.)
2. Remove the A-pillar trim. (See 09-17-10 A-PILLAR TRIM REMOVAL/INSTALLATION.)
3. Remove the cowl grille. (See 09-16-2 COWL GRILLE REMOVAL/INSTALLATION.)
4. Remove the windshield molding. (See 09-16-3 WINDSHIELD MOLDING REMOVAL.)
5. Apply protective tape along the edge of the body to protect it from damage.
6. Remove the sunvisor, and apply protective tape along the edge of the headliner to protect it from damage.
7. Apply protective tape to the dashboard to protect it from damage.

Note

- For the areas of the sealant that are difficult to cut, use a piano wire and follow the procedures under "Reusing Windshield".

8. Use a tool like that shown in the figure, and insert the blade into the sealant.
9. Pull through the sealant around the edge of the glass.



W6U912WAZ

10. Remove the glass.

Reusing Windshield

1. Remove the rearview mirror. (See 09-12-24 REARVIEW MIRROR REMOVAL.)
2. Remove the A-pillar trim. (See 09-17-10 A-PILLAR TRIM REMOVAL/INSTALLATION.)
3. Remove the cowl grille. (See 09-16-2 COWL GRILLE REMOVAL/INSTALLATION.)
4. Remove the windshield molding. (See 09-16-3 WINDSHIELD MOLDING REMOVAL.)
5. Apply protective tape along the edge of the body to protect it from damage.
6. Remove the sunvisor, and apply protective tape along the edge of the headliner to protect it from damage.
7. Apply protective tape to the dashboard to protect it from damage.
8. Make a hole through the sealant from the inside of the vehicle by using an awl.
9. Pass the **SST** (piano wire) through the hole.



W6U912WB0

10. Wind each end of the wire around a bar.

Note

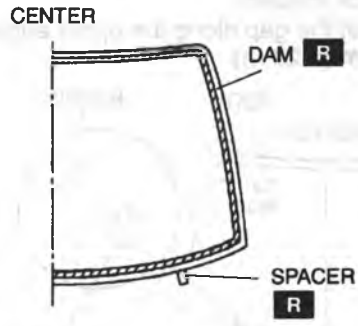
- Use a long sawing action to spread the work over the whole length of the **SST** (piano wire) to prevent it from breaking.

11. Working with another person, saw through the sealant around the edge of the glass, being careful not to damage the vehicle body or the dashboard.



W6U912WB1

12. Remove the windshield.
13. Remove the spacers and dam.



W6U912WB2

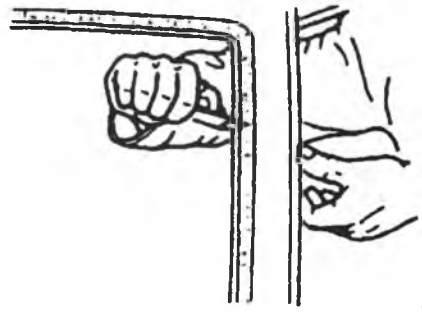
WINDSHIELD INSTALLATION

Caution

- **To prevent the sealant from cracking or the glass from being pushed out by air pressure if a door is closed, open all of the windows and leave them open until the sealant has hardened.**

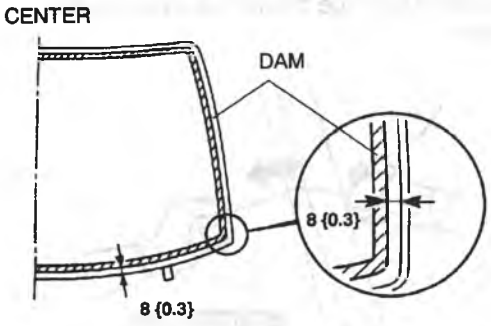
1. Cut away the old sealant using a razor knife so that **1—2 mm {0.04—0.07 in}** thickness of a sealant remains around the circumference of the frame. If all the sealant has come off in any one place, apply some primer after decreasing, and allow it **30 minutes** to dry. Put on new sealant to create a **2 mm {0.08 in}** layer.

Z6U091263900W02

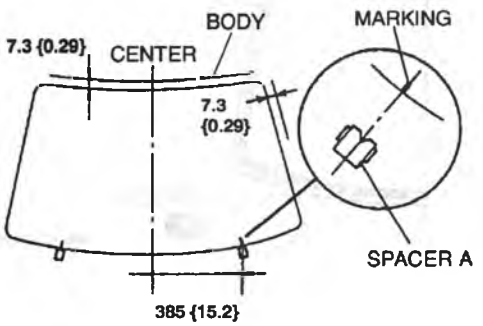

W6U912WB3

2. Clean and degrease an **approximately 50 mm {2.0 in}** wide strip around the circumference of the glass and the bonding area on the body.

3. Securely bond a dam along the circumference of the glass **8 mm {0.3 in}**.



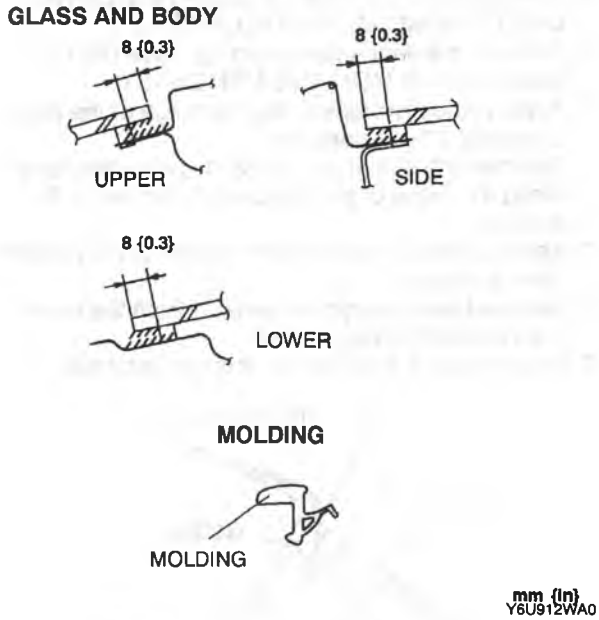
4. Install spacers into the holes.
5. Temporarily install the glass onto the body and adjust the glass-to-body clearance.
6. Make a mark on the glass directly above the V-notch of spacers.
7. Verify that the gap along the upper edge and sides is **7.3 mm {0.29 in}**.



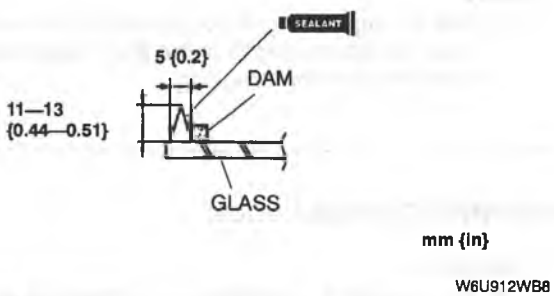
8. Remove the windshield.

Caution
- **Keep the area free of dirt and grease, and do not touch the surface or the primer may not properly bond to the surface of the glass and body which may cause leaks to occur.**

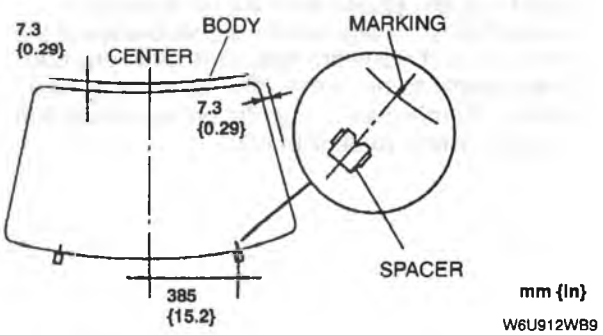
9. Use a brush to apply primer to the bonding area of the glass and body within the region shown. Use only glass primer on the glass and body primer on the body and molding. Allow it to dry for **approximately 30 minutes**.



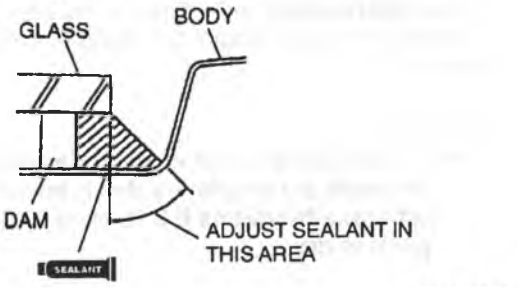
10. Once the primer is dry, apply sealant around the entire circumference to fill the gap between the dam and the edge of the glass with a **11—13 mm {0.44—0.51 in}** high **5 mm {0.2 in}** wide bead of sealant.



11. Align the glass marks with the V-notches in spacers and install the glass onto the body.
12. Press firmly inward on the glass to compress the sealant.
13. Verify that the gap along both the upper edge and sides is **7.3 mm {0.29 in}**.



14. Use a scraper to smooth away any sealant that oozes out. Add more sealant to any points of poor contact. Adjust the sealant as shown if necessary.



W6U912WBA

15. Before the surface of the sealant has hardened, install the windshield molding. (See 09-16-4 WINDSHIELD MOLDING INSTALLATION.)

Hardening time of sealant

Temperature	Surface hardening time	Time required until car can be put into service
5 °C {41 °F}	Approx. 1.5 h	Approx. 12 h
20 °C {68 °F}	Approx. 1 h	Approx. 4 h
35 °C {95 °F}	Approx. 10 min	Approx. 2 h

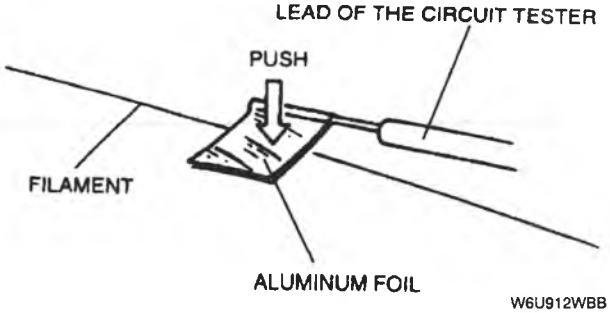
16. Use white gasoline to remove any sealant that oozes out.
17. Check for water leaks.
    - If a leak is found, wipe the water off well and add sealant where needed.
18. Install the sunvisor.
19. Install the cowl grille. (See 09-16-2 COWL GRILLE REMOVAL/INSTALLATION.)
20. Install the A-pillar trim. (See 09-17-10 A-PILLAR TRIM REMOVAL/INSTALLATION.)
21. Install the rearview mirror.

FILAMENT INSPECTION

Z6U091263931W03

1. Turn the ignition switch to ON.
2. Turn the rear window defroster switch on.

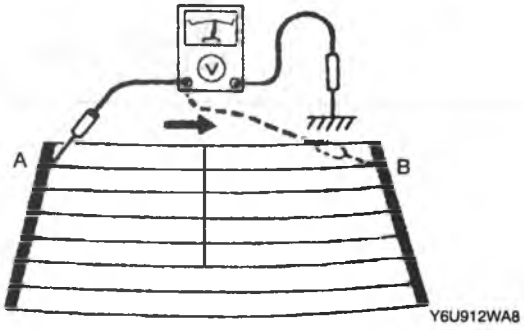
Caution
- **Directly touching the rear defroster filament with the lead of the circuit tester will damage it. Wrap aluminum foil around the end of the lead and test the filament by touching it with the foil.**



W6U912WBB

3. Connect the positive (+) lead of the voltmeter to the positive side of each filament and the negative (-) lead to ground.
4. Gradually slide the positive (+) lead from the positive side to the negative side and measure the voltage. Verify that the voltage decreases accordingly.
    - If the voltage is not as specified or it changes rapidly, the filament is faulty. Repair the filament.

Measurement place	Voltage (Reference value)
A→B	Approx. 12 V→Approx. 0 V

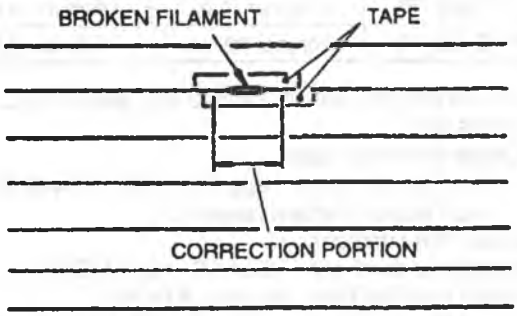


Y6U912WA8

FILAMENT REPAIR

Z6U091263931W04

1. Use white gasoline to clean around the damaged section of the filament.
2. Attach tape above and below the damaged section of the filament.



W6U912WBD

3. Using a small brush or marking pen, repair the filament with silver paint or equivalent.
4. After **approximately 2—3 minutes**, carefully remove the tape without disturbing the repaired area.

Caution

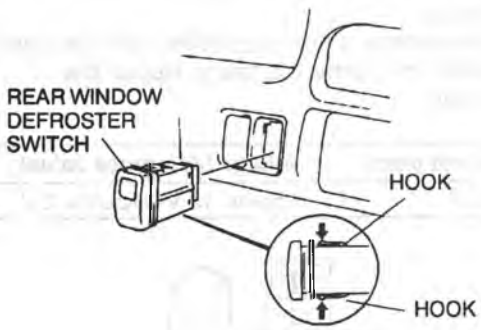
- **Do not use the rear window defroster until the paint is completely dry. It may cause other malfunctions if it is used before the paint is dry.**

5. Use a hot air blower heated to **150 °C {302 °F}** for **30 minutes** or let the paint set for **24 hours** at **25 °C {77 °F}** to allow it to dry completely.

REAR WINDOW DEFROSTER SWITCH REMOVAL/INSTALLATION

Z6U091266460W01

1. Disconnect the negative battery cable.
2. Remove the meter hood. (See 09-17-7 METER HOOD REMOVAL/INSTALLATION.)
3. Press the hooks of the rear window defroster switch and pull the switch out.



W6U912WBE

4. Install in the reverse order of removal.

REAR WINDOW DEFROSTER SWITCH INSPECTION

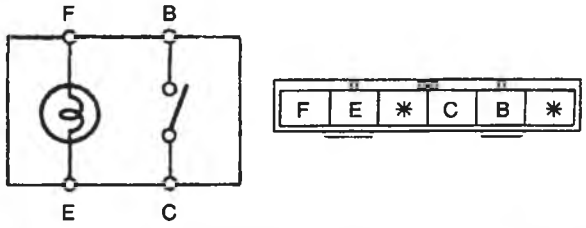
Z6U091286460W02

1. Remove the rear window defroster switch. (See 09-12-18 REAR WINDOW DEFROSTER SWITCH REMOVAL/INSTALLATION.)
2. Inspect for continuity between the rear window defroster switch terminals by using an ohmmeter.
   - If not as specified, replace the rear window defroster switch.

○—○ : Continuity ○—⊗—○ : Bulb

Switch position	Terminal			
	B	C	E	F
Off			○—⊗—○	
On	○—○		○—⊗—○	

W6U912WBF



W6U912WBG

REAR WINDOW DEFROSTER RELAY REMOVAL/INSTALLATION

Z6U091259874W01

1. Disconnect the negative battery cable.
2. Remove the rear window defroster relay.
3. Install in the reverse order of removal.



W6U912WBH

REAR WINDOW DEFROSTER RELAY INSPECTION

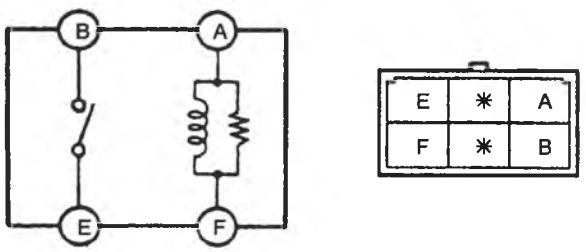
Z6U091259874W02

1. Remove the rear window defroster relay.
2. Inspect for continuity between the rear window defroster relay terminals by using an ohmmeter.
   - If not as specified, replace the rear window defroster relay.

○—○ : Continuity

Step	Terminal			
	A	B	E	F
1	○			○
2	B+	○	○	GND

W6U912WBJ



W6U912WBK

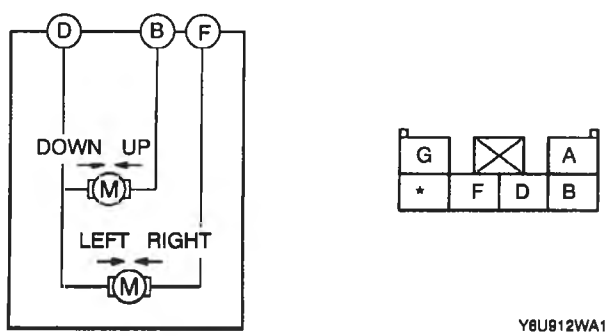
POWER OUTSIDE MIRROR INSPECTION

Z6U091269100W01

Mirror Adjustment

1. Disconnect the negative battery cable.
2. Remove the front door trim.
3. Partially peel off the front door screen.
4. Disconnect the power outside mirror connector.
5. Apply battery positive voltage to the power outside mirror terminals and check the operation of the power outside mirror.
   - If not as specified, replace the power outside mirror.

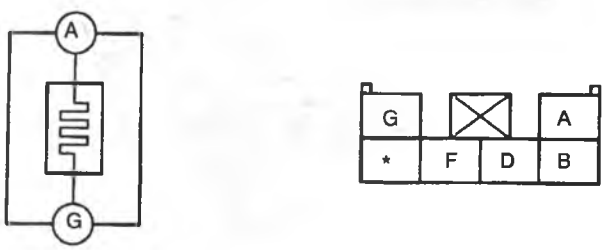
Connection		Mirror operation
B+	GND	
B	D	Up
D	B	Down
D	F	Left
F	D	Right



Y6U912WA1

Heated Outside Mirror

1. Inspect for continuity between the power outside mirror terminals A and G using an ohmmeter.
   - If not as specified, replace the power outside mirror.

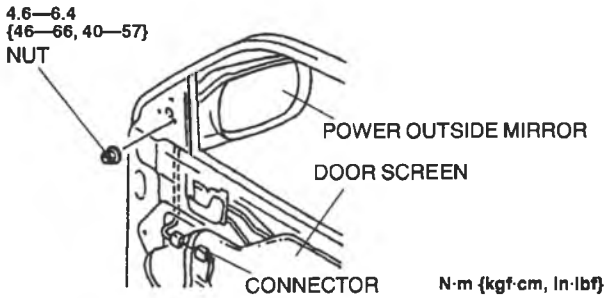


Y6U912WA2

POWER OUTSIDE MIRROR REMOVAL/INSTALLATION

Z6U091269100W02

1. Disconnect the negative battery cable.
2. Remove the inner garnish.
3. Remove the front door trim. (See 09-17-9 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
4. Partially peel off the door screen.
5. Disconnect the connector.
6. Remove the nuts and the power outside mirror.
7. Install in the reverse order of removal.

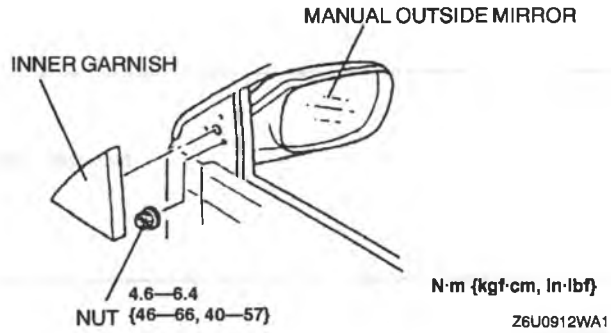


Z6U0912WA0

MANUAL OUTSIDE MIRROR REMOVAL/INSTALLATION

Z6U091269100W03

1. Remove the inner garnish.
2. Remove the nuts and the manual outside mirror.
3. Install in the reverse order of removal.

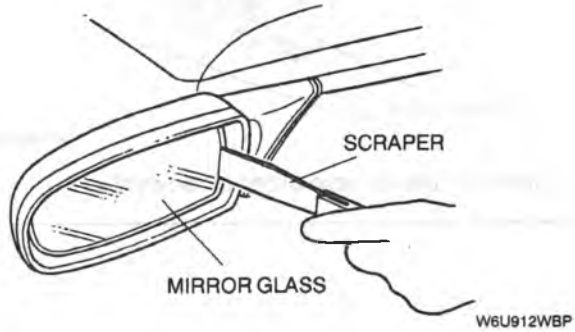


Z6U0912WA1

POWER OUTSIDE MIRROR GLASS REMOVAL

Z6U091269111W01

1. Warm the frame and the mirror glass to **approximately 70 °C {158 °F}** for **3 minutes** using a hot air blower.
2. Put on gloves and protective eye wear.
3. Insert a scraper between the mirror glass and the frame, and pry the glass loose.

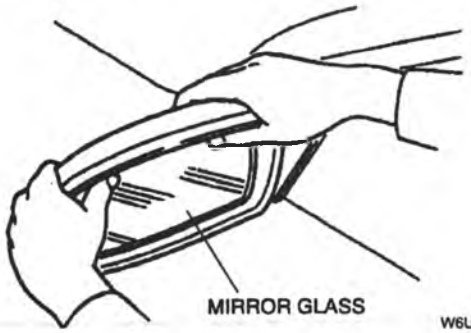


W6U912WBP

POWER OUTSIDE MIRROR GLASS INSTALLATION

Z6U091269111W02

1. Clean and degrease the adhesion surface of the mirror glass.
2. Warm up the frame and the mirror glass using a hot air blower.
3. Remove the paper backing from the double-sided adhesive tape on the back of the mirror glass.
4. Insert the mirror glass into the frame, then press lightly on the glass to secure it.



W6U912WBQ

MANUAL OUTSIDE MIRROR GLASS REMOVAL

Z6U091269111W03

1. Remove the manual outside mirror glass.(See 09-12-21 POWER OUTSIDE MIRROR GLASS REMOVAL.)

MANUAL OUTSIDE MIRROR GLASS INSTALLATION

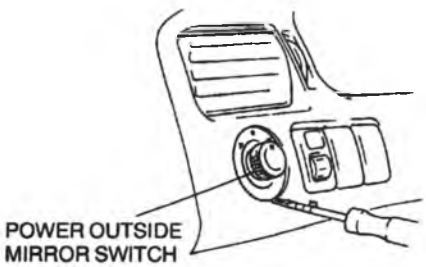
Z6U091269111W04

1. Install the manual outside mirror glass.(See 09-12-22 POWER OUTSIDE MIRROR GLASS INSTALLATION.)

POWER OUTSIDE MIRROR SWITCH REMOVAL/INSTALLATION

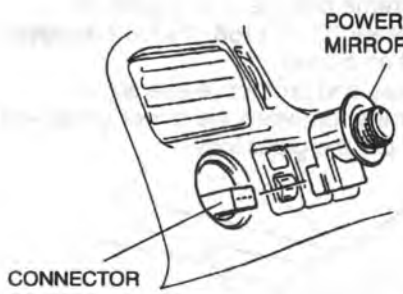
Z6U091266600W01

1. Disconnect the negative battery cable.
2. Insert a tape-wrapped, flathead screwdriver between the power outside mirror switch and the meter hood.



W6U912WBR

3. Disconnect the connector and remove the power outside mirror switch.



W6U912WBS

4. Install in the reverse order of removal.

POWER OUTSIDE MIRROR SWITCH INSPECTION

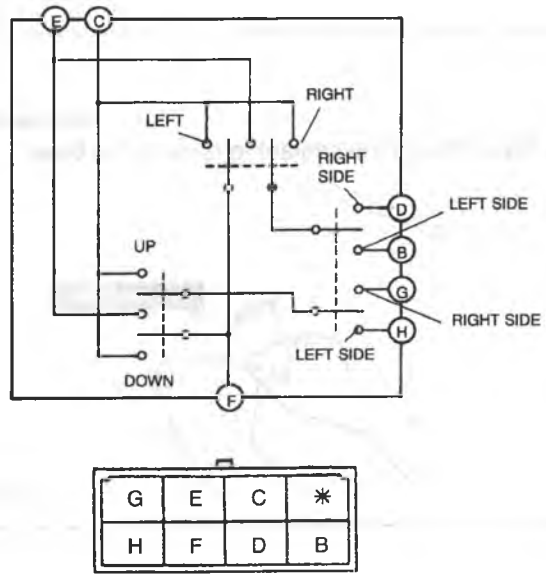
Z6U091266600W02

1. Remove the power outside mirror switch.
2. Inspect for continuity between the power outside mirror switch terminals by using an ohmmeter.
   - If not as specified, replace the power outside mirror switch.

○—○ : Continuity

Switch position		Terminal						
		H	G	F	E	D	C	B
Left side	Up	○		○	○		○	
	Down	○		○			○	
	Left			○	○		○	○
	Right			○	○		○	○
Right side	Up		○	○	○		○	
	Down		○	○	○		○	
	Left			○	○	○	○	
	Right			○	○	○	○	

W6U912WBT

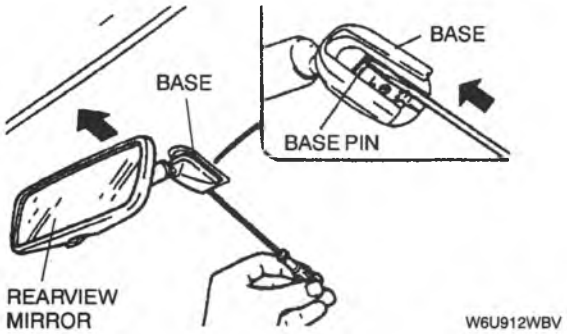


W6U912WBU

REARVIEW MIRROR REMOVAL

Z6U091269220W01

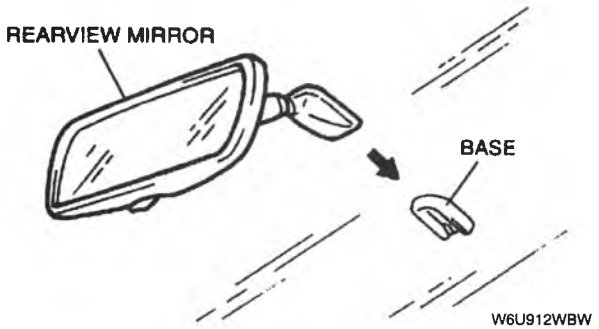
1. Insert a flathead screwdriver between the mirror and the base.
2. Push the base pin to remove the rearview mirror.



REARVIEW MIRROR INSTALLATION

Z6U091269220W02

- Install the rearview mirror onto the base.



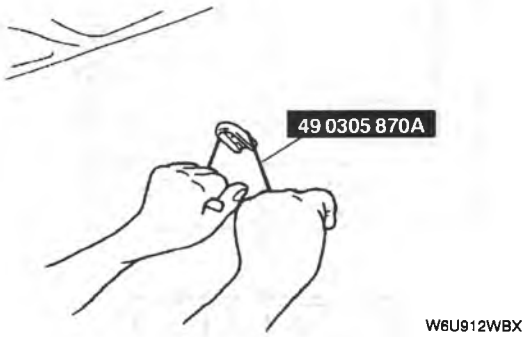
BASE REMOVAL

Z6U091269240W01

1. Remove the rearview mirror. (See 09-12-24 REARVIEW MIRROR REMOVAL.)
2. Wind each end of a piano wire around a bar.

Note
- Use a long sawing action to spread the work over the whole length of the **SST** (piano wire) to prevent it from breaking.

3. Saw through the sealant to remove the base.



BASE INSTALLATION

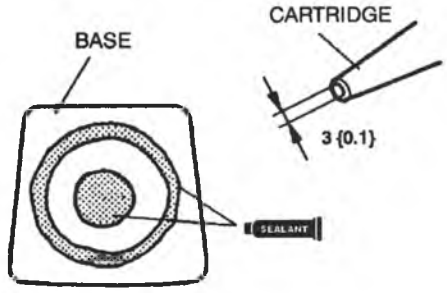
Z6U091269240W02

1. Cut away all of the original sealant by using a razor knife.
2. Clean and degrease the ceramic coating on the glass and the base.

Caution

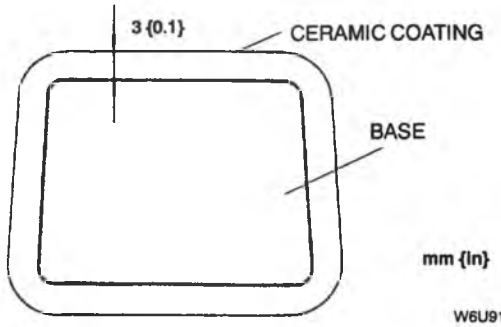
- **Keep the area free of dirt and grease, and do not touch the surface or the primer may not properly bond to the surface of the glass.**

3. Apply primer to the glass and the base. Use only glass primer on the glass and body primer on the base. Allow the primer to dry for **approximately 30 minutes**.
4. Apply a **3 mm {0.1 in}** bead of sealant to the base.



mm {in}
W6U912WBY

5. Center the base in the ceramic coating and press it onto the glass.



mm {in}
W6U912WBZ

6. Use white gasoline to remove any excessive sealant.

Hardening time of sealant

Temperature	Surface hardening time	Time required until car can be put into service
5 °C {41 °F}	Approx. 1.5 h	Approx. 12 h
20 °C {68 °F}	Approx. 1 h	Approx. 4 h
35 °C {95 °F}	Approx. 10 min	Approx. 2 h

7. Install the rearview mirror.

09-13 SEATS

FRONT SEAT REMOVAL/ INSTALLATION 09-13-1
FRONT SEAT DISASSEMBLY/ ASSEMBLY 09-13-2
Power Seat 09-13-2
Manual Seat (Driver Seat) 09-13-3
Manual Seat (Passenger Seat) 09-13-4
REAR SEAT REMOVAL/ INSTALLATION 09-13-5
REAR SEAT DISASSEMBLY/ ASSEMBLY 09-13-6
SLIDE MOTOR INSPECTION 09-13-7
FRONT TILT MOTOR INSPECTION 09-13-7
REAR TILT MOTOR INSPECTION 09-13-8
POWER SEAT SWITCH INSPECTION 09-13-9

FRONT SEAT REMOVAL/INSTALLATION

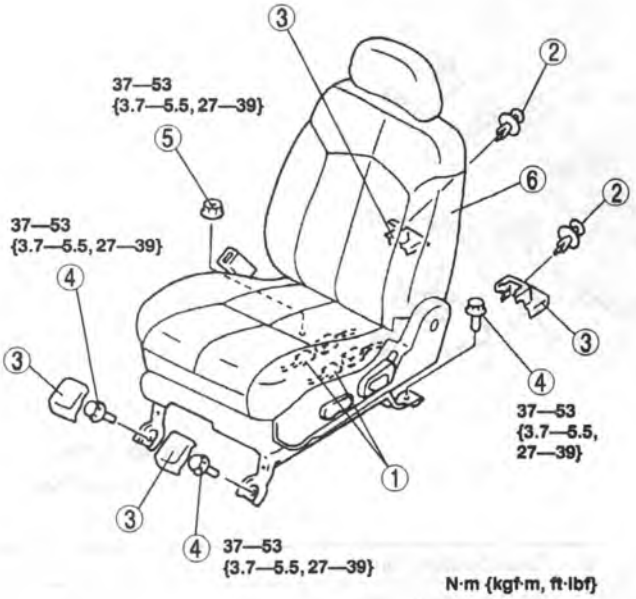
Z6U091357100W01

Warning

- **Handling the front seat (side air bag) improperly can accidentally deploy the side air bag, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling the front seat. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)**

1. Turn the ignition switch to the LOCK position.
2. Disconnect the negative battery cable and wait for **more than 1 minute**.
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Connector
2	Fastener
3	Cover
4	Bolt
5	Nut
6	Front seat



FRONT SEAT DISASSEMBLY/ASSEMBLY

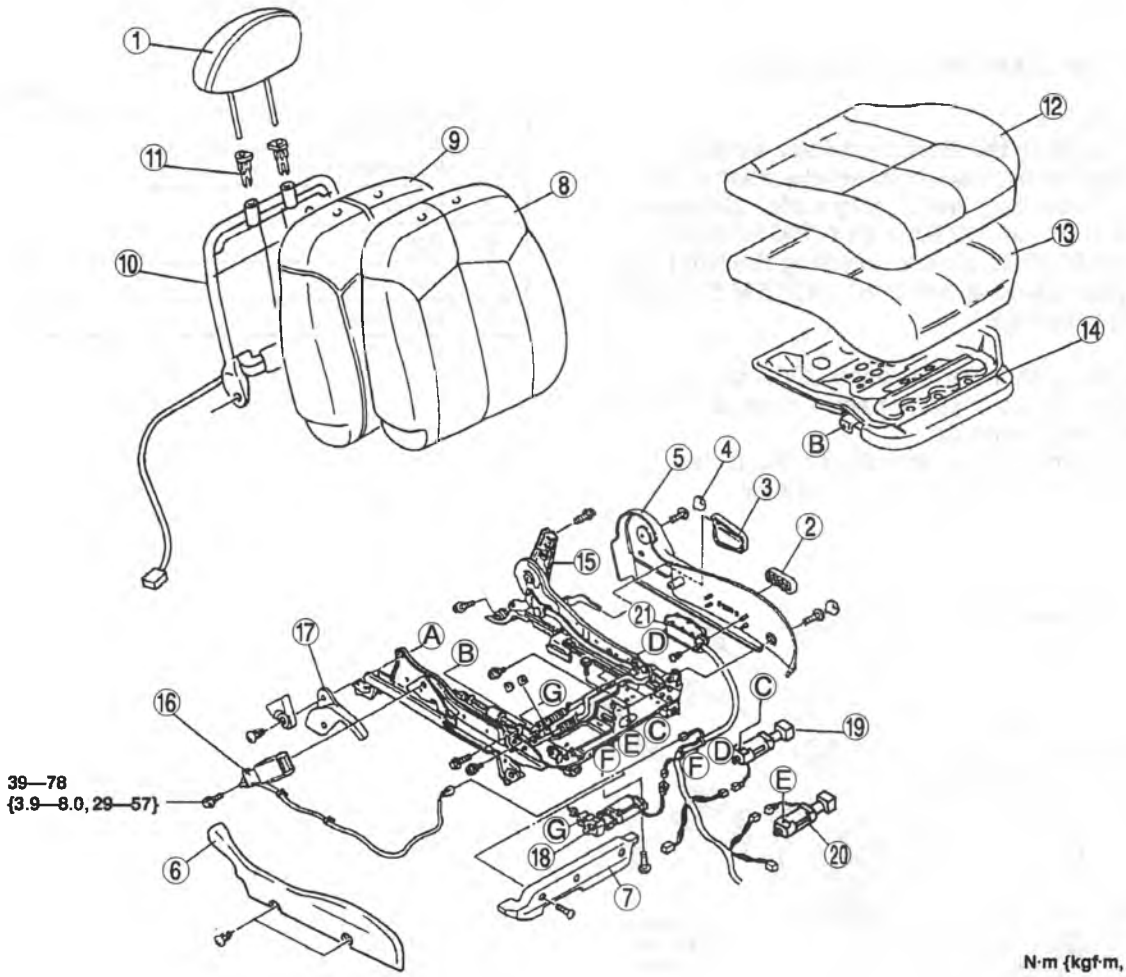
Z6U091357100W02

Power Seat

Warning

- **Handling the front seat (side air bag) improperly can accidentally deploy the side air bag, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling the front seat. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)**

1. Remove the side air bag module. (See 08-10-11 SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
2. Disassemble in the order indicated in the table.
3. Assemble in the reverse order of disassembly.



Z6U0913W001

1	Headrest
2	Power seat switch knob
3	Recliner lever
4	Cap
5	Knuckle cover
6	Side cover
7	Front cover
8	Seat back trim
9	Seat back pad
10	Seat back frame
11	Pole guide

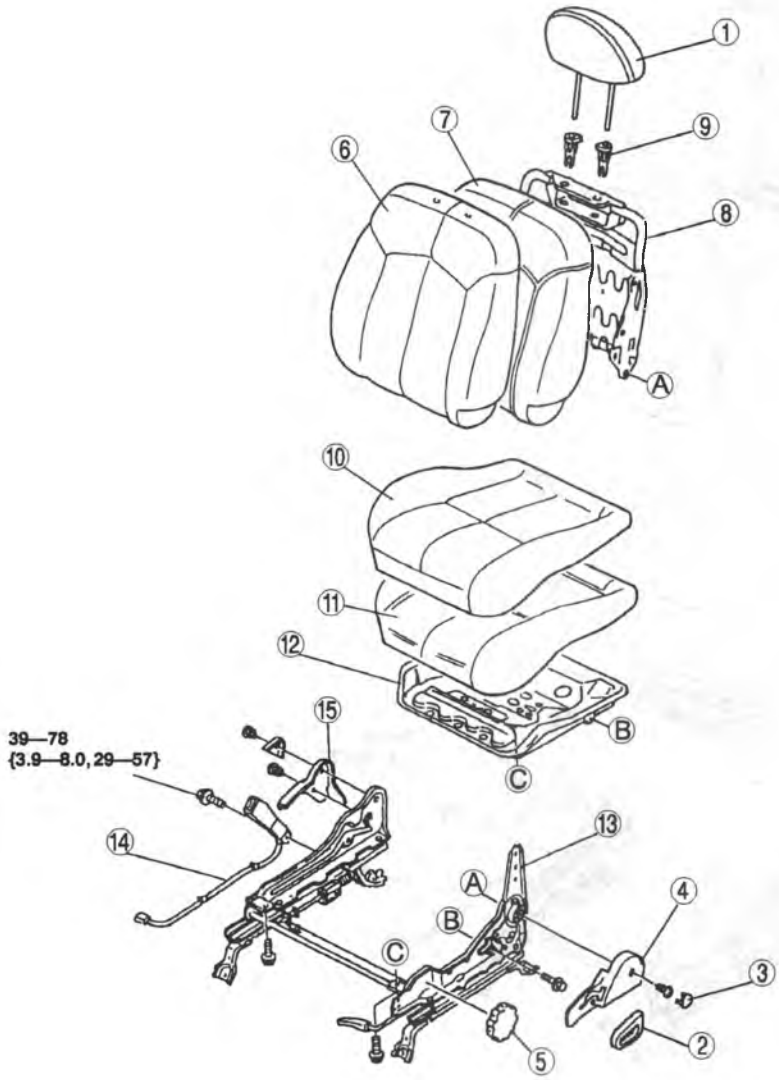
12	Seat cushion trim
13	Seat cushion pad
14	Seat cushion frame
15	Slide adjuster
16	Buckle
17	Cover
18	Front tilt motor
19	Rear tilt motor
20	Slide motor
21	Power seat switch

Manual Seat (Driver Seat)

Warning

- **Handling the front seat (side air bag) improperly can accidentally deploy the side air bag, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling the front seat. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)**

1. Remove the driver-side side air bag module. (See 08-10-11 SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
2. Disassemble in the order indicated in the table.
3. Assemble in the reverse order of disassembly.



Y6U913WA2

1	Headrest
2	Recliner lever
3	Cap
4	Knuckle cover
5	Tilt dial
6	Seat back trim
7	Seat back pad
8	Seat back frame
9	Pole guide

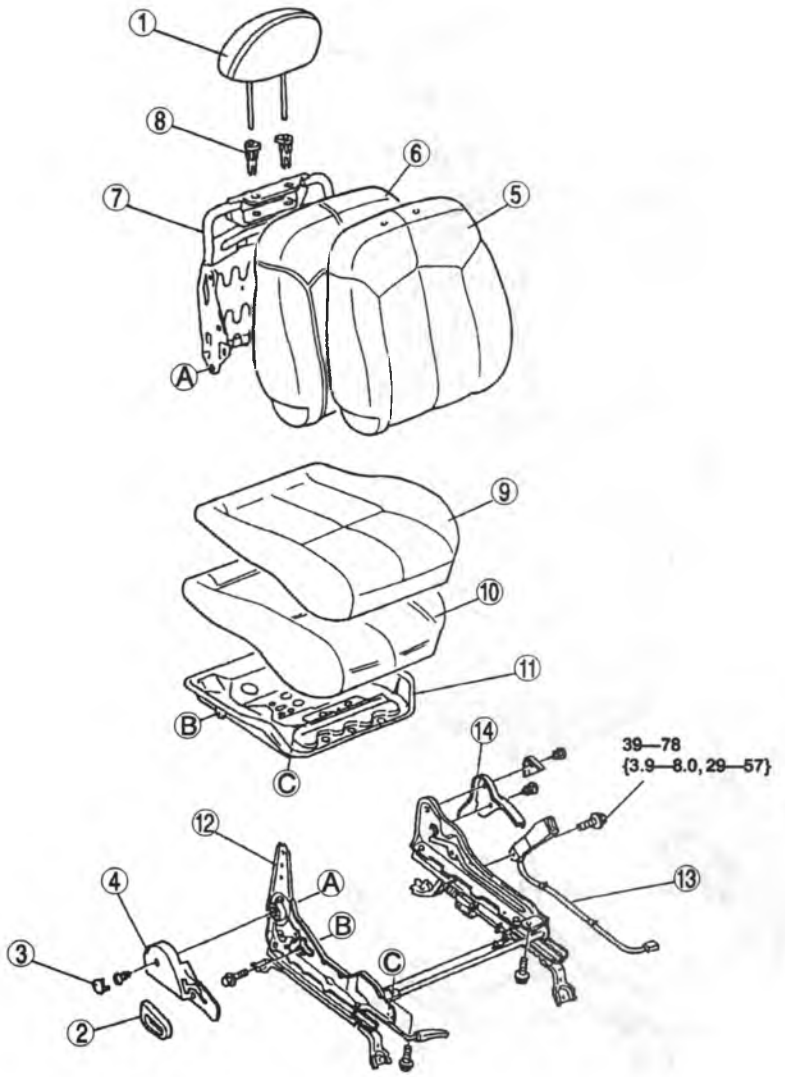
10	Seat cushion trim
11	Seat cushion pad
12	Seat cushion frame
13	Slide adjuster
14	Buckle
15	Cover

Manual Seat (Passenger Seat)

Warning

- **Handling the front seat (side air bag) improperly can accidentally deploy the side air bag, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling the front seat. (See 08-10-8 AIR BAG SYSTEM SERVICE WARNINGS.)**

1. Remove the passenger-side side air bag module. (See 08-10-11 SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
2. Disassemble in the order indicated in the table.
3. Assemble in the reverse order of disassembly.



N·m {kgf·m, ft·lbf}

Y6U913WA3

1	Headrest
2	Recliner lever
3	Cap
4	Knuckle cover
5	Seat back trim
6	Seat back pad
7	Seat back frame

8	Pole guide
9	Seat cushion trim
10	Seat cushion pad
11	Seat cushion frame
12	Slide adjuster
13	Buckle
14	Cover

REAR SEAT REMOVAL/INSTALLATION

Z6U091357200W01

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



Y6U913WA4

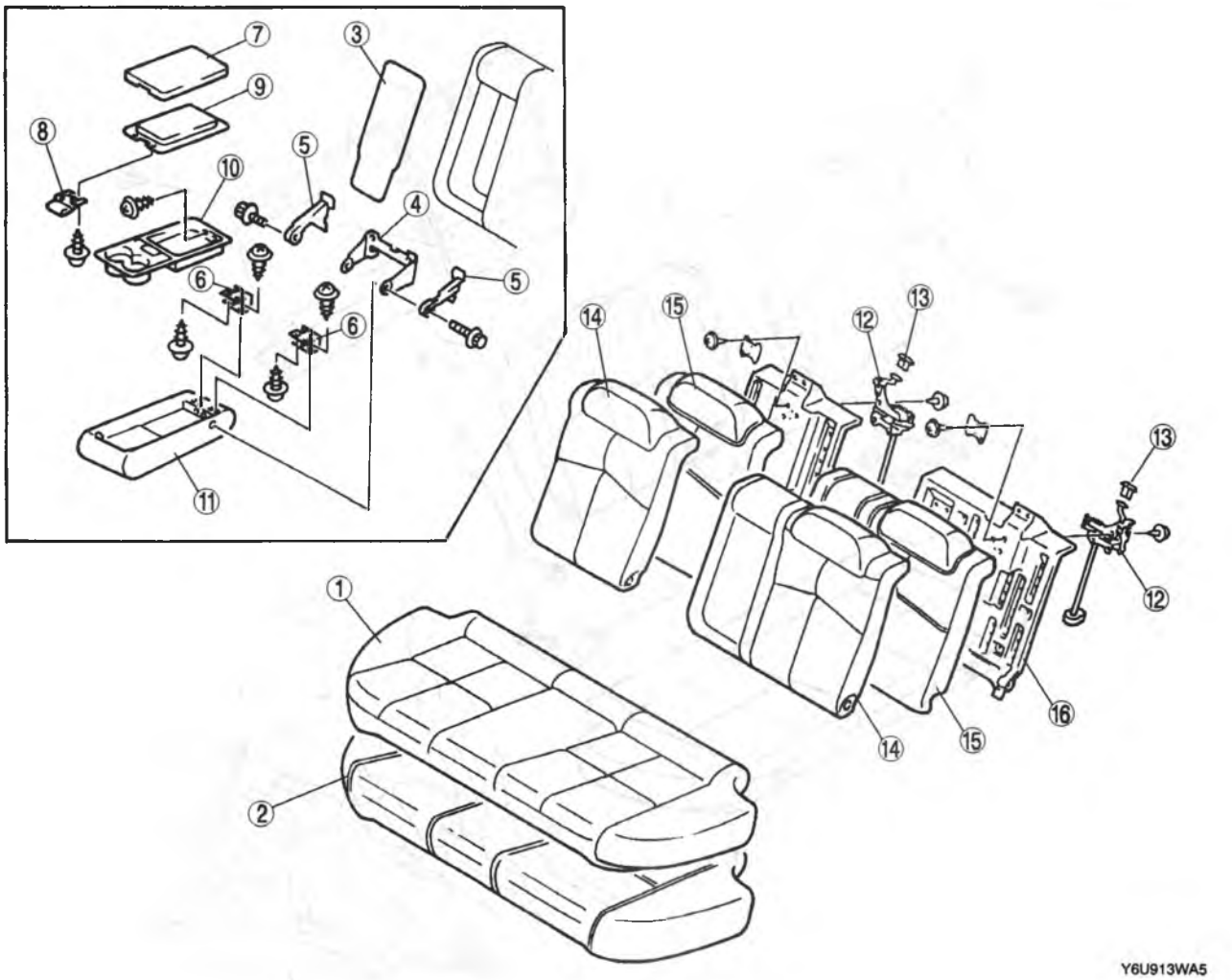
1	Rear seat cushion
2	Rear side seat
3	Rear seat back hinge

4	Rear seat back
5	Trunk mat

REAR SEAT DISASSEMBLY/ASSEMBLY

Z6U091357200W02

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



Y6U913WA5

1	Rear seat cushion trim
2	Rear seat cushion pad
3	Cover
4	Armrest bracket
5	Bracket cover
6	Armrest hinge
7	Armrest lid
8	Armrest lid lock

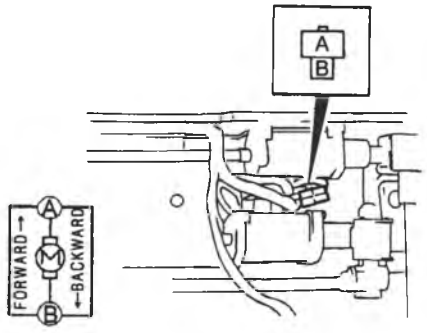
9	Armrest lid inner
10	Armrest inner
11	Armrest trim
12	Rear seat back catch lock
13	Rear seat back catch knob
14	Rear seat back trim
15	Rear seat back pad
16	Rear seat back frame

SLIDE MOTOR INSPECTION

Z6U091388662W01

1. Remove the front seat. (See 09-13-1 FRONT SEAT REMOVAL/INSTALLATION.)
2. Disconnect the slide motor connector, and check operation of the seat when battery positive voltage is applied to the terminals as shown.
   - If not as specified, replace the slide motor.

Connection		Seat operation
B+	GND	
B	A	Forward
A	B	Backward



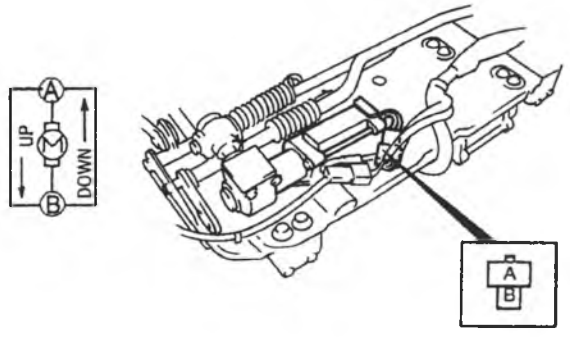
Y6U913WA6

FRONT TILT MOTOR INSPECTION

Z6U091388660W01

1. Remove the front seat. (See 09-13-1 FRONT SEAT REMOVAL/INSTALLATION.)
2. Disconnect the front tilt motor connector, and check operation of the seat when battery positive voltage is applied to the terminals as shown.
   - If not as specified, replace the front tilt motor.

Connection		Seat operation
B+	GND	
A	B	Up
B	A	Down



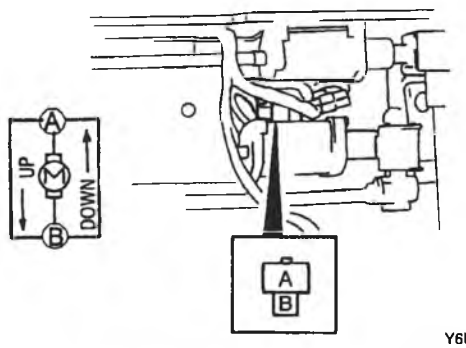
Y6U913WA7

REAR TILT MOTOR INSPECTION

Z6U091388661W01

1. Remove the front seat. (See 09-13-1 FRONT SEAT REMOVAL/INSTALLATION.)
2. Disconnect the rear tilt motor connector, and check operation of the seat when battery positive voltage is applied to the terminals as shown.
   - If not as specified, replace the rear tilt motor.

Connection		Seat operation
B+	GND	
A	B	Up
B	A	Down



Y6U913WA8

POWER SEAT SWITCH INSPECTION

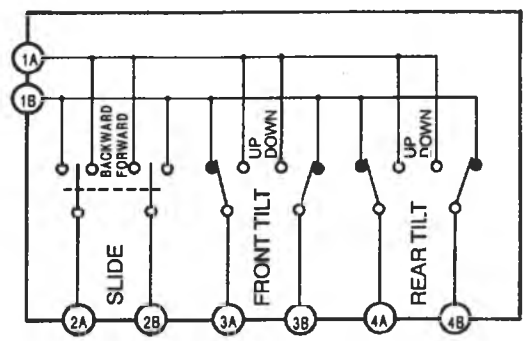
Z6U091357155W01

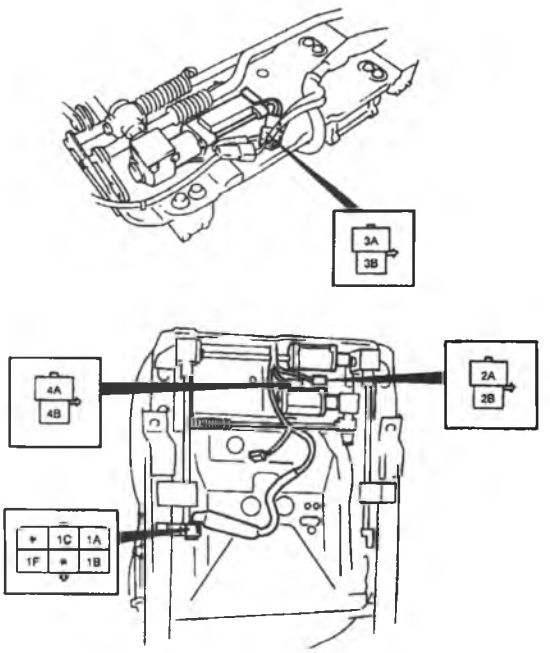
1. Remove the front seat. (See 09-13-1 FRONT SEAT REMOVAL/INSTALLATION.)
2. Disconnect the power seat switch connectors.
3. Check for continuity between the power seat switch terminals by using an ohmmeter.
   - If not as specified, replace the power seat switch.

O—O : Continuity

Switch condition		Terminal							
		1A	1B	2A	2B	3A	3B	4A	4B
Slide	Forward	O	O	O	O				
	Backward	O	O	O	O				
Front tilt	Up	O	O			O	O		
	Down	O	O			O	O		
Rear tilt	Up	O	O					O	O
	Down	O	O					O	O
Front/rear lifter	Up	O	O			O	O	O	O
	Down	O	O			O	O	O	O

W6U913WA8





Y6U913WA9

09-14 SECURITY AND LOCKS

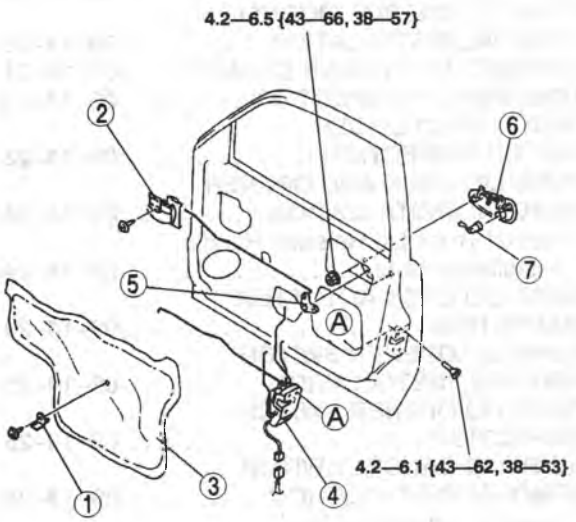
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FRONT DOOR LOCK AND OPENER REMOVAL/INSTALLATION

Z6U091458311W01

1. Raise the front door glass fully.
2. Disconnect the negative battery cable.
3. Remove the front door trim. (See 09-17-9 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.

1	Bracket
2	Inner handle
3	Front door screen
4	Front door lock
5	Front lock link
6	Outer handle
7	Door key cylinder



N·m {kgf·cm, in·lbf}

W6U914WA0

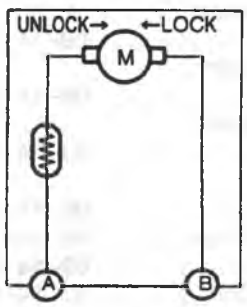
FRONT DOOR LOCK ACTUATOR INSPECTION

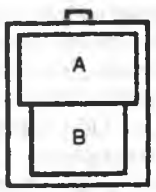
Z6U091458310W01

Note
- The front door lock actuator is built into the front door lock.

1. Disconnect the negative battery cable.
2. Remove the front door trim. (See 09-17-9 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
3. Partially peel off the front door screen.
4. Disconnect the front door lock actuator connector.
5. Apply battery positive voltage to the front door lock actuator terminals and check the operation of the front door lock actuator.
   - If not as specified, replace the front door lock.

Connection		Actuator operation
B+	GND	
B	A	Lock
A	B	Unlock



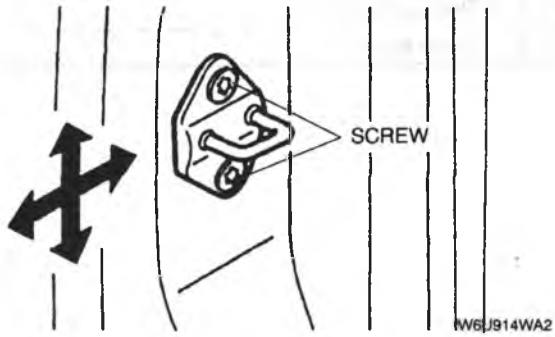


W6U914WA1

FRONT DOOR LOCK STRIKER ADJUSTMENT

Z6U091458361W01

1. Verify that the front door can be closed easily and that there is no looseness.
   - If not correct, loosen the front door lock striker installation screws and move the striker horizontally or vertically.

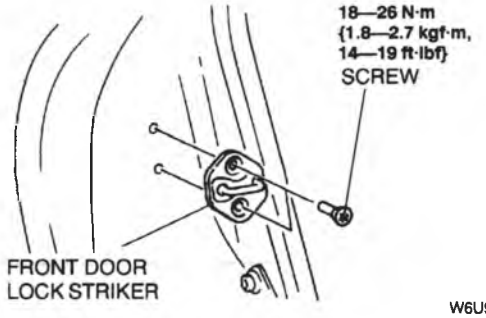


2. Tighten the front door lock striker installation screws.

FRONT DOOR LOCK STRIKER REMOVAL/INSTALLATION

Z6U091458361W02

1. Remove the screws.
2. Remove the front door lock striker.



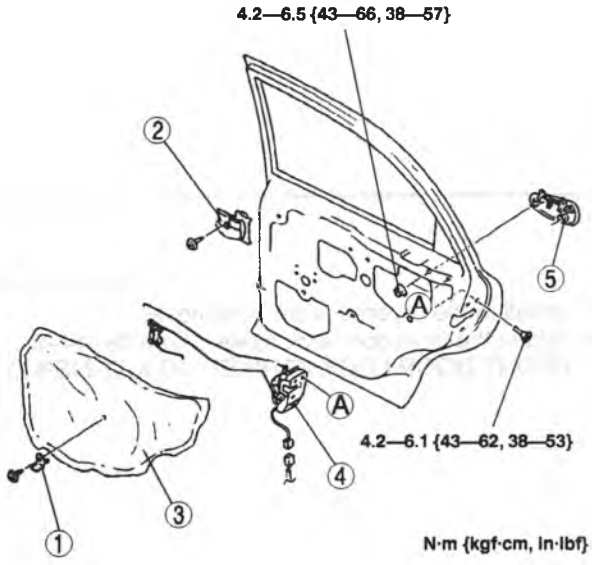
3. Install in the reverse order of removal.
4. Adjust the front door lock striker. (See 09-14-3 FRONT DOOR LOCK STRIKER ADJUSTMENT.)

REAR DOOR LOCK AND OPENER REMOVAL/INSTALLATION

Z6U091472311W01

1. Raise the rear door glass fully.
2. Disconnect the negative battery cable.
3. Remove the rear door trim. (See 09-17-10 REAR DOOR TRIM REMOVAL/INSTALLATION.)
4. To remove the rear door lock, remove the rear door glass guide. (See 09-12-2 REAR DOOR GLASS AND GUIDE REMOVAL/INSTALLATION.)
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.

1	Bracket
2	Inner handle
3	Rear door screen
4	Rear door lock
5	Outer handle



W6U914WA4

REAR DOOR LOCK ACTUATOR INSPECTION

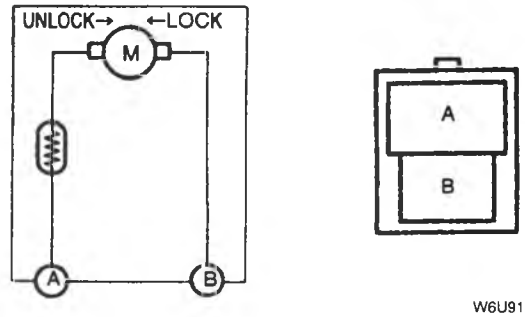
Z6U091472310W01

Note

- The rear door lock actuator is built into the rear door lock.

1. Disconnect the negative battery cable.
2. Remove the rear door trim. (See 09-17-10 REAR DOOR TRIM REMOVAL/INSTALLATION.)
3. Partially peel off the rear door screen.
4. Disconnect the rear door lock actuator connector.
5. Apply battery positive voltage to the rear door lock actuator terminals and check the operation of the rear door lock actuator.
   - If not as specified, replace the rear door lock.

Connection		Actuator operation
B+	GND	
B	A	Lock
A	B	Unlock

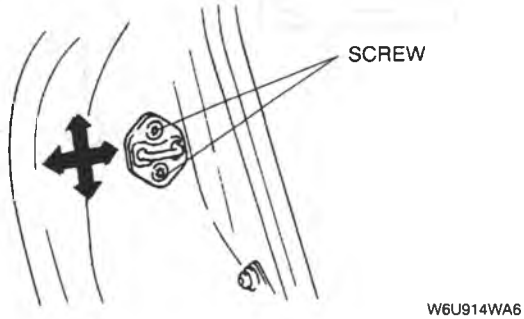


W6U914WA5

REAR DOOR LOCK STRIKER ADJUSTMENT

Z6U091472361W01

1. Verify that the rear door can be closed easily and that there is no looseness.
2. If not correct, loosen the rear door lock striker installation screws and move the striker horizontally or vertically.
3. Tighten the rear door lock striker installation screws.

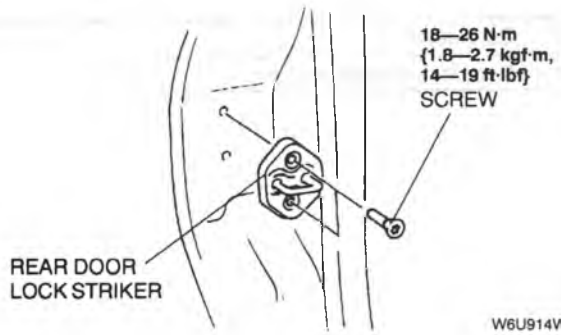


W6U914WA6

REAR DOOR LOCK STRIKER REMOVAL/INSTALLATION

Z6U091472361W02

1. Remove the screws.
2. Remove the rear door lock striker.
3. Install in the reverse order of removal.
4. Adjust the rear door lock striker. (See 09-14-5 REAR DOOR LOCK STRIKER ADJUSTMENT.)



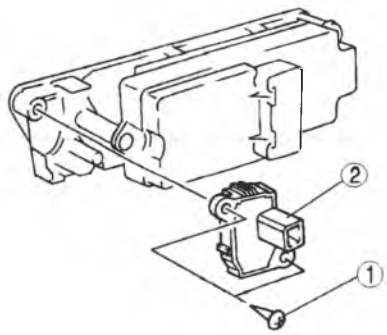
W6U914WA7

DOOR LOCK SWITCH REMOVAL/INSTALLATION

Z6U091466210W01

1. Disconnect the negative battery cable.
2. Remove the driver's side front door trim. (See 09-17-9 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Screw
2	Door lock switch

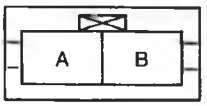


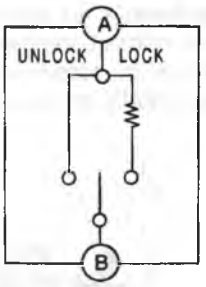
W6U914WA8

DOOR LOCK SWITCH INSPECTION

Z6U091466210W02

1. Disconnect the negative battery cable.
2. Remove the driver's side front door trim. (See 09-17-9 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
3. Check for continuity between the door lock switch terminals by using an ohmmeter.
   - If not as specified, replace the door lock switch.





W6U914WA9

○—○ : Continuity ○WW○ : Resistance

Switch position	Terminal	
	A	B
Lock	○—WW—○	R
Neutral		
Unlock	○—	—○

R: 950—1050 Ω

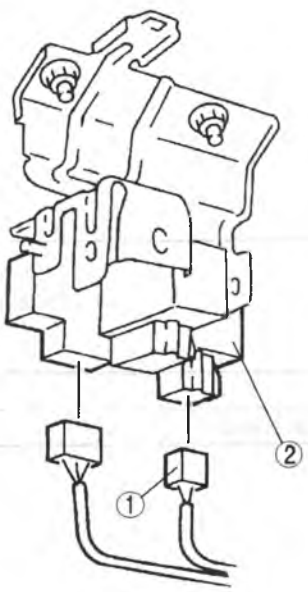
W6U914WBK

DOOR LOCK CONTROL MODULE 1 REMOVAL/INSTALLATION

Z6U091467830W01

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

1	Connector
2	Door lock control module 1



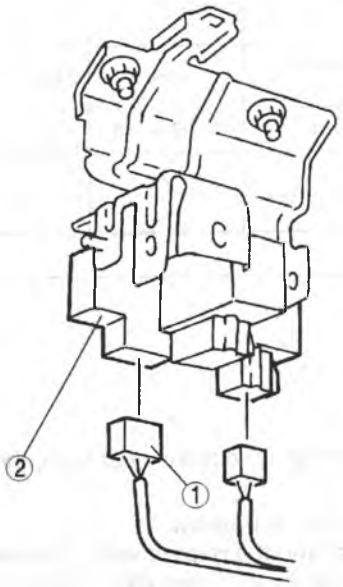
W6U914WAA

DOOR LOCK CONTROL MODULE 2 REMOVAL/INSTALLATION

Z6U091467830W02

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

1	Connector
2	Door lock control module 2



W6U914WAB

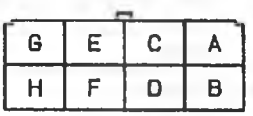
DOOR LOCK CONTROL MODULE 1 INSPECTION

Z6U091467830W03

Note
- Disconnect the door lock control module 1 connector before checking for continuity at terminal F.

1. Measure the voltage at the door lock control module 1 terminals as indicated below.
   - If not as specified, inspect the parts listed under "Inspection area" and the related wiring harnesses.
   - If the parts and wiring harnesses are okay but the system still does not work properly, replace the door lock control module 1.

Terminal Voltage List (Reference)



W6U914WAC

Terminal	Signal	Connection	Test condition	Voltage (V)/ Continuity	Inspection area
A	—	—	—	—	—
B	Door lock input	CPU	Door lock switch at lock	B+→0→B+	CPU
			Transmitter lock button pressed	B+→0→B+	
			Other	B+	
C	Power supply	D.LOCK 30 A fuse	Constant	B+	D.LOCK 30 A fuse
D	Door lock output	Door lock actuator	Door lock actuator locked	0→B+→0	Door lock actuator
			Other	0	

Terminal	Signal	Connection	Test condition	Voltage (V)/ Continuity	Inspection area
E	Door unlock input (passenger's side, rear)	CPU	Door lock switch at unlock	B+→0→B+	CPU
			Transmitter unlock button pressed twice within 5 sec	B+→0→B+	
			Other	B+	
F	Door lock control module 1 ground	GND	Constant: check for continuity to ground	Yes	GND
G	Door unlock output (passenger's side, rear)	Door lock actuator	Door lock actuator unlocked	0→B+→0	Door lock actuator
			Other	0	
H	—	—	—	—	—

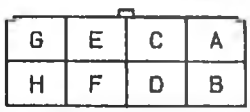
DOOR LOCK CONTROL MODULE 2 INSPECTION

Z6U091467830W04

Note
- Disconnect the door lock control module 2 connector before checking for continuity at terminal F.

1. Measure the voltage at the door lock control module 2 terminals as indicated below.
   - If not as specified, inspect the parts listed under "Inspection area" and the related wiring harnesses.
   - If the parts and wiring harnesses are okay but the system still does not work properly, replace the door lock control module 2.

Terminal Voltage List (Reference)



W6U914WAD

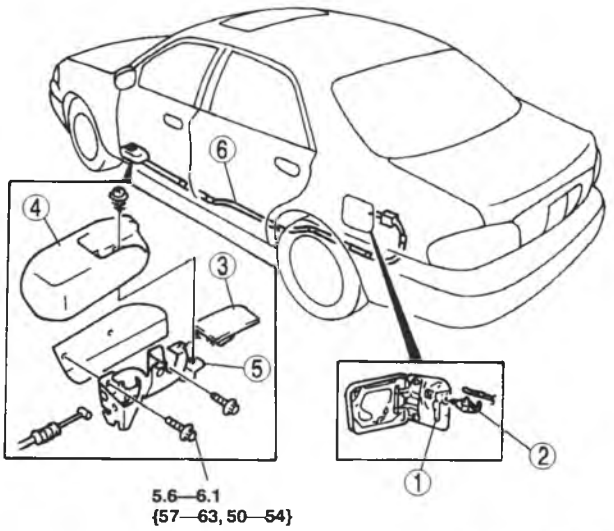
Terminal	Signal	Connection	Test condition	Voltage (V)/ Continuity	Inspection area
A	—	—	—	—	—
B	Trunk lid open input	• CPU • Trunk lid opener switch	Trunk lid opener switch pressed	B+→0→B+	• CPU • Trunk lid opener switch
			Transmitter trunk button pressed	B+→0→B+	
			Other	B+	
C	+B	D.LOCK 30 A fuse	Constant	B+	D.LOCK 30 A fuse
D	Trunk lid open output	Trunk lid lock actuator	Trunk lid lock actuator operated	0→B+→0	Trunk lid lock actuator
			Other	0	
E	Door unlock input (driver's side)	CPU	Door lock switch at unlock	B+→0→B+	CPU
			Transmitter unlock button pressed once	B+→0→B+	
			Other	B+	
F	Door lock control module 2 ground	GND	Constant: check for continuity to ground	Yes	GND
G	Door unlock output (driver's side)	Door lock actuator	Driver's side door lock actuator unlocked	0→B+→0	Door lock actuator
			Other	0	
H	—	—	—	—	—

FUEL-FILLER LID OPENER REMOVAL/INSTALLATION

Z6U091442410W01

1. To remove the fuel-filler lid opener cable, perform the following and partially peel off the floor covering and trunk compartment covering.
   (1) Remove the driver-side front seat.
   (2) Remove the driver-side front and rear scuff plates.
   (3) Remove the B-piller lower trim.
   (4) Remove the rear seat back.
   (5) Remove the trunk end trim.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

1	Lift spring
2	Fuel-filler lid opener
3	Knob
4	Cover
5	Fuel-filler lid opener lever
6	Fuel-filler lid opener cable



N·m {kgf·cm, in·lbf}

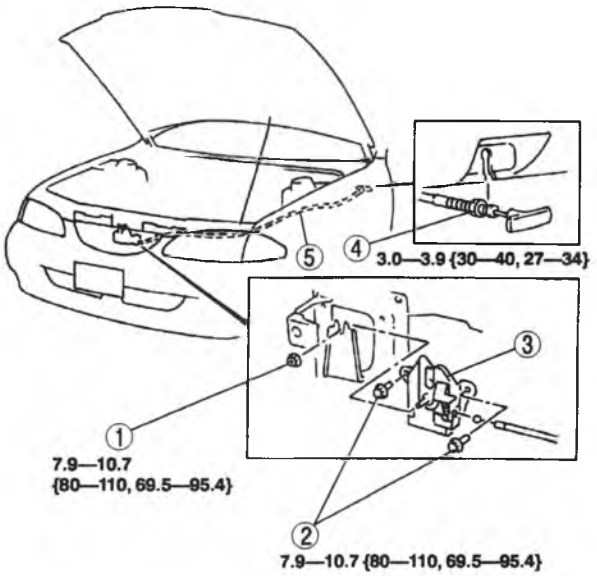
Y6U914WA0

HOOD LOCK AND OPENER REMOVAL/INSTALLATION

Z6U091456620W01

1. Disconnect the negative battery cable.
2. To remove the hood lock, remove the upper seal board.
3. To remove the hood release cable, remove the left side mud guard.
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. Adjust the hood lock. (See 09-14-10 HOOD LOCK ADJUSTMENT.)

1	Nut A
2	Bolt
3	Hood lock
4	Nut B
5	Hood release cable



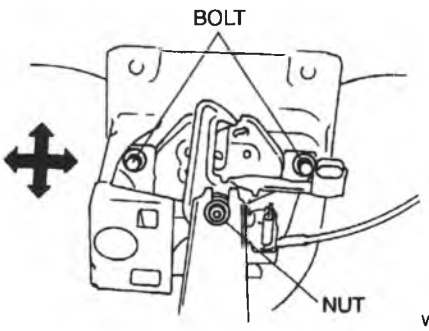
N·m {kgf·cm, in·lbf}

W6U914WAE

HOOD LOCK ADJUSTMENT

Z6U091456620W02

1. Verify that the hood can be closed easily and that there is no looseness.
   - If not correct, loosen the hood lock installation bolts and nut, and move the hood lock horizontally or vertically.



W6U914WAF

2. Tighten the hood lock installation bolts and nut.

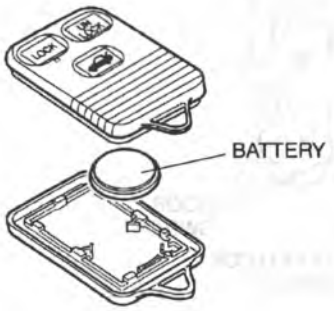
TRANSMITTER DISASSEMBLY/ASSEMBLY

Z6U091467543W01

1. Remove the cover by using a quarter coin.
2. Remove the battery.

Battery specification
Lithium CR 2032 × 1





W6U914WAG

3. Assemble in the reverse order of disassembly.

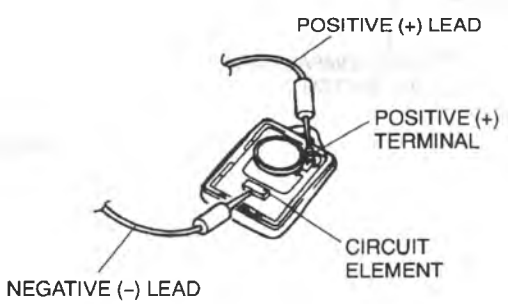
Note
- The battery will last about **2 years** when used **10 times** a day.

TRANSMITTER BATTERY INSPECTION

Z6U091467543W02

Note
- If the battery is not subject to load it cannot be properly inspected.
- A correct measurement cannot be obtained when the battery temperature is low. If the inspection result is below the standard voltage, inspect it again after it has been at **18 °C {64 °F}** or more for **at least 30 minutes**.
- There is an auto power off function in the transmitter, so be sure to read the voltage **within 0.5 seconds** after pushing the button.

1. Remove the transmitter cover.
2. Connect the positive (+) lead of the voltmeter to the positive (+) terminal of the transmitter and the negative (-) lead to the circuit element.



W6U914WD1

3. Push any button of transmitter 10 times or more in **every 1 second** and measure the voltage every time.
4. Compare the minimum voltage to the standard voltage.

Standard voltage
2.8 V or more

- If not specified, replace transmitter battery. (See 09-14-11 TRANSMITTER DISASSEMBLY/ASSEMBLY.)

5. If the keyless entry system does not operate even though the voltage is as specified, the transmitter may be malfunctioning. Perform the following inspection on the transmitter:
   (1) Get a transmitter known to be good.
   (2) Push the suspect battery into the good transmitter.
   (3) Perform steps 2 to 4.
   (4) If voltage is not as specified, replace the battery. If voltage is as specified, replace the transmitter.

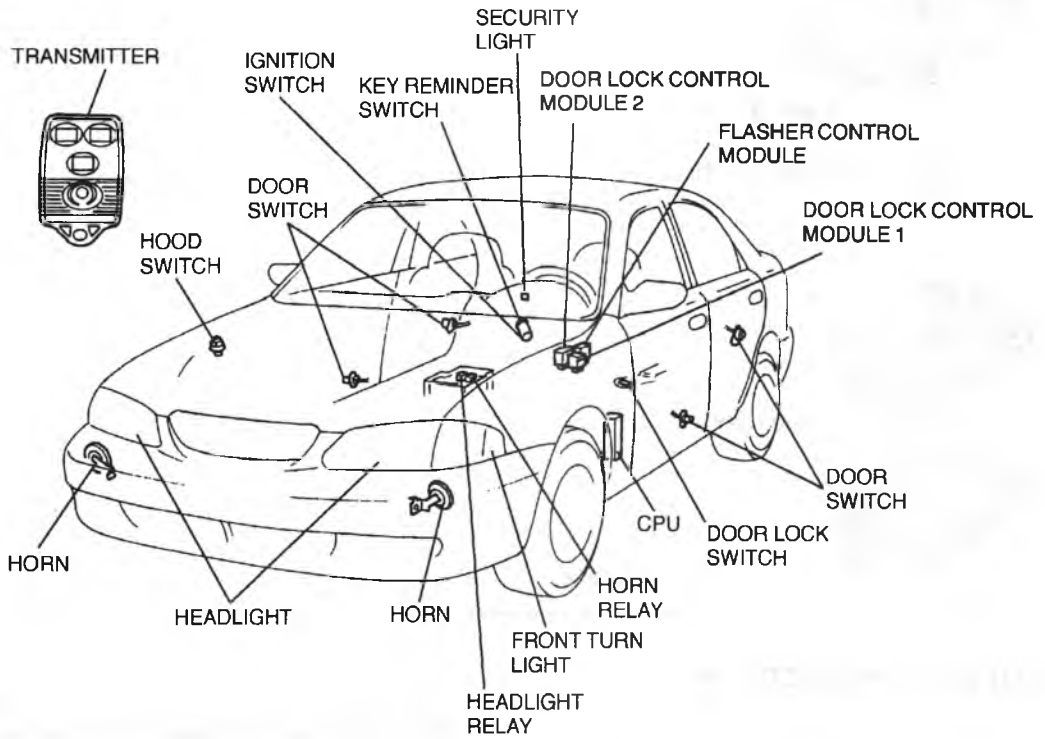
KEYLESS ENTRY SECURITY SYSTEM

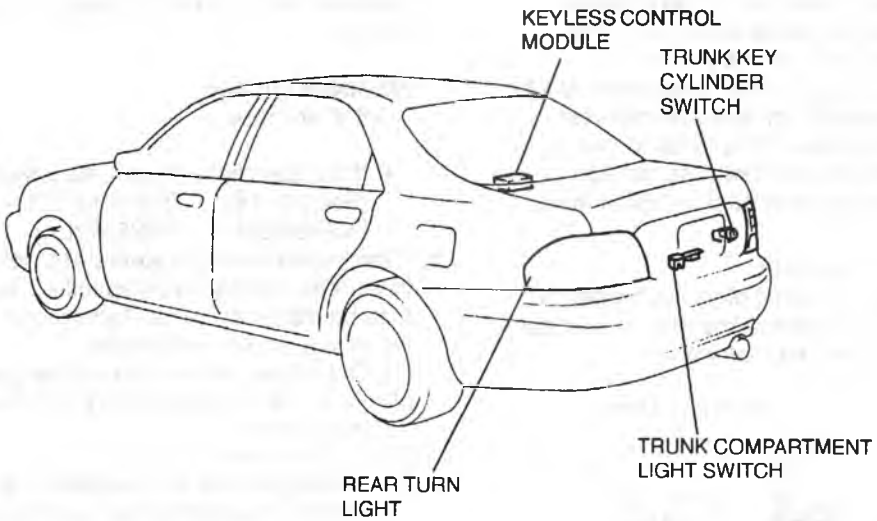
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Keyless Entry Security System Outline

- The keyless entry security system is mainly designed to prevent property in the vehicle from being stolen while the immobilizer system is designed to prevent the vehicle from being stolen.
- If forcible entry is attempted, the system sounds the horn and flashes the headlights and the turn lights.
- The keyless entry security system locks or unlocks the door(s) or the trunk lid by the transmitter.
- The vehicle can be armed for theft deterrent by the transmitter or the door lock switch.

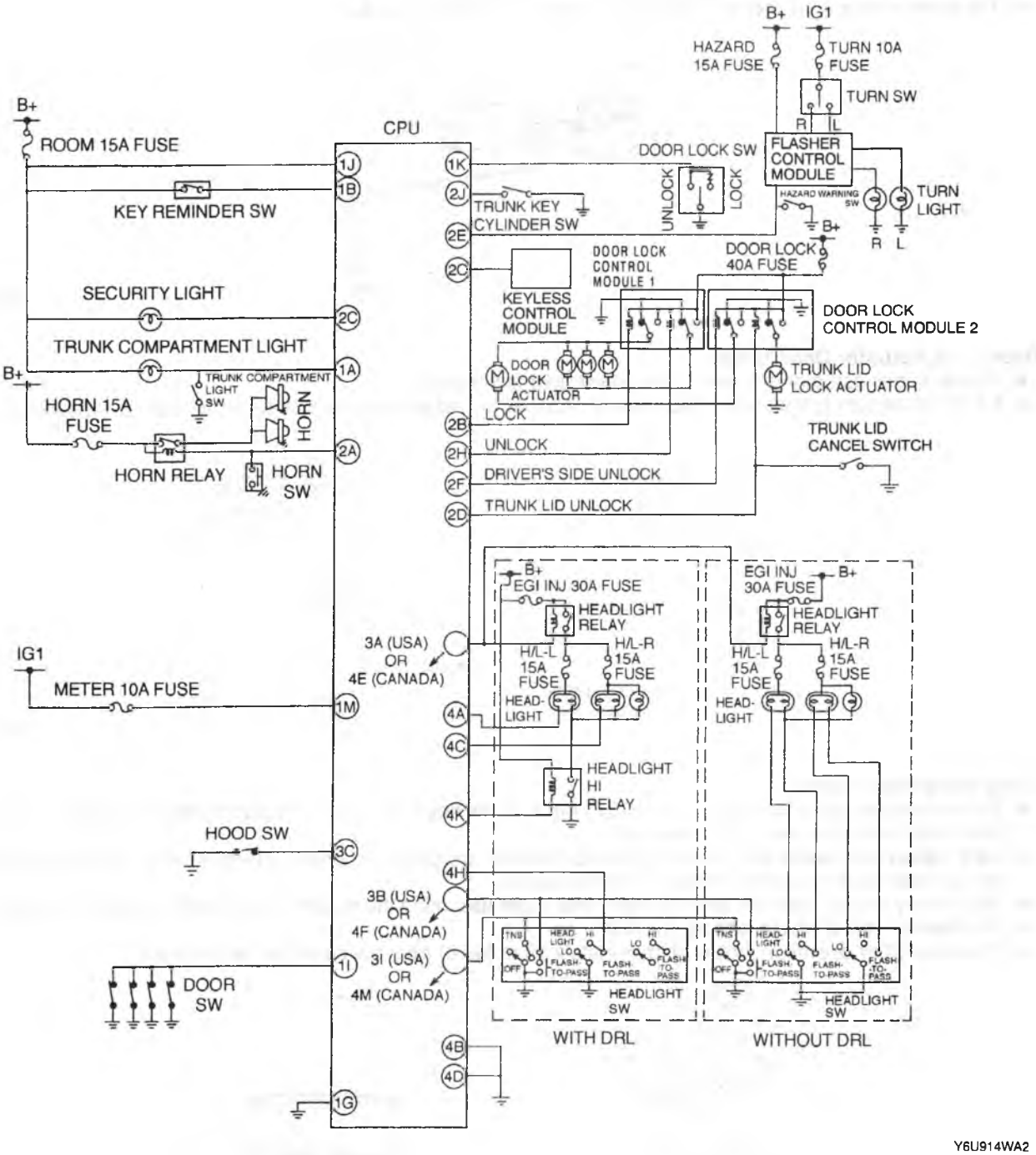
Keyless Entry Security System Structural View





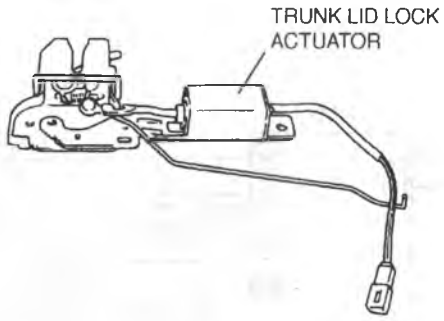
Y6U914WA1

Keyless Entry Security System Wiring Diagram



Trunk Lid Lock Actuator Description

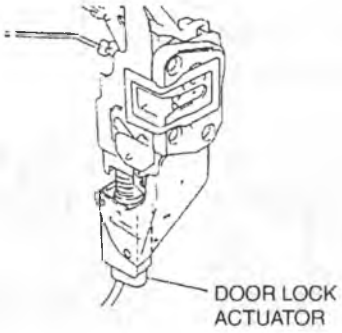
- The trunk lid lock actuator is a part of the trunk lid lock.
- The trunk lid can be unlocked electrically by the trunk lid lock actuator.

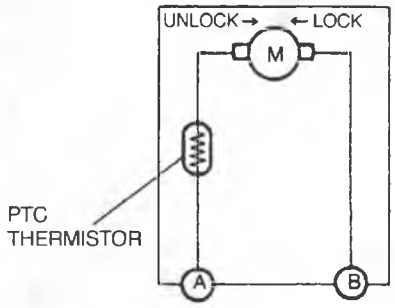


W6U914SA5

Door Lock Actuator Description

- The door lock actuator is a part of the power door lock system.
- A PTC thermistor is installed in the internal circuit of the actuator to prevent the motor from overheating.



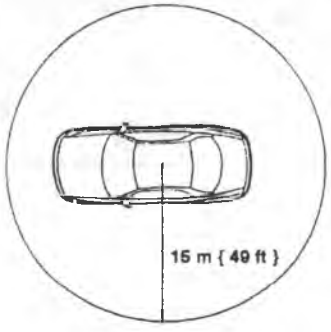


W6U914SA6

Transmitter Description

- The transmitter sends AM radio waves (315 MHz) to the keyless control module for remote control of door lock/unlock and trunk lid unlock features.
- Each transmitter has its own identification (ID) code for burglary prevention. Keyless entry system operation is not possible by using a transmitter of another vehicle.
- The battery can be used for approximately two years assuming the system is operated up to ten times daily.
- The battery type is lithium battery CR2032.
- The transmitter operation limit is approximately 15 m {49 ft} from the center of the vehicle.

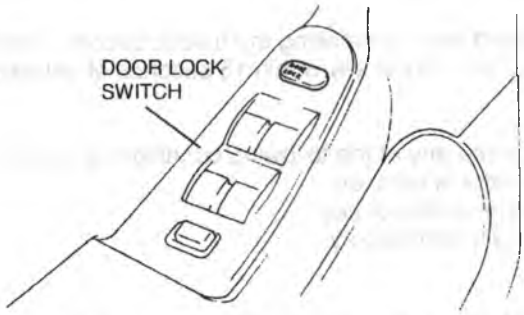




W6U914SA7

Door Lock Switch Description

- All doors are locked or unlocked by operating the door lock switch.



W6U914SA8

Keyless Entry Description

Operation

The operation of the keyless entry system is outlined in the table below. The system operates when the ignition switch is not at ON.

Function	Operating conditions	Signal (keyless control module to CPU)	Door	Trunk	Warning
LOCK	LOCK button pressed	3.5 V	Unlock→Lock	Inoperative	Inoperative
	LOCK button pressed 2 times within 5 seconds with door switch ON (all doors closed)	3.5 V	Inoperative (Look position)	Inoperative	Horn sounds for 50 ms
UNLOCK	UNLOCK button pressed	1.7 V	Lock→Unlock (Only driver's side)	Inoperative	Inoperative
	UNLOCK button pressed 2 times within 5 seconds with door switch ON.	1.7 V	Lock→Unlock (All doors)	Inoperative	Inoperative
Trunk	TRUNK button pressed	0 V	Inoperative	Unlock	Inoperative
Keyless inoperative	LOCK/UNLOCK button pressed with ignition switch at ON	LOCK: 3.5 V UNLOCK: 1.7 V CPU does not send signals to door lock control module.	Inoperative	Inoperative	Inoperative

Keyless Entry Security System Description (Theft deterrent function operation)

Setting the arming mode

The system will be automatically set to the armed mode after the setting procedure listed below is performed.

Setting Procedure: (perform step "1." first, the order of "2." and "3." do not matter)

1. Remove the ignition key from the key cylinder.
2. Close all entry points (doors, hood and trunk lid).
3. Use any one of the following methods to lock all the doors. If any door is unlocked after all the doors have been locked with the transmitter, the setting procedure will be canceled.
   (1) Use the transmitter to lock any door. (as a result, all the doors will be locked)
   (2) Use the door lock switch to lock the doors. (as a result, all the doors will be locked)
4. After the above steps are performed, the armed mode will automatically start with the turn lights flashing for 2 seconds. Then the security light flashes at 3 seconds intervals.

Note

After step "4.", the trunk lid may be opened by using the key or the transmitter and closed, the system remains in the arming mode.

Alarming mode

When the system is set to the armed mode and any of the following conditions are met, the system sounds the horns and flashes the turn lights and the headlights for about 2.5 minutes:

1. After 15 seconds if any of the door is unlocked and opened without the transmitter. (after 15 seconds, the security light flashes at 3 seconds intervals.)
2. The trunk lid or the hood is opened without the key or transmitter.

Cancellation of armed mode

- The armed mode can be canceled only by pressing the unlock button of the transmitter.
- The ignition switch is turned to ON with the key within 15 seconds of unlocking or opening any door without the transmitter.

Cancellation of alarmed mode

The alarm mode can be canceled when any of the following conditions are met.

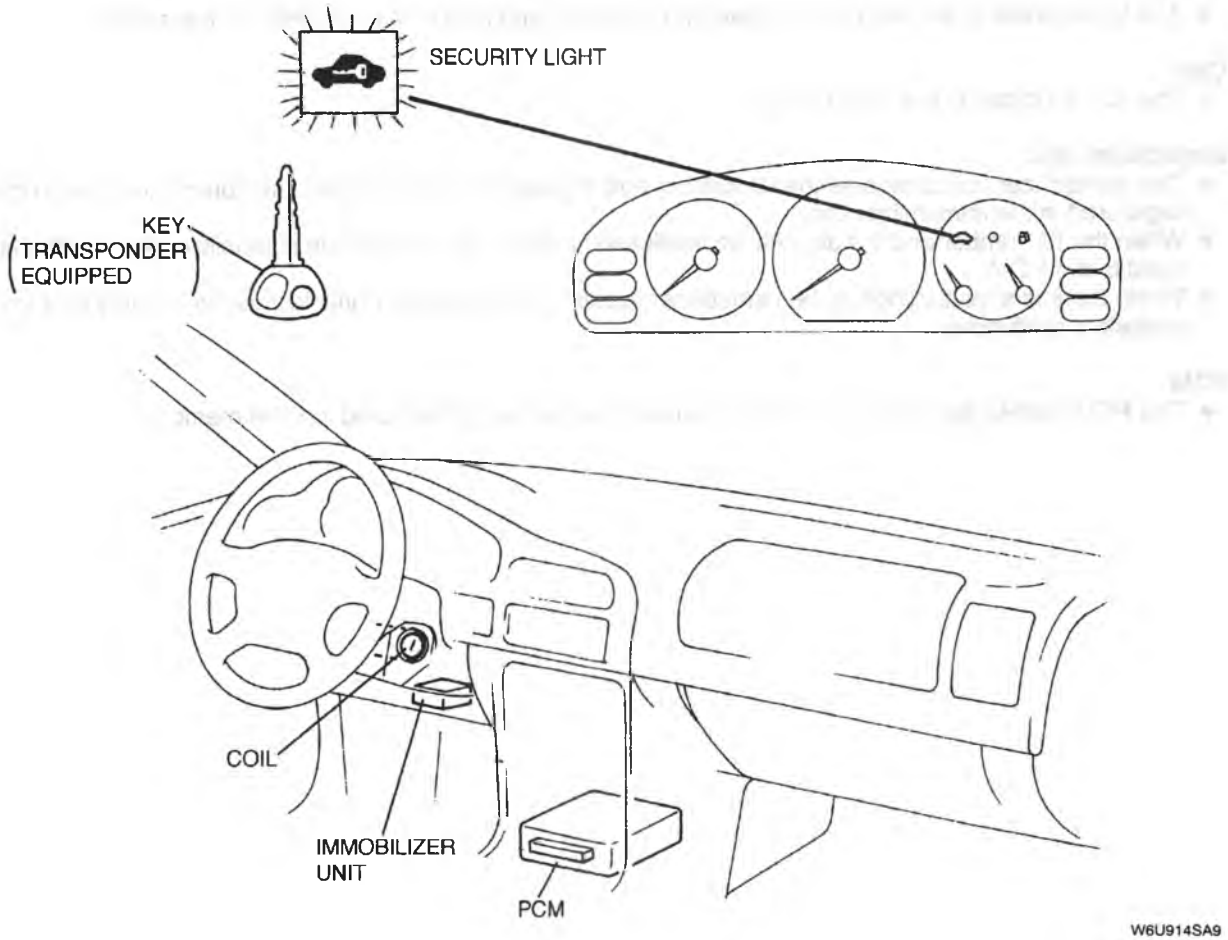
1. The unlock button of the transmitter is pressed.
2. The trunk lid is opened by the transmitter or key.
3. The ignition switch is turned to ON with the key.

Immobilizer System Outline

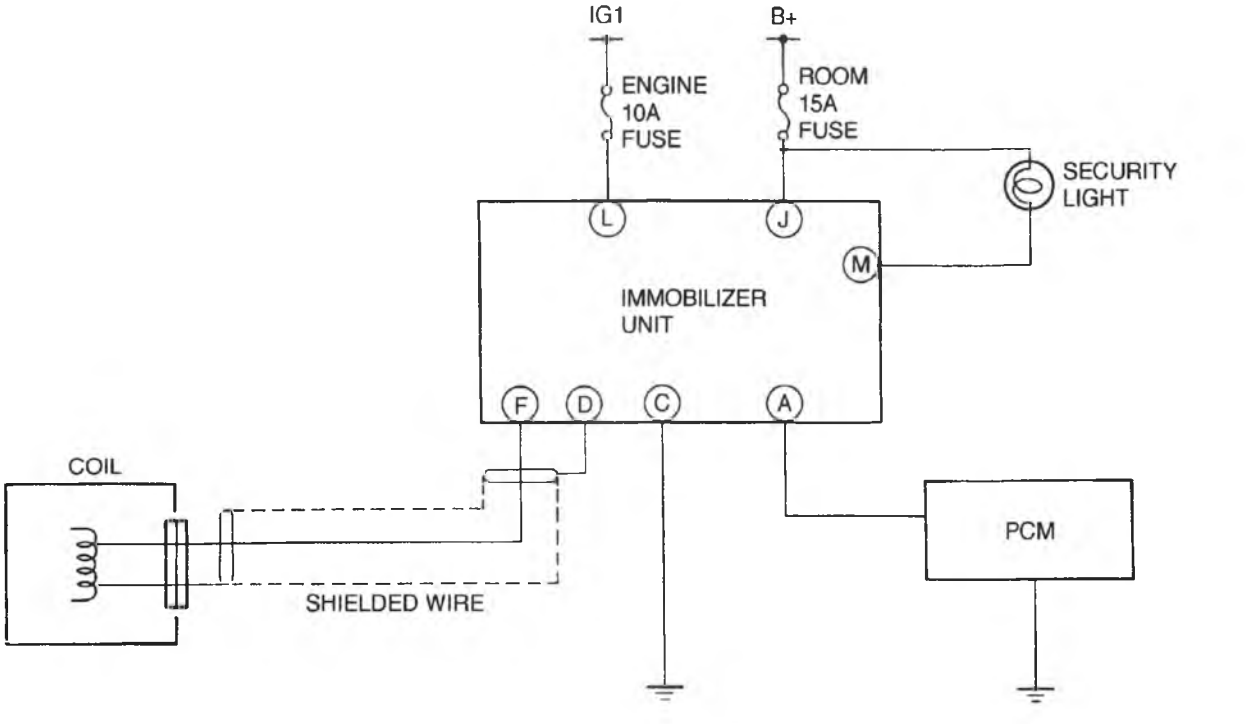
- The immobilizer system prevents the engine from starting when anything other than the programmed ignition key is used. (even if the ignition switch is short-circuited. If unprogrammed key is used the PCM will cut the fuel and ignition.)
- The system components are:
  - —Key with transponder
  - —Security light
  - —Coil
  - —Immobilizer unit
  - —PCM
- The engine will start only if the key with the corresponding identification number is recognized and verified by the PCM and immobilizer unit.
- The engine can be started using the key, which has and ID number registered in its transponder and which uses an algorithmic verification method.
- *Code word is input into the immobilizer unit and PCM, and the vehicle will not start if the code word is not newly registered when parts (i.e. PCM) are replaced.
- *The procedure for registering the ID number and the procedure for inputting the code word are different according to the parts being replaced and the number of the registered keys.

*:These are very important outlines for the immobilizer system.

Immobilizer System Structural View



Immobilizer System Wiring Diagram



Immobilizer System Description

Key

- The transponder in the key has a registered ID number and performs an algorithmic transaction.

Coil

- The coil is located in the steering lock.

Immobilizer unit

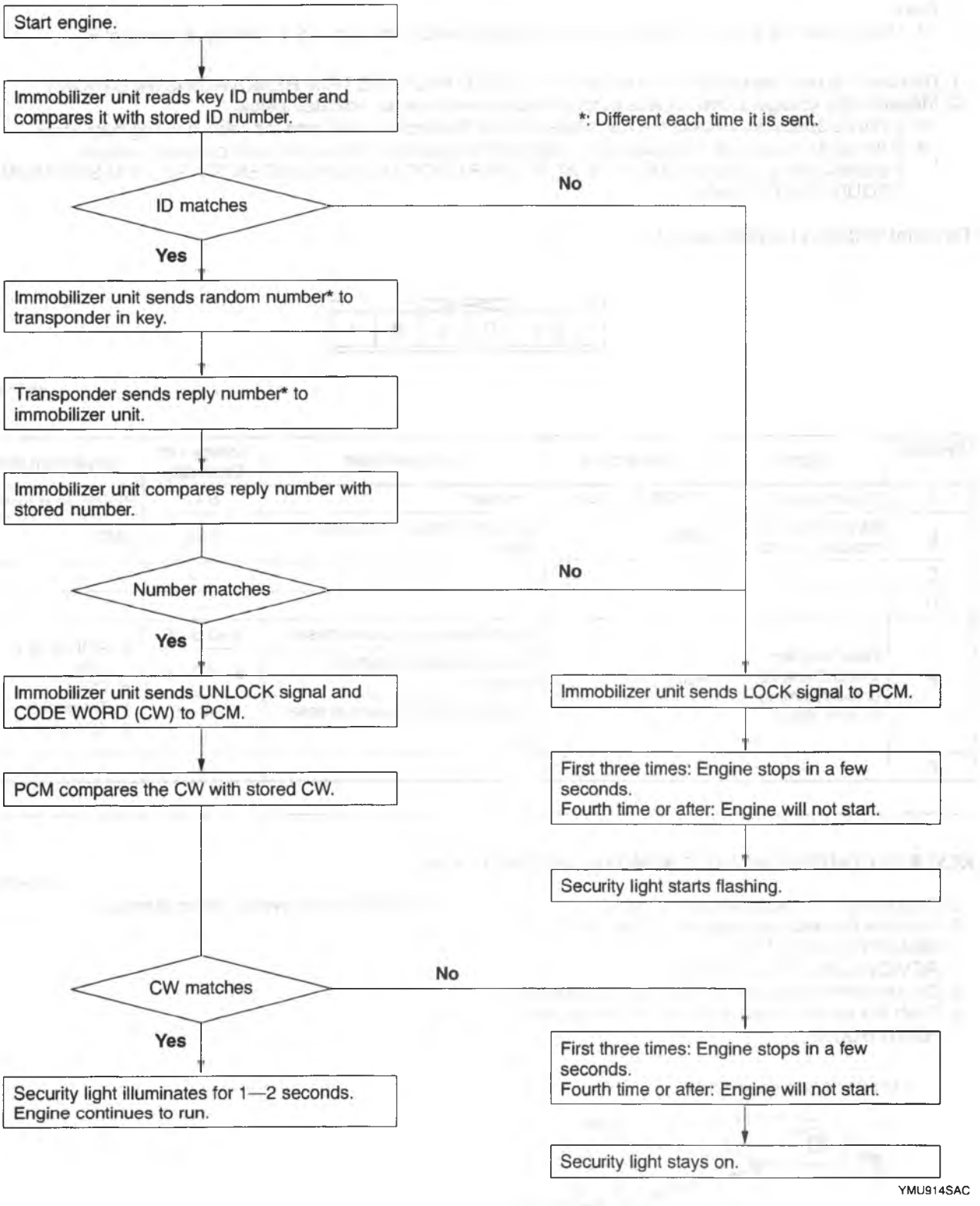
- The immobilizer unit compares the ID number and the algorithmic verification method of the key with those registered in the immobilizer unit.
- When the ID number and the algorithmic verification method are verified, the immobilizer unit sends the code word to the PCM.
- When there is a malfunction in the immobilizer system, the immobilizer unit flashes the security light to indicate a malfunction.

PCM

- The PCM verifies the code word from the immobilizer unit with that stored in PCM memory.

System operation

- This is a conceptual flowchart for understanding how the immobilizer system operates. It shows how the system decides whether or not to start the vehicle when the ignition switch is turned to ON position.



KEYLESS CONTROL MODULE INSPECTION

Z6U091467543W04

Note
- Disconnect the keyless control module connector before checking for continuity at terminal B.

1. Remove the rear package trim. (See 09-17-12 REAR PACKAGE TRIM REMOVAL/INSTALLATION.)
2. Measure the voltage at the keyless control module terminals as indicated below.
   - If not as specified, inspect the parts listed under "Inspection area" and the related wiring harnesses.
   - If the parts and wiring harnesses are okay but the system still does not work properly, perform troubleshooting. (See 09-03E-8 POWER DOOR LOCK AND KEYLESS ENTRY SYSTEM SYMPTOM TROUBLESHOOTING.)

Terminal Voltage List (Reference)



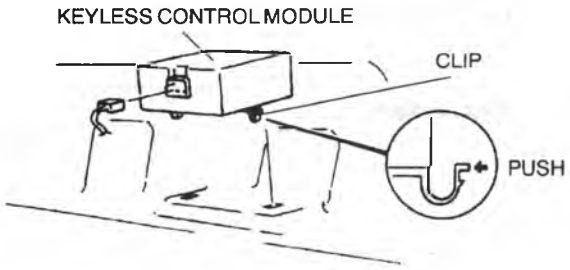
W6U914WAH

Terminal	Signal	Connection	Test condition	Voltage (V)/ Continuity	Inspection area
A	Power supply	ROOM 15 A fuse	Constant	B+	ROOM 15 A fuse
B	Keyless control module ground	GND	Constant: check for continuity to ground	Yes	GND
C	—	—	—	—	—
D	—	—	—	—	—
E	Door lock/door unlock/trunk lid unlock/warning buzzer output	CPU	Transmitter lock button pressed	5→3.5→5	• ROOM 15 A fuse • CPU • Transmitter • Jamming
			Transmitter unlock button pressed	5→1.7→5	
			Transmitter trunk button pressed	5→0→5	
			Other	5	
F	—	—	—	—	—

KEYLESS CONTROL MODULE REMOVAL/INSTALLATION

Z6U091467540W01

1. Disconnect the negative battery cable.
2. Remove the rear package trim. (See 09-17-12 REAR PACKAGE TRIM REMOVAL/INSTALLATION.)
3. Disconnect the keyless control module connector.
4. Push the sides of clips and remove the keyless control module.
5. Install in the reverse order of removal.



X6U914WA0

TRANSMITTER ID CODE CHANGE

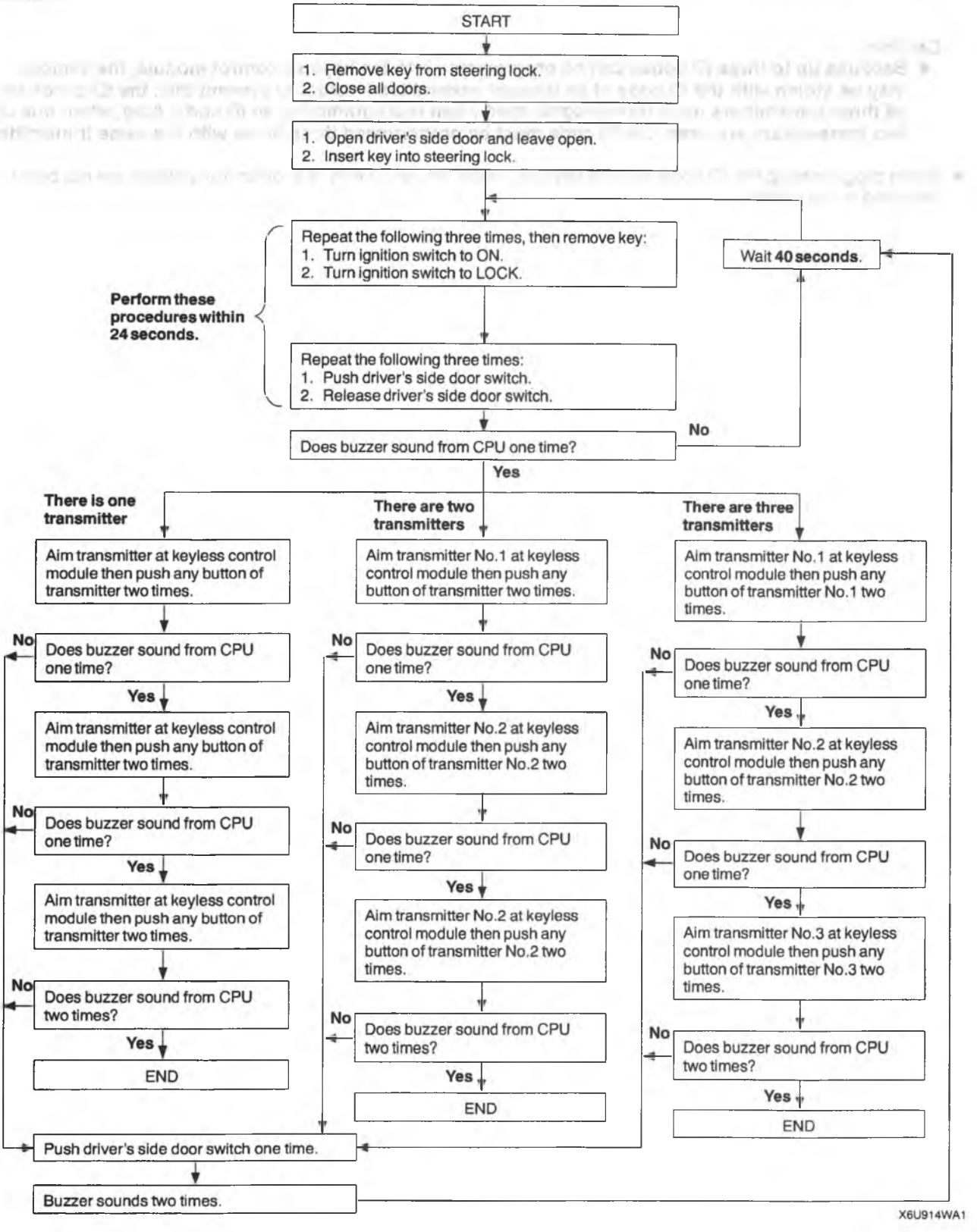
Z6U091467540W02

Caution

- **Because up to three ID codes can be programmed into the keyless control module, the vehicle may be stolen with the ID code of an unused transmitter. In order to prevent this, the ID codes for all three transmitters must be reprogrammed when reprogramming an ID code. Also, when one or two transmitters are used, the ID code must be programmed three times with the same transmitter.**

- When programming the ID code into the keyless control module, verify that other transmitters are not being operated in the vicinity.

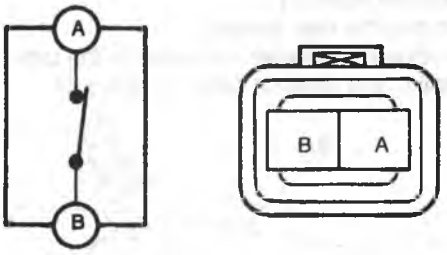
- Program the ID code according to the procedures below.



HOOD SWITCH INSPECTION

Z6U091467001W01

1. Disconnect the negative battery cable.
2. Disconnect the hood switch connector.
3. Check for continuity between the hood switch terminals by using an ohmmeter.
   - If not as specified, replace the hood switch.



W6U914WAL

○—○ : Continuity

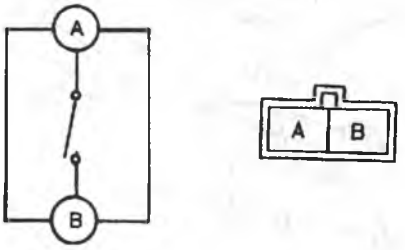
Switch position	Terminal	
	A	B
Pushed		
Released	○	○

W6U914WAK

TRUNK KEY CYLINDER SWITCH INSPECTION

Z6U091467002W01

1. Open the trunk lid.
2. Disconnect the negative battery cable.
3. Disconnect the trunk key cylinder switch connector.
4. Check for continuity between the trunk key cylinder switch terminals by using an ohmmeter.
   - If not as specified, replace the trunk key cylinder.



W6U914WAN

○—○ : Continuity

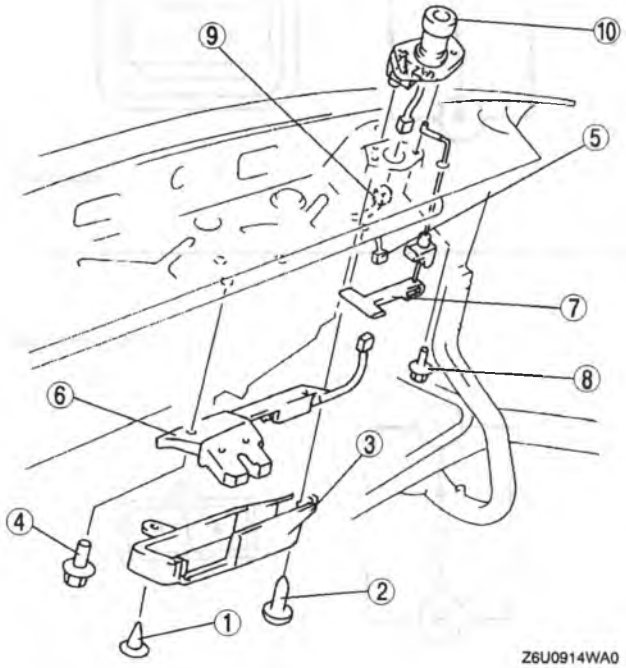
Switch position	Terminal	
	A	B
Neutral		
Unlock	○	○

W6U914WAM

TRUNK LID LOCK AND OPENER REMOVAL/INSTALLATION

Z6U091456821W01

1. Disconnect the negative battery cable.
2. Open the trunk lid.
3. Remove the rear finisher.
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.



Z6U0914WA0

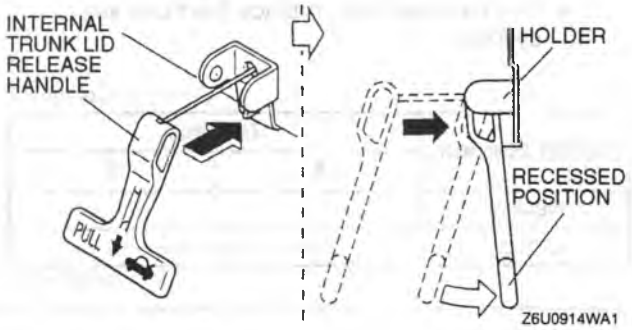
1	Fastener
2	Screw
3	Trunk lid lock cover
4	Bolt A
5	Connector A
6	Trunk lid lock
7	Internal Trunk Lid Release Handle (See 09-14-24 Internal Trunk Lid Release Handle Installation Note)
8	Bolt B
9	Connector B
10	Trunk key cylinder

Internal Trunk Lid Release Handle Installation Note

Caution

- **Always keep the handle firmly attached to the holder and in the recessed position. Not securing the handle this way could allow it to snag luggage in the compartment and open the trunk lid.**

1. After installation of the internal trunk lid release handle, pull the handle forward to verify the handle and rod are securely installed.
2. Attach the handle to the holder on the cover and in the recessed position.



Z6U0914WA1

TRUNK LID LOCK ACTUATOR INSPECTION

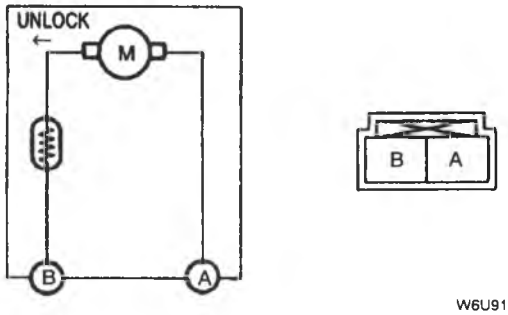
Z6U091456830W01

Note

- The trunk lid lock actuator is built into the trunk lid lock.

1. Disconnect the negative battery cable.
2. Open the trunk lid.
3. Disconnect the trunk lid lock actuator connector.
4. Apply battery positive voltage to the trunk lid lock actuator terminals and check the operation of the trunk lid lock actuator.
   - If not as specified, replace the trunk lid lock.

Terminal		Actuator operation
B+	GND	
A	B	Unlock

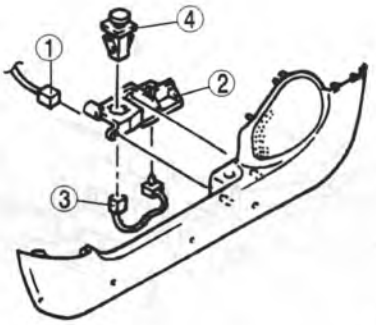


W6U914WAQ

TRUNK LID OPENER SWITCH REMOVAL/INSTALLATION

Z6U091466630W01

1. Disconnect the negative battery cable.
2. Disassemble the pocket. (See 09-17-9 FRONT DOOR TRIM DISASSEMBLY/ASSEMBLY.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.



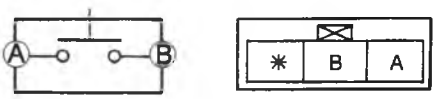
W6U914WAR

1	Connector
2	Pocket bracket
3	Short cord
4	Trunk lid opener switch

TRUNK LID OPENER SWITCH INSPECTION

Z6U091466630W02

1. Disconnect the negative battery cable.
2. Remove the trunk lid opener switch.
3. Check for continuity between the trunk lid opener switch terminals by using an ohmmeter.
   - If not as specified, replace the trunk lid opener switch.



W6U914WAT

○—○ : Continuity

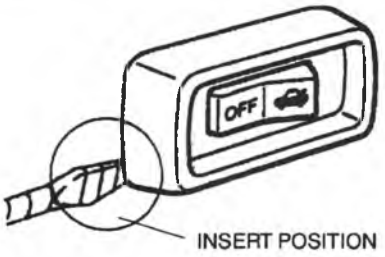
Switch position	Terminal	
	A	B
Off		
On	○	○

W6U914WAS

TRUNK LID CANCEL SWITCH REMOVAL/INSTALLATION

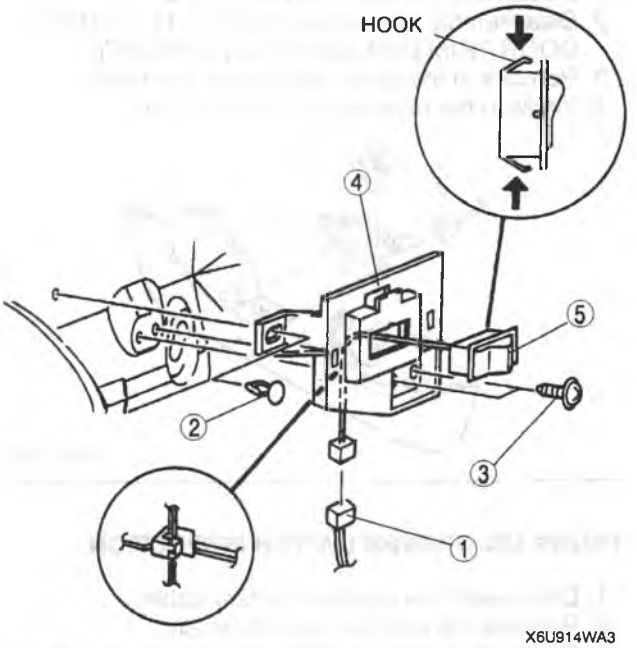
Z6U091466400W01

1. Disconnect the negative battery cable.
2. Remove the trunk lid cancel switch cover by inserting a small tape-wrapped flathead screwdriver and carefully pry it off without scratching the trunk compartment covering.



X6U914WA6

3. Turn back the left side of trunk compartment covering. (See 09-17-14 TRUNK COMPARTMENT COVERING REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.



X6U914WA3

1	Connector
2	Fastener
3	Screw
4	Bracket
5	Trunk lid cancel switch (See 09-14-26 Trunk Lid Cancel Switch Removal Note)

Trunk Lid Cancel Switch Removal Note

1. Press the hooks of the trunk lid cancel switch.
2. Pull the trunk lid cancel switch out from the bracket.

TRUNK LID CANCEL SWITCH INSPECTION

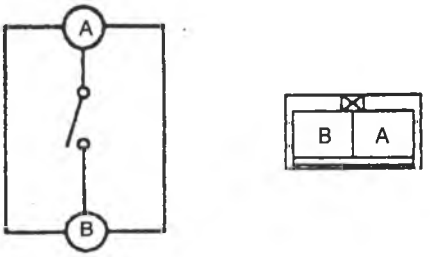
Z6U091466400W02

1. Remove the trunk lid cancel switch. (See 09-14-26 TRUNK LID CANCEL SWITCH REMOVAL/INSTALLATION.)
2. Inspect for continuity between the trunk lid cancel switch terminals by using an ohmmeter.
   - If not as specified, replace the trunk lid cancel switch.

○—○ : Continuity

Switch position	Terminal	
	A	B
ON	○	○
OFF		

X6U914WA4

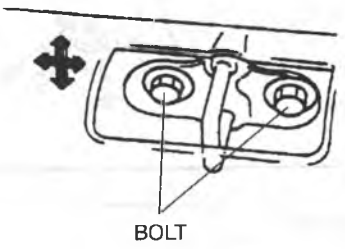


X6U914WA5

TRUNK LID STRIKER ADJUSTMENT

Z6U091456840W01

1. Verify that the trunk lid can be closed easily and that there is no looseness.
   - If not correct, loosen the trunk lid striker installation bolts and move the striker horizontally or vertically.
2. Tighten the trunk lid striker installation bolts.

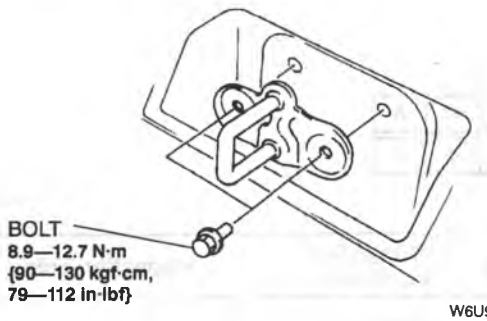


X6U914WA2

TRUNK LID STRIKER REMOVAL/INSTALLATION

Z6U091456840W02

1. Remove the trunk end trim. (See 09-17-13 TRUNK END TRIM REMOVAL/INSTALLATION.)
2. Remove the bolts.
3. Remove the trunk lid striker.
4. Install in the reverse order of removal.
5. Adjust the trunk lid striker. (See 09-14-27 TRUNK LID STRIKER ADJUSTMENT.)



W6U914WAV

IMMOBILIZER SYSTEM SERVICE CAUTION

Z6U091467000W01

Caution

- **When an immobilizer system component (such as the PCM, immobilizer unit, coil or the key) has failed, it must be accurately determined according to the troubleshooting procedures or by the display of the DTCs prior to carrying out the service procedures.**
- **If a normal component is mistakenly replaced and the ID number and/or code word are input into the new component, then neither component can be reused on other vehicles.**
- **When a new key registration or immobilizer unit and/or PCM replacement is performed on vehicles equipped with an immobilizer system, the new ID number should be registered using the procedure that includes engine cranking through idling. When the engine starts to reprogram the immobilizer system, if the input voltage to the immobilizer unit becomes lower than the operation voltage of the immobilizer system, the ID number can not be input momentarily. This is not a unit failure, so do not misunderstand during the problem diagnosis (when the terminal voltage goes back to the operation voltage, then the unit also begins to operate normally). Charge or replace the battery.**

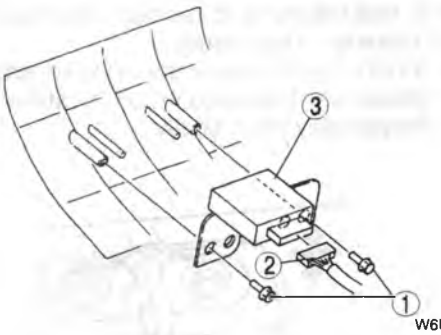
IMMOBILIZER UNIT REMOVAL/INSTALLATION

Z6U091467003W01

1. Disconnect the negative battery cable.
2. Remove the driver's side side panel.
3. Remove the lower panel.
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.

Caution

- **After replacing the immobilizer unit with a new one, the engine cannot be started without reprogramming the ID number of the keys and the code word of the new immobilizer unit. Input the ID number and code word. (See 09-14-29 IMMOBILIZER SYSTEM REPROGRAMMING PROCEDURE.)**



W6U914WAW

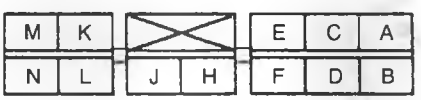
1	Bolt
2	Connector
3	Immobilizer unit

IMMOBILIZER UNIT INSPECTION

Z6U091467003W02

1. Measure the voltage at the immobilizer unit terminals as indicated below.
2. Disconnect the immobilizer unit connector before inspecting for continuity at terminal B.
   - If not specified, inspect the parts listed under "Inspection area".
   - If the parts and wiring harnesses are okay but the system still does not work properly, replace the immobilizer unit.

Terminal Voltage List (Reference)



YMU914WC4

Terminal	Signal	Connection	Test condition	Voltage (V)/ continuity	Inspection area
A	Communication with PCM	PCM	IG SW LOCK position	Below 0.1	PCM
			IG SW ON position	B+	
B	—	—	—	—	—
C	GND	GND	Under any condition: inspect for continuity to ground	Yes	GND
D	Power supply to coil	Coil	IG SW LOCK position	Below 0.1	Coil
			IG SW ON position	Can not be measured	
E	—	—	—	—	—
F	Key ID number input	Coil	IG SW LOCK position	Below 0.1	Coil
			IG SW ON position	Can not be measured	
H	—	—	—	—	—
J	Back-up power supply	Battery	Under any condition	B+	ROOM 15 A fuse
K	—	—	—	—	—
L	Power supply	Ignition switch	IG SW LOCK position	0	ENGINE 10 A fuse
			IG SW ON position	B+	

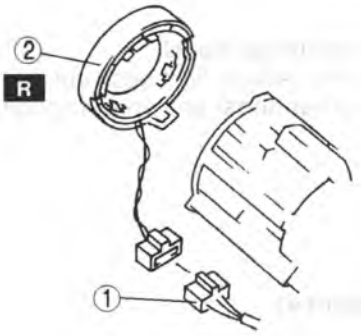
Terminal	Signal	Connection	Test condition	Voltage (V)/ continuity	Inspection area
M	Security light output	Security light	Security light does neither illuminate nor blink	B+	Security light
N	—	—	—	—	—

COIL REMOVAL/INSTALLATION

Z6U091467004W01

Note
- Do not remove the coil unless you are replacing it.
- When only the coil is replaced, the immobilizer system reprogram procedure is not necessary.

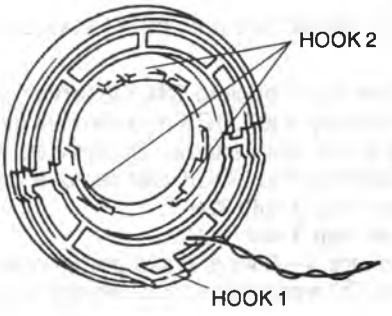
1. Disconnect the negative battery cable.
2. Remove the column cover.
3. Remove in the order indicated in table.
4. Install in the reverse order of removal.



W6U914WAX

1	Connector
2	Coil (See 09-14-29 Coil Installation Note)

Coil Installation Note
1. Install the hook 1 to the steering lock.
2. Install the hook 2 to the steering lock.



W6U914WBL

IMMOBILIZER SYSTEM REPROGRAMMING PROCEDURE

Z6U091401077W01

Note
- When an error occurs during the reprogram procedures, except when both the immobilizer unit and PCM are replaced, repeat the procedure from Step 1. If you still cannot reprogram, confirm how many keys can start the engine. Then, perform the key replacement or addition reprogram procedure according to the valid key number.
- To make a copy of the key or replace the immobilizer system component parts (the key(s), steering lock, immobilizer unit and/or PCM), customer should bring all keys to the dealer. This is because the previously programmed key IDs are erased when reprogramming the key IDs into the immobilizer unit and PCM.
- If the customer has only one valid key when replacing the immobilizer system component parts, the dealer should contact a distributor to obtain the code word.
- To replace the immobilizer unit or PCM, there should be at least one valid key. Otherwise, both the immobilizer unit and PCM should be replaced.
- The immobilizer unit and PCM cannot be changed from one car to another. If the immobilizer unit or PCM is replaced with one from another car, the engine will not start. Reprogramming of the IDs and code word of an immobilizer unit that has already programmed as a set is not possible.
- The immobilizer unit and PCM should not be newly replaced as a trial during troubleshooting. If this is done, the ID and code word will be programmed into the new unit and it cannot be used for other cars even if you find that the old unit was normal.
- The immobilizer system cannot be deactivated.
- Confirm that all keys registered can start the engine after the reprogram procedure. When confirming, wait for **more than 5 seconds** before inserting the next key.
- When the customer does not need to register more than two keys, the following procedures can be stopped after registering two keys.

Key Replacement or Addition
When the customer has two or more valid keys



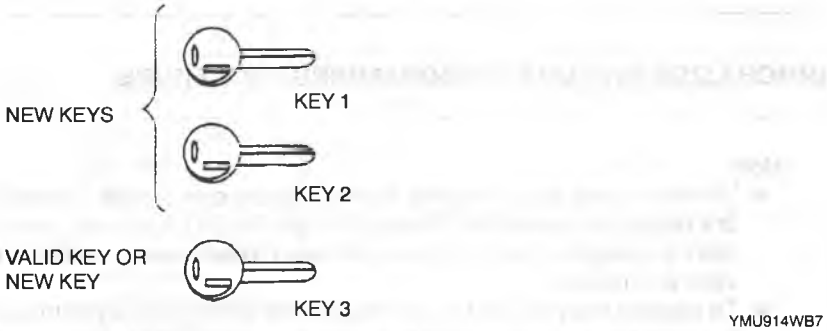
Note
- If no specific time interval is given, each step should be performed **within 30 seconds** of the previous step.

1. Cut new transponder equipped key(s).
2. Using key 1, turn ignition switch to ON then back to LOCK five times.

Note
- Key should not remain at ON or LOCK for **more than one second**.

   (1) Turn key 1 back to ON. Observe illumination of security light in instrument panel.
   (2) Turn key 1 to LOCK and remove key 1 from steering lock. Observe security light goes out.
3. Using key 2, start engine. Observe security light illuminates (for **1—2 seconds**) and engine continues to run.
   (1) Turn key 2 to LOCK and remove from steering lock.
4. Repeat step 3 with key 1.
5. Repeat step 3 with key 3.
6. If there are 4—8 keys (valid and/or new keys), repeat step 3.
7. Wait for **30 seconds** to quit reprogram mode.

When the customer has only one or no valid key (code word is required)



Note
- If no specific time interval is given, each step should be performed **within 30 seconds** of the previous step.

1. Cut new transponder equipped key(s).
2. Using key 1, turn ignition switch to ON then back to LOCK **five times**.

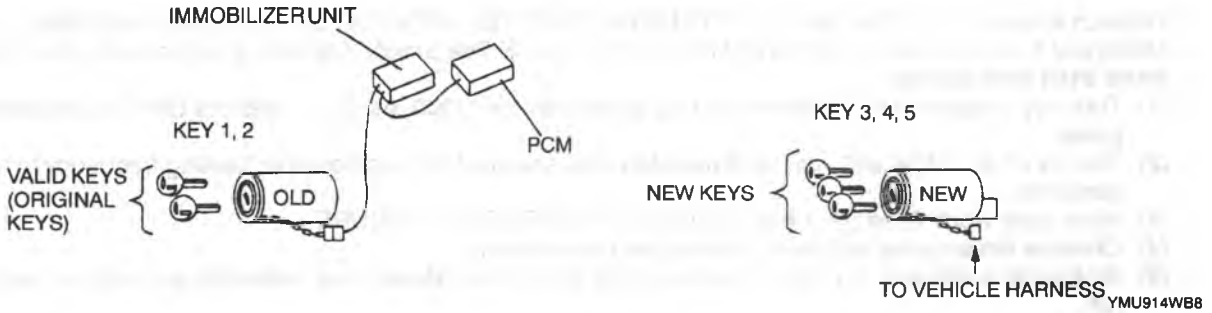
Note
- Key should not remain at ON or LOCK for **more than one second**.

   (1) Turn key 1 back to ON. Observe flashing of security light (**300 ms** ON — **300 ms** OFF) in instrument panel.
   (2) Turn key 1 to LOCK and wait for **5 minutes** until security light decreases in flashing frequency to **1.2 seconds**.
   (3) Input code word. (See 09-14-35 CODE WORD INPUT PROCEDURE.)
   (4) Observe security light stops flashing and illuminates.

(5) Start engine with key 1. Observe security light illuminates (**about 1—2 seconds**) and engine continues to run.
(6) Turn key 1 to LOCK and remove from steering lock.
3. Using key 2, start engine. Observe security light illuminates (for **1—2 seconds**) and engine continues to run.
(1) Turn key 2 to LOCK and remove from steering lock.
4. Repeat step 3 with key 3.
5. If there are 4—8 keys (valid and/or new keys), repeat step 3.
6. Wait for **30 seconds** to quit reprogram mode.

Steering Lock Replacement
When the customer has two or more valid keys from old steering lock

Note
- When replacing the steering lock, the coil and keys should be replaced as a set.
- If no specific time interval is given, each step should be performed **within 30 seconds** of the previous step.



1. Remove old steering lock. (See 06-12-7 STEERING SHAFT COMPONENT DISASSEMBLY/ASSEMBLY.)
2. Connect new steering lock to ignition switch connector.
3. Connect old steering lock to coil connector as shown in figure.
4. Insert key 1 into old steering lock.
5. Insert key 3 into new steering lock and turn to ON then back to LOCK five times. Key should not remain at ON or LOCK for **more than one second**.
(1) Turn key 3 back to ON. Observe illumination of security light in instrument panel.
(2) Turn key 3 to LOCK. Observe security light goes out.

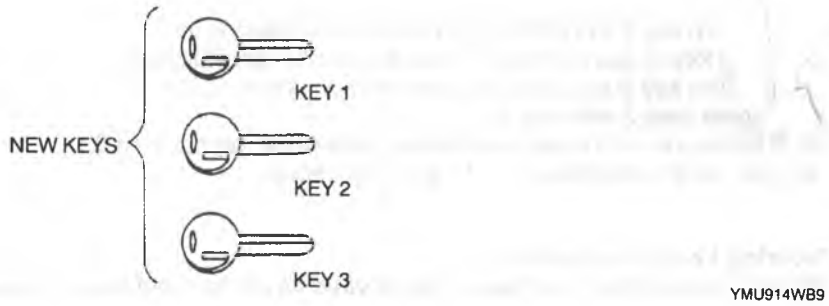
Note
- Operate next two steps **within 30 seconds** of step 5-(2).

6. Remove key 1 from old steering lock and insert key 2 into old steering lock.
7. Using key 3 of new steering lock, start engine. Observe security light illuminates (for **1—2 seconds**) and engine continues to run.
(1) Turn key 3 to LOCK.

Note
- Operate next two steps **within 30 seconds** of step 7-(1).

8. Disconnect coil connector from old steering lock, and reconnect coil connector to new steering lock.
9. Using key 3 of new steering lock, start engine. Observe security light illuminates (for **1—2 seconds**) and engine continues to run.
(1) Turn key 3 to LOCK and remove from steering lock.
10. Repeat step 9 with key 4.
11. Repeat step 9 with key 5.
12. Wait for **30 seconds** to quit reprogram mode.
13. Install new steering lock.

When the customer has only one or no valid key (code word is required)

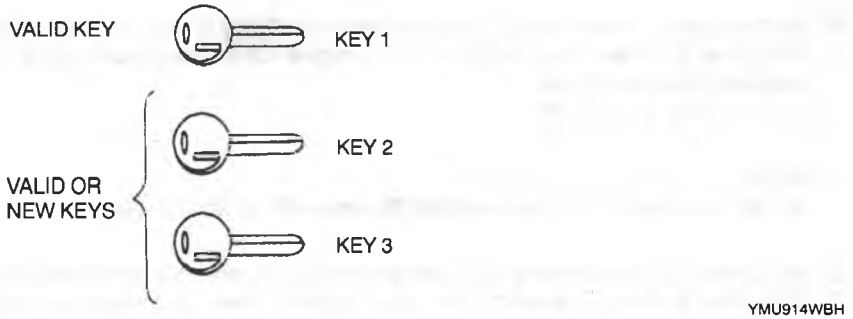


Note
- When replacing the steering lock, the coil and keys should be replaced as a set.
- If no specific time interval is given, each step should be performed **within 30 seconds** of the previous step.

1. Replace steering lock. (See 06-12-7 STEERING SHAFT COMPONENT DISASSEMBLY/ASSEMBLY.)
2. Using key 1, turn ignition switch to ON then back to LOCK **five times**. Key should not remain ON or LOCK for **more than one second**.
   (1) Turn key 1 back to ON. Observe flashing of security light (**300 ms** ON — **300 ms** OFF) in instrument panel.
   (2) Turn key 1 to LOCK and wait for **5 minutes** until security light decreases in flashing frequency to **1.2 seconds**.
   (3) Input code word. (See 09-14-35 CODE WORD INPUT PROCEDURE.)
   (4) Observe the security light stops flashing and illuminates.
   (5) Start engine with key 1. Observe security light illuminates (**about 1—2 seconds**) and engine continues to run.
   (6) Turn key 1 to LOCK and remove from steering lock.
3. Using key 2, start engine. Observe security light illuminates (for **1—2 seconds**) and engine continues to run.
   (1) Turn key 2 to LOCK and remove from steering lock.
4. Repeat step 3 with key 3.
5. Wait for 30 seconds to quit reprogram mode.

Immobilizer Unit Replacement
When the customer does not have valid key
- PCM needs to be replaced with immobilizer unit. Perform "Both Immobilizer unit and PCM Replacement" of the IMMOBILIZER SYSTEM REPROGRAMMING PROCEDURE.

When the customer has at least one valid key (code word is required)



Note
- If no specific time interval is given, each step should be performed **within 30 seconds** of the previous step.

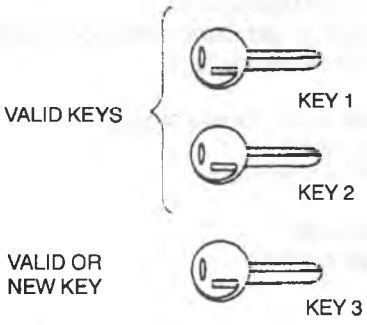
1. Cut new transponder equipped key(s) if necessary.
2. Replace immobilizer unit. (See 09-14-28 IMMOBILIZER UNIT REMOVAL/INSTALLATION.)
3. Using key 1, start engine. Observe security light illuminates (for **1—2 seconds**) and engine continues to run.
   (1) Turn key 1 to LOCK and remove from steering lock.

4. Using key 2, turn ignition switch to ON then back to LOCK **five times**. Key should not remain at ON or LOCK for **more than one second**.
   (1) Turn key 2 back to ON. Observe flashing of security light (**300 ms** ON — **300 ms** OFF) in instrument panel.
   (2) Turn key 2 to LOCK and wait for **5 minutes** until security light decreases in flashing frequency to **1.2 seconds**.
   (3) Input code word. (See 09-14-35 CODE WORD INPUT PROCEDURE.)
   (4) Observe the security light stops flashing and illuminates.
   (5) Start engine with key 2. Observe security light illuminates (about **1—2 seconds**) and engine continues to run.
   (6) Turn key 2 to LOCK and remove from steering lock.
5. Using key 1, start engine. Observe security light illuminates (for **1—2 seconds**) and engine continues to run.
   (1) Turn key 1 to LOCK and remove from steering lock.
6. Repeat step 5 with key 3.
7. If there are 4—8 keys (valid and/or new keys), repeat step 5.
8. Wait for **30 seconds** to quit reprogram mode.

PCM Replacement
When the customer does not have valid key

Note
- Immobilizer unit needs to be replaced with PCM. Perform "Both Immobilizer unit and PCM Replacement" of the IMMOBILIZER SYSTEM REPROGRAM PROCEDURE.
- If no specific time interval is given, each step should be performed **within 30 seconds** of the previous step.

When the customer has two or more valid keys



YMU914WBA

1. Cut new transponder equipped key(s) if necessary.
2. Replace PCM. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS].) (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
3. Using key 1, turn ignition switch to ON, and observe security light illuminates (for **1—2 seconds**) in instrument panel.
   (1) Turn key 1 to LOCK.
   (2) Turn key 1 to ON then back to LOCK **six times**. Key should not remain at ON or LOCK for **more than one second**. It is particularly important to ensure that the 6th turn is done **within 1 second**.
   (3) Remove key 1.
4. Using key 2, turn ignition switch to ON. Observe security light illuminates (for **1—2 seconds**).
   (1) Turn key 2 to LOCK and remove from steering lock.
5. Using key 1, start engine. Observe security light illuminates (for **1—2 seconds**) and engine continues to run.
   (1) Turn key 1 to LOCK and remove from steering lock.
6. Repeat step 5 with key 3.
7. If there are 4—8 keys (valid and/or new keys), repeat step 5.
8. Wait for **30 seconds** to quit reprogram mode.
9. After reprogramming, clear DTCs of PCM with NGS.

When the customer has only one valid key (code word is required)



Note
- If no specific time interval is given, each step should be performed **within 30 seconds** of the previous step.

1. Cut new transponder equipped key(s) if necessary.
2. Replace PCM. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS].) (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
3. Using key 3, turn ignition switch to ON. Observe security light illuminates (for **1—2 seconds**) in instrument panel.
   (1) Turn key 3 to LOCK and remove from steering lock.
4. Using key 1, turn ignition switch to ON then back to LOCK **six times**. Key should not remain at ON or LOCK for **more than one second**. It is particularly important to ensure that the 6th turn is done **within 1 second**.
   (1) Observe flashing of security light (**300 ms** ON — **300 ms** OFF) in instrument panel.
   (2) Wait for **5 minutes** until security light decreases in flashing frequency to **1.2 seconds**.
   (3) Input code word. (See 09-14-35 CODE WORD INPUT PROCEDURE.)
   (4) Observe the security light stops flashing and illuminates.
   (5) Turn key 1 to ON. Observe security light illuminates (about **1—2 seconds**).
   (6) Turn key 1 to LOCK and remove from steering lock.
5. Using key 2, start engine. Observe security light illuminates (for **1—2 seconds**) and engine continues to run.
   (1) Turn key 2 to LOCK and remove from steering lock.
6. Repeat step 5 with key 3.
7. If there are 4—8 keys (valid and/or new keys), repeat step 5.
8. Wait for **30 seconds** to quit reprogram mode.
9. After reprogramming, clear DTCs of PCM with NGS.

Both Immobilizer Unit and PCM Replacement
When the customer has two or move valid keys

Note
- Keys may be valid or new keys.
- When an error occurs in steps 1 to 4, repeat the procedure from step 1.
- When an error occurs in step 5, perform the "Reprogram error recovery procedure for both immobilizer unit and PCM replacement".
- If no specific time interval is given, each step should be performed **within 30 seconds** of the previous step.

1. Cut new transponder equipped key(s) if necessary.
2. Replace immobilizer unit and PCM.
3. Using key 1, turn ignition switch to ON. Observe security light illuminates and then goes out in instrument panel.
   (1) Turn key 1 to LOCK. Observe security light blinks once repeatedly.
4. Using key 2, turn ignition switch to ON. Observe security light illuminates and then goes out.
   (1) Turn key 2 to LOCK. Observe security light blinks twice repeatedly.
5. Using key 3, turn ignition switch to ON. Observe security light illuminates and then goes out.
   (1) Turn key 3 to LOCK. Observe security light blinks three times repeatedly.
6. If there are 4—8 keys (valid and/or new keys), repeat step 4.
7. Wait for **30 seconds** to quit reprogram mode.
8. After reprogramming, clear DTCs of PCM with NGS.

Reprogram error recovery procedure for both immobilizer unit and PCM replacement

Note
- If no specific time interval is given, each step should be performed **within 30 seconds** of the previous step.

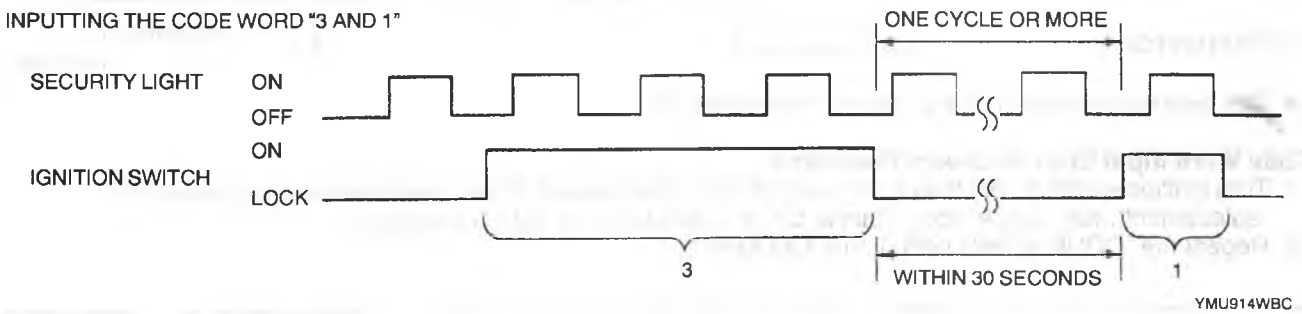
1. Using key 1, start engine. After security light illuminates for **1—2 seconds**, turn key 1 to LOCK.
2. Using key 1, turn ignition switch to ON then back to LOCK **five times**. Key should not remain at ON or LOCK for more than one second.
3. Using key 1, turn ignition switch to ON (security light illuminates).
4. Turn key 1 to LOCK and remove from steering lock (security light goes out).
5. Using key 2, start engine. Observe security light illuminates (about **1—2 seconds**) and engine continues to run.
6. Turn key 2 to LOCK and remove from steering lock.
7. Repeat step 5 and 6 with key 1.
8. Repeat step 5 and 6 with key 3.
9. If there are 4—8 keys (valid and/or new keys), repeat step 5 and 6.
10. Wait for **30 seconds** to quit reprogram mode.
11. After reprogramming, clear DTCs of PCM with NGS.

CODE WORD INPUT PROCEDURE

Z6U091467006W01

Note
- A code word is composed of eight digits from 1—9 and is part of the Immobilizer unit from manufacturer. Each unit has its own code word. To obtain the code word, you need to have the Immobilizer serial number, then ask importer/distributor.
- The process for inputting the code word to the PCM is done by cycling the ignition key and counting the number of flashes of the security light. The calculation of the number of flashes of the security light comes with the timing of the turning of the key.

1. Wait **for 5 minutes** until the security light flashes slowly. (**300 ms** ON, **300 ms** OFF → **1.2 s** ON, **1.2 s** OFF)
2. Input the code word as shown in the example below.



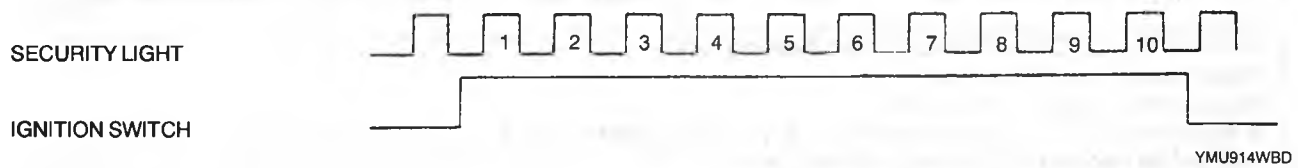
   (1) Turn ignition switch to ON while the security light is off and count three illumination cycles. As the light goes out after the third illumination, turn key to LOCK.
   (2) **Within 30 seconds** of going to LOCK, turn ignition switch to ON while the security light is off and count one illumination cycle. As the light goes out after the first illumination, turn key to LOCK.
   (3) Repeat step (2) for rest of six digits.
3. When code word is registered correctly in the PCM, the security light stops flashing and illuminates.
4. As soon as the security light stops flashing and illuminates, the following immobilizer system reprogram procedure should be started.

Note
- If the code word is not input correctly, the security light goes out after all eight digits are input. In this case, perform the "Code Word Input Error Recovery Procedure".

Examples of Incorrect Input of Code Word

Note
- The security light must flash one or more times between the digits of the code word.
- If the code word is input incorrectly, the security light goes out.
- When an error occurs during the reprogram procedure (except when both the immobilizer unit and PCM are replaced,) repeat the procedure from step 1. If you still can not reprogram, confirm how many keys can start the engine. Then, perform the key replacement or addition reprogram procedure according to the valid key number.

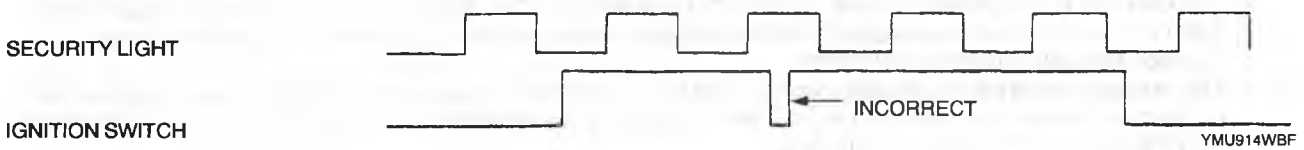
- The security light flashes ten or more times while the ignition switch is at ON position.



- The ignition switch is turned to ON and LOCK while the security light is off.



- The ignition switch is turned to LOCK and ON while the security light is on.



- The ignition switch is turned to LOCK and ON while the security light is off.



- The incorrect code word is input to the immobilizer unit.

Code Word Input Error Recovery Procedure
1. Turn ignition switch to ON then back to LOCK five times (except PCM replacement) or six times (PCM replacement). Key should not remain at ON or LOCK for more than one second.
2. Repeat the "CODE WORD INPUT PROCEDURE".

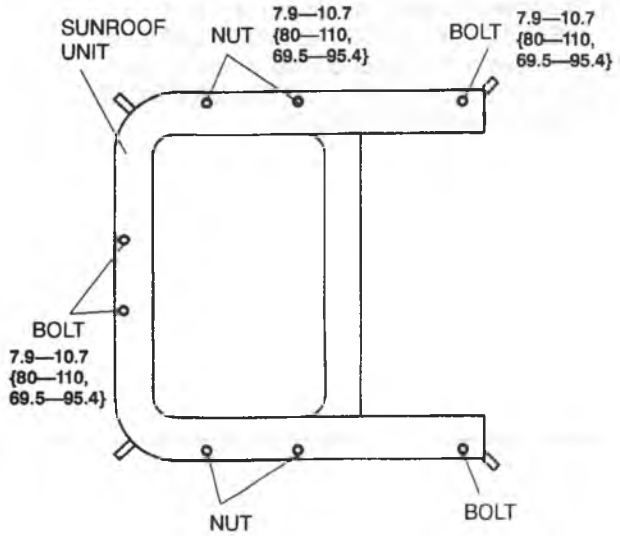
09-15 SUNROOF

SUNROOF UNIT REMOVAL/INSTALLATION 09-15-1
SUNROOF UNIT DISASSEMBLY 09-15-2
SUNROOF UNIT ASSEMBLY 09-15-3
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SUNROOF UNIT REMOVAL/INSTALLATION

Z6U091569850W01

1. Disconnect the negative battery cable.
2. Remove the headliner. (See 09-17-15 HEADLINER REMOVAL/INSTALLATION.)
3. Remove the glass panel. (See 09-15-5 GLASS PANEL REMOVAL/INSTALLATION.)
4. Disconnect the front and rear drain hose from the sunroof unit.
5. Disconnect the roof harness from the sunroof unit.
6. Remove the bolts, nuts and fasteners.
7. Pull the sunroof unit downward to disengage pins from the sunroof unit.
8. Remove the sunroof unit.
9. Install in the reverse order of removal.
10. Adjust the glass panel. (See 09-15-6 GLASS PANEL ADJUSTMENT.)

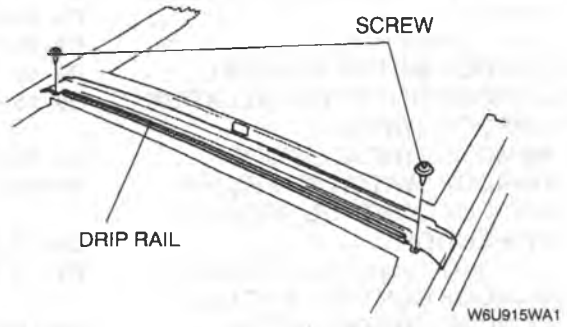


N·m {kgf·cm, in·lbf}
Y6U915WA0

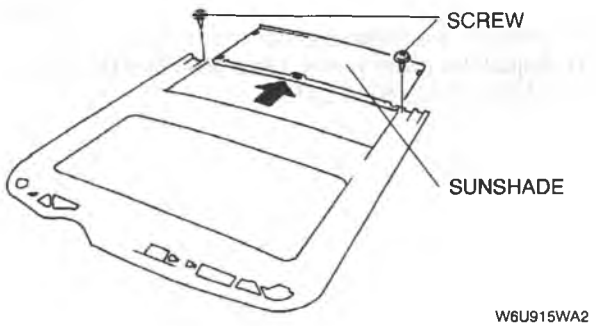
SUNROOF UNIT DISASSEMBLY

Z6U091569850W02

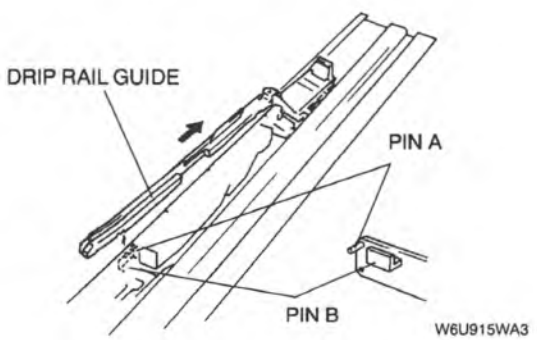
1. Remove the screws, and remove the drip rail.



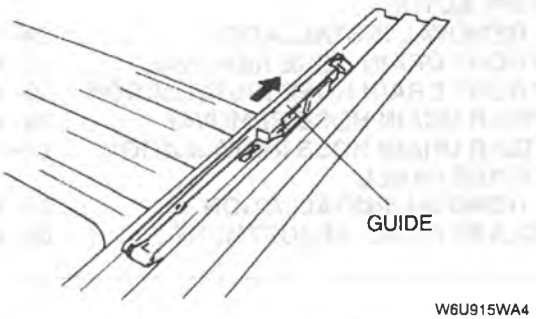
2. Remove the screws.
3. Slide the sunshade backward, and remove it from the sunroof frame.



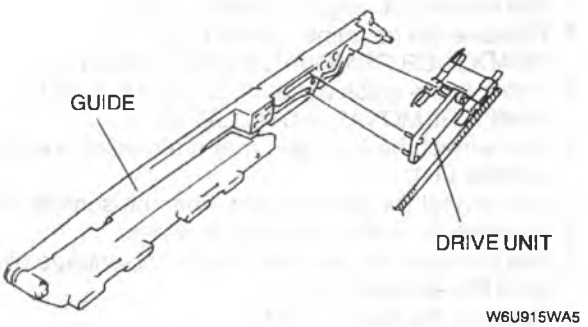
4. Pull the drip rail guide upward to disengage pins A and B from the guide.
5. Slide the drip rail guide backward, and remove it from the sunroof frame.



6. Remove the sunroof motor. (See 09-15-7 SUNROOF MOTOR REMOVAL.)
7. Slide the guide backward, and remove it from the sunroof frame.



8. Remove the drive unit from the guide.

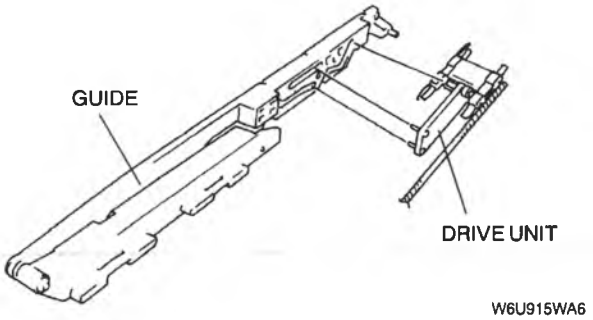


9. Remove the deflector. (See 09-15-4 DEFLECTOR REMOVAL/INSTALLATION.)
10. Remove the sunroof control module. (See 09-15-9 SUNROOF CONTROL MODULE REMOVAL/INSTALLATION.)

SUNROOF UNIT ASSEMBLY

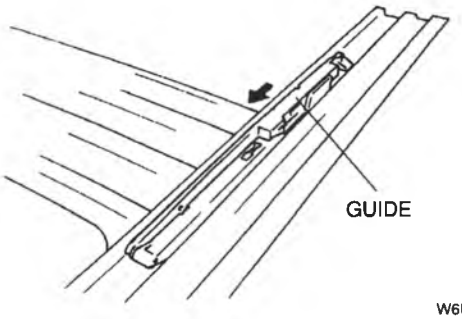
Z6U091569850W03

1. Install the sunroof control module. (See 09-15-9 SUNROOF CONTROL MODULE REMOVAL/INSTALLATION.)
2. Install the deflector. (See 09-15-4 DEFLECTOR REMOVAL/INSTALLATION.)
3. Install the drive unit to the guide.



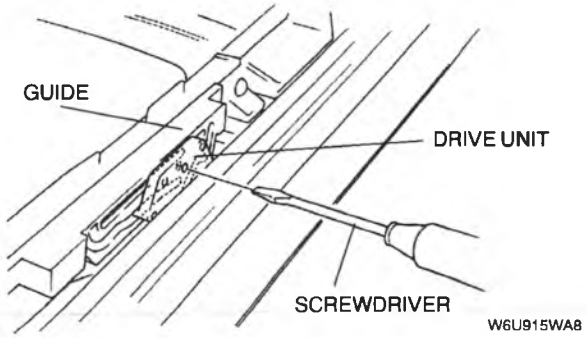
W6U915WA6

4. Install the guide to the sunroof frame by sliding it forward until reaches to the end of rail.



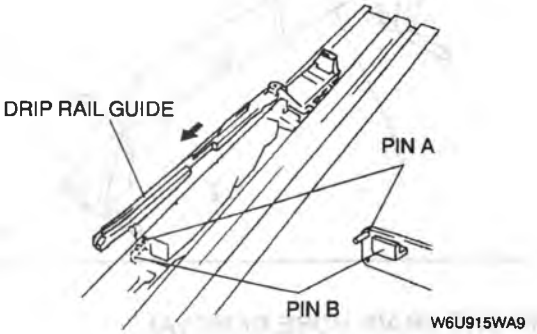
W6U915WA7

5. Adjust the drive unit, and insert an **approximately 3.0 mm {0.12 in} diameter** screwdriver or equivalent tool to align the drive unit with the guide.



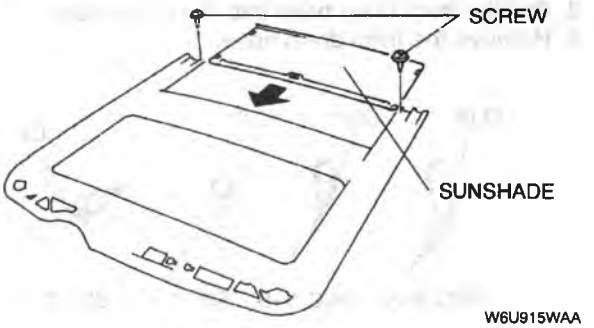
W6U915WA8

6. Install the sunroof motor. (See 09-15-7 SUNROOF MOTOR INSTALLATION.)
7. Slide the drip rail guide forward, and install it to the sunroof frame.
8. Push the drip rail guide downward to engage pins A and B to the guide.



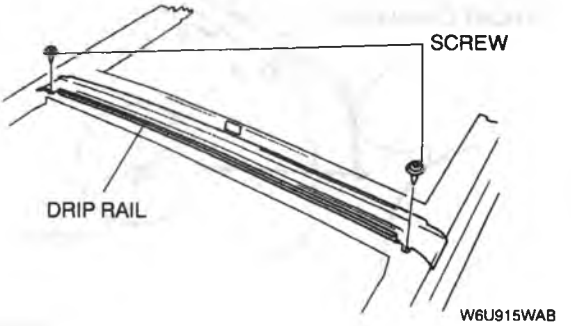
W6U915WA9

9. Slide the sunshade forward, and install it to the sunroof frame.
10. Install the screws.



W6U915WAA

11. Install the screws, and install the drip rail.



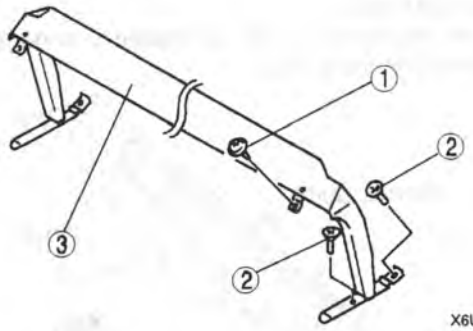
W6U915WAB

DEFLECTOR REMOVAL/INSTALLATION

Z6U091569880W01

1. Fully open the glass panel.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

1	Screw
2	Bolt
3	Deflector

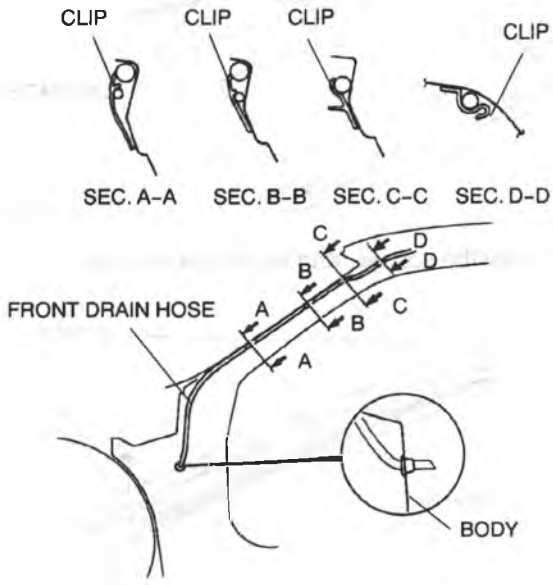


X6U915WA0

FRONT DRAIN HOSE REMOVAL

Z6U091569920W01

1. Remove the headliner. (See 09-17-15 HEADLINER REMOVAL/INSTALLATION.)
2. Remove the front drain hose from the clips.
3. Pull the front drain hose into the room side.
4. Remove the front drain hose.



W6U915WAD

FRONT DRAIN HOSE INSTALLATION

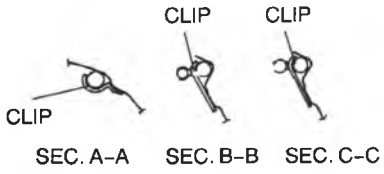
Z6U091569920W02

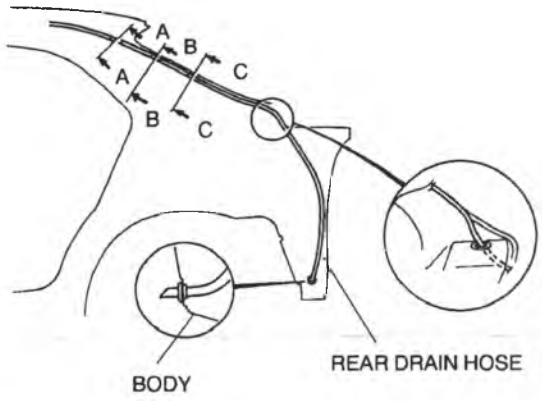
1. Apply soapy water to the front drain hose inserting area.
2. Insert one end of the front drain hose into the sunroof frame, set the hose along the clips, and insert the front drain hose joint into the hinge pillar inner hole.
3. Install the headliner. (See 09-17-15 HEADLINER REMOVAL/INSTALLATION.)

REAR DRAIN HOSE REMOVAL

Z6U091569922W01

1. Remove the headliner. (See 09-17-15 HEADLINER REMOVAL/INSTALLATION.)
2. Remove the rear drain hose from the clips.
3. Pull the rear drain hose into the room side.
4. Remove the rear drain hose.





W6U915WAE

REAR DRAIN HOSE INSTALLATION

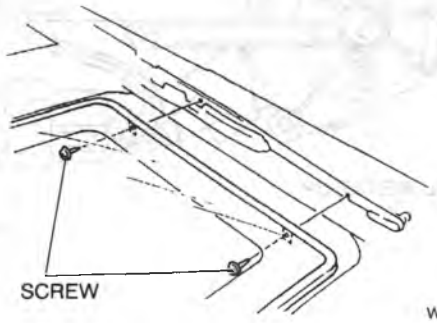
Z6U091569922W02

1. Apply soapy water to the rear drain hose inserting area.
2. Insert one end of the rear drain hose into the sunroof frame, set the hose along the clips, and insert the rear drain hose joint into the rear pillar inner hole.
3. Install the headliner. (See 09-17-15 HEADLINER REMOVAL/INSTALLATION.)

GLASS PANEL REMOVAL/INSTALLATION

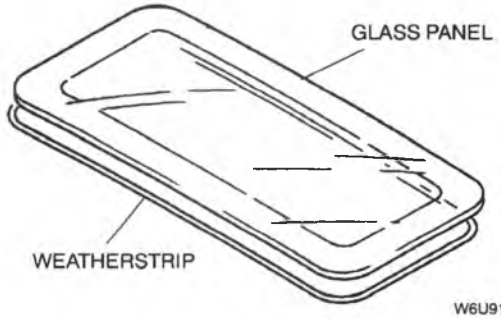
Z6U091569810W01

1. Fully open the sunshade.
2. Remove the screws.



W6U915WAF

3. Peel the weatherstrip off the glass panel.



W6U915WAG

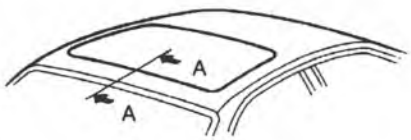
4. Install in the reverse order of removal.
5. Adjust the glass panel. (See 09-15-6 GLASS PANEL ADJUSTMENT.)

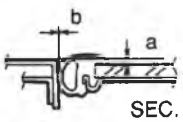
GLASS PANEL ADJUSTMENT

Z6U091569810W02

1. Fully close the glass panel.
2. Measure the gap and height between the glass panel and body.
   - If not as specified, loosen the glass panel installation screws, and reposition the glass panel.

Clearance	Nominate (mm {in})	Minimum (mm {in})	Maximum (mm {in})
a	0.75 {0.03}	0.25 {0.01}	2.25 {0.09}
b	0 {0}	—	—





W6U915WAH

3. Tighten the glass panel installation screws.

Tightening torque
2.5—3.5 N·m {25—36 kgf·cm, 22—31 in·lbf}

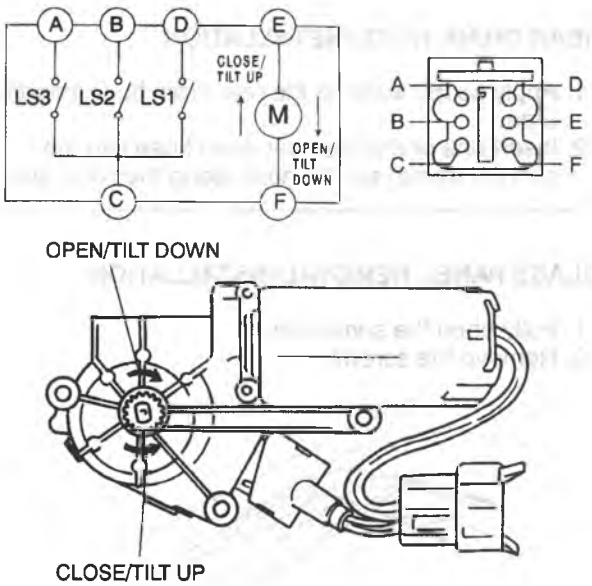
SUNROOF MOTOR INSPECTION

Z6U091569870W01

Motor

1. Remove the sunroof motor. (See 09-15-7 SUNROOF MOTOR REMOVAL.)
2. Apply battery positive voltage to the sunroof motor terminals and check the operation of the motor.
   - If not as specified, replace the sunroof motor.

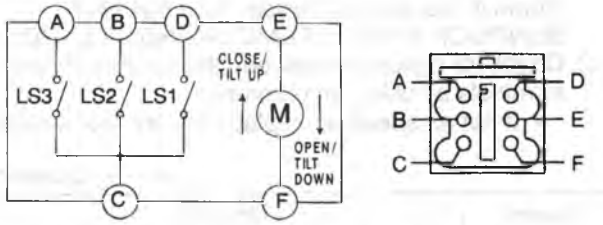
Connection		Motor operation
B+	GND	
E	F	Open/Tilt down (turn right)
F	E	Close/Tilt up (turn left)



W6U915WAS

Limit Switch

1. Remove the headliner. (See 09-17-15 HEADLINER REMOVAL/INSTALLATION.)
2. Disconnect the connector.
3. Check for continuity between the sunroof motor terminals by using an ohmmeter.
   - If not as specified, replace the sunroof motor.



W6U915WAV

○—○ : Continuity

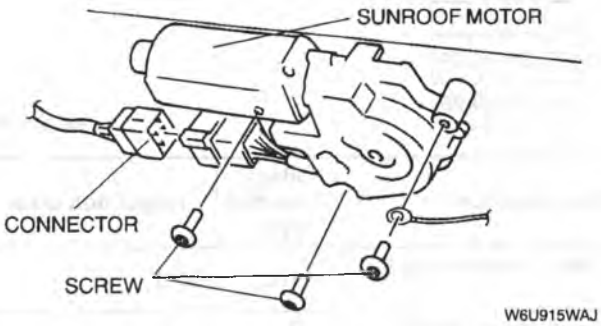
Glass panel position	Terminal			
	A	B	C	D
Fully open	○		○	
		○	○	
			○	○
Fully closed				
Fully tilt up	○		○	
			○	○

W6U915WAU

SUNROOF MOTOR REMOVAL

Z6U091569870W02

1. Fully close the glass panel.
2. Disconnect the negative battery cable.
3. Remove the headliner. (See 09-17-15 HEADLINER REMOVAL/INSTALLATION.)
4. Disconnect the connector.
5. Remove the screws, and remove the sunroof motor.



W6U915WAJ

SUNROOF MOTOR INSTALLATION

Z6U091569870W03

1. Connect the sunroof motor connector.
2. Connect the sunroof switch connector.
3. Connect the negative battery cable.
4. Turn the IG switch to ON.
5. Press the CLOSE side of the slide switch until the sunroof motor stops.
6. Disconnect the sunroof switch connector.
7. Install the screws, and install the sunroof motor.
8. Install the headliner. (See 09-17-15 HEADLINER REMOVAL/INSTALLATION.)

SUNROOF SWITCH REMOVAL/INSTALLATION

Z6U091566560W01

Note

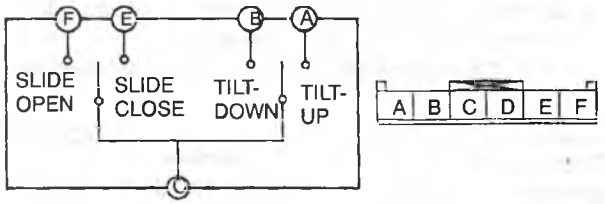
- The sunroof switch is together with the spot light.

1. Disconnect the negative battery cable.
2. Remove the map light from the headliner. (See 09-18-11 MAP LIGHT REMOVAL/INSTALLATION.)
3. Install in the reverse order of removal.

SUNROOF SWITCH INSPECTION

Z6U091566560W02

1. Remove the sunroof switch. (See 09-15-7 SUNROOF SWITCH REMOVAL/INSTALLATION.)
2. Check for continuity between the sunroof switch terminals by using an ohmmeter.
   - If not as specified, replace the sunroof switch.



X6U915WA2

○—○ : Continuity

Switch position	Terminal				
	A	B	C	D	E
Slide open			○		○
Slide close			○	○	
Tilt-up	○		○		
Tilt-down		○	○		

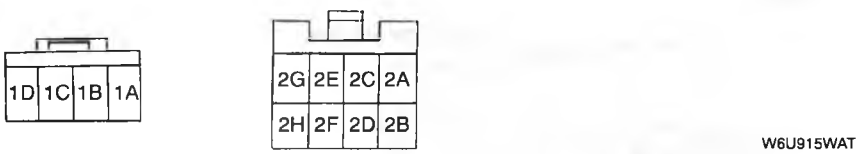
X6U915WA1

SUNROOF CONTROL MODULE INSPECTION

Z6U091569874W01

1. Remove the headliner. (See 09-17-15 HEADLINER REMOVAL/INSTALLATION.)
2. Connect the negative battery cable.
3. Measure the voltage at the sunroof control module terminals as indicated below.
4. Disconnect the sunroof control module connector before checking for continuity at terminal 1A and 2B.
   - If not as specified, inspect the parts listed under "Inspection area" and the related wiring harnesses.
   - If the parts and wiring harnesses are okay but the system still does not work properly, replace the sunroof control module.

Terminal Voltage List (Reference)



W6U915WAT

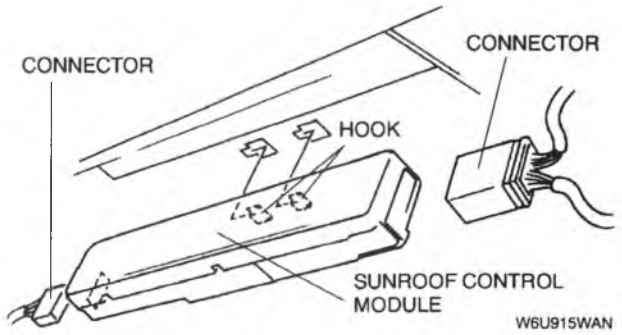
Terminal	Signal	Connection	Test condition		Voltage (V)/Continuity	Inspection area
1A	GND	GND	Constant: check for continuity to ground		Yes	GND
1B	Sunroof open/tilt down	Sunroof motor	Sunroof opening/tilting down		B+	• Sunroof switch • Sunroof motor
			Sunroof closing/tilting up		0	
1C	IG1	Sunroof 15 A fuse	Ignition switch at ON		B+	Sunroof 15 A fuse
			Ignition switch at LOCK or ACC		0	
1D	Sunroof close/tilt up	Sunroof motor	Sunroof opening/tilting down		0	• Sunroof switch • Sunroof motor
			Sunroof closing/tilting up		B+	
2A	Slide open	Sunroof switch	Ignition switch at ON	Slide open switch at on	0	Sunroof switch
				Other	Approx. 5	
2B	Limit switch common	Sunroof motor (Limit switch)	Constant: check for continuity to ground		Yes	Sunroof motor
2C	Limit switch 3	Sunroof motor (Limit switch)	Sunroof fully closed position		Approx. 5	Sunroof motor
			Other		0	
2D	Tilt down	Sunroof switch	Ignition switch at ON	Tilt down switch at on	0	Sunroof switch
				Other	Approx. 5	

Terminal	Signal	Connection	Test condition		Voltage (V)/Continuity	Inspection area
2E	Limit switch 2	Sunroof motor (Limit switch)	Sunroof fully closed position/tilting up/tilting down/fully tilted up position		Approx. 5	Sunroof motor
			Other		0	
2F	Tilt up	Sunroof switch	Ignition switch at ON	Tilt up switch at on	0	Sunroof switch
				Other	Approx. 5	
2G	Limit switch 1	Sunroof motor (Limit switch)	Sunroof fully opened position/fully tilted up position		0	Sunroof motor
			Other		Approx. 5	
2H	Slide close	Sunroof switch	Ignition switch at ON	Slide close switch at on	0	Sunroof switch
				Other	Approx. 5	

SUNROOF CONTROL MODULE REMOVAL/INSTALLATION

Z6U091569874W02

1. Disconnect the negative battery cable.
2. Remove the headliner. (See 09-17-15 HEADLINER REMOVAL/INSTALLATION.)
3. Slide the sunroof control module, and disengage hooks from the sunroof frame.
4. Disconnect the connectors, and remove the sunroof control module.
5. Install in the reverse order of removal.



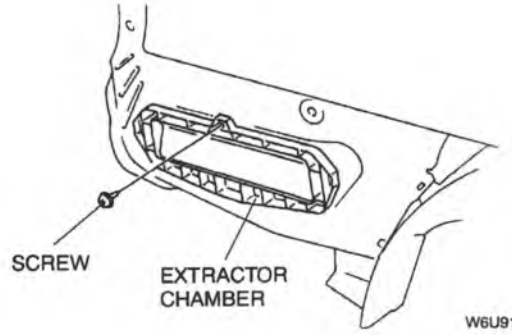
09-16 EXTERIOR TRIM

EXTRACTOR CHAMBER
REMOVAL/INSTALLATION 09-16-1
RADIATOR GRILLE REMOVAL 09-16-1
RADIATOR GRILLE INSTALLATION ... 09-16-2
FRONT FLAP
REMOVAL/INSTALLATION 09-16-2
COWL GRILLE
REMOVAL/INSTALLATION 09-16-2
REAR FINISHER
REMOVAL/INSTALLATION 09-16-2
SIDE PROTECTOR NO.1, NO.2, NO.3
REMOVAL 09-16-3
SIDE PROTECTOR NO.1, NO.2, NO.3
INSTALLATION 09-16-3
WINDSHIELD MOLDING REMOVAL ... 09-16-3
WINDSHIELD MOLDING
INSTALLATION 09-16-4
REAR WINDOW MOLDING
REMOVAL 09-16-5
REAR WINDOW MOLDING
INSTALLATION 09-16-5
FRONT BELTLINE MOLDING
REMOVAL/INSTALLATION 09-16-6
REAR BELTLINE MOLDING
REMOVAL/INSTALLATION 09-16-6
ROOF MOLDING REMOVAL 09-16-6
ROOF MOLDING INSTALLATION 09-16-7
REAR FINISHER MOLDING REMOVAL 09-16-7
REAR FINISHER MOLDING
INSTALLATION 09-16-8
AIR DAM SKIRT
REMOVAL/INSTALLATION 09-16-8

EXTRACTOR CHAMBER REMOVAL/INSTALLATION

Z6U091651920W01

1. Remove the rear bumper. (See 09-10-6 REAR BUMPER REMOVAL/INSTALLATION.)
2. Remove the rear side seat. (See 09-13-5 REAR SEAT REMOVAL/INSTALLATION.)
3. Remove the trunk compartment covering. (See 09-17-14 TRUNK COMPARTMENT COVERING REMOVAL/INSTALLATION.)
4. Remove the screw.
5. Remove the extractor chamber.
6. Install in the reverse order of removal.

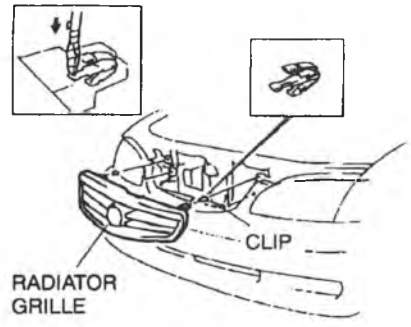


W6U916WA0

RADIATOR GRILLE REMOVAL

Z6U091650710W01

1. Push the clips downward by using a tape-wrapped flathead screwdriver.
2. Remove the radiator grille.



Y6U916WA0

RADIATOR GRILLE INSTALLATION

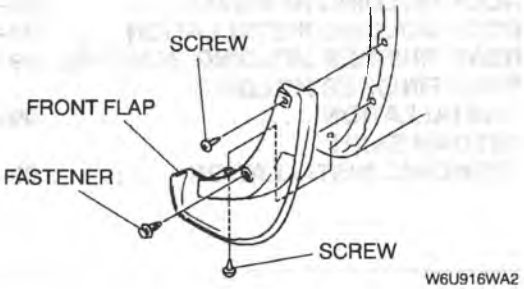
Z6U091650710W02

1. Insert the clips into the radiator grille.
2. Install the radiator grille.

FRONT FLAP REMOVAL/INSTALLATION

Z6U091651840W01

1. Remove the screws.
2. Remove the fastener.
3. Remove the front flap.
4. Install in the reverse order of removal.

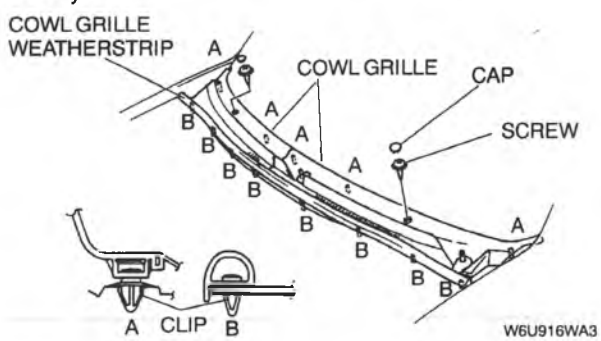


W6U916WA2

COWL GRILLE REMOVAL/INSTALLATION

Z6U091650790W01

1. Remove the windshield wiper arm and blade. (See 09-19-1 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
2. Pull the cowl grille weatherstrip to disengage clips B from the body.
3. Remove the caps.
4. Remove the screws.
5. Pull the cowl grille to disengage clips A from the body.
6. Install in the reverse order of removal.

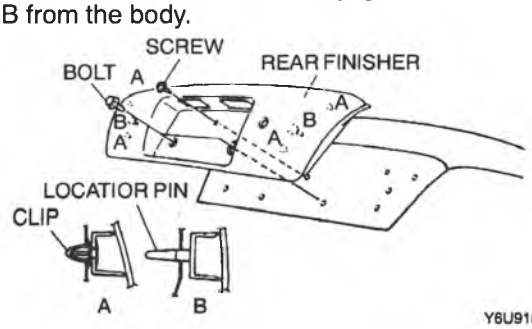


W6U916WA3

REAR FINISHER REMOVAL/INSTALLATION

Z6U091650850W01

1. Remove the screws and bolts.
2. Pull the rear finisher to disengage clips A and pins B from the body.
3. Install in the reverse order of removal.



Y6U916WA3

SIDE PROTECTOR NO.1, NO.2, NO.3 REMOVAL

Z6U091650680W01

1. Pry the side protector end **20—30 mm {0.79—1.18 in}** by using a flathead screwdriver or a razor knife.
2. Pull the side protector forward to remove it.

Note
- The side protector is installed with double-sided adhesive tape. If the side protector is difficult to remove, soften the double-sided adhesive tape by using a hot air blower.

SIDE PROTECTOR NO.1, NO.2, NO.3 INSTALLATION

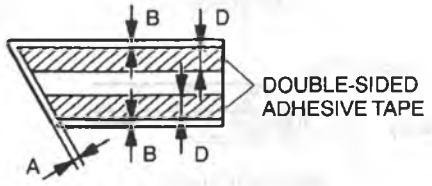
Z6U091650680W02

1. Remove the adhesive remaining on the side protector (if it will be reused) and the body by using a razor knife.
2. Remove any grease or dirt from the adhesion surface of the side protector (if it will be reused) and body.
3. Attach double-sided adhesive tape to the side protector as shown (if it will be reused.).
4. Peel off the wax paper from the double-sided adhesive tape and attach the side protector onto the body as shown.

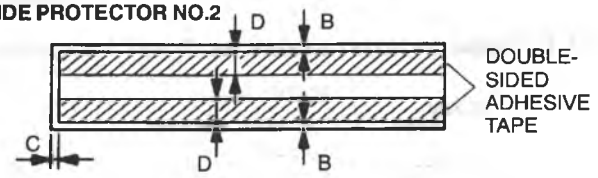
	Nominate(mm {in})	Clearance (mm {in})	
		Minimum	Maximum
A	2.5 {0.10}	1.5 {0.06}	4.5 {0.18}
B	2.5 {0.10}	1.5 {0.06}	3.5 {0.13}
C	3.5 {0.14}	2.5 {0.10}	5.5 {0.22}
D	8 {0.3}	—	—

	Distance from vehicle front end (mm {in})	Nominate (mm {in})
A	1600 {62.99}	219.0 {8.62}
B	2000 {78.74}	222.6 {8.76}
C	2500 {98.43}	227.4 {8.95}
D	2600 {102.36}	228.5 {9.00}
E	2900 {114.17}	231.2 {9.10}
F	3150 {124.02}	233.6 {9.20}

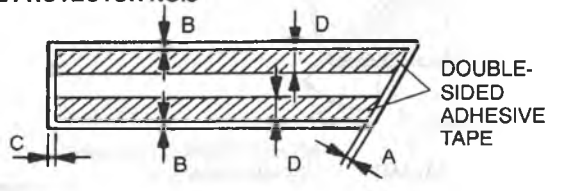
SIDE PROTECTOR NO.1



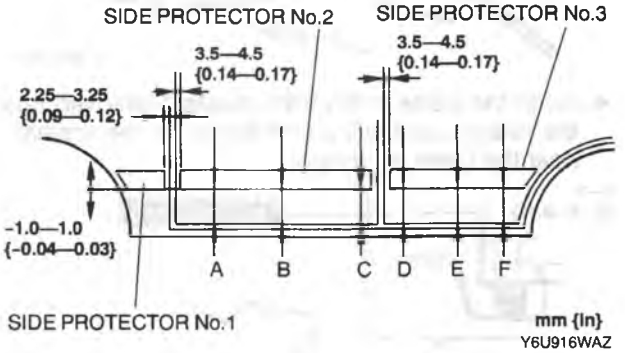
SIDE PROTECTOR NO.2



SIDE PROTECTOR NO.3



Y6U916WA1



Y6U916WAZ

WINDSHIELD MOLDING REMOVAL

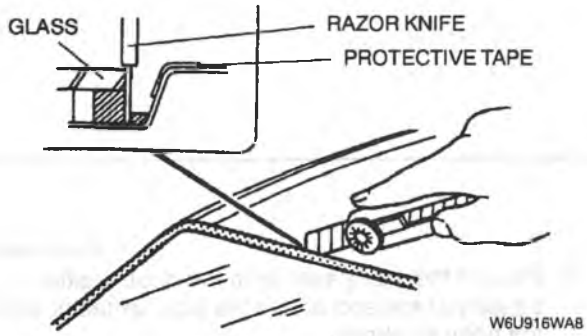
Z6U091650600W01

Note
- Windshield molding is a replacement part.

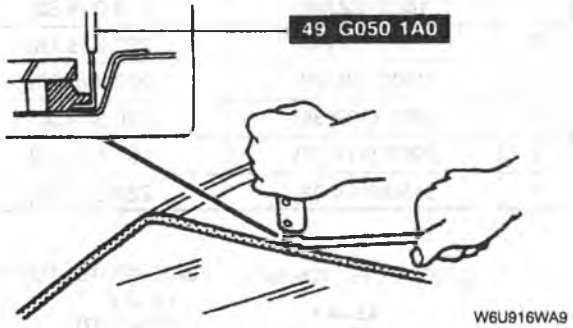
1. Remove the cowl grille.
2. Pull the windshield molding forward to remove it.

WINDSHIELD MOLDING INSTALLATION

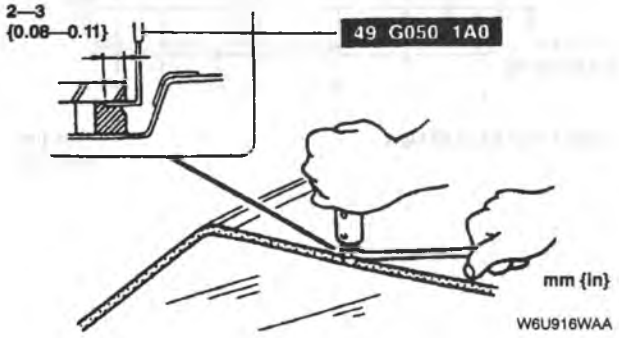
1. Apply protective tape along the edge of the body to protect it from damage.
2. Cut the sealant by using a razor knife as shown.



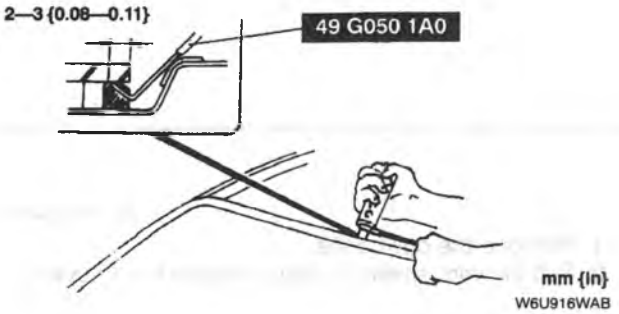
3. Insert the blade of the **SST** (Sealant remover) into the sealant, and pull on the bar to cut the sealant near the body as shown.



4. Insert the blade of the **SST** (Sealant remover) into the sealant, and pull on the bar to cut the sealant near the glass as shown.



5. Remove as much sealant as possible from between the body and the glass.

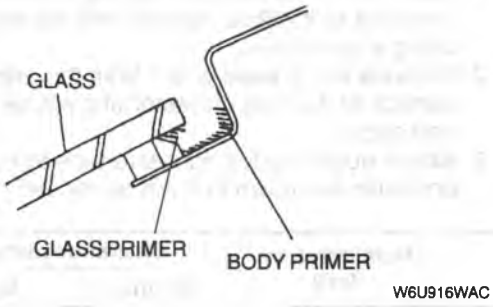


Z6U091650600W02

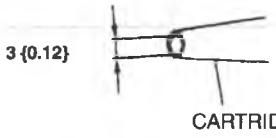
Caution

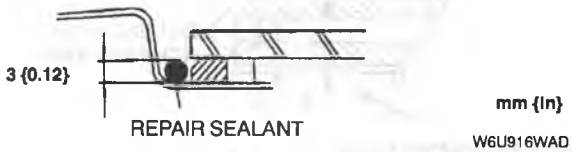
- **Keep the area free of dirt and grease, and do not touch the surface or the primer may not properly bond to the surface of the glass and body which may cause leaks to occur.**

6. Use a brush to apply primer to the bonding area of the glass and body within the region shown. Use only glass primer on the glass and body primer on the body. Allow it to dry for **approximately 30 minutes**.

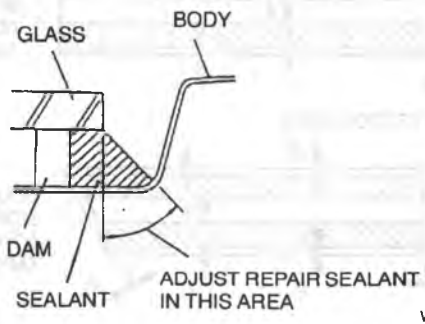


7. Insert a sealant tube cartridge into a sealant gun.
8. Apply a bead of repair sealant to a height **3 mm {0.12 in}** between the glass and the body.





9. Reshape the repair sealant as shown if necessary.



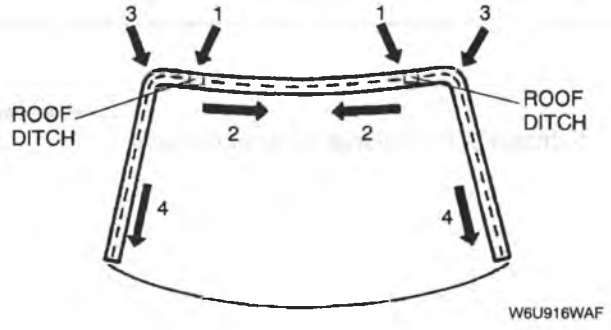
Caution

- **Once the sealant has hardened, you will not be able to install the molding. Install the windshield molding within the time shown below.**

Hardening time of sealant

Temperature	Surface hardening time	Time required until car can be put into service
5 °C {41 °F}	Approx. 1.5 h	Approx. 12 h
20 °C {68 °F}	Approx. 1 h	Approx. 4 h
35 °C {95 °F}	Approx. 10 min	Approx. 2 h

10. Align the marking on the molding with the inner side of the roof ditch (groove). (1)
11. Install the upper edge starting from the outer ends and moving inward (2).
12. Install the corners (3).
13. Install the sides, starting from the upper edge and moving downward, being careful to not pull out the corners (4).



14. Use white gasoline to remove any sealant that oozes out.
15. Check for water leaks.
    - If a leak is found, wipe the water off well and repeat the installation.
16. Install the windshield wiper arm and blade. (See 09-19-1 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION.)

REAR WINDOW MOLDING REMOVAL

Z6U091650610W01

Note
- The rear window molding is a replacement part.
- Remove the rear window glass when removing the rear window molding. (See 09-12-11 REAR WINDOW GLASS REMOVAL.)

REAR WINDOW MOLDING INSTALLATION

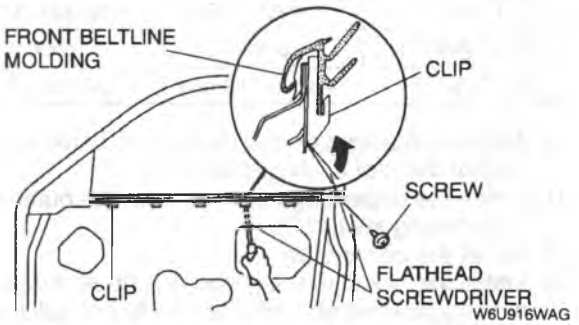
Z6U091650610W02

Note
- Install the rear window glass when installing the rear window molding (See 09-12-13 REAR WINDOW GLASS INSTALLATION.)

FRONT BELTLINE MOLDING REMOVAL/INSTALLATION

Z6U091650640W01

1. Remove the manual outside mirror or power outside mirror. (See 09-12-21 MANUAL OUTSIDE MIRROR REMOVAL/INSTALLATION.) (See 09-12-21 POWER OUTSIDE MIRROR REMOVAL/INSTALLATION.)
2. Remove the front door glass. (See 09-12-2 FRONT DOOR GLASS AND GUIDE REMOVAL/INSTALLATION.)
3. Remove the screw.
4. Insert a tape-wrapped flathead screwdriver under the clip as shown.
5. Lift the flathead screwdriver and pull up on the front beltline molding to remove it.

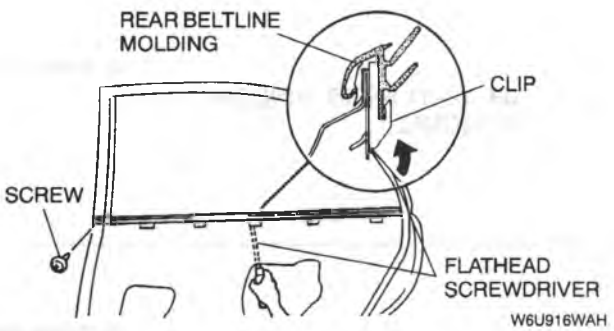


6. Install in the reverse order of removal.

REAR BELTLINE MOLDING REMOVAL/INSTALLATION

Z6U091650660W01

1. Remove the rear door glass. (See 09-12-2 REAR DOOR GLASS AND GUIDE REMOVAL/INSTALLATION.)
2. Remove the screw.
3. Insert a tape-wrapped flathead screwdriver under the clip as shown.
4. Lift the flathead screwdriver and pull up on the rear beltline molding to remove it.



5. Install in the reverse order of removal.

ROOF MOLDING REMOVAL

Z6U091650620W01

- Pull up each end of roof molding to remove it.

Note

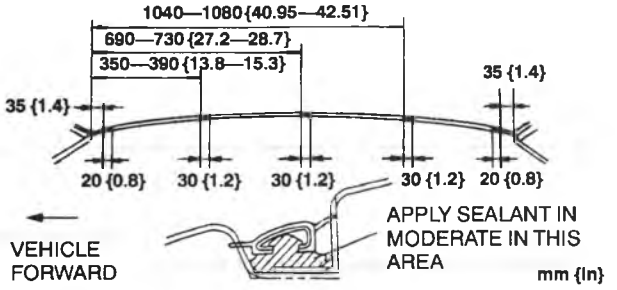
- The roof molding is installed with double-sided adhesive tape. If the roof molding is difficult to remove, soften the double-sided adhesive tape by using a hot air blower.

ROOF MOLDING INSTALLATION

Z6U091650620W02

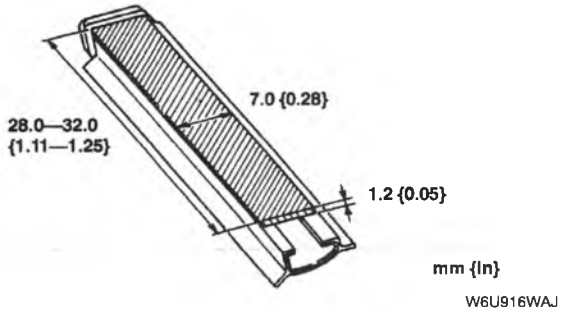
Note
- The roof molding is a replacement part.

1. Remove the adhesive remaining on the body by using a razor knife.
2. Remove any grease or dirt from the adhesion surface of the body.
3. Apply repair sealant as shown.



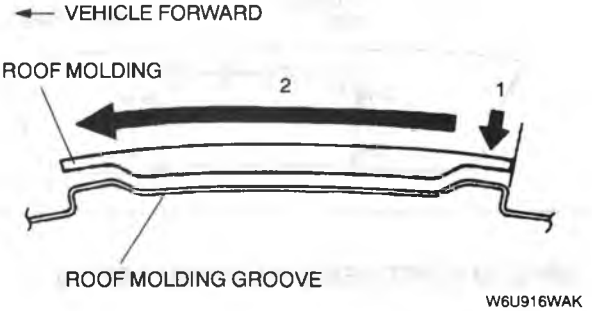
W6U916WAM

4. Attach double-sided adhesive tape to the roof molding as shown.



W6U916WAJ

5. Peel off the wax paper from the double-sided adhesive tape.
6. Align the rear end of the roof molding with the rear end of the roof molding groove. (1)
7. Install the roof molding, starting from rear and moving forward. (2)



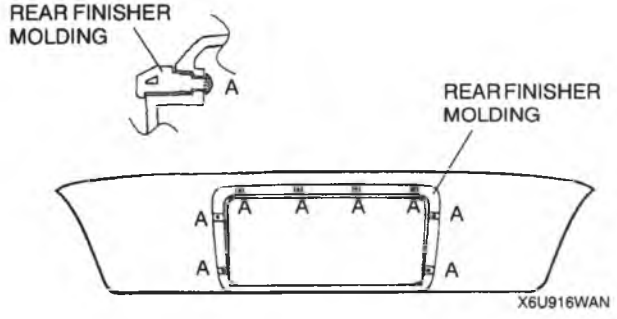
W6U916WAK

REAR FINISHER MOLDING REMOVAL

Z6U091650810W01

Note
- Rear finisher molding is a replacement part.

1. Cut the plastic weld A of the rear finisher molding using a razor.
2. Pull the rear finisher molding forward, then remove it.

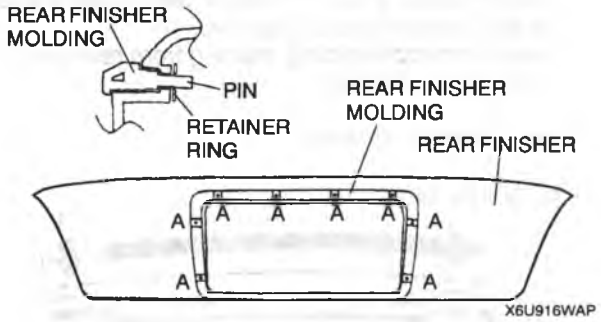


X6U916WAN

REAR FINISHER MOLDING INSTALLATION

Z6U091650810W02

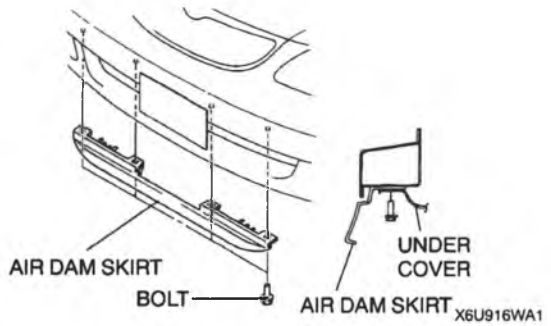
1. Install the rear finisher molding to the rear finisher.
2. Install the retainer rings to pins A.



AIR DAM SKIRT REMOVAL/INSTALLATION

Z6U091650032W01

1. Remove the bolts.
2. Remove the air dam skirt.
3. Install in the reverse order of removal.



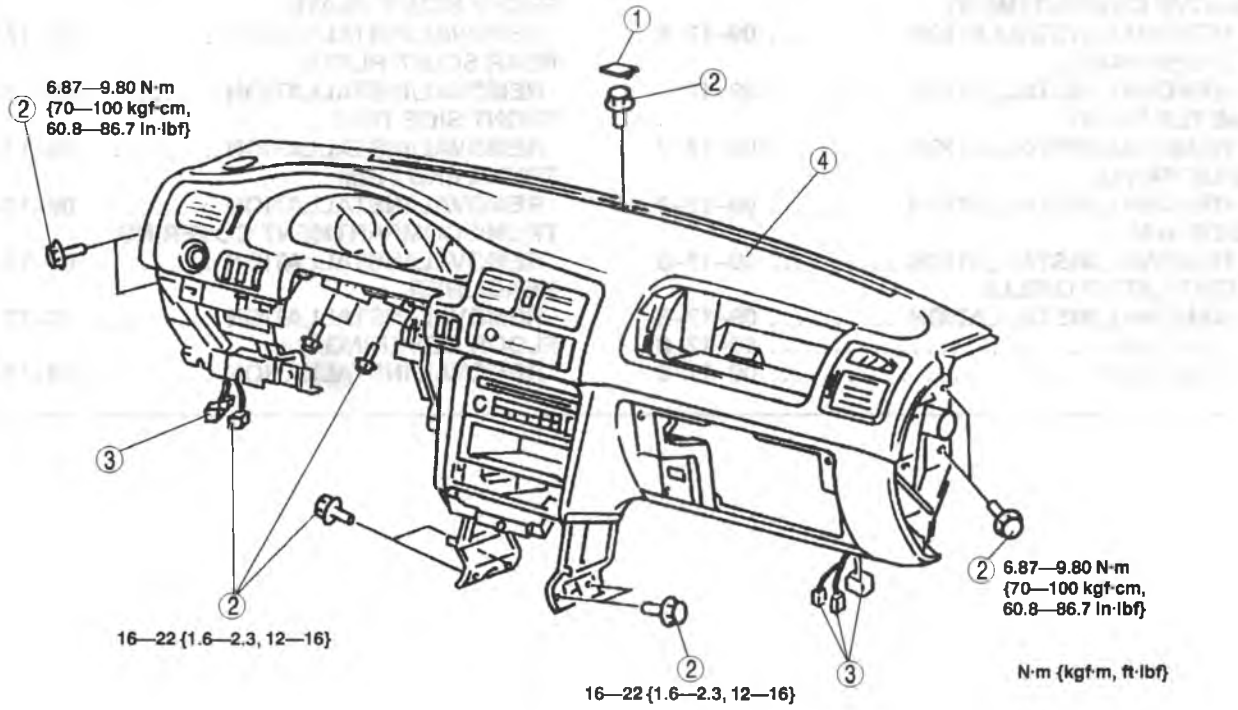
09-17 INTERIOR TRIM

DASHBOARD
REMOVAL/INSTALLATION 09-17-2
DASHBOARD
DISASSEMBLY/ASSEMBLY 09-17-3
CENTER LOWER PANEL
REMOVAL/INSTALLATION 09-17-4
CENTER PANEL
REMOVAL/INSTALLATION 09-17-4
CENTER PANEL
DISASSEMBLY/ASSEMBLY 09-17-4
COLUMN COVER
REMOVAL/INSTALLATION 09-17-5
FRONT CONSOLE
REMOVAL/INSTALLATION 09-17-5
REAR CONSOLE
REMOVAL/INSTALLATION 09-17-5
REAR CONSOLE
DISASSEMBLY/ASSEMBLY 09-17-6
GLOVE COMPARTMENT
REMOVAL/INSTALLATION 09-17-6
LOWER PANEL
REMOVAL/INSTALLATION 09-17-7
METER HOOD
REMOVAL/INSTALLATION 09-17-7
SIDE PANEL
REMOVAL/INSTALLATION 09-17-7
SIDE WALL
REMOVAL/INSTALLATION 09-17-8
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Left Side 09-17-8
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A-PILLAR TRIM
REMOVAL/INSTALLATION 09-17-10
B-PILLAR LOWER TRIM
REMOVAL/INSTALLATION 09-17-11
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REMOVAL/INSTALLATION 09-17-11
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REMOVAL/INSTALLATION 09-17-12
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FRONT SCUFF PLATE
REMOVAL/INSTALLATION 09-17-12
REAR SCUFF PLATE
REMOVAL/INSTALLATION 09-17-13
FRONT SIDE TRIM
REMOVAL/INSTALLATION 09-17-13
TRUNK END TRIM
REMOVAL/INSTALLATION 09-17-13
TRUNK COMPARTMENT COVERING
REMOVAL/INSTALLATION 09-17-14
HEADLINER
REMOVAL/INSTALLATION 09-17-15
FLOOR COVERING
REMOVAL/INSTALLATION 09-17-16

DASHBOARD REMOVAL/INSTALLATION

Z6U091755100W01

1. Disconnect the negative battery cable.
2. Remove the driver-side air bag module. (See 08-10-10 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
3. Remove the passenger-side air bag module. (See 08-10-11 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
4. Remove the steering wheel. (See 06-12-5 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
5. Remove the column cover.
6. Remove the side wall. (See 09-17-8 SIDE WALL REMOVAL/INSTALLATION.)
7. Remove the front side trim. (See 09-17-13 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
8. Remove the under cover.
9. Remove the lower panel. (See 09-17-7 LOWER PANEL REMOVAL/INSTALLATION.)
10. Remove the installation nuts then shift the assembled steering shaft in the dashboard. (See 06-12-5 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
11. Remove the PCM. (See 01-40A-14 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [FS].) (See 01-40B-13 POWERTRAIN CONTROL MODULE (PCM) REMOVAL/INSTALLATION [KL].)
12. Remove the A-pillar trim.
13. Remove in the order indicated in the table.
14. Install in the reverse order of removal.



W6U917WA0

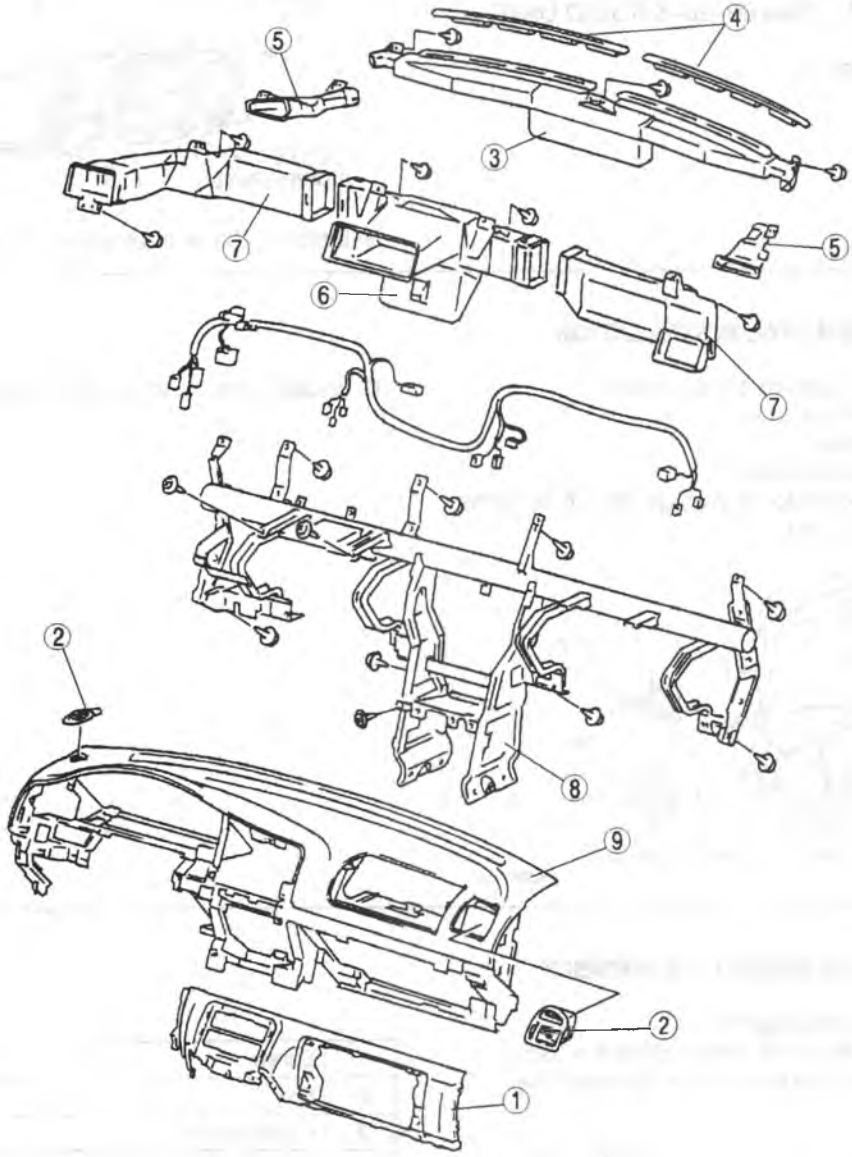
1	Cover
2	Bolt

3	Connector
4	Dashboard

DASHBOARD DISASSEMBLY/ASSEMBLY

Z6U091755100W02

1. Remove the instrument cluster. (See 09-22-1 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
2. Remove the climate control unit. (See 07-40-20 CLIMATE CONTROL UNIT REMOVAL/INSTALLATION.)
3. Remove the audio unit. (See 09-20-6 AUDIO UNIT REMOVAL.) (See 09-20-6 AUDIO UNIT INSTALLATION.)
4. Disassemble in the order indicated in the table.
5. Assemble in the reverse order of disassembly.



W6U917WA1

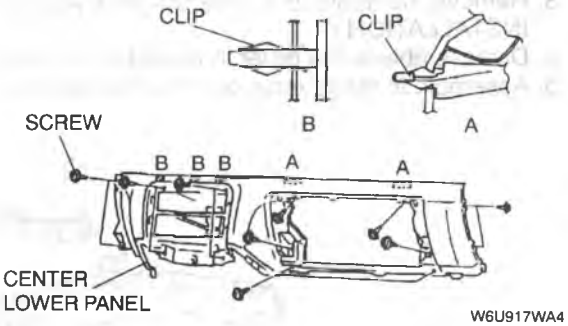
1	Center lower panel
2	Ventilator grille
3	Defroster duct
4	Defroster grille
5	Side demister duct

6	Center duct
7	Duct
8	Dashboard member
9	Dashboard crash pad

CENTER LOWER PANEL REMOVAL/INSTALLATION

Z6U091764271W01

1. Remove the rear console (See 09-17-5 REAR CONSOLE REMOVAL/INSTALLATION.)
2. Remove the glove compartment.
3. Remove the under cover.
4. Remove the meter hood. (See 09-17-7 METER HOOD REMOVAL/INSTALLATION.)
5. Remove the audio unit. (See 09-20-6 AUDIO UNIT REMOVAL.) (See 09-20-6 AUDIO UNIT INSTALLATION.)
6. Remove the screws.
7. Pull the center lower panel to disengage clips A and B from the dashboard.



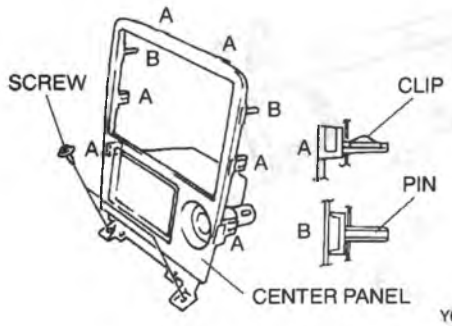
W6U917WA4

8. Install in the reverse order of removal.

CENTER PANEL REMOVAL/INSTALLATION

Z6U091755210W01

1. Disconnect the negative battery cable.
2. Remove the front console.
3. Remove the screws.
4. Disconnect the connector.
5. Pull the center panel to disengage clips A and pins B from the dashboard.
6. Install in the reverse order of removal.

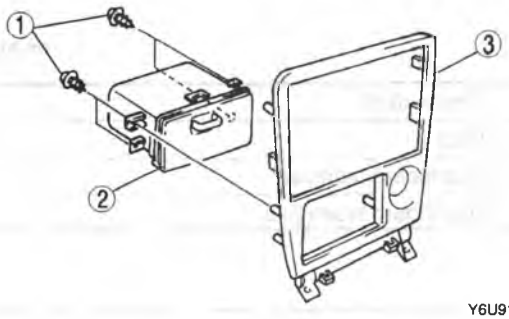


Y6U917WA0

CENTER PANEL DISASSEMBLY/ASSEMBLY

Z6U091755210W02

1. Remove the cigarette lighter.
2. Disassemble in the order indicated in the table.
3. Assemble in the reverse order of disassembly.



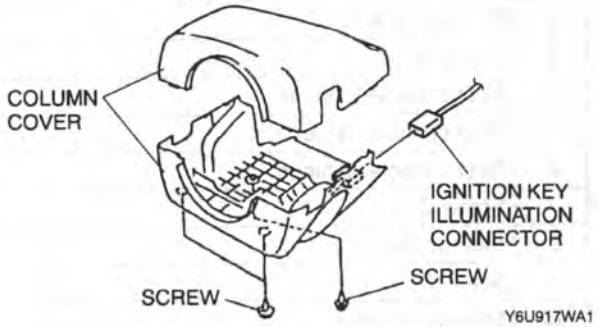
Y6U917WA4

1	Screw
2	Box
3	Center panel

COLUMN COVER REMOVAL/INSTALLATION

Z6U091760200W01

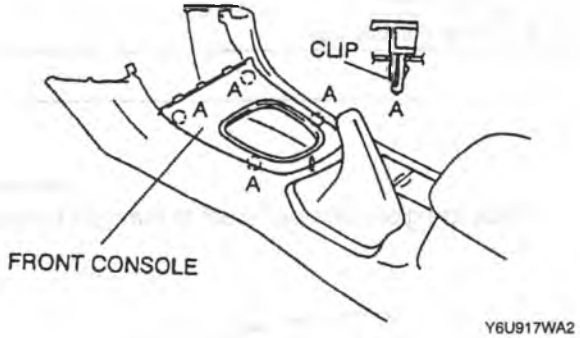
1. Remove the screws to remove the column cover.
2. Disconnect the ignition key illumination connector.
3. Install in the reverse order of removal.



FRONT CONSOLE REMOVAL/INSTALLATION

Z6U091764310W01

1. Remove the shift lever knob if equipped with the MTX.
2. Pull the front console to disengage clips A from the rear console.
3. Install in the reverse order of removal.



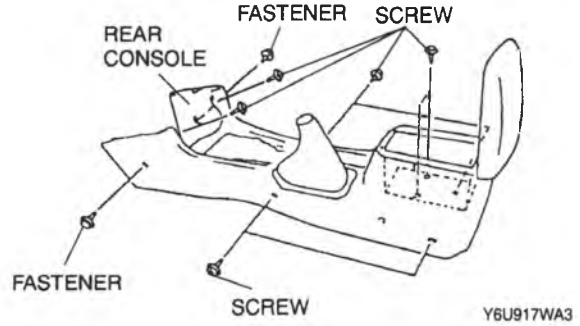
REAR CONSOLE REMOVAL/INSTALLATION

Z6U091764400W01

Note

- To remove the installation screws in the middle of the console, use an L-shape screwdriver.

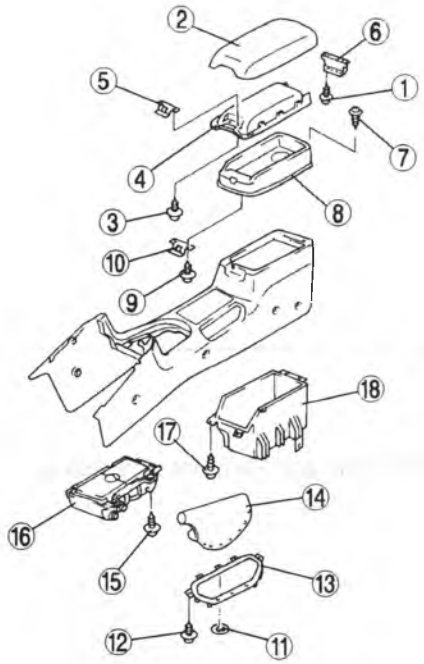
1. Remove the front console.
2. Remove the center panel.
3. Remove the screws to remove the rear console.
4. Disconnect the accessory socket connector.
5. Install in the reverse order of removal.



REAR CONSOLE DISASSEMBLY/ASSEMBLY

Z6U091764400W02

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



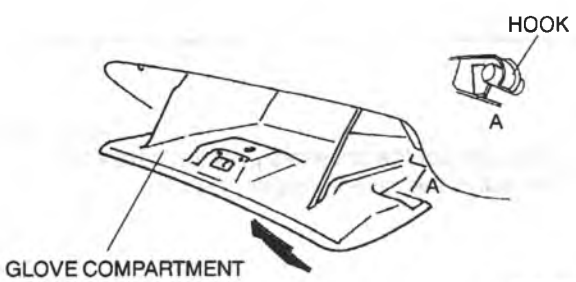
Y6U917WA5

1	Screw A
2	Rear console lid
3	Screw B
4	Rear console lid inner
5	Rear console lid lock
6	Rear console lid hinge
7	Screw C
8	Storage box
9	Screw D
10	Storage box lock
11	Fastener
12	Screw E
13	Plate
14	Boot
15	Screw F
16	Cup holder
17	Screw G
18	Rear console box

GLOVE COMPARTMENT REMOVAL/INSTALLATION

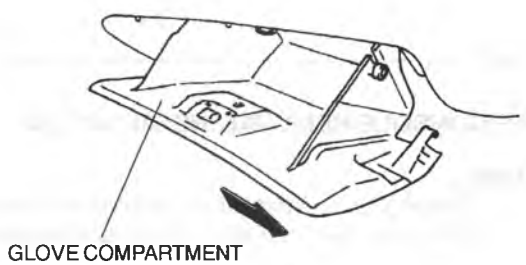
Z6U091764030W01

1. Open the glove compartment and pull up on the right side to disengage hook A from the center lower panel.



W6U917WAA

2. Slide the glove compartment to the right to remove it.



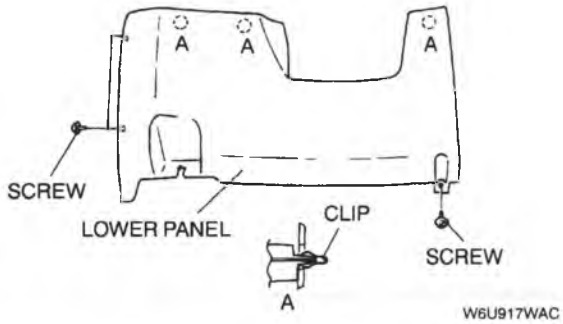
W6U917WAB

3. Install in the reverse order of removal.

LOWER PANEL REMOVAL/INSTALLATION

Z6U091764280W01

1. Remove the side panel.
2. Remove the hood release lever installation nut.
3. Remove the screws.
4. Pull the lower panel to disengage clips A from the dashboard.
5. Disconnect the immobilizer unit connector to remove the lower panel.



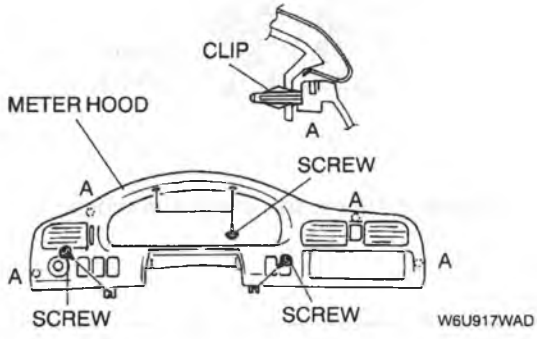
W6U917WAC

6. Install in the reverse order of removal.

METER HOOD REMOVAL/INSTALLATION

Z6U091755420W01

1. Disconnect the negative battery cable.
2. Remove the driver's side side panel.
3. Remove the lower panel.
4. Remove the screws.
5. Pull the meter hood to disengage clips A from the dashboard.
6. Disconnect the connectors to remove the meter hood.



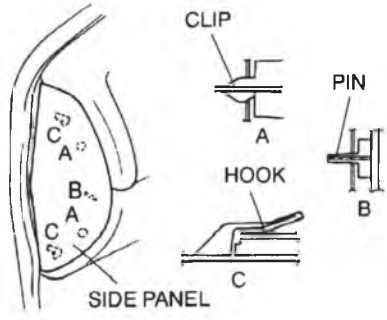
W6U917WAD

7. Install in the reverse order of removal.

SIDE PANEL REMOVAL/INSTALLATION

Z6U091764960W01

1. Pull the front edge of the side panel to disengage clips A and pin B from the dashboard.
2. Pull the side panel to disengage hooks C from the dashboard.



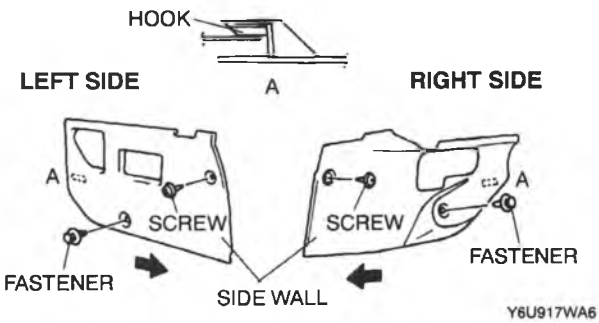
W6U917WAE

3. Install in the reverse order of removal.

SIDE WALL REMOVAL/INSTALLATION

Z6U091768371W01

1. Remove the rear console. (See 09-17-5 REAR CONSOLE REMOVAL/INSTALLATION.)
2. Remove the screws and fasteners.
3. Slide the side wall indicated by the arrows to disengage hook A from the dashboard.



Y6U917WA6

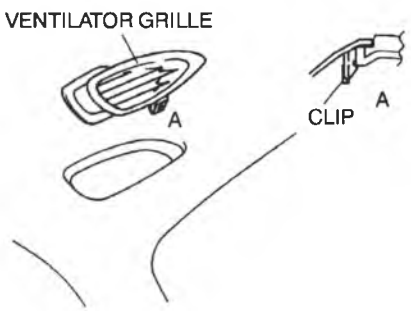
4. Install in the reverse order of removal.

VENTILATOR GRILLE REMOVAL/INSTALLATION

Z6U091764730W01

Left Side

1. Remove the side panel.
2. Remove the lower panel.
3. Remove the meter hood.
4. Push up clip A from the backside of the dashboard to remove the ventilator grille.

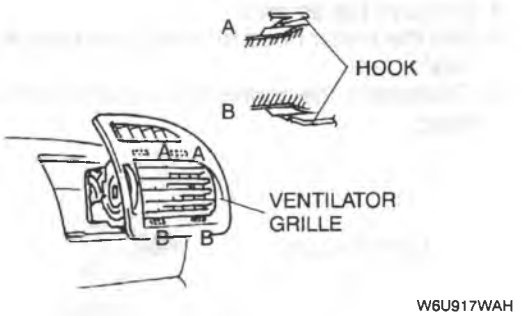


W6U917WAG

5. Install in the reverse order of removal.

Right Side

1. Remove the glove compartment.
2. Push up hooks A and B from the backside of the dashboard to remove the ventilator grille.



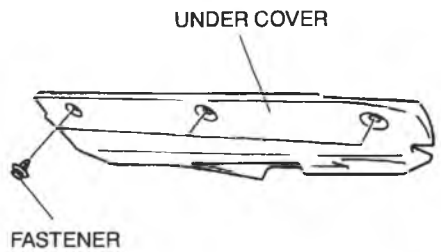
W6U917WAH

3. Install in the reverse order of removal.

UNDER COVER REMOVAL/INSTALLATION

Z6U091764520W01

1. Remove the fasteners to remove the under cover.



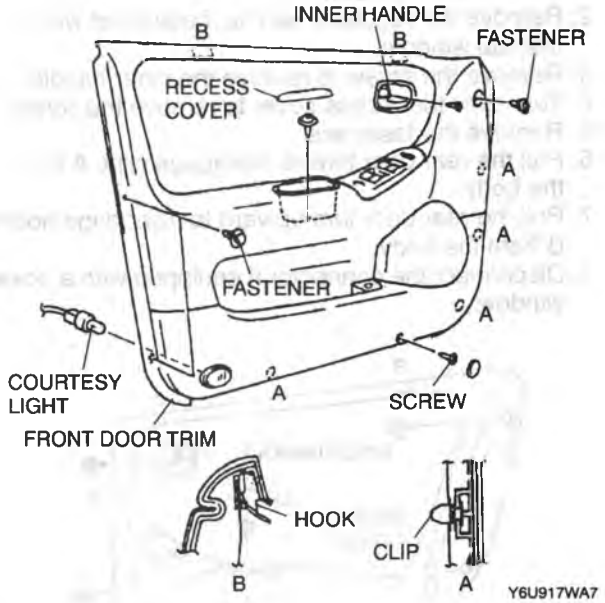
W6U917WAJ

2. Install in the reverse order of removal.

FRONT DOOR TRIM REMOVAL/INSTALLATION

Z6U091768420W01

1. Disconnect the negative battery cable.
2. Remove the regulator handle if equipped with a manual window.
3. Remove the inner garnish.
4. Remove the screw to remove the inner handle.
5. Turn over the recess cover to remove the screw.
6. Remove the screw.
7. Remove the fasteners.
8. Pull the front door trim to disengage clips A from the body.
9. Pull the front door trim upward to disengage hooks B from the body.
10. Disconnect the trunk lid opener switch connector.
11. Disconnect the connector if equipped with a power window.
12. Disconnect the courtesy light.

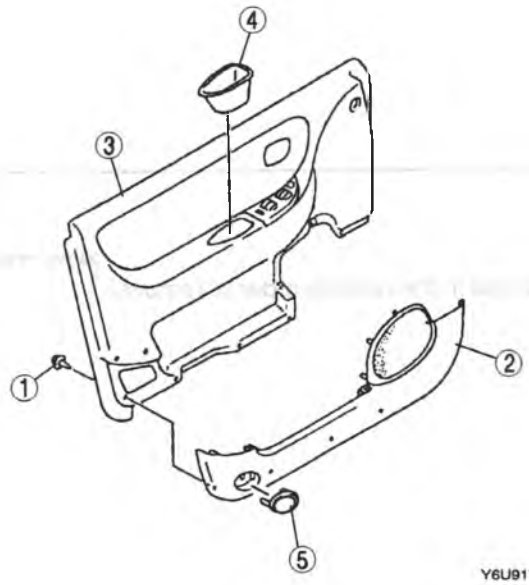


13. Install in the reverse order of removal.

FRONT DOOR TRIM DISASSEMBLY/ASSEMBLY

Z6U091768420W02

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

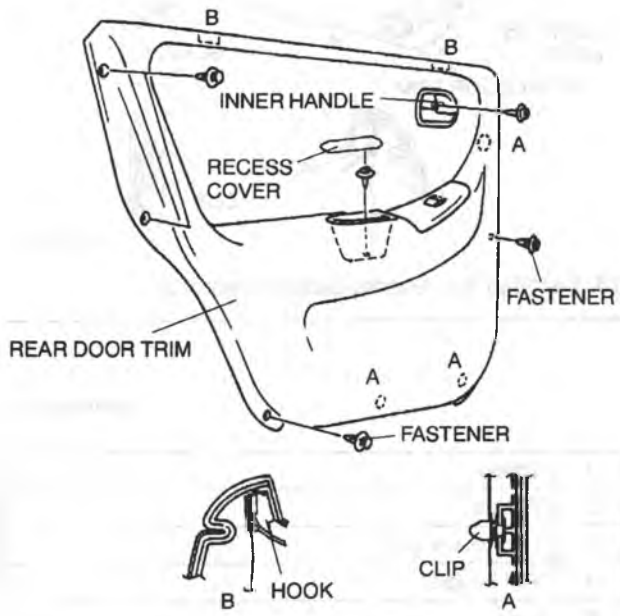


1	Screw
2	Pocket
3	Door cover trim
4	Pull handle
5	Lens

REAR DOOR TRIM REMOVAL/INSTALLATION

Z6U091768520W01

1. Disconnect the negative battery cable if equipped with a power window.
2. Remove the regulator handle if equipped with a manual window.
3. Remove the screw to remove the inner handle.
4. Turn over the recess cover to remove the screw.
5. Remove the fasteners.
6. Pull the rear door trim to disengage clips A from the body.
7. Pull the rear door trim upward to disengage hooks B from the body.
8. Disconnect the connector if equipped with a power window.
9. Install in the reverse order of removal.

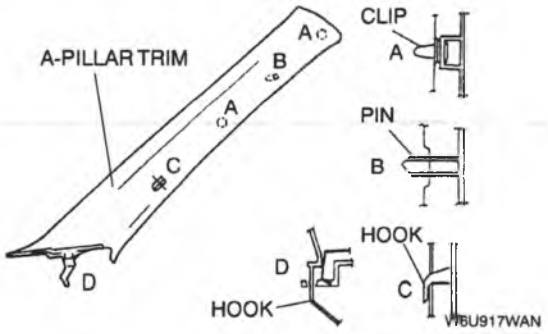


W6U917WAM

A-PILLAR TRIM REMOVAL/INSTALLATION

Z6U091768160W01

1. Turn over the seaming welt.
2. Pull the A-pillar trim to disengage clips A and pin B from the body.
3. Pull the A-pillar trim upward to disengage hook C from the body.
4. Pull the A-pillar trim upward to disengage hook D from the dashboard.
5. Install in the reverse order of removal.

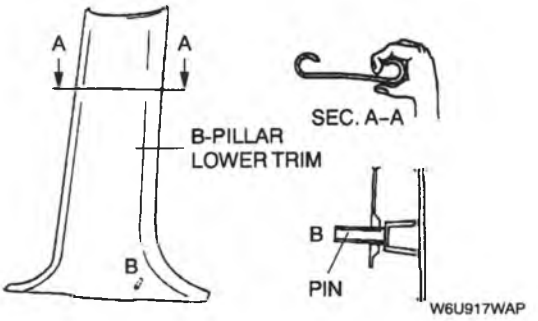


W6U917WAN

B-PILLAR LOWER TRIM REMOVAL/INSTALLATION

Z6U091768220W01

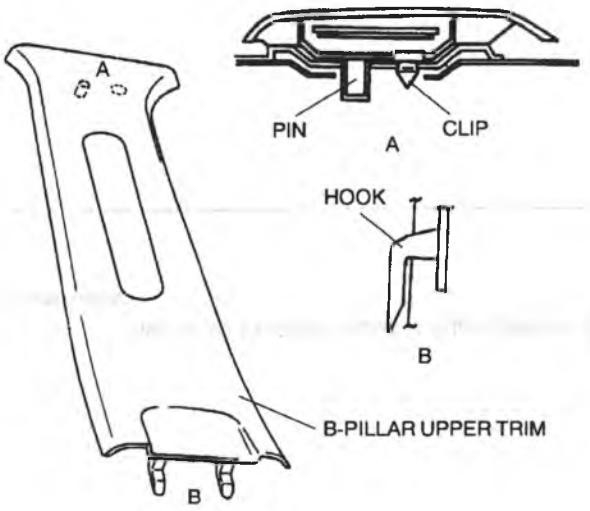
1. Remove the front scuff plate.
2. Remove the rear scuff plate. (See 09-17-13 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
3. Bend sec. A-A to remove one side of the B-pillar lower trim.
4. Pull the B-pillar lower trim to disengage pin B from the body.
5. Install in the reverse order of removal.



B-PILLAR UPPER TRIM REMOVAL/INSTALLATION

Z6U091768210W01

1. Remove the upper anchor of the front seat belt. (See 08-11-1 FRONT SEAT BELT REMOVAL/INSTALLATION.)
2. Remove the B-pillar lower trim. (See 09-17-11 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
3. Turn over the seaming welt.
4. Pull the B-pillar upper trim to disengage clip and pin A from the body.
5. Pull the B-pillar upper trim upward to disengage hooks B from the body.
6. Install in the reverse order of removal.

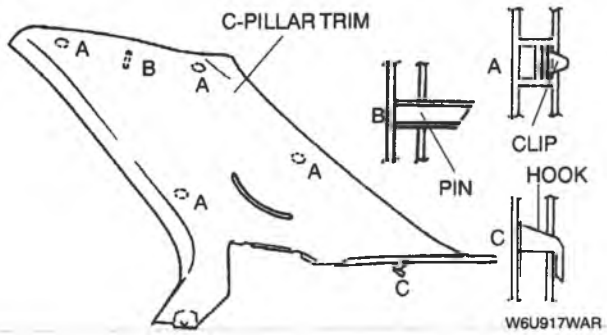


W6U917WAQ

C-PILLAR TRIM REMOVAL/INSTALLATION

Z6U091768240W01

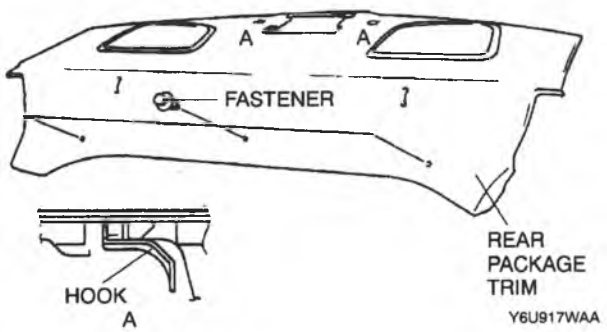
1. Turn over the seaming welt.
2. Remove the rear package trim. (See 09-17-12 REAR PACKAGE TRIM REMOVAL/INSTALLATION.)
3. Remove the lower anchor of the rear seat belt.
4. Pull the C-pillar trim to disengage clips A and pin B from the body.
5. Pull the C-pillar trim upward to disengage hook C from the body.
6. Install in the reverse order of removal.



REAR PACKAGE TRIM REMOVAL/INSTALLATION

Z6U091768320W01

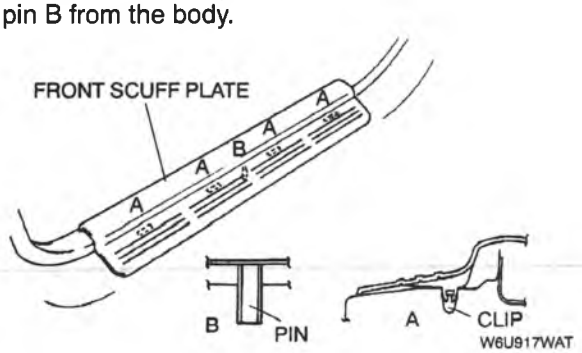
1. Disconnect the negative battery cable.
2. Remove the rear side seat. (See 09-13-5 REAR SEAT REMOVAL/INSTALLATION.)
3. Remove the child-restraint seat anchor.
4. Remove the high-mount brake light.
5. Remove the fasteners.
6. Pull the rear package trim to disengage hooks A from the body.
7. Install in the reverse order of removal.



FRONT SCUFF PLATE REMOVAL/INSTALLATION

Z6U091768710W01

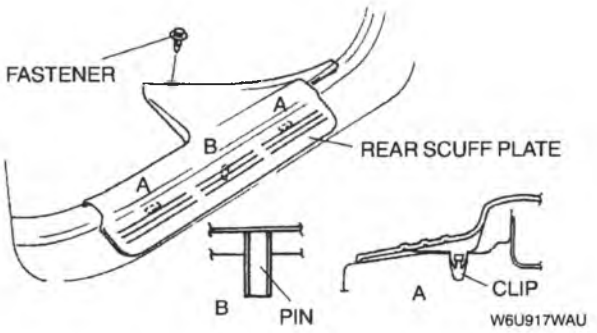
1. Pull the front scuff plate to disengage clips A and pin B from the body.
2. Install in the reverse order of removal.



REAR SCUFF PLATE REMOVAL/INSTALLATION

Z6U091768730W01

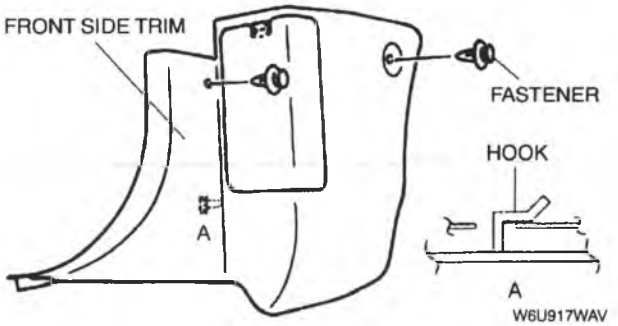
1. Remove the rear seat cushion.
2. Remove the fastener.
3. Pull the rear scuff plate to disengage clips A and pin B from the body.
4. Install in the reverse order of removal.



FRONT SIDE TRIM REMOVAL/INSTALLATION

Z6U091768370W01

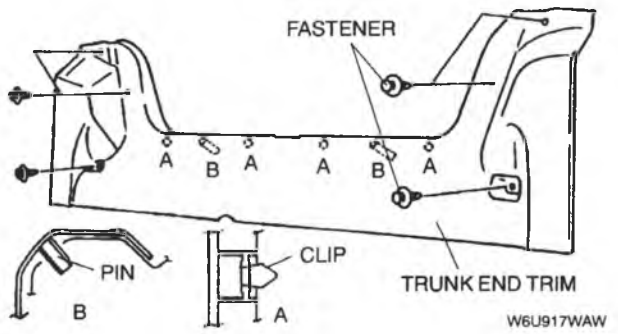
1. Remove the front scuff plate.
2. Remove the fasteners.
3. Slide the front side trim to disengage hook A from the body.
4. Install in the reverse order of removal.



TRUNK END TRIM REMOVAL/INSTALLATION

Z6U091768890W01

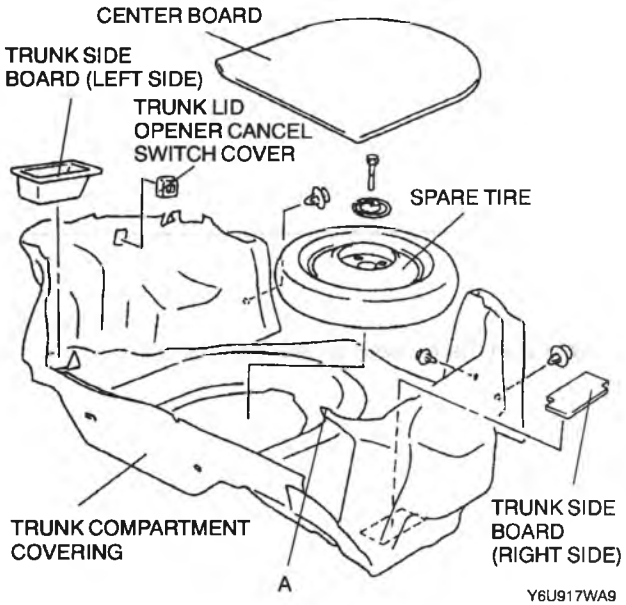
1. Remove the fasteners.
2. Pull the trunk end trim upward to disengage clips A and pins B from the body.
3. Install in the reverse order of removal.



TRUNK COMPARTMENT COVERING REMOVAL/INSTALLATION

Z6U091768810W01

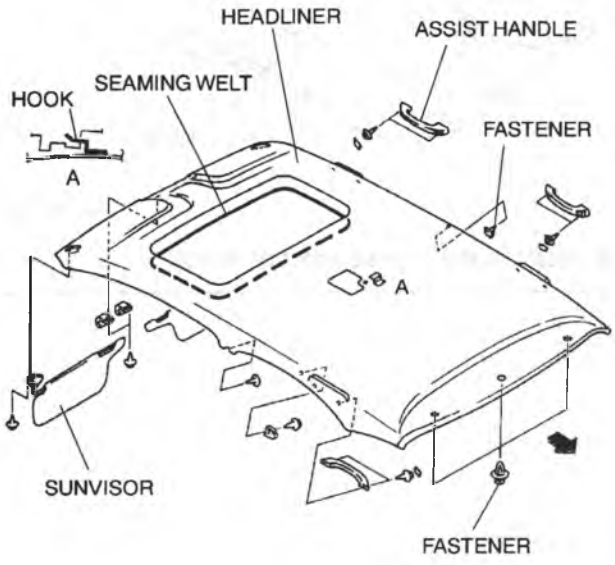
1. Remove the center board and the spare tire.
2. Remove the trunk side board.
3. Remove the trunk end trim. (See 09-17-13 TRUNK END TRIM REMOVAL/INSTALLATION.)
4. Remove the fasteners.
5. Disengage the part of trunk compartment covering A from the corner plate to remove it.
6. Remove the trunk lid opener cancel switch cover.
7. Install in the reverse order of removal.



HEADLINER REMOVAL/INSTALLATION

Z6U091768030W01

1. Disconnect the negative battery cable.
2. Remove the interior light. (See 09-18-11 INTERIOR LIGHT REMOVAL/INSTALLATION.)
3. Remove the overhead console.
4. Remove the seaming welt.
5. Remove the A-pillar trim. (See 09-17-10 A-PILLAR TRIM REMOVAL/INSTALLATION.)
6. Remove the B-pillar upper trim. (See 09-17-11 B-PILLAR UPPER TRIM REMOVAL/INSTALLATION.)
7. Remove the C-pillar trim. (See 09-17-12 C-PILLAR TRIM REMOVAL/INSTALLATION.)
8. Remove the rear console. (See 09-17-5 REAR CONSOLE REMOVAL/INSTALLATION.)
9. Remove the sunvisors and the assist handles.
10. Remove the fasteners.
11. Move the shift lever to 4th gear if equipped with MTX. Move the shift lever to 1 position if equipped with ATX.
12. Slide the seat back to the maximum rearward position.
13. Recline both seat backs to the maximum reclined position.
14. Slide the headliner towards the rear of the vehicle to disengage the headliner hook A from the roof.
15. Remove the headliner from the vehicle through the passenger's side front door at a **45°** angle, with the right edge at the lower right corner and the left edge at the upper left corner of the door opening.
16. Install in the reverse order of removal.

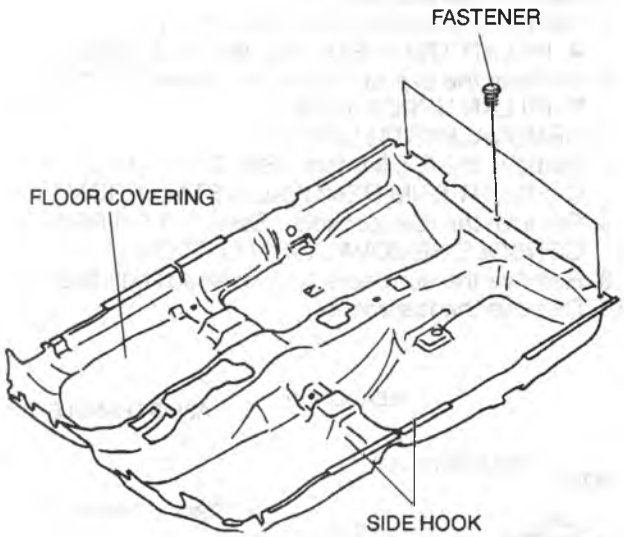


W6U917WAY

FLOOR COVERING REMOVAL/INSTALLATION

Z6U091768670W01

1. Disconnect the negative battery cable.
2. Remove the front seat. (See 09-13-1 FRONT SEAT REMOVAL/INSTALLATION.)
3. Remove the rear seat cushion.
4. Remove the dashboard. (See 09-17-2 DASHBOARD REMOVAL/INSTALLATION.)
5. Remove the B-pillar lower trim. (See 09-17-11 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
6. Remove the selector cable and the interlock cable if equipped with ATX. (See 05-16-1 SHIFT MECHANISM REMOVAL/INSTALLATION.)
7. Remove the SAS control module bracket. (See 08-10-16 SAS CONTROL MODULE BRACKET REMOVAL/INSTALLATION.)
8. Remove the set plate. (See 06-12-5 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
9. Remove the audio amplifier. (See 09-20-5 AUDIO AMPLIFIER REMOVAL/INSTALLATION.)
10. Remove the fasteners.
11. Disengage the side hooks to remove the floor covering.



W6U917WAZ

12. Install in the reverse order of removal.

09-18 LIGHTING SYSTEMS

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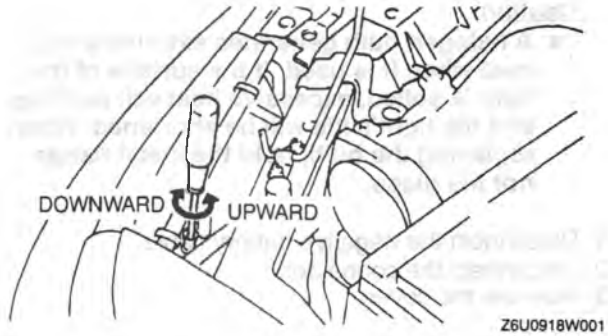
HEADLIGHT ADJUSTMENT

1. Adjust the tire air pressure to the specification.
2. Position the unloaded vehicle on a flat, level surface.
3. Seat one person in the driver's seat.
4. Position the vehicle straight ahead.
5. While adjusting one headlight, disconnect the connector of the other.
6. Start the engine to charge the battery.
7. Adjust the headlights by turning the adjusting screws as shown in the figure. Loosen the screws first, then tighten them.

Note

- If the adjusting screws are tightened first, then loosened, they will continue to loosen when the vehicle is in motion and may cause the headlights to become misaligned.

Z6U091851030W01



Z6U0918W001

HEADLIGHT REMOVAL/INSTALLATION

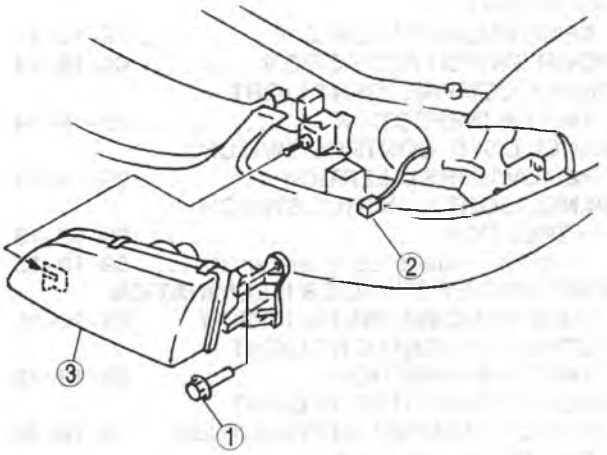
Z6U091851030W02

Caution

- **When you install the headlight, the headlight may hit the edge of the front fender panel. This may cause scratches on the front fender panel. To avoid this, attach protective tape to the edge of the front fender panel.**

1. Disconnect the negative battery cable.
2. Remove the front combination light.
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.
5. Adjust the headlight aiming. (See 09-18-1 HEADLIGHT ADJUSTMENT.)

1	Bolt
2	Connector
3	Headlight



W6U918WA1

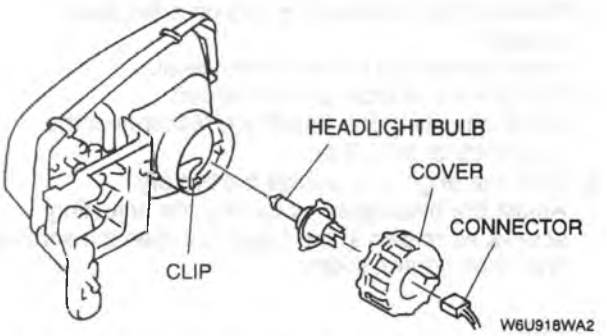
HEADLIGHT BULB REMOVAL/INSTALLATION

Z6U091851030W03

Caution

- **A halogen bulb generates extremely high heat when it is used. If the surface of the bulb is soiled, excessive heat will build up and the light's life will be shortened. When replacing the bulb, hold the metal flange, not the glass.**

1. Disconnect the negative battery cable.
2. Disconnect the connector.
3. Remove the cover.
4. Release the clip to remove the headlight bulb.



W6U918WA2

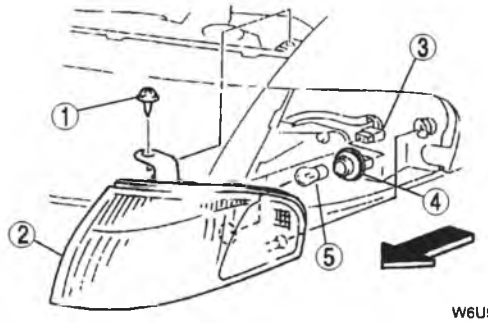
5. Install in the reverse order of removal.

FRONT COMBINATION LIGHT REMOVAL/INSTALLATION

Z6U091851060W01

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

1	Screw
2	Front combination light
3	Connector
4	Socket
5	Front combination light bulb



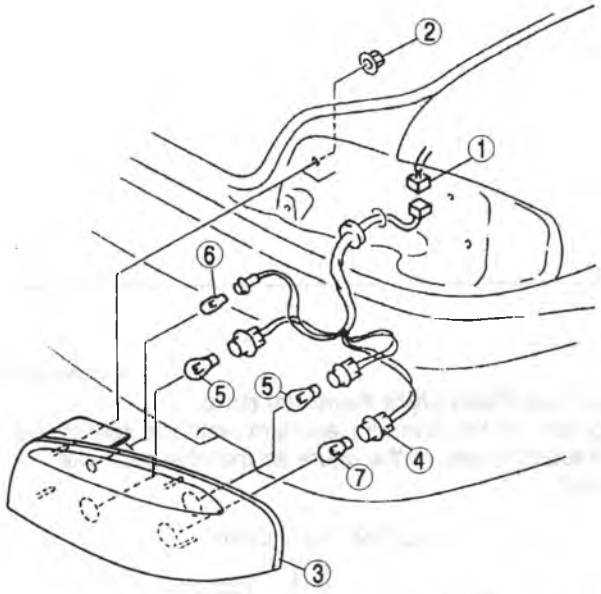
W6U918WA3

REAR COMBINATION LIGHT REMOVAL/INSTALLATION

Z6U091851150W01

1. Disconnect the negative battery cable.
2. Partially peel off the trunk compartment covering. (See 09-17-14 TRUNK COMPARTMENT COVERING REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Connector
2	Nut
3	Rear combination light
4	Socket
5	Brake light/taillight bulb
6	Back-up light bulb
7	Rear turn light bulb

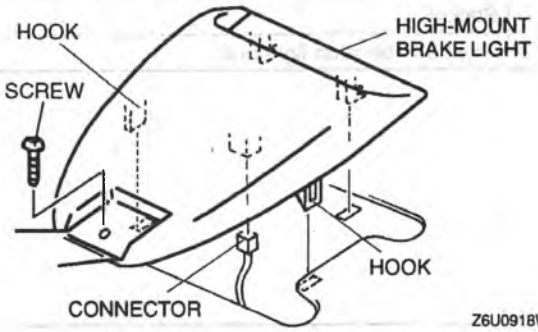


Y6U918WA0

HIGH-MOUNT BRAKE LIGHT REMOVAL/INSTALLATION

Z6U091851580W01

1. Disconnect the negative battery cable.
2. Open the cover and remove the screw.
3. Push the hooks of the high-mount brake light to remove the light.
4. Disconnect the connector.
5. Install in the reverse order of removal.

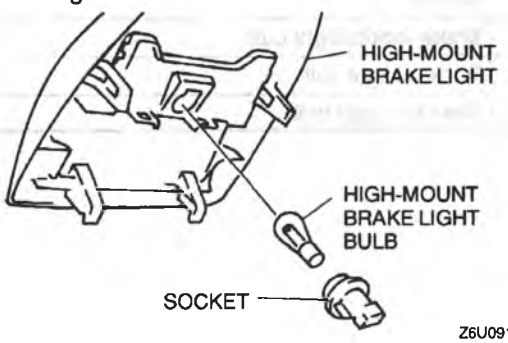


Z6U0918W101

HIGH-MOUNT BRAKE LIGHT BULB REMOVAL/INSTALLATION

Z6U091851580W02

1. Disconnect the negative battery cable.
2. Remove the high-mount brake light.
3. Remove the socket to remove the high-mount brake light bulb.
4. Install in the reverse order of removal.

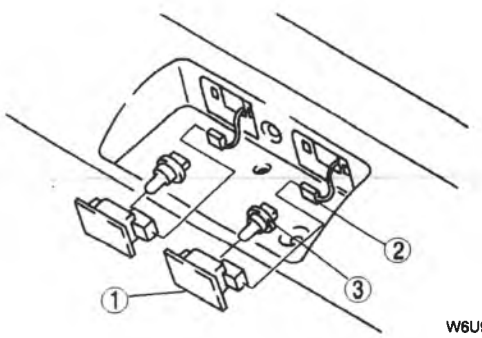


Z6U0918WA1

LICENSE PLATE LIGHT REMOVAL/INSTALLATION

Z6U091851270W01

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

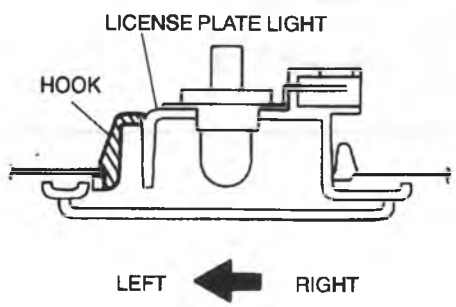


W6U918WA7

1	License plate light (See 09-18-4 License Plate Light Removal Note)
2	Connector
3	License plate light bulb

License Plate Light Removal Note

To remove the license plate light, shift the light to the direction shown in the figure so that the hook will bend.

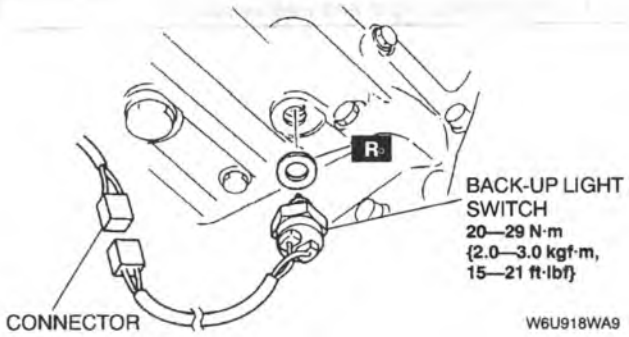


W6U918WA8

BACK-UP LIGHT SWITCH REMOVAL/INSTALLATION

Z6U091817640W01

1. Disconnect the negative battery cable.
2. Disconnect the connector.
3. Remove the back-up light switch.
4. Install in the reverse order of removal.



BACK-UP LIGHT SWITCH INSPECTION

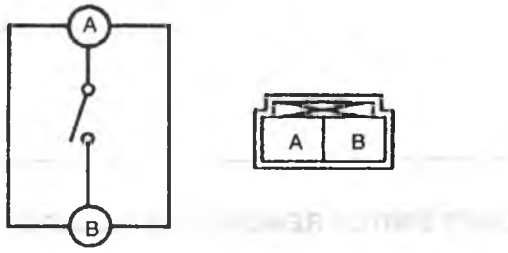
Z6U091817640W02

1. Disconnect the back-up light switch connector.
2. Check for continuity between the back-up light switch terminals by using an ohmmeter.
   - If not as specified, replace the back-up light switch.

○—○ : Continuity

Shift lever position	Terminal	
	A	B
Reverse	○	○
Other		

W6U918WB4



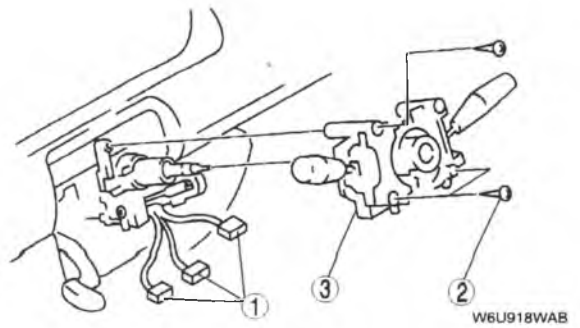
W6U918WAA

COMBINATION SWITCH REMOVAL/INSTALLATION

Z6U091866120W01

1. Disconnect the negative battery cable.
2. Remove the driver-side air bag module. (See 08-10-10 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
3. Remove the steering wheel. (See 06-12-5 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
4. Remove the column cover.
5. Remove the clock spring. (See 08-10-13 CLOCK SPRING ADJUSTMENT.)
6. Remove in the order indicated in the table.
7. Install in the reverse order of removal.

1	Connector
2	Screw
3	Combination switch

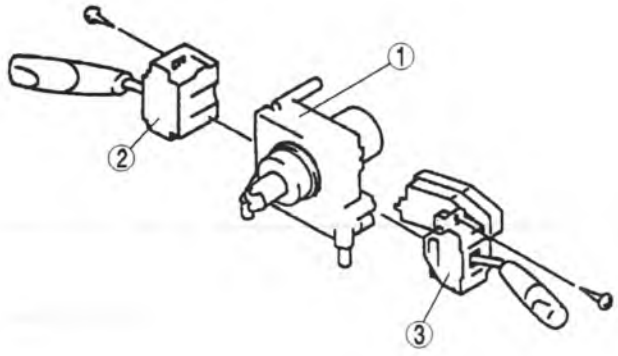


COMBINATION SWITCH DISASSEMBLY/ASSEMBLY

Z6U091866120W02

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

1	Combination switch body
2	Light switch
3	Windshield wiper and washer switch

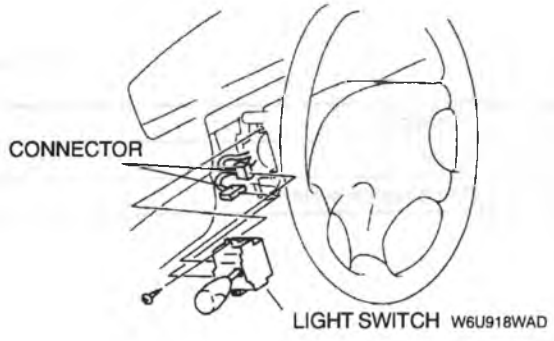


X6U918WA0

LIGHT SWITCH REMOVAL/INSTALLATION

Z6U091866121W01

1. Disconnect the negative battery cable.
2. Remove the column cover.
3. Disconnect the connectors.
4. Remove the screws to remove the light switch.
5. Install in the reverse order of removal.



W6U918WAD

LIGHT SWITCH INSPECTION

Z6U091866121W02

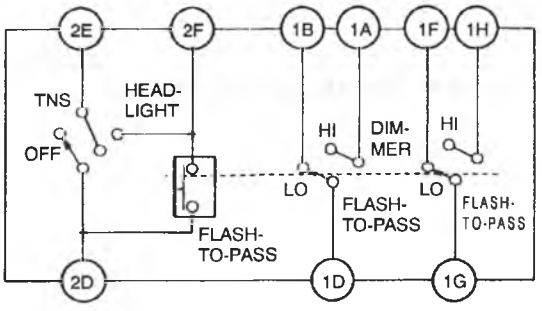
1. Remove the light switch. (See 09-18-6 LIGHT SWITCH REMOVAL/INSTALLATION.)
2. Check for continuity between the light switch terminals by using an ohmmeter.
   - If not as specified, replace the light switch.

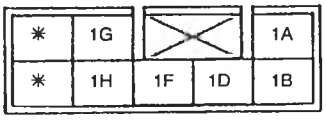
Headlight switch

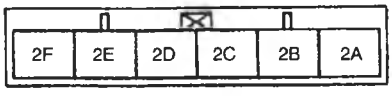
O—O : Continuity

Switch position			Terminal								
Light	Dimmer	Flash-to-pass	2D	2E	2F	1G	1H	1F	1D	1A	1B
OFF	—	Off									
		On	O		O	O	O			O	O
TNS	—	Off	O	O							
		On	O	O	O	O	O			O	O
Head-light	LO	Off	O	O	O	O		O		O	O
		On	O	O	O	O	O			O	O
	HI	—	O	O	O	O	O			O	O

W6U918WB5







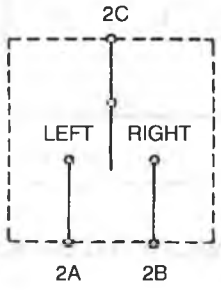
W6U918WAE

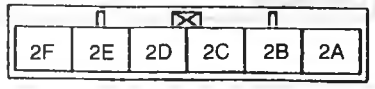
Turn switch

O—O : Continuity

Switch position	Terminal		
	2C	2A	2B
Left	O	O	
Off			
Right	O		O

W6U918WB6



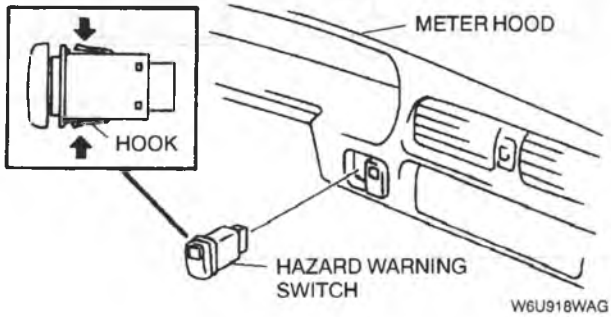


W6U918WAF

HAZARD WARNING SWITCH REMOVAL/INSTALLATION

Z6U091866401W01

1. Disconnect the negative battery cable.
2. Remove the meter hood. (See 09-17-7 METER HOOD REMOVAL/INSTALLATION.)
3. Press the hooks of the hazard warning switch and pull the switch out.
4. Install in the reverse order of removal.

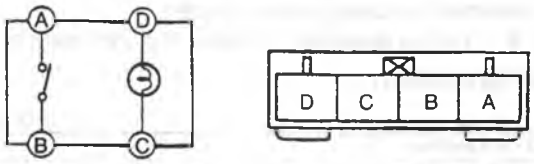


W6U918WAG

HAZARD WARNING SWITCH INSPECTION

Z6U091866401W02

1. Remove the hazard warning switch. (See 09-18-7 HAZARD WARNING SWITCH REMOVAL/INSTALLATION.)
2. Check for continuity between the hazard warning switch terminals by using an ohmmeter.
   - If not as specified, replace the hazard warning switch.



W6U918WAH

○—○ : Continuity ○—Ⓑ—○ : Bulb

Switch position	Terminal			
	A	B	C	D
Released			○—Ⓑ—○	
Depressed	○——	——○	○—Ⓑ—○	

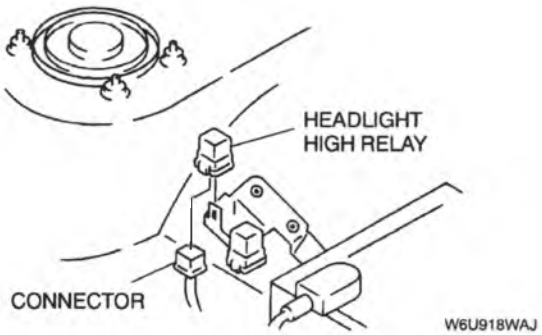
X6U918WA4

HEADLIGHT HIGH RELAY REMOVAL/INSTALLATION

Z6U091867744W01

Canada Only

1. Disconnect the negative battery cable.
2. Remove the nuts to move the main fuse block to the side.
3. Disconnect the connector.
4. Remove the headlight high relay.



W6U918WAJ

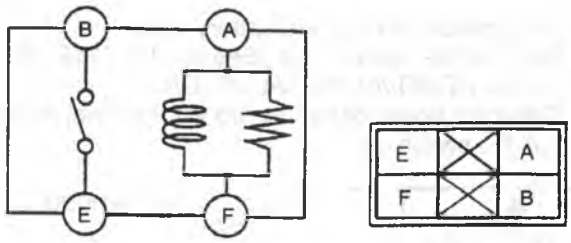
5. Install in the reverse order of removal.

HEADLIGHT HIGH RELAY INSPECTION

Z6U091867744W02

Canada Only

1. Remove the headlight high relay. (See 09-18-8 HEADLIGHT HIGH RELAY REMOVAL/INSTALLATION.)
2. Check for continuity between the headlight high relay terminals by using an ohmmeter.
   - If not as specified, replace the headlight high relay.



W6U918WAK

○—○ : Continuity

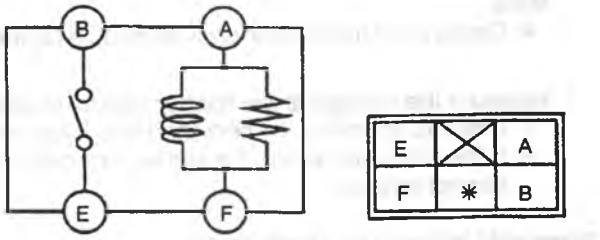
Step	Terminal			
	A	F	B	E
1	○——	——○		
2	B+	GND	○——	——○

W6U918WB8

HEADLIGHT RELAY INSPECTION

Z6U091867742W01

1. Disconnect the negative battery cable.
2. Remove the headlight relay.
3. Check for continuity between the headlight relay terminals by using an ohmmeter.
   - If not as specified, replace the headlight relay.



W6U918WAL

○—○ : Continuity

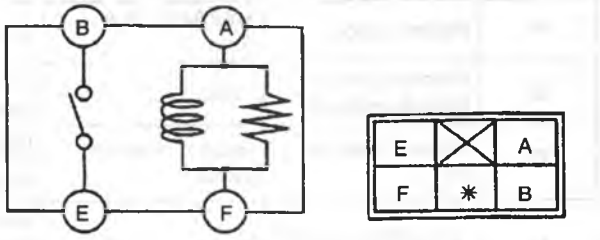
Step	Terminal			
	A	F	B	E
1	○	○		
2	B+	GND	○	○

W6U918WB9

TNS RELAY INSPECTION

Z6U091867743W01

1. Disconnect the negative battery cable.
2. Remove the TNS relay.
3. Check for continuity between the TNS relay terminals by using an ohmmeter.
   - If not as specified, replace the TNS relay.



W6U918WAM

○—○ : Continuity

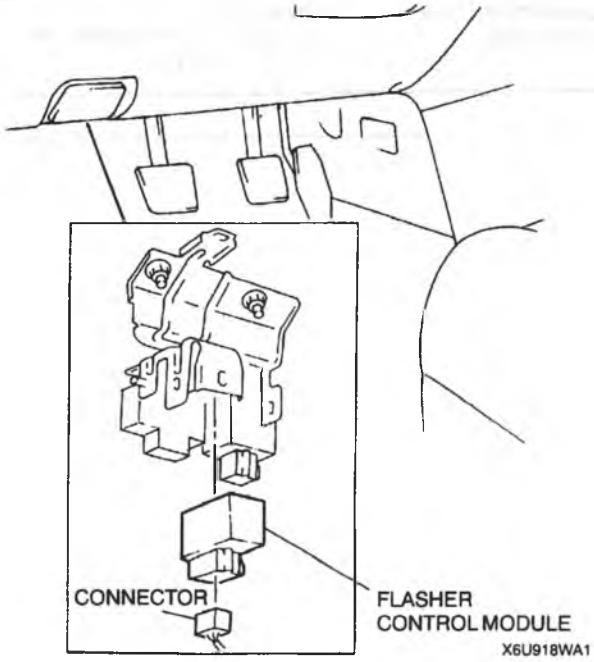
Step	Terminal			
	A	F	B	E
1	○	○		
2	B+	GND	○	○

W6U918WBA

FLASHER CONTROL MODULE REMOVAL/INSTALLATION

Z6U091866830W01

1. Disconnect the negative battery cable.
2. Disconnect the connector.
3. Remove the flasher control module.
4. Install in the reverse order of removal.



X6U918WA1

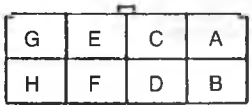
FLASHER CONTROL MODULE INSPECTION

Z6U091866830W02

Note
- Disconnect the flasher control module connector before checking for continuity at terminal B.

1. Measure the voltage at the flasher control module terminals as indicated below.
   - If not as specified, inspect the parts listed under "Inspection area" and the related wiring harnesses.
   - If the parts and wiring harnesses are okay but the system still does not work properly, replace the flasher control module.

Terminal Voltage List (Reference)



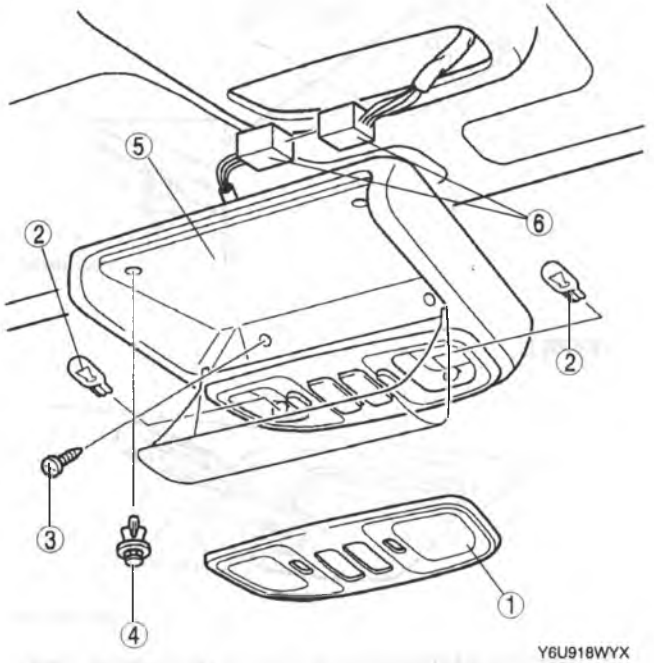
W6U918WAP

Terminal	Signal	Connection	Test condition	Voltage (V)/ Continuity	Inspection area
A	Power supply	HAZARD 15 A fuse	Constant	B+	HAZARD 15 A fuse
B	Flasher control module ground	GND	Constant: check for continuity to ground	Yes	GND
C	Hazard warning on	Hazard warning switch	Hazard warning switch depressed	0	Hazard warning switch
			Hazard warning switch released	B+	
D	Turn switch on/off (RH)	Turn switch (RH)	Ignition switch at ON and turn switch (RH) on	B+	Turn switch
			Other	0	
E	Turn signal flasher (RH)	Turn signal light (RH)	Ignition switch at ON and turn signal light (RH) flashes	Alternates0 and B+	Turn signal light (RH)
			Other	0	
F	Turn switch on/off (LH)	Turn switch (LH)	Ignition switch at ON and turn switch (LH) on	B+	Turn switch
			Other	0	
G	—	—	—	—	—
H	Turn signal flasher (LH)	Turn signal light (LH)	Ignition switch at ON and turn signal light (LH) flashes	Alternates0 and B+	Turn signal light (LH)
			Other	0	

MAP LIGHT REMOVAL/INSTALLATION

Z6U091869970W01

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

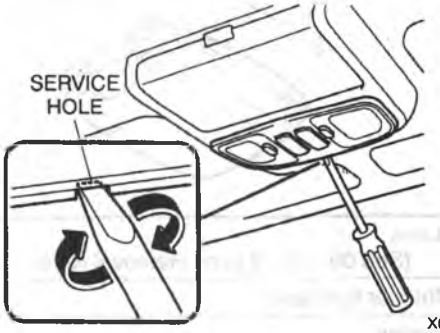


Y6U918WYX

1	Lens (See 09-18-11 Lens Removal Note)
2	Map light bulb
3	Screw
4	Fastener
5	Map light
6	Connector

Lens Removal Note

1. Insert a tape-wrapped, flathead screwdriver into the service hole.
2. Twist the flathead screwdriver indicated by the arrow to remove the lens.



X6U918WA3

INTERIOR LIGHT REMOVAL/INSTALLATION

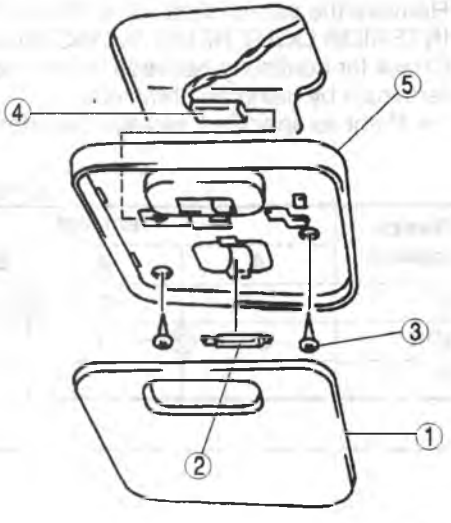
Z6U091851311W01

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

Note

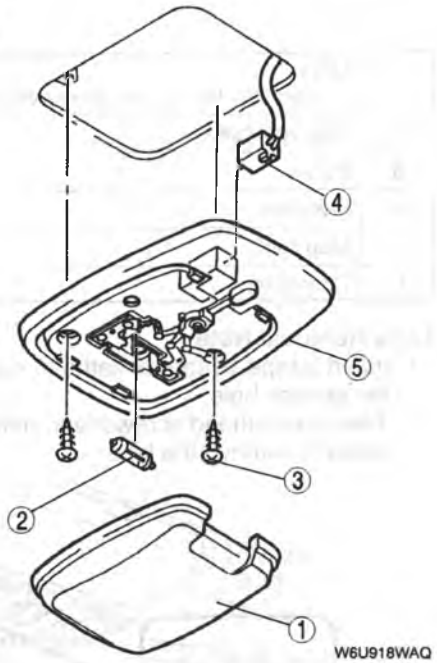
- To remove type A interior light bulb, move the bulb gently to the left or right using a small screwdriver and pull down out of the clip. To install a new bulb, loop a small rubber band around the bulb to hold it secure as it is positioned in one of the clips. Then with the assistance of the rubber band, move the bulb over to go into the remaining clip.
- When the bulb is in both clips, carefully remove the rubber band. Gently bend the two clips outward using a screwdriver to secure bulb.

TYPE A



W6U918WBF

TYPE B



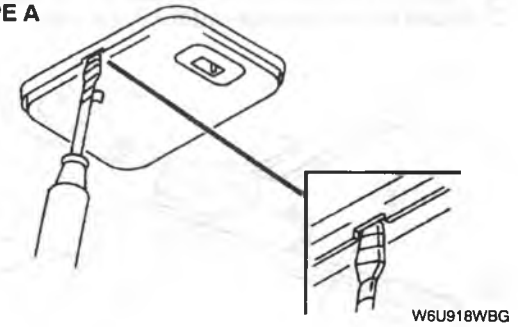
W6U918WAQ

1	Lens (See 09-18-12 Lens Removal Note)
2	Interior light bulb
3	Screw
4	Connector
5	Housing

Lens Removal Note

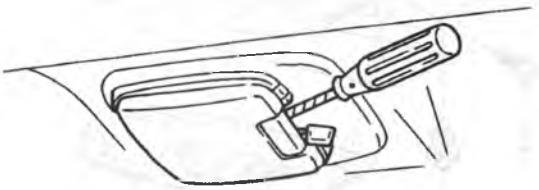
1. Insert a tape-wrapped, flathead screwdriver as shown in the figure.

TYPE A



W6U918WBG

TYPE B



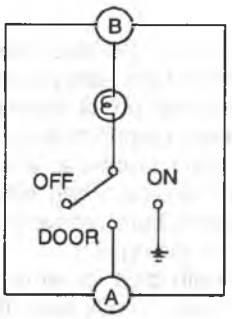
W6U918WAR

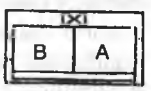
2. Twist the flathead screwdriver to remove the lens.

INTERIOR LIGHT INSPECTION

1. Remove the interior light. (See 09-18-11 INTERIOR LIGHT REMOVAL/INSTALLATION.)
2. Check for continuity between the interior light terminals by using an ohmmeter.
   - If not as specified, replace the interior light.

Z6U091851311W02





W6U918WAS

○—⊘—○ : Bulb

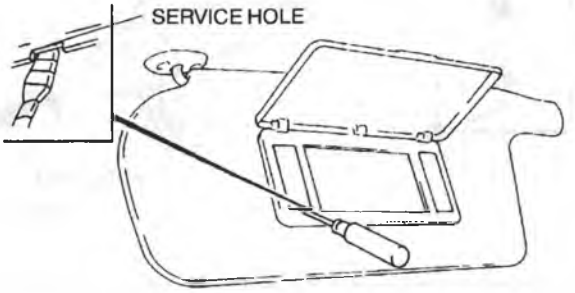
Switch position	Terminal		
	A	B	Body GND
ON		○—⊘—○	
DOOR	○—⊘—○		
OFF			

W6U918WBB

VANITY MIRROR ILLUMINATION REMOVAL/INSTALLATION

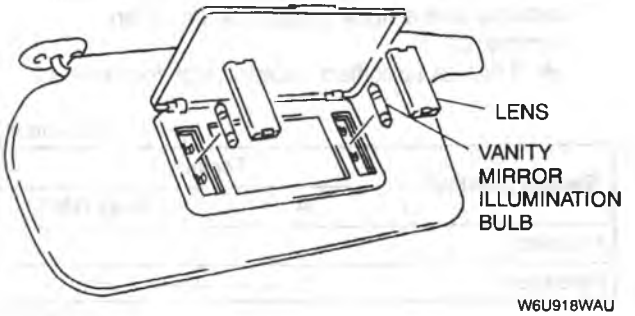
Z6U091869270W01

1. Disconnect the negative battery cable.
2. Insert a tape-wrapped, flathead screwdriver into the service hole.



W6U918WAT

3. Twist the flathead screwdriver to remove the lens.
4. Remove the vanity mirror illumination bulb.



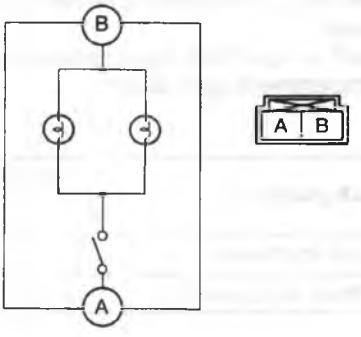
W6U918WAU

5. Install in the reverse order of removal.

VANITY MIRROR ILLUMINATION INSPECTION

Z6U091869270W02

1. Remove the sunvisor.
2. Check for continuity between the vanity mirror illumination terminals by using an ohmmeter.
   - If not as specified, replace the sunvisor.



W6U918WAV

: Bulb

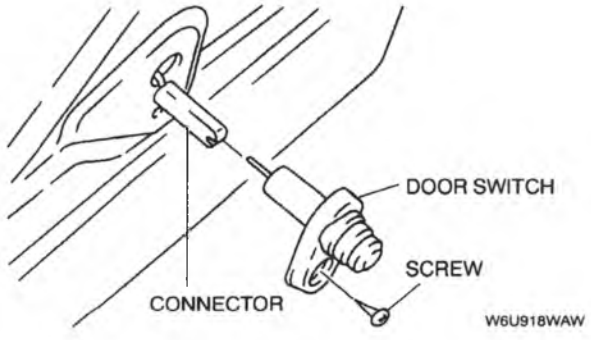
Vanity mirror cover condition	Terminal	
	A	B
Open	○	○
Close		

W6U918WBC

DOOR SWITCH REMOVAL/INSTALLATION

Z6U091866540W01

1. Disconnect the negative battery cable.
2. Remove the screw to remove the door switch.
3. Disconnect the connector.



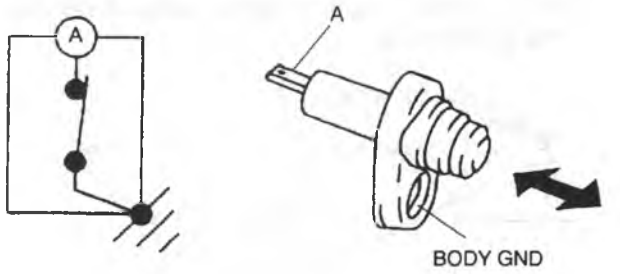
W6U918WAW

4. Install in the reverse order of removal.

DOOR SWITCH INSPECTION

Z6U091866540W02

1. Remove the door switch.
2. Check for continuity between the door switch terminal and a body ground by using an ohmmeter.
   - If not as specified, replace the door switch.



W6U918WAX

○—○ : Continuity

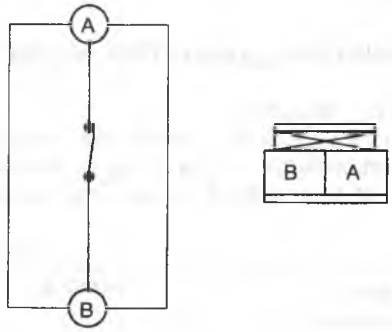
Switch position	Terminal	
	A	Body GND
Pressed		
Released	○	○

W6U918WBD

TRUNK COMPARTMENT LIGHT SWITCH INSPECTION

Z6U091851440W01

1. Disconnect the trunk compartment light switch connector.
2. Check for continuity between the trunk compartment light switch terminals by using an ohmmeter.
   - If not as specified, replace the trunk compartment light switch.



W6U918WAY

○—○ : Continuity

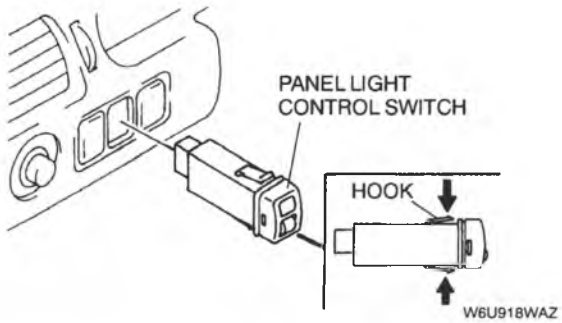
Switch position	Terminal	
	A	B
Locked (trunk lid closed)		
Unlocked (trunk lid opened)	○	○

W6U918WBE

PANEL LIGHT CONTROL SWITCH REMOVAL/INSTALLATION

Z6U091866600W01

1. Disconnect the negative battery cable.
2. Remove the meter hood. (See 09-17-7 METER HOOD REMOVAL/INSTALLATION.)
3. Press the hooks of the panel light control switch and pull the switch out.



W6U918WAZ

4. Install in the reverse order of removal.

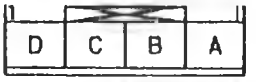
PANEL LIGHT CONTROL SWITCH INSPECTION

Z6U091866600W02

Note
- Disconnect the panel light control switch connector before checking for continuity at terminal D.

1. Remove the panel light control switch. (See 09-18-14 PANEL LIGHT CONTROL SWITCH REMOVAL/INSTALLATION.)
2. Connect the connector to the panel light control switch.
3. Measure the voltage at the panel light control switch as indicated below.
   - If not as specified, inspect the parts listed under "Inspection area" and the related wiring harnesses.
   - If the parts and wiring harnesses are okay but the system still does not work properly, replace the panel light control switch.

Terminal Voltage List (Reference)

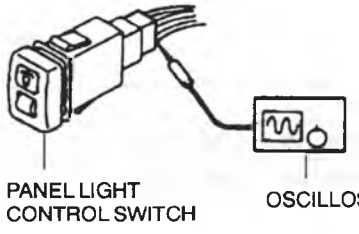


W6U918WB0

Terminal	Signal	Connection	Test condition	Voltage (V)/Continuity	Inspection area
A	—	—	—	—	—
B	TNS	TNS relay	Headlight switch at first or second position	B+	• Light switch • TAIL 15 A fuse
			Other	0	
C	Illumination	Each illumination	Inspect by using an oscilloscope (See 09-18-15 C terminal inspection)	—	Each illumination
D	Panel light control switch ground	GND	Constant: check for continuity to ground	Yes	GND

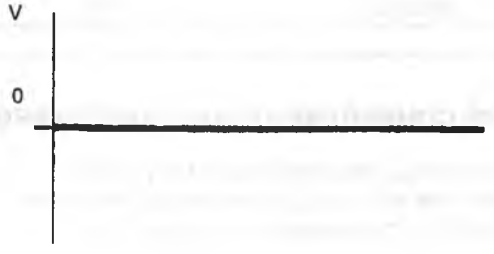
C terminal inspection

1. Measure the wave pattern of the C terminal on the panel light control switch by using an oscilloscope.



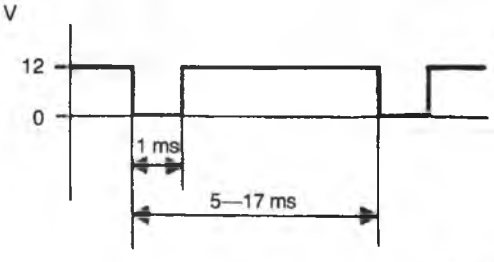
W6U918WB1

   a. Set the headlight switch to either the first or second position.
   b. Set the panel light control switch to the brightest position.
   c. Verify that the pattern on the screen is as shown in the figure.



W6U918WB2

- Verify that the pattern on the screen matches the pattern shown in the figure as the panel light control switch is gradually turned to the darkest position.

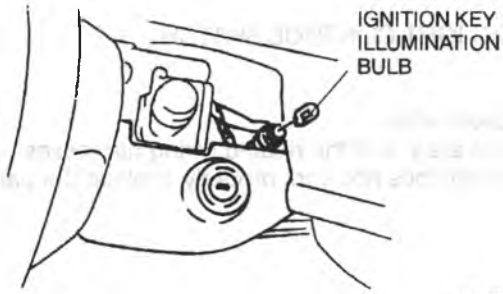


W6U918WB3

IGNITION KEY CYLINDER ILLUMINATION BULB REMOVAL/INSTALLATION

Z6U091860231W01

1. Disconnect the negative battery cable.
2. Remove the upper column cover.
3. Remove the ignition key cylinder illumination bulb.
4. Install in the reverse order of removal.



Y6U918WGG

GLOVE COMPARTMENT LIGHT SWITCH INSPECTION

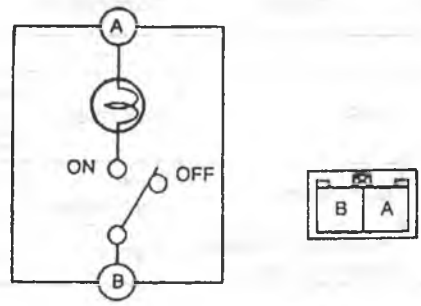
Z6U091851447W01

1. Disconnect the negative battery cable.
2. Remove the glove compartment light switch.
3. Inspect for continuity between the glove compartment light switch terminals using an ohmmeter.
   - If not specified, replace the glove compartment light switch.

○—○ : Continuity

Switch position	Terminal	
	A	B
Pressed		
Released	○	○

Y6U918WXZ



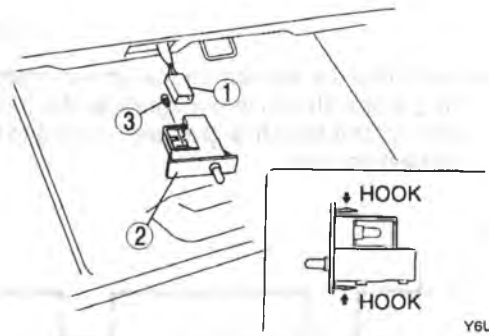
Y6U918WWZ

GLOVE COMPARTMENT LIGHT SWITCH REMOVAL/INSTALLATION

Z6U091851447W02

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

1	Connector
2	Glove compartment light switch
3	Glove compartment light bulb

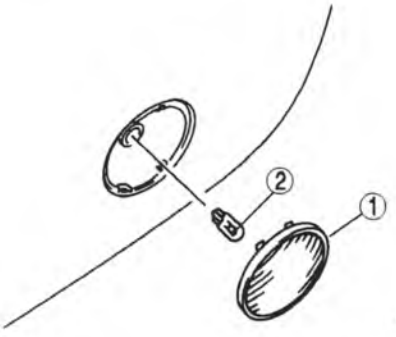


Y6U918WA1

COURTESY LIGHT BULB REMOVAL/INSTALLATION

Z6U091869971W01

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



YMU918WBP

1	Lens (See 09-18-17 Lens Removal Note)
2	Courtesy light bulb

Lens Removal Note

1. Using a tape-wrapped flathead screwdriver, unhook the hooks.



YMU918WBQ

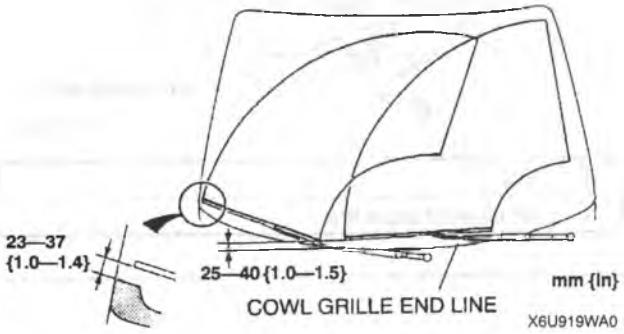
09-19 WIPER/WASHER SYSTEM

WINDSHIELD WIPER ARM AND BLADE ADJUSTMENT 09-19-1
WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION 09-19-1
Windshield Wiper Arm Installation Note 09-19-2
WINDSHIELD WIPER LINK REMOVAL/INSTALLATION 09-19-2
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WINDSHIELD WIPER MOTOR INSPECTION 09-19-3
WINDSHIELD WASHER TANK REMOVAL/INSTALLATION 09-19-4
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WINDSHIELD WASHER HOSE REMOVAL/INSTALLATION 09-19-8

WINDSHIELD WIPER ARM AND BLADE ADJUSTMENT

Z6U091967320W01

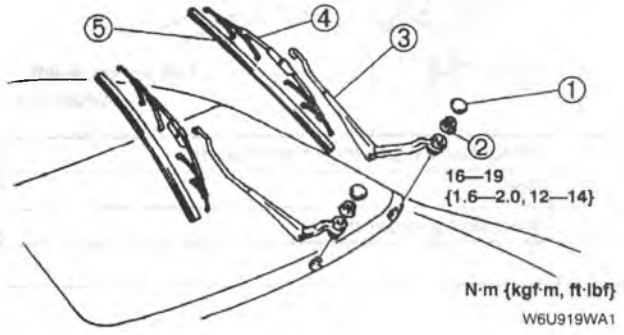
1. Operate the windshield wiper motor to set the wipers in the park position.
2. Set the windshield wiper arm height as shown.



WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION

Z6U091967320W02

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. Adjust the windshield wiper arm and blade. (See 09-19-1 WINDSHIELD WIPER ARM AND BLADE ADJUSTMENT.)

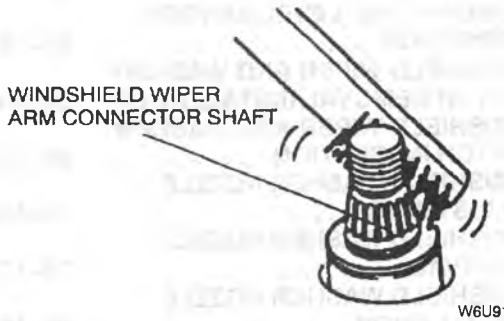


1	Cap
2	Nut

3	Windshield wiper arm (See 09-19-2 Windshield Wiper Arm Installation Note)
4	Windshield wiper blade
5	Rubber brush

Windshield Wiper Arm Installation Note

- Clean the windshield wiper arm connector shafts by using a wire brush before installing the windshield wiper arms.

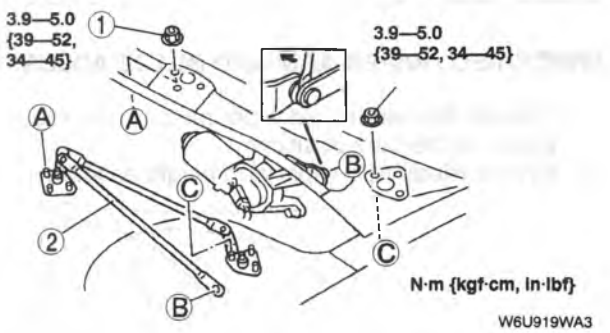


W6U919WA2

WINDSHIELD WIPER LINK REMOVAL/INSTALLATION

Z6U091967360W01

1. Remove the windshield wiper arm and blade. (See 09-19-2 Windshield Wiper Arm Installation Note.)
2. Remove the cowl grille.
3. Pry off the connection between the windshield wiper motor and windshield wiper link.
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. Adjust the windshield wiper arm and blade. (See 09-19-1 WINDSHIELD WIPER ARM AND BLADE ADJUSTMENT.)



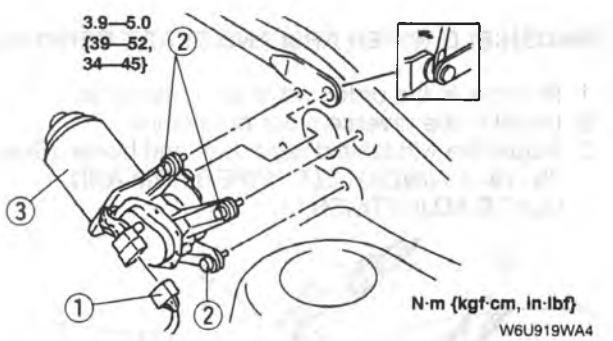
W6U919WA3

1	Nut
2	Windshield wiper link

WINDSHIELD WIPER MOTOR REMOVAL/INSTALLATION

Z6U091967340W01

1. Disconnect the negative battery cable.
2. Remove the windshield wiper arm and blade. (See 09-19-2 Windshield Wiper Arm Installation Note.)
3. Remove the cowl grille.
4. Pry off the connection between the windshield wiper motor and windshield wiper link.
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.
7. Adjust the windshield wiper arm and blade. (See 09-19-1 WINDSHIELD WIPER ARM AND BLADE ADJUSTMENT.)



W6U919WA4

1	Windshield wiper motor connector
2	Bolt
3	Windshield wiper motor

WINDSHIELD WIPER MOTOR INSPECTION

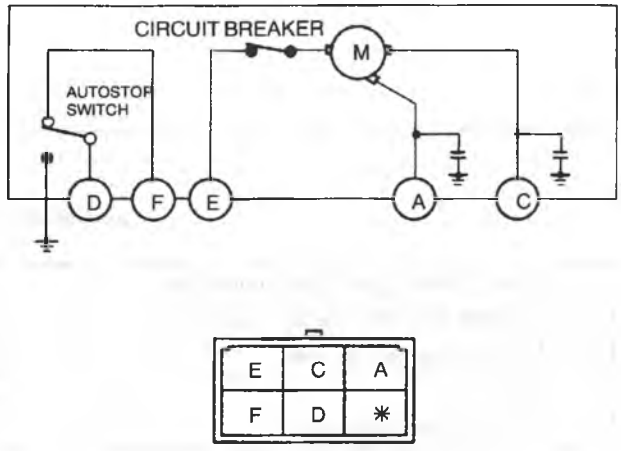
Z6U091967340W02

1. Turn the ignition switch to LOCK while the windshield wiper is operating.
2. Verify that the windshield wiper does not stop in the park position.
3. Disconnect the windshield wiper motor connector.
4. Inspect for continuity between the windshield wiper motor terminals by using an ohmmeter.
   - If not as specified, replace the windshield wiper motor.

○—○ : Continuity

Windshield wiper motor position	Terminal				
	A	C	D	E	F
Except park position	○	○	○	○	○

W6U919WA5



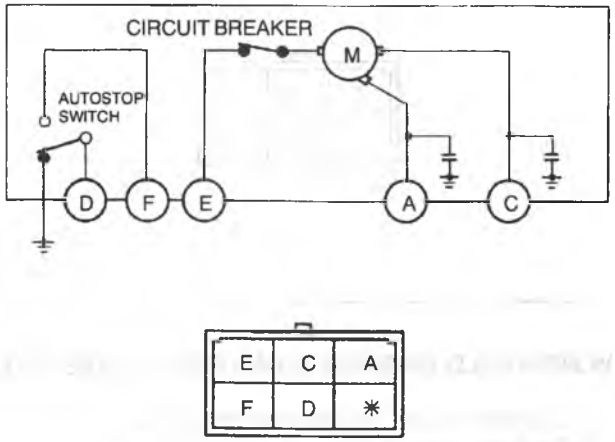
W6U919WA6

5. Connect the windshield wiper motor connector.
6. Turn the ignition switch to ON.
7. Turn the wiper switch off while the windshield wiper is operating.
8. Verify that the windshield wiper stops in the park position.
   - If not as specified, replace the windshield wiper motor.
9. Disconnect the windshield wiper motor connector.
10. Inspect for continuity between the windshield wiper motor terminals by using an ohmmeter.
    - If not as specified, replace the windshield wiper motor.

○—○ : Continuity

Windshield wiper motor position	Terminal				
	A	C	D	E	Body GND
Park position	○	○	○	○	○

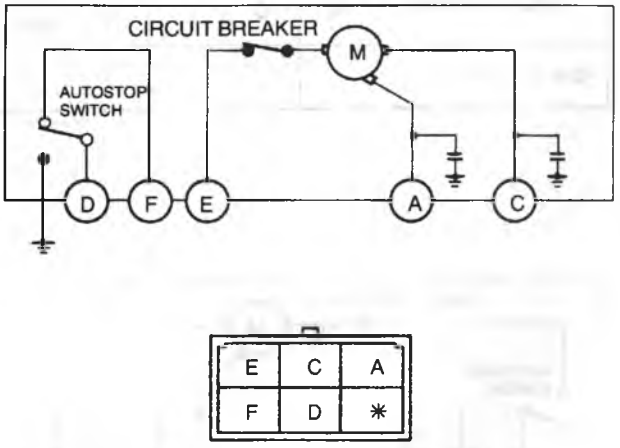
W6U919WA7



W6U919WA8

11. Connect ground to the windshield wiper motor terminal E and battery positive voltage to the following terminals of the windshield wiper motor.
12. Verify that the windshield wiper motor operates as indicated below.
    - If not as specified, replace the windshield wiper motor.

Terminal	Operation
A	High
C	Low



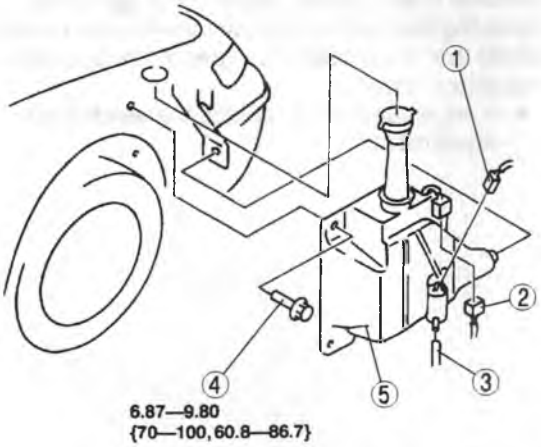
W6U919WA9

WINDSHIELD WASHER TANK REMOVAL/INSTALLATION

Z6U091967480W01

1. Disconnect the negative battery cable.
2. Partially peel off the right side mud guard.
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Windshield washer motor connector
2	Washer fluid-level sensor connector
3	Windshield washer hose
4	Bolt
5	Windshield washer tank



N·m {kgf·cm, in·lbf}

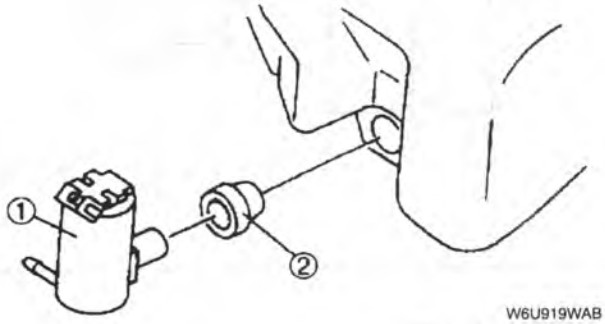
W6U919WAA

WINDSHIELD WASHER MOTOR REMOVAL/INSTALLATION

Z6U091976670W01

1. Disconnect the negative battery cable.
2. Partially peel off the right side mud guard.
3. Remove the windshield washer tank.
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.

1	Windshield washer motor
2	Grommet

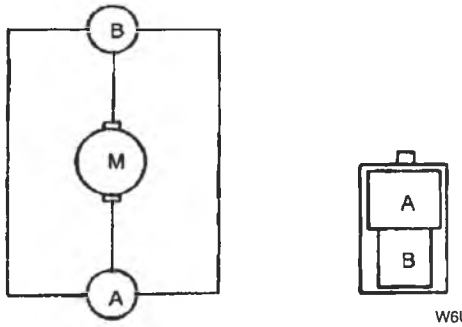


W6U919WAB

WINDSHIELD WASHER MOTOR INSPECTION

Z6U091976670W02

1. Partially peel off the right side mud guard.
2. Remove the windshield washer tank.
3. Connect battery positive voltage to terminal B and ground to terminal A of the motor.
4. Verify that the windshield washer motor operates.
   - If the motor does not operate, replace the windshield washer motor.



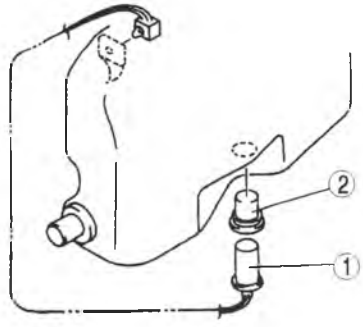
W6U919WAC

WASHER FLUID-LEVEL SENSOR REMOVAL/INSTALLATION

Z6U091967488W01

1. Disconnect the negative battery cable.
2. Partially peel off the right side mud guard.
3. Remove the windshield washer tank.
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.

1	Washer fluid-level sensor
2	Grommet



W6U919WAD

WASHER FLUID-LEVEL SENSOR INSPECTION

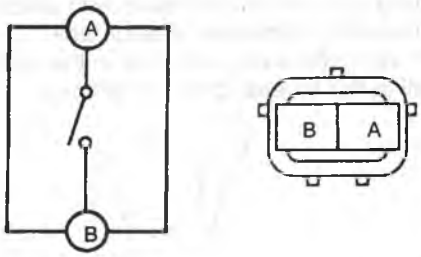
Z6U091967488W02

1. Partially peel off the right side mud guard.
2. Remove the windshield washer tank.
3. Inspect for continuity between the washer fluid-level sensor terminals by using an ohmmeter.
   - If not as specified, replace the washer fluid-level sensor.

○—○ : Continuity

Fluid level	Terminal	
	A	B
Above Low		
Below Low	○	○

W6U919WAE

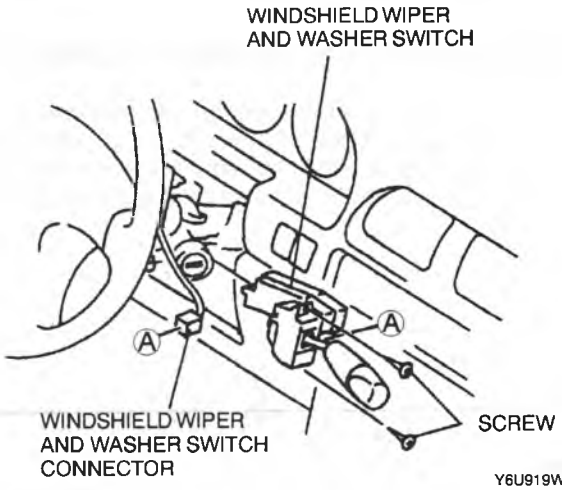


W6U919WAF

WINDSHIELD WIPER AND WASHER SWITCH REMOVAL/INSTALLATION

Z6U091966122W01

1. Disconnect the negative battery cable.
2. Remove the column cover.
3. Disconnect the windshield wiper and washer switch connector.
4. Remove the screws.
5. Remove the windshield wiper and washer switch.
6. Install in the reverse order of removal.



Y6U919WZX

WINDSHIELD WIPER AND WASHER SWITCH INSPECTION

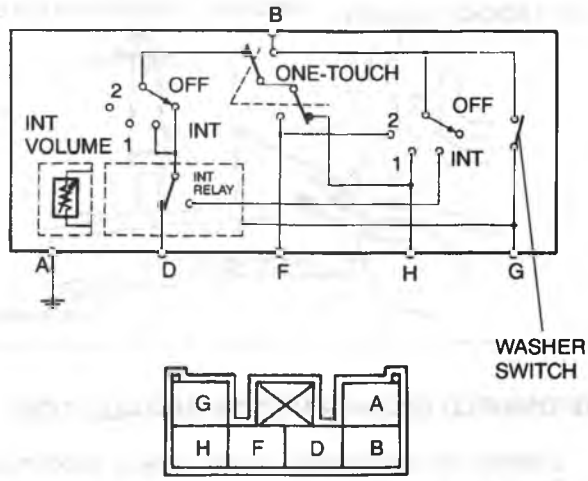
Z6U091966122W02

1. Remove the column cover.
2. Remove the windshield wiper and washer switch.
3. Inspect for continuity between the windshield wiper and washer switch terminals by using an ohmmeter.
   - If not as specified, replace the windshield wiper and washer switch.

○—○ : Continuity

Switch position			Terminal				
			D	H	F	B	G
OFF			○—○				
Wiper	One-touch switch	OFF	○—○				
		ON			○—○		
	INT		○—○				
	1			○	——	○	
	2				○—○		
Washer						○—○	

W6U919WAH

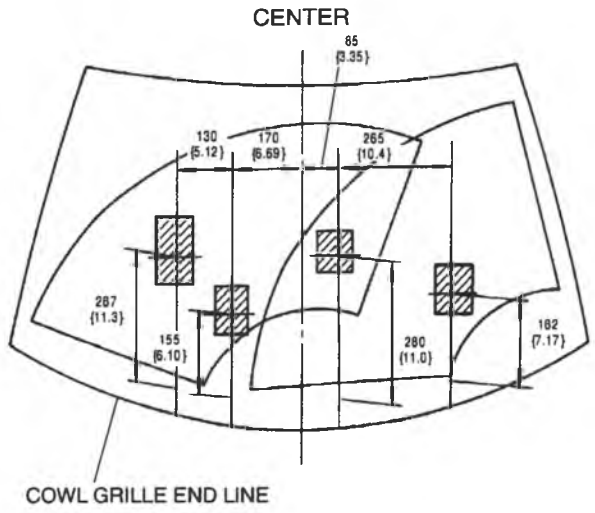


X6U919WA2

WINDSHIELD WASHER NOZZLE ADJUSTMENT

Z6U091967510W01

- Insert a needle or equivalent tool into the spray hole of the windshield washer nozzle and adjust the nozzle direction as shown.



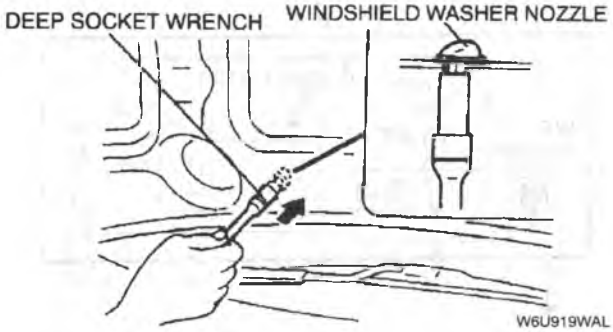
mm {in}

W6U919WAK

WINDSHIELD WASHER NOZZLE REMOVAL

Z6U091967510W02

1. Remove the hood insulator.
2. Disconnect the windshield washer hose from the windshield washer nozzle.
3. Remove the windshield washer nozzle by using a **10 mm {0.4 in}** deep socket wrench from underneath the hood.



WINDSHIELD WASHER NOZZLE INSTALLATION

Z6U091967510W03

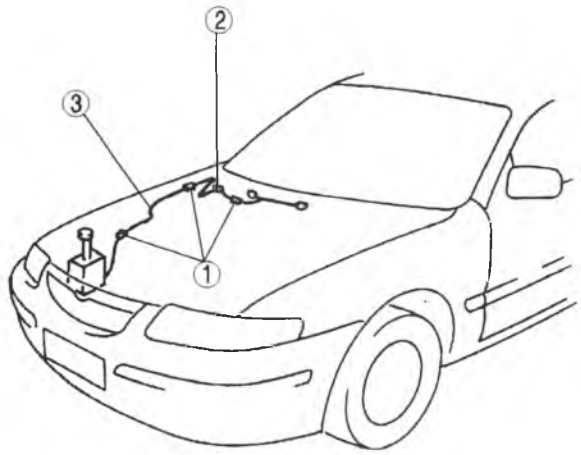
1. Connect the windshield washer hose to windshield washer nozzle.
2. Push the windshield washer nozzle into the installation hole.
3. Adjust the windshield washer nozzle. (See 09-19-7 WINDSHIELD WASHER NOZZLE ADJUSTMENT.)
4. Install the hood insulator.

WINDSHIELD WASHER HOSE REMOVAL/INSTALLATION

Z6U091967500W01

1. Partially peel off the right side mud guard.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

1	Clip
2	Joint pipe
3	Windshield washer hose



09-20 ENTERTAINMENT

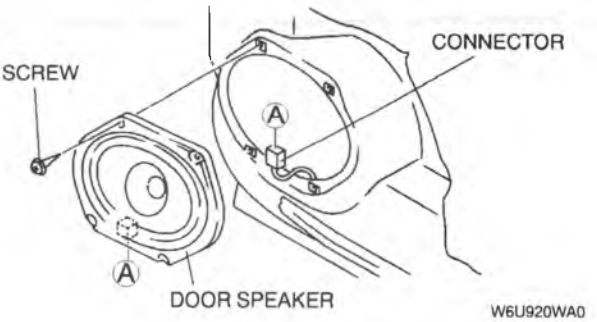
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DOOR SPEAKER INSPECTION 09-20-2
REAR SPEAKER
REMOVAL/INSTALLATION 09-20-2
REAR SPEAKER INSPECTION 09-20-3
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DOOR SPEAKER REMOVAL/INSTALLATION

Z6U092066961W01

Caution
- **When removing or installing a door speaker, touching the radio cone paper could cause poor sound quality. When removing or installing a door speaker, hold the speaker's bracket and handle with care.**

1. Disconnect the negative battery cable.
2. Remove the front door trim. (See 09-17-9 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
3. Remove the screws.
4. Disconnect the connector and remove the door speaker.



5. Position the door speaker so that the terminals face downward and install in the reverse order of removal.

DOOR SPEAKER INSPECTION

Z6U092066961W02

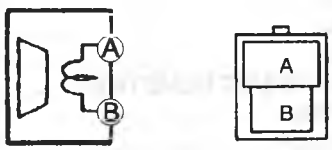
1. Remove the door speaker. (See 09-20-1 DOOR SPEAKER REMOVAL/INSTALLATION.)
2. Check for resistance between the door speaker terminals by using an ohmmeter.
   - If not as specified, replace the door speaker.

○-W-○ : Resistance

Door speaker	Terminal		
	A	B	
Standard type	○—W—○		R_1
BOSE type	○—W—○		R_2

R_1: 4 Ω R_2: 2 Ω

W6U920WA1



W6U920WA2

3. Touch the leads of an ohmmeter to the door speaker terminals and verify that the speaker clicks.

Range
×1 Ω

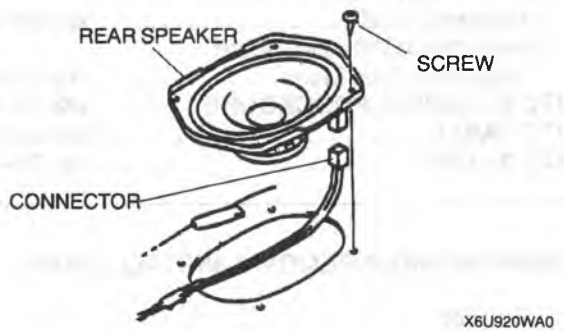
- If not as specified, replace the door speaker.

REAR SPEAKER REMOVAL/INSTALLATION

Z6U092066964W01

Caution
- **When removing or installing a rear speaker, touching the radio cone paper could cause poor sound quality. When removing or installing a rear speaker, hold the speaker's bracket and handle with care.**

1. Disconnect the negative battery cable.
2. Remove the rear package trim. (See 09-17-12 REAR PACKAGE TRIM REMOVAL/INSTALLATION.)
3. Remove the screws.
4. Disconnect the connector and remove the rear speaker.



X6U920WA0

5. Install in the reverse order of removal.

REAR SPEAKER INSPECTION

Z6U092066964W02

1. Remove the rear speaker. (See 09-20-2 REAR SPEAKER REMOVAL/INSTALLATION.)
2. Check for resistance between the rear speaker terminals by using an ohmmeter.
   - If not as specified, replace the rear speaker.

○WW○ : Resistance

Rear speaker	Terminal		
	A	B	
Standard type	○	○	R_1
BOSE type	○	○	R_2

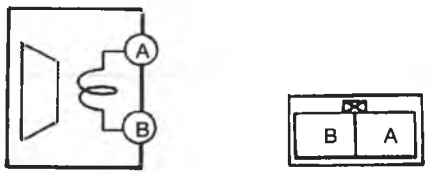
R_1: 4 Ω R_2: 2 Ω

W6U920WA4

3. Touch the leads of an ohmmeter to the rear speaker terminals and verify that the speaker clicks.

Range
×1 Ω

- If not as specified, replace the rear speaker.



X6U920WA1

FRONT ANTENNA FEEDER INSPECTION

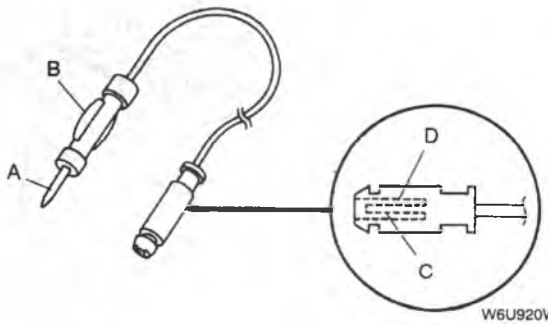
Z6U092066941W01

1. Disconnect the negative battery cable.
2. Remove the audio unit. (See 09-20-6 AUDIO UNIT REMOVAL.)
3. Remove the rear console. (See 09-17-5 REAR CONSOLE REMOVAL/INSTALLATION.)
4. Disconnect the front antenna feeder.
5. Verify that there is no continuity between front antenna feeder terminals A and B by using an ohmmeter.
   - If not as specified, replace the front antenna feeder.
6. Check for continuity between the front antenna feeder terminals by using an ohmmeter.
   - If not as specified, replace the front antenna feeder.

○—○ : Continuity

Step	Terminal			
	A	B	C	D
1	○		○	
2		○		○

W6U920WA6

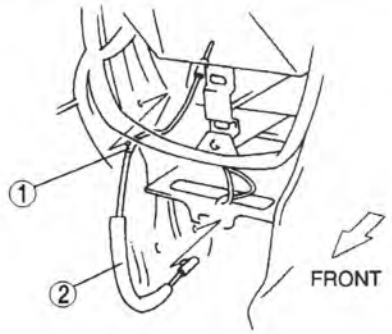


W6U920WA7

FRONT ANTENNA FEEDER REMOVAL/INSTALLATION

Z6U092066941W02

1. Disconnect the negative battery cable.
2. Remove the rear console. (See 09-17-5 REAR CONSOLE REMOVAL/INSTALLATION.)
3. Remove the audio unit. (See 09-20-6 AUDIO UNIT REMOVAL.)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal. (See 09-20-6 AUDIO UNIT INSTALLATION.)



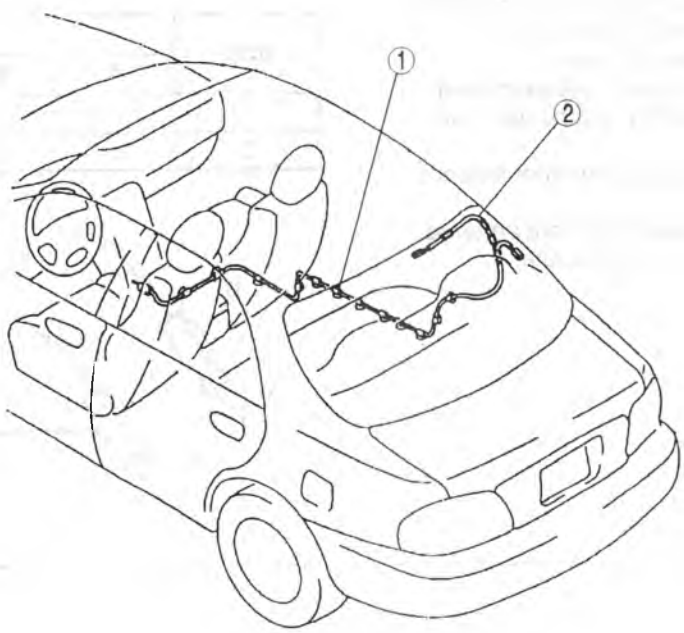
W6U920WA8

1	Clip
2	Front antenna feeder

REAR ANTENNA FEEDER REMOVAL/INSTALLATION

Z6U092066942W01

1. Disconnect the negative battery cable.
2. Remove the rear console. (See 09-17-5 REAR CONSOLE REMOVAL/INSTALLATION.)
3. Turn the floor covering over from passenger-side. (See 09-17-16 FLOOR COVERING REMOVAL/INSTALLATION.)
4. Turn the C-pillar trim and the headliner rear end over from passenger-side. (See 09-17-12 C-PILLAR TRIM REMOVAL/INSTALLATION.)
   (See 09-17-15 HEADLINER REMOVAL/INSTALLATION.)
5. Disconnect the rear antenna feeder.
6. Remove in the order indicated in the table.
7. Install in the reverse order of removal.



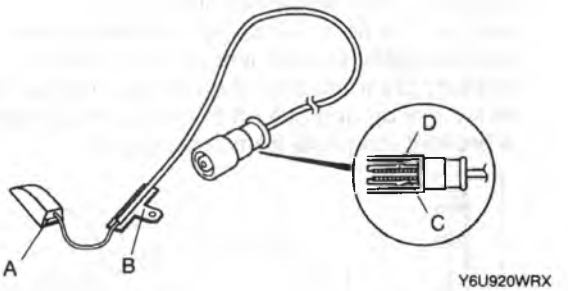
Y6U920WA5

1	Clip
2	Rear antenna feeder

REAR ANTENNA FEEDER INSPECTION

Z6U092066942W02

1. Remove the rear antenna feeder. (See 09-20-4 REAR ANTENNA FEEDER REMOVAL/INSTALLATION.)
2. Verify that there is no continuity between rear antenna feeder terminals A and B by using an ohmmeter.
   - If not as specified, replace the rear antenna feeder.
3. Check for continuity between the rear antenna feeder terminals by using an ohmmeter.
   - If not as specified, replace the rear antenna feeder.



Y6U920WRX

○—○ : Continuity

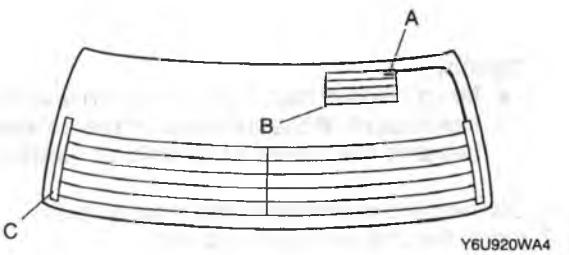
Step	Terminal			
	A	B	C	D
1	○		○	
2		○		○

W6U920WAA

GLASS ANTENNA INSPECTION

Z6U092066930W01

1. Visually inspect the glass antenna for damage.
2. Inspect for continuity between the glass antenna terminals using an ohmmeter.
   - If not as specified, repair the glass antenna. (See 09-12-18 FILAMENT REPAIR.)



Y6U920WA4

Condition	Terminal		
	A	B	C
Constant		R1 / R2	

R1: 0.3 Ω R2: 0.5—0.7 Ω

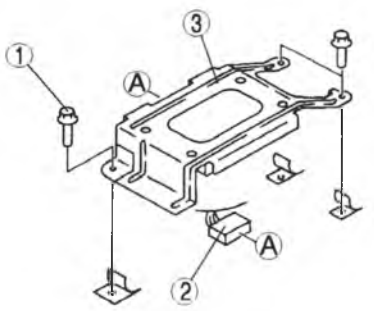
Y6U920WA3

AUDIO AMPLIFIER REMOVAL/INSTALLATION

Z6U092066910W01

1. Disconnect the negative battery cable.
2. Remove the passenger side front seat. (See 09-13-1 FRONT SEAT REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Bolt
2	Connector
3	Audio amplifier

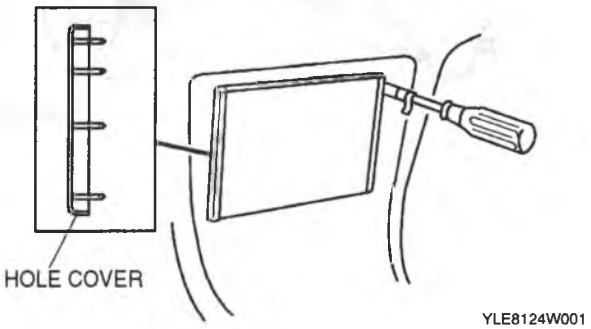


W6U920WAM

AUDIO UNIT REMOVAL

Z6U092066900W01

1. Disconnect the negative battery cable.
2. Remove the hole covers by inserting a small tape-wrapped screwdriver into the slot and carefully pry them off without scratching the center panel. Pry up and pull off the hole covers carefully to prevent the posts from breaking off.



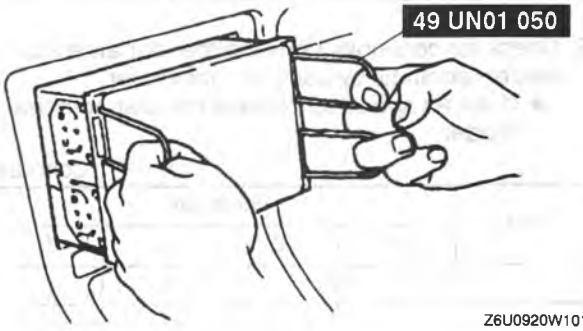
YLE8124W001

3. With the beveled parts of the **SST** facing inward, insert them into the unit.

Note

- A pair of the **SSTs** is necessary to remove the car-navigation unit.

4. Pull the **SST** outward and forward to slide out the unit.



Z6U0920W101

5. Disconnect the connectors and antenna jack.

AUDIO UNIT INSTALLATION

Z6U092066900W02

Caution

- **Make certain that the wiring harness and antenna feeder are not caught between the unit and dashboard. If the harness or the antenna feeder is caught between the unit and dashboard, it may become the cause of trouble or malfunctions.**

1. Connect the connectors and antenna jack.
2. Insert the unit until each clip click.

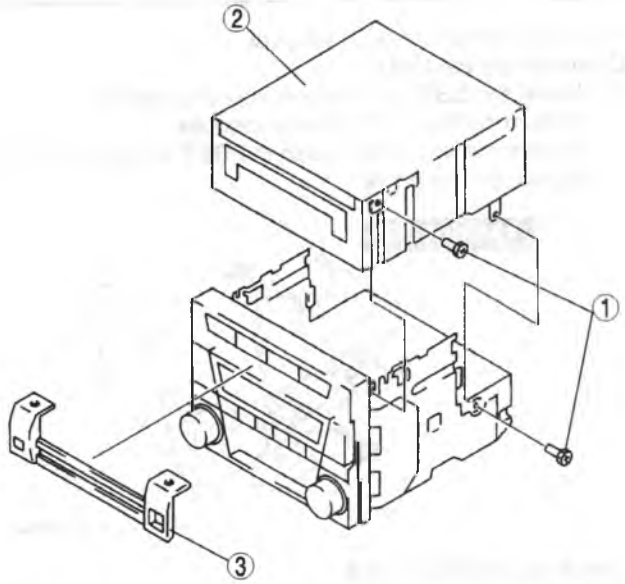
Caution

- **To install audio unit, be sure to push service hole cover areas on both sides of the audio unit. If switches are pressed instead, it may become the cause of trouble or malfunctions.**

3. Install the service hole covers.
4. Connect the negative battery cable.

UPPER MODULE REMOVAL/INSTALLATION

1. Disconnect the negative battery cable.
2. Remove the audio unit. (See 09-20-6 AUDIO UNIT REMOVAL.)
3. Remove in the order indicated in the table.



Y5J8124W004

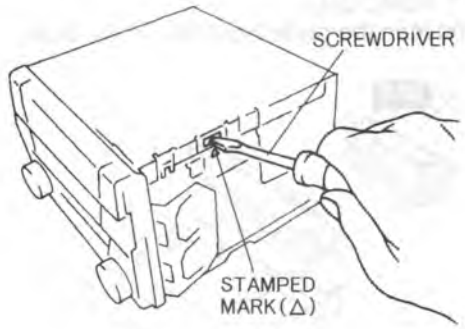
1	Screw (See 09-20-7 Screw Installation Note.)
2	Upper module (See 09-20-7 Upper Module Removal Note.)
3	Cover (See 09-20-7 Cover Removal Note.)

4. Install in the order of removal.

Z6U092066900W03

Upper Module Removal Note

1. Insert a screwdriver into the hole stamped mark.

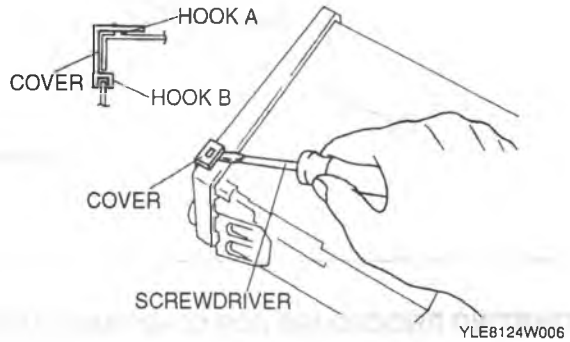


YLE8124W005

2. To remove upper module, lift it by pushing down the screwdriver's handle.

Cover Removal Note

1. Insert a tape-wrapped screwdriver between the cover and the base unit, then unhook the hook A.



YLE8124W006

2. To unhook the hook B, pull the cover upward.

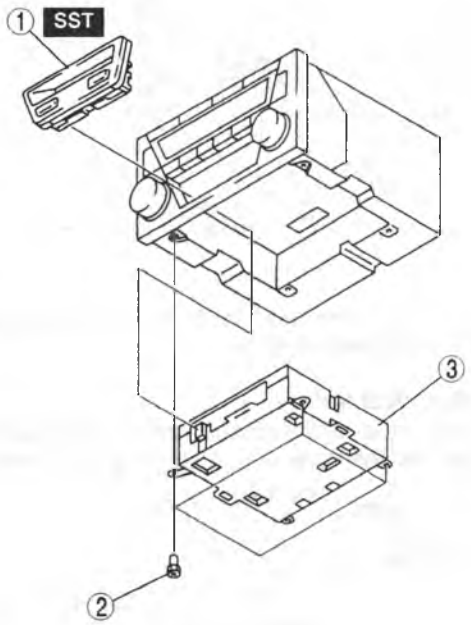
Screw Installation Note

1. If an undesignated screw is used, the inside of the upper module could be damaged. When installing the module, be sure to use a designated screw (red).

LOWER MODULE REMOVAL/INSTALLATION

Z6U092066900W04

1. Disconnect the negative battery cable.
2. Remove the audio unit. (See 09-20-6 AUDIO UNIT REMOVAL.)
3. Remove in the order indicated in the table.



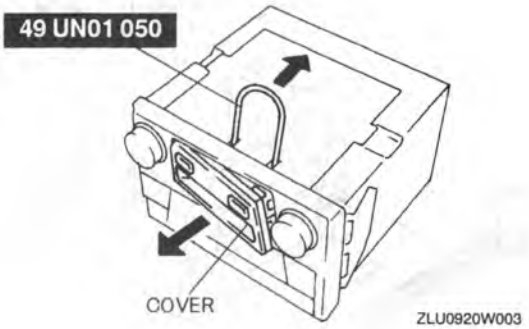
YLE8124W007

1	Cover (See 09-20-8 Cover Removal Note.)
2	Screw (See 09-20-8 Screw Installation Note.)
3	Lower module

4. Install in the order of removal.

Cover Removal Note

1. Insert the **SST** into the service holes on the bottom surface of the lower module.
2. To remove the cover, push the **SST** in the direction shown by the arrow.



ZLU0920W003

Screw Installation Note

1. If an undesignated screw is used, the inside of the upper module could be damaged. When installing the module, be sure to use a designated screw (red).

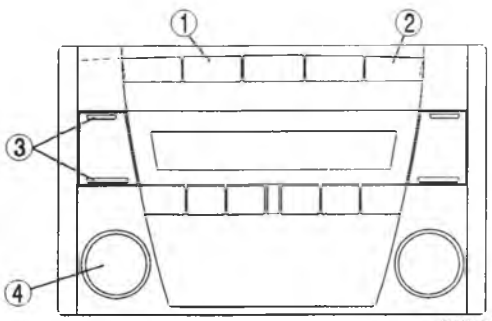
STARTING PROCEDURE FOR ON-BOARD DIAGNOSTIC TEST MODE

Z6U092066900W05

Note

- All DTCs displayed in the on-board diagnostic test mode should be entered in the Audio Repair Order Form.

1. Turn the ignition switch to the ACC or ON position.
2. First press the POWER button, then simultaneously press the AM button and CLOCK button for **2 seconds or more**.



Z6U0920W200

1	AM button
2	CLOCK button
3	SEEK button
4	POWER button

Note

- If several DTCs are in the memory, they can be displayed by the SEEK button.

3. To stop the on-board diagnostic test mode, turn the ignition switch to the LOCK position.

SUPPLIER IDENTIFICATION PROCEDURE

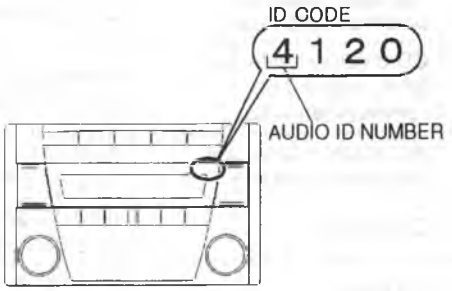
Z6U092066900W06

Note
- When asking the supplier (service center) for repair or replace, verify which supplier the module belongs to and enter in the Audio Repair Order Form.

Identification With Printed Numbers/label

Base unit

1. To get the supplier name, compare the leftmost number of the ID code (4 digits), printed on the upper right corner of the LCD, with the table below.



YLE8175W002

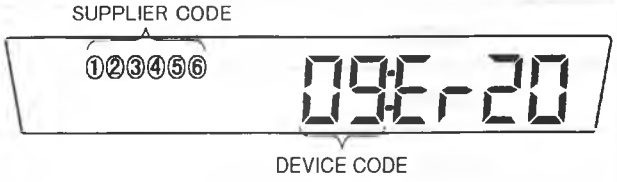
Audio ID number	Supplier name
1	Panasonic
2	Clarion
4	FMS Audio

Upper/lower module

1. Remove the audio unit.
2. Verify the supplier name written in the label attached on each module.

Identification With On-board Diagnostic Test Mode

1. Start the on-board diagnostic test mode.
2. Verify the device code and supplier code displayed in the LCD.



ZLU0920W004

Note
- When no DTCs are in the memory, parts number and supplier code will not be displayed.

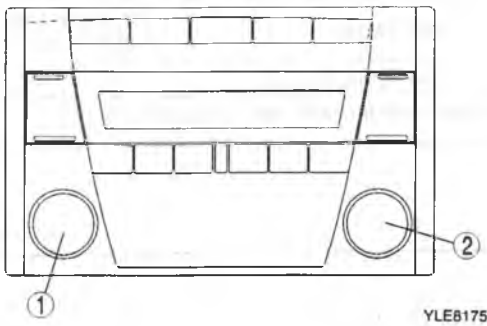
Device code	Parts name
00	Cassette deck (lower module)
03	CD player (upper module)
05	CD changer (external type)
06	CD changer (upper module)
07	MD player (lower module)
09	Base unit

Supplier code	Supplier name
1	FMS Audio
2	Panasonic
3	Clarion

DTC CLEARING PROCEDURE

Z6U092066900W07

1. Start the on-board diagnostic test mode.
2. First press the POWER button, then simultaneously press AUDIO CONT button for **2 seconds or more**.



YLE8175W004

1	POWER button
2	AUDIO CONT button

Caution
- **Before clearing the DTCs, be sure to enter all of them displayed in the on-board diagnostic test mode in the Audio Repair Order Form.**

3. To stop the on-board diagnostic test mode, turn the ignition switch to the LOCK position.

DTC TABLE

Z6U092066900W08

Screen display		Malfunction location	Page
DTC	Output signal		
09:Er22	—	Base unit (peripheral circuit)	(See 09-20-10 DTC 09:ER22.)
09:Er20	—	Power supply circuit of base unit	(See 09-20-11 DTC 09:ER20.)
00:Er10	—	Cassette deck—base unit communication line	(See 09-20-12 DTC 00:ER10.)
03:Er10	—	CD player—base unit communication line	(See 09-20-13 DTC 03:ER10.)
05:Er10	—	CD changer (upper module)—base unit communication line	(See 09-20-13 DTC 05:ER10.)
06:Er10	—	CD changer (external type)—base unit communication line	(See 09-20-14 DTC 06:ER10.)
07:Er10	—	MD player—base unit communication line	(See 09-20-14 DTC 07:ER10.)
03:Er01	—	CD player	(See 09-20-15 DTC 03:ER01.)
03:Er02	CHECK*1 CD*2	CD player	(See 09-20-15 DTC 03:ER02.)
03:Er07	CHECK*1 CD*2	CD player	(See 09-20-16 DTC 03:ER07.)
00:Er01	—	Cassette deck	(See 09-20-16 DTC 00:ER01.)
00:Er03	—	Cassette deck	(See 09-20-17 DTC 00:ER03.)
00:Er04	CHECK*1 TAPE*2	Cassette deck	(See 09-20-17 DTC 00:ER04.)
05:Er01	—	CD changer (external type)	(See 09-20-18 DTC 05:ER01.)
05:Er07	CHECK*1 CD*2	CD changer (external type)	(See 09-20-18 DTC 05:ER07.)
06:Er01	—	CD changer (upper module)	(See 09-20-19 DTC 06:ER01.)
06:Er02	CHECK*1 CD*2	CD changer (upper module)	(See 09-20-19 DTC 06:ER02.)
06:Er07	CHECK*1 CD*2	CD changer (upper module)	(See 09-20-20 DTC 06:ER07.)
07:Er01	—	MD player	(See 09-20-20 DTC 07:ER01.)
07:Er02	CHECK*1 MD*2	MD player	(See 09-20-21 DTC 07:ER02.)
07:Er07	CHECK*1 MD*2	MD player	(See 09-20-21 DTC 07:ER07.)
no Err	—	No stored DTCs	—

*1,*2:When an error occurs, the error messages are displayed three times in the order of *1 and *2, respectively.

DTC 09:ER22

Z6U092066900W09

DTC 09:Er22	Base unit (peripheral circuit)
DETECTION CONDITION	• Base unit detects malfunction in its inner circuit (related to tuner).
POSSIBLE CAUSE	• Base unit malfunction

Diagnostic procedure

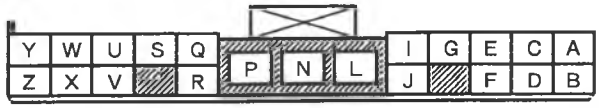
INSPECTION		ACTION
INSPECT BASE UNIT • Clear DTC. • Turn on radio and operate it for **3 seconds or more**. • Start on-board diagnostic test mode. • Is DTC 09:Er22 displayed?	Yes	Follow current audio replacement procedure.
	No	Troubleshooting completed.

DTC 09:ER20

Z6U092066900W10

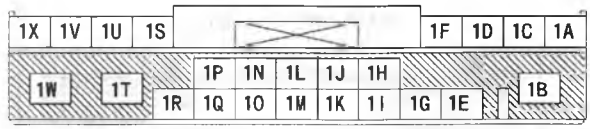
DTC 09:Er20	Power supply circuit of base unit
DETECTION CONDITION	• Voltage detected at base unit terminals 1B and 1R is **less than 8.5 V, or more than 16 V (must not be 16V)**.
POSSIBLE CAUSE	• Weak battery • Malfunction in wiring harness between battery and base unit

JOINT BOX CONNECTOR
(JB-01)



HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

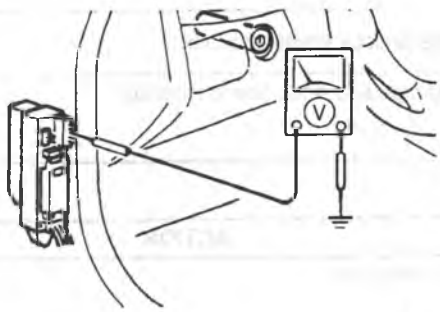
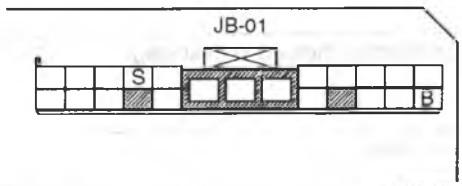
BASE UNIT CONNECTOR

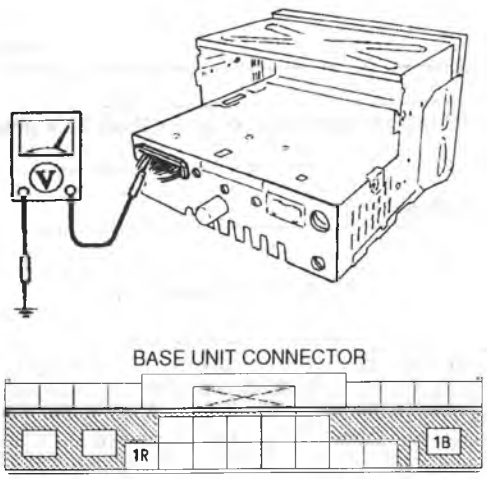


HARNESS SIDE CONNECTOR
(VIEW FROM HARNESS SIDE)

Z6U0920W002

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT BATTERY** • Measure battery voltage. • Is voltage **8.5 V —16 V**?	Yes	Go to next step.
		No	Battery is weak. • Inspect charge/discharge system.
2	**INSPECT WIRING HARNESS BETWEEN BATTERY AND JOINT BOX** • Measure voltage at joint box connector (JB–01) terminals B and S. • Is voltage **8.5 V —16 V**?   Z6U0920W003	Yes	Go to next step.
		No	Repair wiring harness between battery and joint box.

STEP	INSPECTION		ACTION
3	**INSPECT WIRING HARNESS BETWEEN JOINT BOX AND BASE UNIT** • Measure voltage at base unit connector terminals 1B and 1R. • Is voltage **8.5 V —16 V**?  Z6U0920W004	Yes	Go to next step.
		No	Repair wiring harness between joint box and base unit.
4	**INSPECT BASE UNIT** • Clear DTC. • Turn ignition switch to ACC or ON position and wait for **30 seconds or more**. • Start on-board diagnostic test mode. • Is DTC 09:Er20 displayed?	Yes	Follow current audio replacement procedure.
		No	Troubleshooting completed.

DTC 00:ER10

Z6U092066900W11

DTC 00:Er10	Cassette deck —base unit communication line
DETECTION CONDITION	• Base unit detects communication error with cassette deck (lower module).
POSSIBLE CAUSE	• Malfunction of connectors between base unit and cassette deck (lower module) • Cassette deck (lower module) malfunction • Base unit malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT CONNECTOR** • Remove cassette deck (lower module) and inspect connector for the following. — Deformation of pin — Poor connection of female terminal — Pinching of foreign material • Is connector okay?	Yes	Go to next step.
		No	Repair connector, then go to next step.
2	**VERIFY THAT CASSETTE DECK (LOWER MODULE) IS INSTALLED WITH BASE UNIT** • Install cassette deck (lower module) and verify its installation condition. • Is cassette deck securely installed?	Yes	Go to next step.
		No	Securely install cassette deck (lower module), then go to next step.

STEP	INSPECTION		ACTION
3	**INSPECT CASSETTE DECK (LOWER MODULE)** • Clear DTC. • Turn ignition switch to ACC or ON position and wait for **3 seconds or more**. • Start on-board diagnostic test mode. • Is DTC 00:Er10 displayed?	Yes	Follow current audio replacement procedure.
		No	Troubleshooting completed.

DTC 03:ER10

Z6U092066900W12

DTC 03:Er10	CD player—base unit communication line
DETECTION CONDITION	• Base unit detects communication error with CD player (upper module).
POSSIBLE CAUSE	• Malfunction of connectors between base unit and CD player (upper module) • CD player (upper module) malfunction • Base unit malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT CONNECTOR** • Remove CD player (upper module) and inspect connector for the following. — Deformation of pin — Poor connection of female terminal — Pinching of foreign material • Is connector okay?	Yes	Go to next step.
		No	Repair connector, then go to next step.
2	**VERIFY THAT CD PLAYER (UPPER MODULE) IS INSTALLED WITH BASE UNIT** • Install CD player (upper module) and verify its installation condition. • Is CD player securely installed?	Yes	Go to next step.
		No	Securely install CD player (upper module), then go to next step.
3	**INSPECT CD PLAYER (UPPER MODULE)** • Clear DTC. • Turn ignition switch to ACC or ON position and wait for **3 seconds or more**. • Starr on-board diagnostic test mode. • Is DTC 03:Er10 displayed?	Yes	Follow current audio replacement procedure.
		No	Troubleshooting completed.

DTC 05:ER10

Z6U092066900W13

DTC 05:Er10	CD changer—base unit communication line
DETECTION CONDITION	• Base unit detects communication error with CD changer (external type)
POSSIBLE CAUSE	• Malfunction of connectors between base unit and CD changer (external type) • CD changer (external type) malfunction • Base unit malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT CONNECTOR** • Inspect base unit and CD changer (external type) connectors for the following. — Deformation of pin — Poor connection of female terminal — Pinching of foreign material • Are connectors okay?	Yes	Go to next step.
		No	Reconnected connector, then go to next step.

STEP	INSPECTION		ACTION
2	**INSPECT WIRING HARNESS BETWEEN CD CHANGER (EXTERNAL TYPE) AND BASE UNIT** • Inspect wiring harness between base unit and CD changer (external type). • Is wiring harness okay?	Yes	Go to next step.
		No	Securely install CD changer (external type), then go to next step.
3	**INSPECT CD CHANGER (EXTERNAL TYPE)** • Clear DTC. • Turn ignition switch to ACC or ON position and wait for **3 seconds or more**. • Start on-board diagnostic test mode. • Is DTC 05:Er10 displayed?	Yes	Follow current audio replacement procedure.
		No	Troubleshooting completed.

DTC 06:ER10

Z6U092066900W14

DTC 06:Er10	CD changer—base unit communication line
DETECTION CONDITION	• Base unit detects communication error with CD changer (upper module)
POSSIBLE CAUSE	• Malfunction of connectors between base unit and CD changer (upper module) • CD changer (upper module) malfunction • Base unit malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT CONNECTOR** • Remove CD changer (upper module) and inspect connector for the following. — Deformation of pin — Poor connection of female terminal — Pinching of foreign material • Is connector okay?	Yes	Go to next step.
		No	Repair connector, then go to next step.
2	**VERIFY THAT CD CHANGER (UPPER MODULE) IS INSTALLED WITH BASE UNIT** • Install CD changer (upper module) and verify its installation condition. • Is CD changer (upper module) securely installed?	Yes	Go to next step.
		No	Securely install CD changer (upper module), then go to next step.
3	**INSPECT CD CHANGER (UPPER MODULE)** • Clear DTC. • Turn ignition switch to ACC or ON position and wait for **3 seconds or more**. • Start on-board diagnostic test mode. • Is DTC 06:Er10 displayed?	Yes	Follow current audio replacement procedure.
		No	Troubleshooting completed.

DTC 07:ER10

Z6U092066900W15

DTC 07:Er10	MD player—base unit communication line
DETECTION CONDITION	• Base unit detects communication error with MD player (lower module)
POSSIBLE CAUSE	• Malfunction of connectors between base unit and MD player (lower module) • MD player (lower module) malfunction • Base unit malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT CONNECTOR** • Remove MD player (lower module) and inspect connector for the following. — Deformation of pin — Poor connection of female terminal — Pinching of foreign material • Is connector okay?	Yes	Go to next step.
		No	Repair connector, then go to next step.
2	**VERIFY THAT MD PLAYER (LOWER MODULE) IS INSTALLED WITH BASE UNIT** • Install MD player (lower module) and verify its installation condition. • Is MD player (lower module) securely installed?	Yes	Go to next step.
		No	Securely install MD player (lower module), then go to next step.
3	**INSPECT MD PLAYER (LOWER MODULE)** • Clear DTC. • Turn ignition switch to ACC or ON position and wait for **3 seconds or more**. • Start on-board diagnostic test mode. • Is DTC 07:Er10 displayed?	Yes	Follow current audio replacement procedure.
		No	Troubleshooting completed.

DTC 03:ER01

Z6U092066900W16

DTC 03:Er01	CD player (upper module)
DETECTION CONDITION	• CD player (upper module) can not perform insert and eject commands.
POSSIBLE CAUSE	• Defective CD (broken of foreign material stuck/attached) • CD player (upper module) malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is CD able to be ejected?	Yes	Go to next step.
		No	Follow current audio replacement procedure.
2	**INSPECT CD** • Inspect condition of CD where error has occurred. • Is CD okay?	Yes	Go to next step.
		No	Repair (remove foreign material) or replace CD, go to next step.
3	**INSPECT CD PLAYER (UPPER MODULE)** • Clear DTC. • Insert and eject CD with no defect. • Start on-board diagnostic test mode. • Is DTC 03:Er01 displayed?	Yes	Follow current audio replacement procedure.
		No	Troubleshooting completed.

DTC 03:ER02

Z6U092066900W17

DTC 03:Er02	CD player (upper module)
DETECTION CONDITION	**Note** • When error occurs, error message "CHECK CD" is displayed in the LCD. • Can not play CD normally or change tracks.
POSSIBLE CAUSE	• Defective CD (scratches or dirt) • CD player (upper module) malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION	
1	**VERIFY WHETHER MALFUNCTION IS IN CD PLAYER (UPPER MODULE) OR CD** • Play CD and select other song (change tracks). • Does CD player change track?	Yes	Go to Step 3.	
		No	Not able to change particular track.	Go to next step.
			Not able to change any tracks.	Change CD and perform track-change again. • If CD player changes track, go to Step 3. • If not, follow current audio replacement procedure.
2	**INSPECT CD** • Inspect condition of CD where error has occurred. • Is CD okay?	Yes	Go to next step.	
		No	Repair (remove foreign material) or replace CD, go to next step.	
3	**INSPECT CD PLAYER (UPPER MODULE)** • Clear DTC. • Play CD and select other song (change tracks). • Start on-board diagnostic test mode. • Is DTC 03:Er02 displayed?	Yes	Follow current audio replacement procedure.	
		No	Troubleshooting completed.	

DTC 03:ER07

Z6U092066900W18

DTC 03:Er07	CD player (upper module)
DETECTION CONDITION	**Note** • When error occurs, error message "CHECK CD" is displayed in the LCD. • Base unit detects CD reading error.
POSSIBLE CAUSE	• Defective CD (scratches or dirt) • CD player (upper module) malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT CD** • Inspect condition of CD where error has occurred. • Is CD okay?	Yes	Go to next step.
		No	Repair (remove foreign material) or replace CD, go to next step.
2	**INSPECT CD PLAYER (UPPER MODULE)** • Clear DTC. • Insert and play CD with no defect. • Start on-board diagnostic test mode. • Is DTC 03:Er07 displayed?	Yes	Follow current audio replacement procedure.
		No	Troubleshooting completed.

DTC 00:ER01

Z6U092066900W19

DTC 00:Er01	Cassette deck (lower module)
DETECTION CONDITION	• Cassette deck (lower module) can not perform insert and eject commands.
POSSIBLE CAUSE	• Defective cassette tape (deformation, broken, or foreign material stuck/attached) • Cassette deck (lower module) malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is cassette tape able to be ejected?	Yes	Go to next step.
		No	Follow current audio replacement procedure.
2	**INSPECT CASSETTE TAPE** • Inspect condition of cassette tape where error has occurred. • Is cassette tape okay?	Yes	Go to next step.
		No	Repair (remove foreign material) or replace cassette tape, go to next step.
3	**INSPECT CASSETTE DECK (LOWER MODULE)** • Clear DTC. • Insert and eject cassette tape with no defect. • Start on-board diagnostic test mode. • Is DTC 00:Er01 displayed?	Yes	Follow current audio replacement procedure.
		No	Troubleshooting completed.

DTC 00:ER03

Z6U092066900W20

DTC 00:Er03	Cassette deck (lower module)
DETECTION CONDITION	• Base unit detects that reel built into cassette deck does not operate.
POSSIBLE CAUSE	• Defective cassette tape (tape slack, pinched tape in internal cassette deck) • Cassette deck (lower module) malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT CASSETTE TAPE** • Inspect condition of cassette tape where error has occurred. • Is cassette tape okay?	Yes	Go to next step.
		No	Repair (remove tape slack or repair pinched tape) or replace cassette tape, go to next step.
2	**INSPECT CASSETTE DECK (LOWER MODULE)** • Clear DTC. • Insert cassette tape with no defect. • Play cassette tape for **20 seconds or more**. • Start on-board diagnostic test mode. • Is DTC 00:Er03 displayed?	Yes	Follow current audio replacement procedure.
		No	Troubleshooting completed.

DTC 00:ER04

Z6U092066900W21

DTC 00:Er04	Cassette deck (lower module)
DETECTION CONDITION	**Note** • When error occurs, error message "CHECK TAPE" is displayed in the LCD. • Cassette tape is worn out.
POSSIBLE CAUSE	• Tape wear

Diagnostic procedure

STEP	INSPECTION		ACTION
1	**INSPECT CASSETTE TAPE** • Inspect condition of cassette tape where error has occurred. • Is cassette tape okay?	Yes	Go to next step.
		No	Repair (remove tape slack or repair pinched tape) or replace cassette tape, go to next step.
2	**INSPECT CASSETTE DECK (LOWER MODULE)** • Clear DTC. • Insert cassette tape with no defect. • Play cassette tape for **15 seconds or more**. • Start on-board diagnostic test mode. • Is DTC 00:Er04 displayed?	Yes	Follow current audio replacement procedure.
		No	Troubleshooting completed.

DTC 05:ER01

Z6U092066900W22

DTC 05:Er01	CD changer (external type)
DETECTION CONDITION	• Changer function does not operate.
POSSIBLE CAUSE	• Defective CD (broken or foreign material) • Magazine malfunction • CD changer (external type) malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION	
1	**VERIFY WHETHER MALFUNCTION IS IN CD CHANGER OR OTHER PARTS** • Operate changer function. • Is function okay?	Yes	Go to Step 4.	
		No	Not able to change particular CD.	Go to next step.
			Not able to change any CD.	Go to Step 3.
2	**INSPECT CD** • Inspect condition of CD where error has occurred. • Is CD okay?	Yes	Go to next step.	
		No	Repair (remove foreign material) or replace CD, go to next step.	
3	**INSPECT MAGAZINE** • Inspect magazine. • Is magazine okay?	Yes	Go to next step.	
		No	Repair or replace magazine, then go to next step.	
4	**INSPECT CD CHANGER (EXTERNAL TYPE)** • Clear DTC. • Operate changer function. • Start on-board diagnostic test mode. • Is DTC 05:Er01 displayed?	Yes	Follow current audio replacement procedure.	
		No	Troubleshooting completed.	

DTC 05:ER07

Z6U092066900W23

DTC 05:Er07	CD changer (external type)
DETECTION CONDITION	**Note** • When error occurs, error message "CHECK CD" is displayed in the LCD. • Base unit detects CD reading error.
POSSIBLE CAUSE	• Defective CD (scratches or dirt) • CD changer (external type) malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION	
1	**VERIFY WHETHER MALFUNCTION IS IN CD CHANGER OR OTHER PARTS** • Play all CD in magazine. • Is CD changer able to read them properly?	Yes	Go to Step 3.	
		No	Not able to change particular CD.	Go to next step.
			Not able to change any CD.	Go to Step 3.
2	**INSPECT CD** • Inspect condition of CD where error has occurred. • Is CD okay?	Yes	Go to next step.	
		No	Repair (remove foreign material) or replace CD, go to next step.	
3	**INSPECT CD CHANGER (EXTERNAL TYPE)** • Clear DTC. • Insert and play CD with no defect. • Start on-board diagnostic test mode. • Is DTC 05:Er07 displayed?	Yes	Follow current audio replacement procedure.	
		No	Troubleshooting completed.	

DTC 06:ER01

Z6U092066900W24

DTC 06:Er01	CD changer (upper module)
DETECTION CONDITION	• CD changer (upper module) can not perform insert, eject, disc change commands.
POSSIBLE CAUSE	• Defective CD (broken or foreign material stuck/attached) • CD changer (upper module) malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is CD able to be ejected?	Yes	Go to next step.
		No	Follow current audio replacement procedure.
2	**INSPECT CD** • Inspect condition of CD where error has occurred. • Is CD okay?	Yes	Go to next step.
		No	Repair (remove foreign material) or replace CD, go to next step.
3	**INSPECT CD CHANGER (UPPER MODULE)** • Clear DTC. • Insert and eject CD with no defect. • Start on-board diagnostic test mode. • Is DTC 06:Er01 displayed?	Yes	Follow current audio replacement procedure.
		No	Troubleshooting completed.

DTC 06:ER02

Z6U092066900W25

DTC 06:Er02	CD changer (upper module)
DETECTION CONDITION	**Note** • When error occurs, error message "CHECK CD" is displayed in the LCD. • Can not play CD normally or change tracks.
POSSIBLE CAUSE	• Defective CD (scratches or dirt) • CD changer (upper module) malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION	
1	**VERIFY WHETHER MALFUNCTION IS IN CD CHANGER (UPPER MODULE) OR CD** • Play all CDs in changer and select other song (change tracks). • Is CD changer able to change track?	Yes	Go to Step 3.	
		No	Not able to change particular track.	Go to next step.
			Not able to change any tracks.	Change CD and perform track-change again. • If CD changer changes track, go to Step 3. • If not, follow current audio replacement procedure.
2	**INSPECT CD** • Inspect condition of CD where error has occurred. • Is CD okay?	Yes	Go to next step.	
		No	Repair (remove foreign material) or replace CD, go to next step.	
3	**INSPECT CD CHANGER (UPPER MODULE)** • Clear DTC. • Play CD and select other song (change tracks). • Start on-board diagnostic test mode. • Is DTC 06:Er02 displayed?	Yes	Follow current audio replacement procedure.	
		No	Troubleshooting completed.	

DTC 06:ER07

Z6U092066900W26

DTC 06:Er07	CD changer (upper module)
DETECTION CONDITION	**Note** • When error occurs, error message "CHECK CD" is displayed in the LCD. • Base unit detects CD reading error.
POSSIBLE CAUSE	• Defective CD (scratches or dirt) • CD changer (upper module) malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION	
1	**VERIFY WHETHER MALFUNCTION IS IN CD CHANGER (UPPER MODULE) OR CD** • Play all CDs in changer. • Is CD changer able to read them properly?	Yes	Go to Step 3.	
		No	Not able to read particular CD.	Go to next step.
			Not able to read any CD.	Go to Step 3.
2	**INSPECT CD** • Inspect condition of CD where error has occurred. • Is CD okay?	Yes	Go to next step.	
		No	Repair (remove foreign material) or replace CD, go to next step.	
3	**INSPECT CD CHANGER (UPPER MODULE)** • Clear DTC. • Insert and play CD for **12 seconds or more**. • Start on-board diagnostic test mode. • Is DTC 06:Er07 displayed?	Yes	Follow current audio replacement procedure.	
		No	Troubleshooting completed.	

DTC 07:ER01

Z6U092066900W27

DTC 07:Er01	MD player (lower module)
DETECTION CONDITION	• MD player (lower module) can not perform insert and eject commands.
POSSIBLE CAUSE	• Defective MD (broken of foreign material stuck/attached) • MD player (lower module) malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION
1	• Is MD able to be ejected?	Yes	Go to next step.
		No	Follow current audio replacement procedure.
2	**INSPECT MD** • Inspect condition of MD where error has occurred. • Is MD okay?	Yes	Go to next step.
		No	Repair (remove foreign material) or replace MD, go to next step.
3	**INSPECT MD PLAYER (LOWER MODULE)** • Clear DTC. • Insert and eject MD with no defect. • Start on-board diagnostic test mode. • Is DTC 07:Er01 displayed?	Yes	Follow current audio replacement procedure.
		No	Troubleshooting completed.

DTC 07:ER02

Z6U092066900W28

DTC 07:Er02	MD player (lower module)
DETECTION CONDITION	**Note** • When error occurs, error message "CHECK MD" is displayed in the LCD. • Can not play MD normally or change tracks.
POSSIBLE CAUSE	• Defective MD (scratches or dirt) • MD player (lower module) malfunction

Diagnostic procedure

STEP	INSPECTION		ACTION	
1	**VERIFY WHETHER MALFUNCTION IS IN MD PLAYER (LOWER MODULE) OR MD** • Play MD and select other song (change tracks). • Is MD player able to change track?	Yes	Go to Step 3.	
		No	Not able to change particular track.	Go to next step.
			Not able to change any tracks.	Change MD and perform track-change again. • If MD player changes track, go to Step 3. • If not, follow current audio replacement procedure.
2	**INSPECT MD** • Inspect condition of MD where error has occurred. • Is MD okay?	Yes	Go to next step.	
		No	Repair (remove foreign material) or replace MD, go to next step.	
3	**INSPECT MD PLAYER (LOWER MODULE)** • Clear DTC. • Play MD and select other song (change tracks). • Start on-board diagnostic test mode. • Is DTC 07:Er02 displayed?	Yes	Follow current audio replacement procedure.	
		No	Troubleshooting completed.	

DTC 07:ER07

Z6U092066900W29

DTC 07:Er07	MD player (lower module)
DETECTION CONDITION	**Note** • When error occurs, error message "CHECK MD" is displayed in the LCD. • Base unit detects MD reading error.
POSSIBLE CAUSE	• Defective MD (scratches or dirt) • MD player (lower module) malfunction

Diagnostic procedure

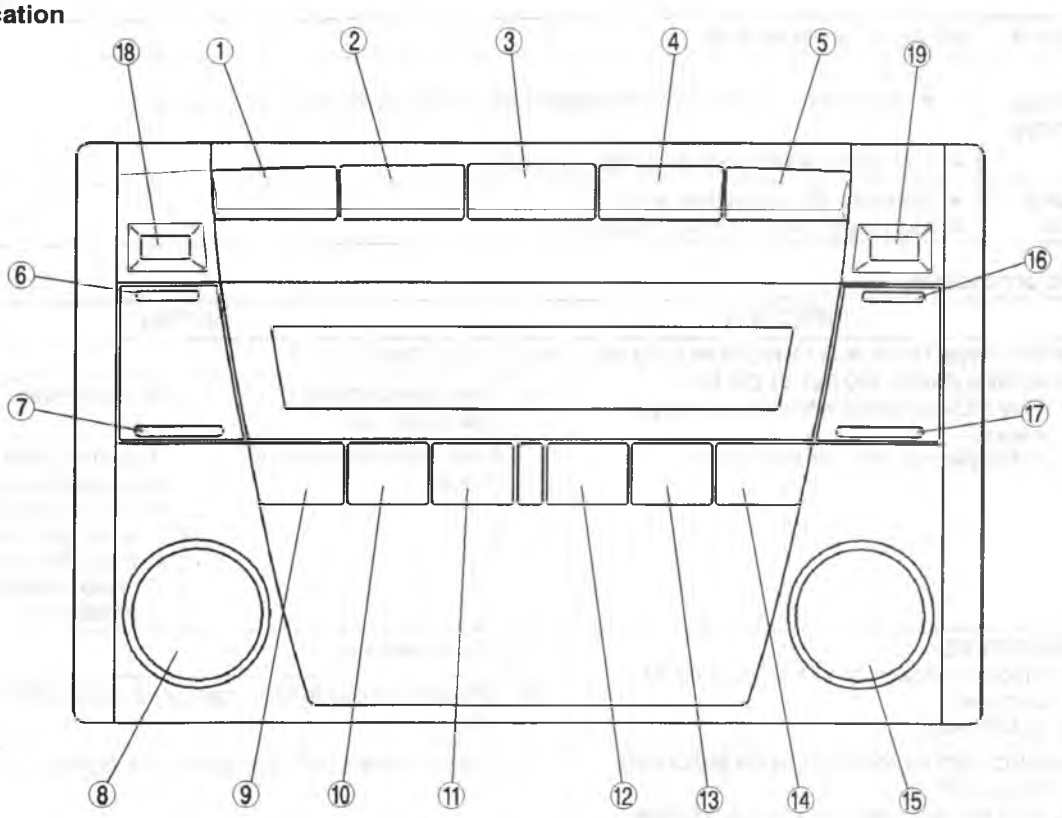
STEP	INSPECTION		ACTION
1	**INSPECT MD** • Inspect condition of MD where error has occurred. • Is MD okay?	Yes	Go to next step.
		No	Repair (remove foreign material) or replace MD, go to next step.
2	**INSPECT MD PLAYER (LOWER MODULE)** • Clear DTC. • Insert and play MD for **12 seconds or more**. • Start on-board diagnostic test mode. • Is DTC 07:Er07 displayed?	Yes	Follow current audio replacement procedure.
		No	Troubleshooting completed.

DIAGNOSTIC ASSIST FUNCTION

Z6U092066900W30

Structural View

Switch location



Z6U0902W100

1	FM1/2 button
2	AM button
3	CD button
4	MD/TAPE button
5	CLOCK button
6	SEEK button (upper)
7	SEEK button (lower)
8	POWER/VOL button
9	Preset button "1"
10	Preset button "2"

11	Preset button "3"
12	Preset button "4"
13	Preset button "5"
14	Preset button "6"
15	AUDIO CONT/TUNE button
16	SCAN button
17	AUTO-M button
18	LOAD button (CD CHANGER)
19	EJECT button (CD PLAYER or CD CHANGER)

LCD inspection

1. With audio on, first press the POWER button, then simultaneously press the SEEK button (upper) for **approximately 1 second**.
2. Inspect the LCD according to the following table:

Inspection	Display	Action	
Start LCD inspection mode.	 ZLU0920W005	Characters displayed in LCD are not truncated or faint.	LCD is okay.
		Other than above.	Replace base unit.

3. Turn the audio off or the ignition switch to the LOCK position to stop the diagnostic assist function.

Button inspection

1. With audio on, first press the POWER button, then simultaneously press the CLOCK button for **approximately 1 second**.
2. Inspect the button according to the following table:

Note

- The button inspection mode is for the base unit buttons. The lower module (cover) buttons cannot be inspected in this mode. (The buzzer will not sound.)
  Cassette deck: DOLBY button, EJECT button
  MD player: DISP button, EJECT button

Inspection	Display	Action	
• Start button inspection mode. • Press the all buttons on base unit.	—	Buzzer is sound.	Button is okay.
		Buzzer is not sound.	Replace base unit.

3. Turn the audio off or the ignition switch to the LOCK position to stop the diagnostic assist function.

Speaker inspection

1. With audio on, first press the POWER button, then simultaneously press the AUTO–M button for **approximately 1 second**.
2. Inspect the speaker according to the following table:

Inspection	Display	Action	
• Start speaker inspection mode. • Does each speaker output sound in the following order? 1. Left front door speaker 2. Right front door speaker 3. Left rear speaker 4. Right rear speaker	—	Yes	Speakers and wiring harness between base unit and speakers are okay.
		No	Inspect the following parts. • Malfunctioning speaker • Wiring harness between base unit and malfunctioning speaker

3. Turn the audio off or the ignition switch to the LOCK position to stop the diagnostic assist function.

Radio reception condition inspection

1. With audio on and at radio mode, first press the POWER button, then simultaneously press the preset button "2" for **approximately 1 second**.
2. Inspect the radio reception condition according to the following table:

Inspection	Display	Action
Start radio reception condition inspection mode.	NORMAL  5 GRADUATIONS OR ABOVE YLE8124W010	Antenna, antenna feeder, and base unit are okay.
	 3–4 GRADUATIONS YLE8124W011	Change frequency (channel) and inspect again.
	MALFUNCTIONING  2 GRADUATIONS OR BELOW YLE8124W012	Inspect antenna and antenna feeder. • If either or them is not okay, replace malfunctioning part. • If both are okay, replace base unit.

3. Turn the audio off or the ignition switch to the LOCK position to stop the diagnostic assist function.

Diversity reception system inspection

1. With audio on and at radio (FM) mode, first press the POWER button, then simultaneously press the FM1/2 button for **approximately 1 second**.
2. Inspect the diversity reception system according to the following table:

Caution

- **Even if the system is normal, radio reception may be difficult depending on where the system is inspected (indoors/outdoors, or conditions at the location). Before inspecting the system, verify that radio reception is adequate.**

Inspection	Display	Action	
• Start diversity reception system inspection mode. • Switch antenna (main or sub) with SEEK buttons.	▲ USING ONLY MAIN ANTENNA YLE8124W014	Speakers output sound.	Main antenna, main antenna feeder, and base unit are okay.
		Speakers do not output sound.	Inspect main antenna and main antenna feeder. • If either or them is not okay, replace malfunctioning part. • If both are okay, replace base unit.
	▼ USING ONLY SUB ANTENNA YLE8124W013	Speakers output sound.	Sub antenna, sub antenna feeder, and base unit are okay.
		Speakers do not output sound.	Inspect sub antenna and sub antenna feeder. • If either or them is not okay, replace malfunctioning part. • If both are okay, replace base unit.

3. Turn the audio off or the ignition switch to the LOCK position to stop the diagnostic assist function.

Audio amplifier (external) inspection

1. With audio on, first press the POWER button, then simultaneously press the SCAN button for **approximately 1 second**.
2. Inspect the audio amplifier (external) according to the following table:

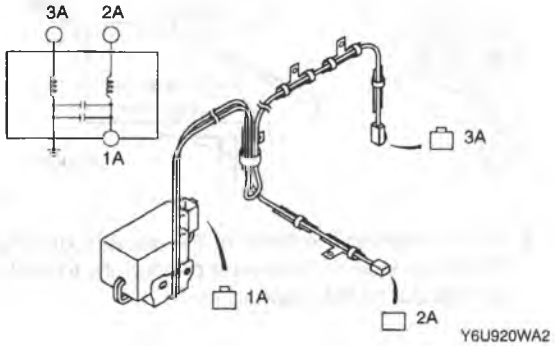
Inspection	Display	Action	
Start audio amplifier (external) inspection mode.	NORMAL AMP-On AUDIO AMPLIFIER OPERATING SIGNAL IS OUTPUT YLE8124W025	Speakers output sound.	System is okay.
		Speakers do not output sound.	Inspect following parts. • audio amplifier (external) • Speakers • Wiring harness (Base unit—audio amplifier (external))
	MALFUNCTIONING AMP-OF AUDIO AMPLIFIER OPERATING SIGNAL IS NOT OUTPUT YLE8124W026	Replace base unit.	

3. Turn the audio off or the ignition switch to the LOCK position to stop the diagnostic assist function.

NOISE FILTER INSPECTION

Z6U092066869W01

1. Remove the noise filter.
2. Verify that resistance between noise filter terminals (+)and A, (–) and a bare metal part of the noise filter is 0.1 Ω using an ohmmeter.
   - If not as specified, replace the noise filter.



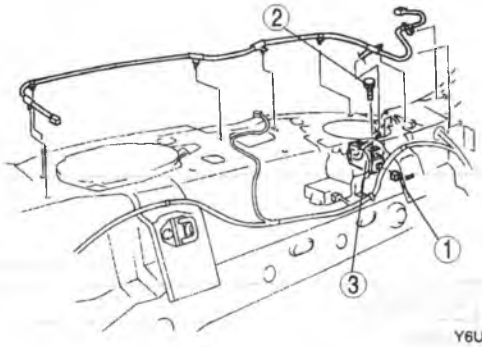
Y6U920WA2

NOISE FILTER REMOVAL/INSTALLATION

Z6U092066869W02

1. Disconnect the negative battery cable.
2. Remove the rear package trim.
3. Remove the driver-side rear speaker.
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.

1	Connector
2	Screw
3	Noise filter



Y6U920WA1

CIGARETTE LIGHTER INSPECTION

Z6U092067000W01

1. Turn the ignition switch to ACC position.
2. Verify that the cigarette lighter plug will operate normally **10 – 20 seconds** after pressing the plug into the socket.
   - If the cigarette lighter does not operate normally, replace the cigarette lighter, ring, and socket.

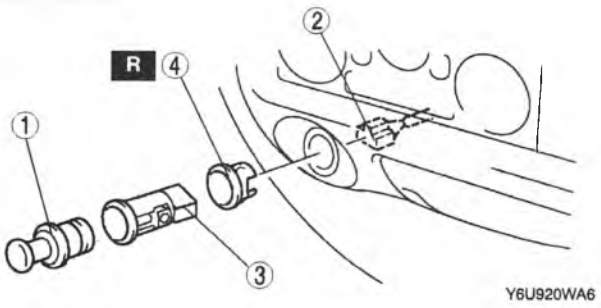
CIGARETTE LIGHTER REMOVAL/INSTALLATION

Z6U092067000W02

Note
- If the socket is removed, replace the ring with a new one. Do not reuse the ring.
- If the cigarette lighter is malfunctioning, replace the cigarette lighter plug and the socket as a set.

1. Disconnect the negative battery cable.
2. Remove the center panel. (See 09-17-4 CENTER PANEL REMOVAL/INSTALLATION.)
3. Remove the climate control unit. (See 07-40-20 CLIMATE CONTROL UNIT REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

5. Install in the reverse order of removal.



Y6U920WA6

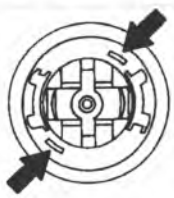
1	Cigarette lighter plug
2	Connector
3	Socket (See 09-20-26 Socket Removal Note)
4	Ring

Socket Removal Note

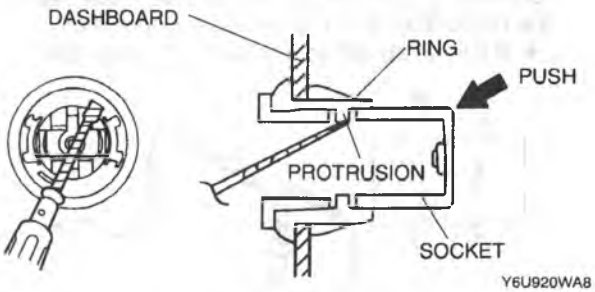
1. Put your hand into the dashboard through the hole where the climate control unit has been removed.

Note

- Two holes (protrusions on the ring) are located opposite each other on the socket.

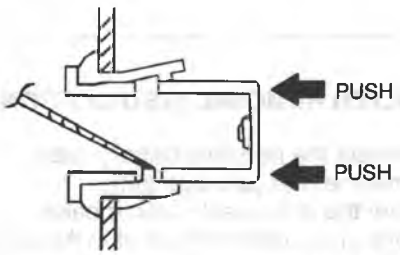

Y6U920WA7

2. While pushing the protrusion through one of the holes using a tape-wrapped flathead screwdriver, push the back of the socket to disengage the ring from the socket.



Y6U920WA8

3. While pushing the back of the socket, disengage the other side in the same procedure to pull the socket out of the dashboard.



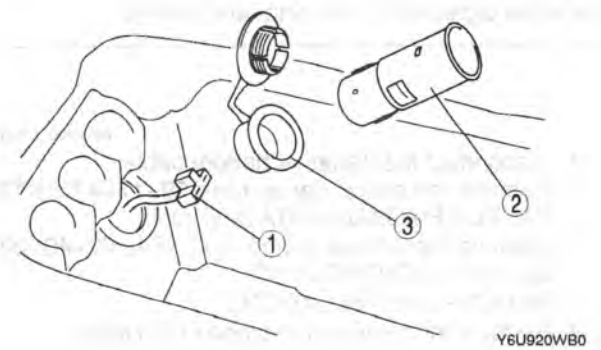
Y6U920WA9

ACCESSORY SOCKET REMOVAL/INSTALLATION

Note

- If the socket is removed, replace the cap with a new one. Do not reuse the cap.

1. Disconnect the negative battery cable.
2. Remove the rear console. (See 09-17-5 REAR CONSOLE REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.



Y6U920WB0

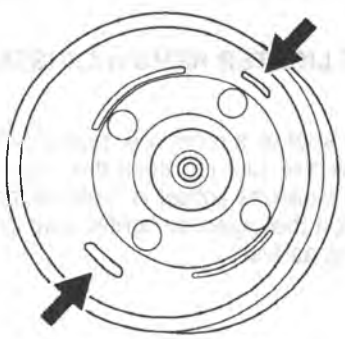
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1	Connector
2	Socket (See 09-20-26 Socket Removal Note)
3	Cap

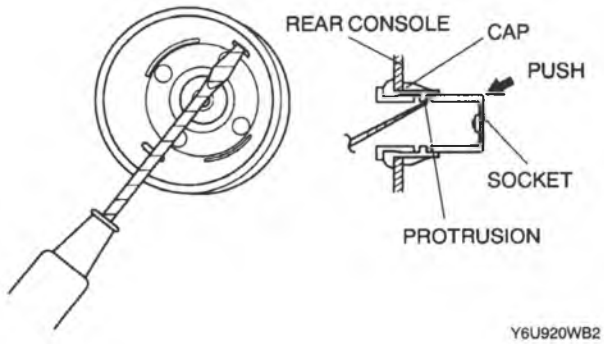
Socket Removal Note

Note

- Two holes (protrusions on the ring) are located opposite each other on the socket.

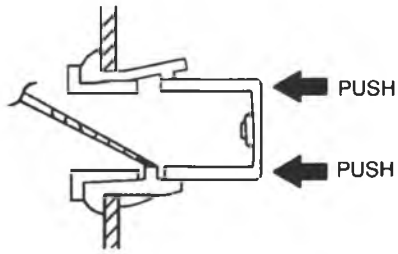

Y6U920WB1

1. While pushing the protrusion through one of the holes using a tape-wrapped flathead screwdriver, push the back of the socket to disengage the cap from the socket.



Y6U920WB2

2. While pushing the back of the socket, disengage the other side in the same procedure to pull the socket out of the rear console.

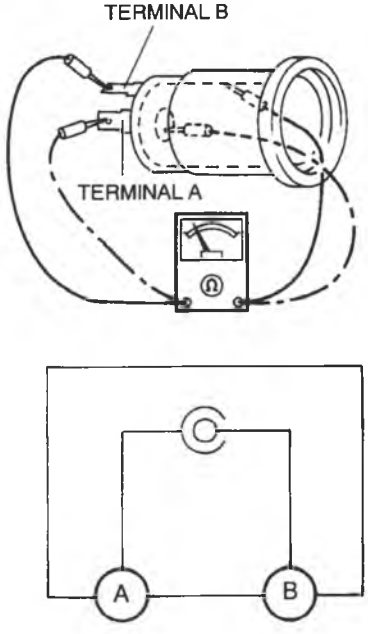


Y6U920WB3

ACCESSORY SOCKET INSPECTION

Z6U092066290W02

1. Remove the accessory socket. (See 09-20-26 ACCESSORY SOCKET REMOVAL/INSTALLATION.)
2. Inspect for continuity between the accessory socket terminals A and B using an ohmmeter as shown in the figure.
   - If not as specified, replace the accessory socket.



Y6U920WB4

09-21 POWER SYSTEMS

FUSE SERVICE CAUTION 09-21-1
MAIN FUSE REMOVAL/
INSTALLATION 09-21-1
ROOM FUSE INSTALLATION 09-21-1
IGNITION SWITCH REMOVAL/
INSTALLATION 09-21-1
IGNITION SWITCH INSPECTION 09-21-2
KEY REMINDER SWITCH
INSPECTION 09-21-2

FUSE SERVICE CAUTION

Z6U092166000W01

Caution

- **Determine and correct the cause of the burnt fuse before replacing it with the specified type. If the fuse is replaced before doing this, it may burn again.**

MAIN FUSE REMOVAL/INSTALLATION

Z6U092166761W01

1. Disconnect the negative battery cable.
2. Remove the main fuse block cover.
3. Remove the main fuse block mounting nuts.
4. Remove the MAIN fuse mounting bolt to remove the MAIN fuse.
5. Install in the reverse order of removal.

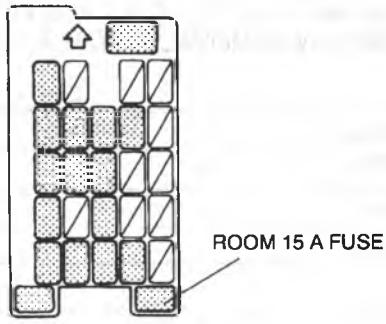
ROOM FUSE INSTALLATION

Z6U092166731W01

Note

- When the ROOM fuse is burnt or removed, the malfunction indicator lamp illuminates. If the ROOM fuse is replaced or installed with the ignition switch at ON, the malfunction indicator lamp will continue to illuminate.

1. Turn the ignition switch to LOCK.
2. Install the ROOM 15 A fuse.

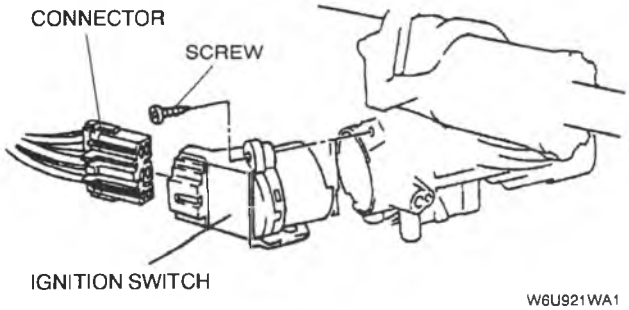


X6U921WA0

IGNITION SWITCH REMOVAL/INSTALLATION

Z6U092166151W01

1. Disconnect the negative battery cable.
2. Remove the column cover.
3. Disconnect the ignition switch connector.
4. Remove the screw to remove the ignition switch.
5. Install in the reverse order of removal.

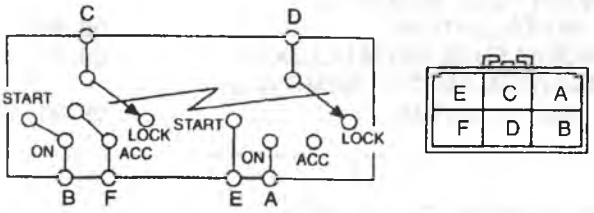


W6U921WA1

IGNITION SWITCH INSPECTION

Z6U092166151W02

1. Disconnect the negative battery cable.
2. Remove the column cover.
3. Disconnect the ignition switch connector.
4. Check for continuity between the ignition switch terminals by using an ohmmeter.
   - If not as specified, replace the ignition switch.



W6U921WA3

○—○ : Continuity

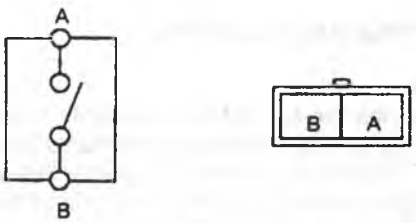
Ignition key position	Terminal					
	C	D	F	B	A	E
LOCK						
ACC	○		○			
ON	○	○	○	○	○	
START	○	○		○		○

W6U921WA2

KEY REMINDER SWITCH INSPECTION

Z6U092166152W01

1. Disconnect the negative battery cable.
2. Remove the column cover.
3. Disconnect the key reminder switch connector.
4. Check for continuity between the key reminder switch terminals by using an ohmmeter.
   - If not as specified, replace the steering lock. (See 06-12-5 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)



W6U921WA5

○—○ : Continuity

Ignition key position	Terminal	
	A	B
key inserted	○	○
key removed		

W6U921WA4

09-22 INSTRUMENTATION/DRIVER INFO.

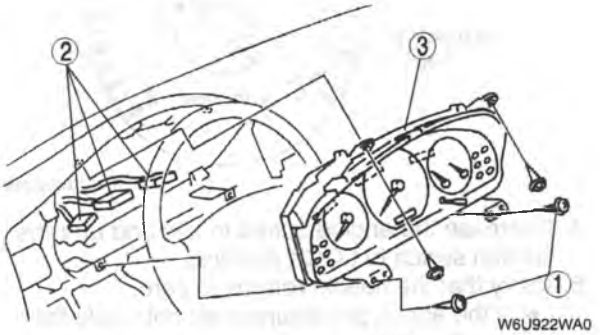
INSTRUMENT CLUSTER REMOVAL/INSTALLATION 09-22-1
INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY 09-22-1
INSTRUMENT CLUSTER INSPECTION 09-22-2
Speedometer 09-22-2
Tachometer 09-22-2
Fuel Gauge 09-22-2
Water Temperature Gauge 09-22-2
INSTRUMENT CLUSTER REPAIR 09-22-2
Tachometer 09-22-2
INSTRUMENT CLUSTER INPUT/ OUTPUT CHECK MODE 09-22-3
Operating Order 09-22-4
Checking Order 09-22-4
Inspection of Diagnostic Trouble Codes 09-22-5
WARNING AND INDICATOR LIGHT BULB REMOVAL/INSTALLATION 09-22-8
FUEL GAUGE SENDER UNIT INSPECTION 09-22-9
OIL PRESSURE SWITCH INSPECTION 09-22-9
WATER TEMPERATURE SENDER UNIT REMOVAL 09-22-10
WATER TEMPERATURE SENDER UNIT INSTALLATION 09-22-10
WATER TEMPERATURE SENDER UNIT INSPECTION 09-22-10
HORN REMOVAL/INSTALLATION 09-22-11
HORN RELAY INSPECTION 09-22-11

INSTRUMENT CLUSTER REMOVAL/INSTALLATION

Z6U092255430W01

1. Disconnect the negative battery cable.
2. Remove the meter hood. (See 09-17-7 METER HOOD REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

1	Screw
2	Connector
3	Instrument cluster



W6U922WA0

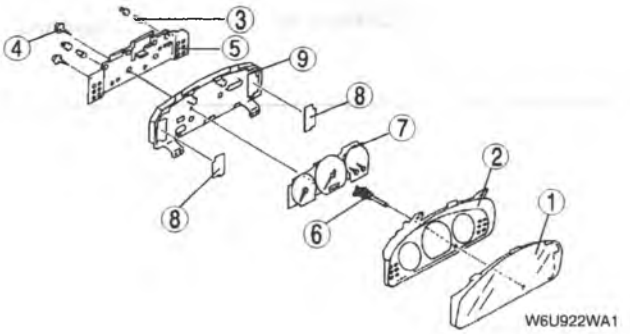
INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY

Z6U092255430W02

Caution
- **If the instrument cluster is dropped or damaged, the system will not operate properly and it may become the cause of trouble or malfunction.**

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

1	Front glass
2	Window plate
3	Bulb
4	Screw
5	Print plate
6	Odometer/tripmeter switch lever
7	Display unit assembly
8	Warning lens
9	Case



W6U922WA1

INSTRUMENT CLUSTER INSPECTION

Z6U092255430W03

Speedometer

1. Inspect the speedometer setting it in the input/output check mode DTC 12. (See 09-22-3 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)

Tachometer

1. Inspect the tachometer setting it in the input/output check mode DTC 13. (See 09-22-3 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)

Fuel Gauge

1. Inspect the fuel gauge setting it in the input/output check mode DTC 23. (See 09-22-3 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)

Water Temperature Gauge

1. Inspect the water temperature gauge setting it in the input/output check mode DTC 25. (See 09-22-3 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)

INSTRUMENT CLUSTER REPAIR

Z6U092255430W04

Tachometer

Note

- The tach needle will not return to zero if the engine is turned off while the engine speed is 4,000 rpm or higher when the Room fuse is not installed. The tach needle will continue to rotate clock wise until it rests on the wrong side of the stopper pin. If a customer complains of this concern, inspect the vehicle and if necessary, repair according to the following steps.

1. Verify the concern.



X6U922WA1

2. Verify that the Room fuse is installed.
3. Start the engine and increase the engine speed to **approximately 5,500 rpm** or until the needle begins to move away from the stopper pin (counter-clock wise).



X6U922WA2

4. Decrease the engine speed to idle and turn the ignition switch to LOCK position.
5. Verify that the needle returns to zero.
   - If the above procedure does not move the needle back to zero, remove the lens and carefully move the needle by hand.



X6U922WA3

INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE

Z6U092255430W05

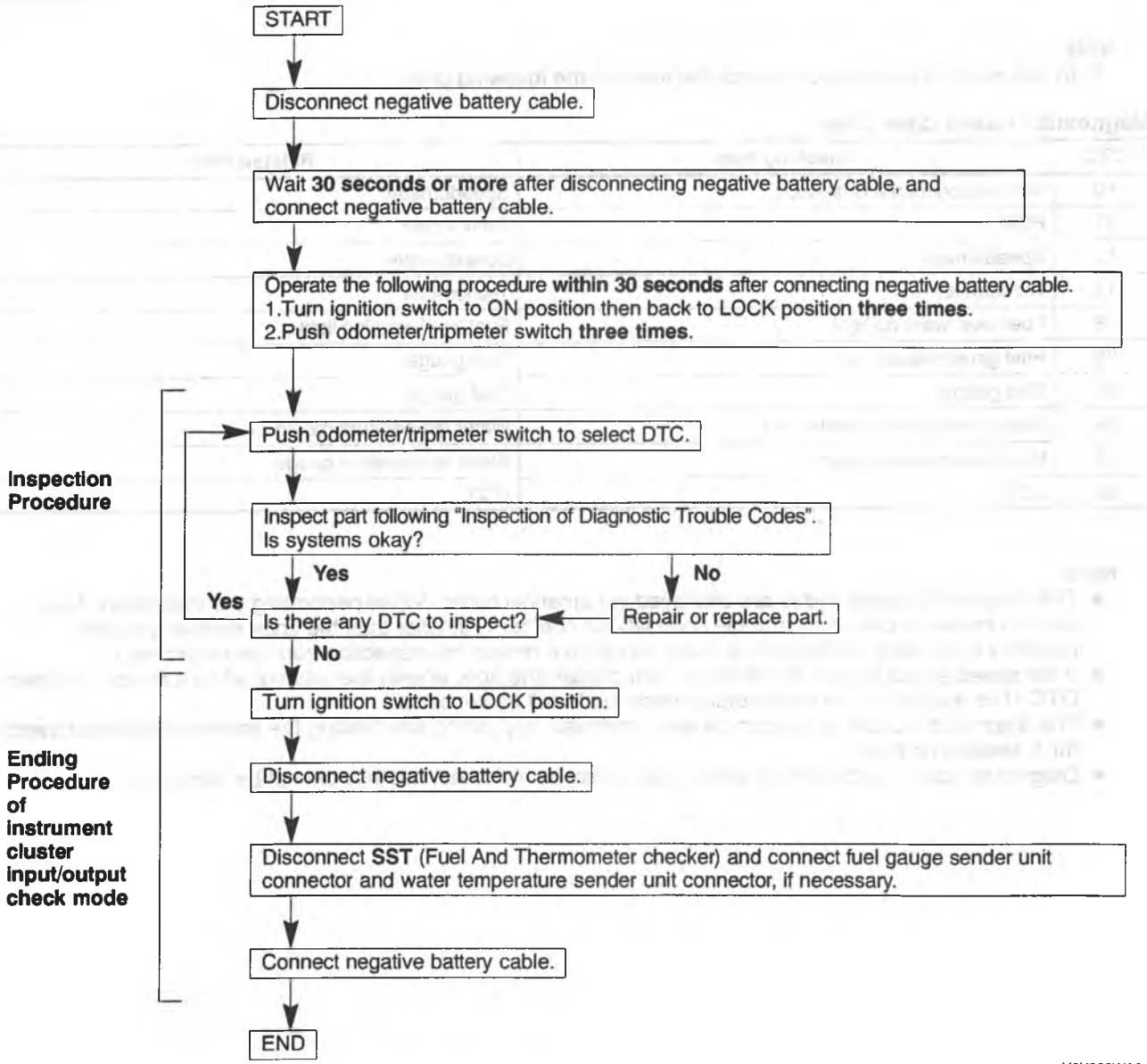
Note
- In this mode, it is possible to check the items in the following chart.

Diagnostic Trouble Code Chart

DTC	Checking item	Related item
10	Vehicle speedometer sensor	Speedometer
11	PCM	Tachometer
12	Speedometer	Speedometer
13	Tachometer	Tachometer
16	Fuel-level warning light	Fuel-level warning light
22	Fuel gauge sender unit	Fuel gauge
23	Fuel gauge	Fuel gauge
24	Water temperature sender unit	Water temperature gauge
25	Water temperature gauge	Water temperature gauge
26	LCD	LCD

Note
- The diagnostic trouble codes are displayed in numerical order. (While performing the inspection, if you want to inspect a diagnostic trouble code whose number is smaller than the code number you are currently inspecting, terminate the check mode then repeat the inspection from the beginning.)
- If the speed signal is put into the instrument cluster (the front wheels are rotated) while a code other than DTC 10 Is displayed, the input/output check mode will be cancelled.
- The diagnostic trouble codes can be fast-forwarded by pushing and holding the odometer/tripmeter switch for **1 second or more**.
- Diagnostic trouble codes which are not listed may be indicated, but they cannot be inspected.

Operating Order



Y6U922WA0

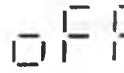
Checking Order

Note

- When inspecting more than two check codes, perform the inspection by following the priority order of inspection indicated in the chart below.

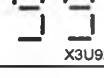
Priority order of inspection	IG switch position	Check code
1	ON	22, 24
2		10, 11, 12, 13, 16, 23, 25, 26

Inspection of Diagnostic Trouble Codes

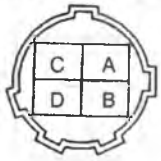
DTC 10	Vehicle speed input signal		
INSPECTION		**INDICATION**	**ACTION**
Rotate drive wheels using chassis roller.		 X3U922WAN	Input signal to instrument cluster is okay.
		 X3U922WAP	Inspect following parts • Vehicle speedometer sensor • Wiring harness (Instrument cluster—vehicle speedometer sensor)

DTC 11	Engine speed input signal		
INSPECTION		**INDICATION**	**ACTION**
Start engine.		 X3U922WAQ	Input signal to instrument cluster is okay.
		 X3U922WAR	Inspect following parts • PCM • Wiring harness (PCM—instrument cluster)

DTC 12	Operation signal to speedometer			
INSPECTION		**INDICATION**	**SITUATION**	**ACTION**
Wait for **2 seconds** after selecting DTC 12.		 X3U922WAS	Speedometer needle moves full scale then returns to **60 km/h or 60 MPH**.	Speedometer is okay.
			Other than stated above.	Replace display unit assembly.
		 X3U922WAT	—	

DTC 13	Operation signal to tachometer			
INSPECTION		**INDICATION**	**SITUATION**	**ACTION**
Wait for **2 seconds** after selecting DTC 13.		 X3U922WAU	Tachometer needle moves full scale then returns to **3000 rpm**.	Tachometer is okay.
			Other than stated above.	Replace display unit assembly.
		 X3U922WAV	—	

DTC 16	Operation signal to fuel-level warning light		
INSPECTION	**INDICATION**	**SITUATION**	**ACTION**
Wait for **2 seconds** after selecting DTC 16.	017 (Turns on and off) X3U922WAX	Fuel-level warning light turns on and off **three times**.	Fuel-level warning light is okay.
		Other than stated above.	Inspect bulb for burn out or looseness. • If there is malfunction, replace or reinstall bulb as necessary. • If bulb is okay, replace instrument cluster.

DTC 22	Fuel level signal
FUEL GAUGE SENDER UNIT CONNECTOR  Y6U922WTX	

Diagnostic procedure

STEP	INSPECTION	INDICATION	SITUATION	ACTION
1	Check the LCD indication.	000 Y6U922WA2	—	Inspect following parts • Fuel gauge sender unit • Wiring harness (Instrument cluster—fuel gauge sender unit)
		255 Y6U922WA1	—	Inspect following parts • Fuel gauge sender unit • Wiring harness (Instrument cluster—fuel gauge sender unit—GND)
		001 ⋮ 254 W6U922WB7	—	Go to next step.
2	Disconnect the fuel pump connector. Connect the red lead of **SST** (Fuel & Thermometer Checker) to terminal B of fuel pump connector and ground to the black lead. Set up the **SST** (Fuel & Thermometer Checker) resistance to **10** Ω.	027 ⋮ 032 W6U922WB8	The LCD indication range is **27—32**.	Go to next step.
			Other than as stated above.	Replace the display unit assembly.
3	Set up the SST (Fuel & Thermometer Checker) resistance to **55** Ω.	105 ⋮ 111 W6U922WB9	The LCD indication range is **105—111**.	Go to next step.
			Other than as stated above.	Replace the display unit assembly.

STEP	INSPECTION	INDICATION	SITUATION	ACTION
4	Set up the SST (Fuel & Thermometer Checker) resistance to **100** Ω.	 W6U922WBA	The LCD indication range is **143—149**.	Instrument cluster is okay.
			Other than as stated above.	Replace the display unit assembly.

DTC 23	Operation signal to fuel gauge		
INSPECTION	INDICATION	SITUATION	ACTION
Wait for **2 seconds** after selecting DTC 23.	(No indication)	Fuel gauge indicates in following order for every **2 seconds**. • F→1/2→E→F (cyclic)	Fuel gauge is okay.
		Other than stated above.	Replace display unit assembly.

DTC 24	Water temperature signal

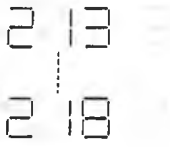
WATER TEMPERATURE SENDER UNIT CONNECTOR



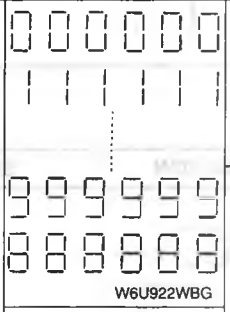
Y6U922WSX

Diagnostic procedure

STEP	INSPECTION	INDICATION	SITUATION	ACTION
1	Check the LCD indication.	 Y6U922WA2	—	Inspect following parts • Fuel gauge sender unit • Wiring harness (Instrument cluster—water temperature sender unit)
		 Y6U922WA1		
		 W6U922WBD	—	Go to next step.
2	Disconnect the water temperature sender unit connector. Connect the red lead of **SST** (Fuel & Thermometer Checker) to terminal A of water temperature sender unit connector and ground to the black lead. Set up the **SST** (Fuel & Thermometer Checker) resistance to **23** Ω.	 W6U922WBE	The LCD indication range is **86—92**.	Go to next step.
			Other than as stated above.	Replace the display unit assembly.
3	Set up the **SST** (Fuel & Thermometer Checker) resistance to **120** Ω.	 W6U922WBF	The LCD indication range is **185—191**.	Go to next step.
			Other than as stated above.	Replace the display unit assembly.

STEP	INSPECTION	INDICATION	SITUATION	ACTION
4	Set up the **SST** (Fuel & Thermometer Checker) resistance to **230** Ω.	 W6U922WBH	The LCD indication range is **213—218**.	Instrument cluster is okay.
			Other than as stated above.	Replace the display unit assembly.

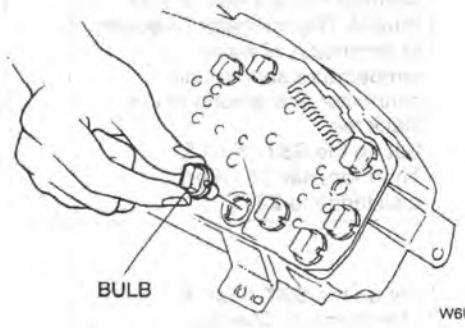
DTC 25	Operation signal to water temperature gauge		
INSPECTION	**INDICATION**	**SITUATION**	**ACTION**
Wait for **2 seconds** after selecting DTC 25.	(No indication)	Water temperature gauge indicates in following order for every **2 seconds**. • H→Center→C→H (cyclic)	Water temperature gauge is okay.
		Other than stated above.	Replace instrument cluster.

DTC 26	LCD indication		
INSPECTION	**INDICATION**	**SITUATION**	**ACTION**
Wait for **2 seconds** after selecting DTC 26.	 W6U922WBG	Indication is normal.	LCD is okay.
	(Display the number sequentially from 1 to 9 and all segment are displayed)	Other than stated above.	Replace display unit assembly.

WARNING AND INDICATOR LIGHT BULB REMOVAL/INSTALLATION

Z6U092255431W01

1. Disconnect the negative battery cable.
2. Remove the meter hood. (See 09-17-7 METER HOOD REMOVAL/INSTALLATION.)
3. Remove the instrument cluster. (See 09-22-1 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
4. Turn the socket counterclockwise to remove the bulb as shown in the figure.



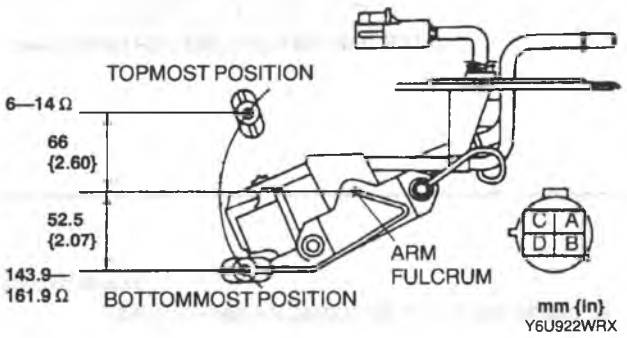
W6U922WA2

5. Install in the reverse order of removal.

FUEL GAUGE SENDER UNIT INSPECTION

Z6U092260960W01

1. Remove the fuel pump. (See 01-14-12 FUEL PUMP REMOVAL/INSTALLATION.)
2. Move the float to the topmost and bottommost positions, and verify that the resistance between terminals A and D of the unit and the position of the float are as indicated in the figure.
   - If they are not as indicated, replace the fuel gauge sender unit. (See 01-14-12 FUEL PUMP REMOVAL/INSTALLATION.)



OIL PRESSURE SWITCH INSPECTION

Z6U092218500W01

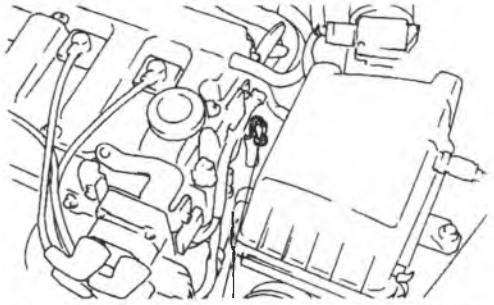
1. Verify that the oil pressure warning light illuminates when the ignition switch is turned to ON.
2. Verify that the oil pressure warning light goes off when the engine is started.
   - If the oil pressure warning light does not illuminate or remains illuminated, inspect the oil pressure warning light bulb and related wiring harness.
3. If the oil pressure warning light bulb and related wiring harness are normal, inspect the oil pressure. (See 01-11-2 OIL PRESSURE INSPECTION.)
   - If the oil pressure is normal, replace the oil pressure switch. (See 01-11-2 OIL PRESSURE INSPECTION.)

WATER TEMPERATURE SENDER UNIT REMOVAL

Z6U092218510W01

1. Disconnect the negative battery cable.
2. Disconnect the water temperature sender unit connector.
3. Remove the water temperature sender unit.

FS



WATER TEMPERATURE SENDER UNIT W6U922WA4

KL

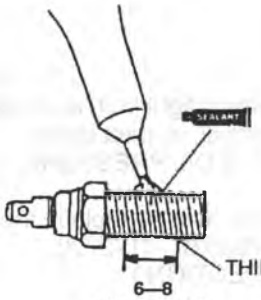


WATER TEMPERATURE SENDER UNIT W6U922WAE

WATER TEMPERATURE SENDER UNIT INSTALLATION

Z6U092218510W02

1. Apply sealant from the third thread to the top thread.



W6U922WA5

2. Install the water temperature sender unit.

Tightening torque
11.8—17.6 N·m {120—180 kgf·cm, 105—156 in·lbf} [FS]
6.4—9.3 N·m {65—95 kgf·cm, 57—82 in·lbf} [KL]

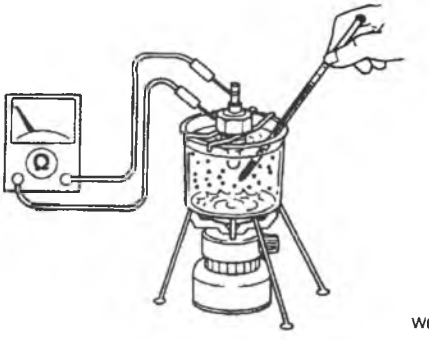
3. Connect the water temperature sender unit connector.
4. Connect the negative battery cable.

WATER TEMPERATURE SENDER UNIT INSPECTION

Z6U092218510W03

1. Remove the water temperature sender unit.
2. Place the sender unit in a container of water.
3. Heat the water gradually.
4. Using an ohmmeter, measure and verify that the resistance between terminal of the sender unit and the sender unit body is as shown below.
   - If not as specified, replace the water temperature sender unit.

Water temperature (°C {°F})	Resistance (Ω)
49.8—50.2 {121.7—122.3}	189.4—259.6

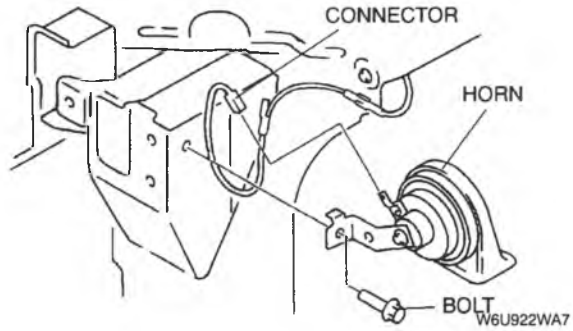


W6U922WA6

HORN REMOVAL/INSTALLATION

Z6U092266790W01

1. Disconnect the negative battery cable.
2. Remove the headlight. (See 09-18-2 HEADLIGHT REMOVAL/INSTALLATION.)
3. Disconnect the horn connector.
4. Remove the bolt.
5. Remove the horn.
6. Install in the reverse order of removal.



HORN RELAY INSPECTION

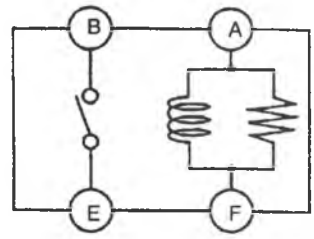
Z6U092267744W01

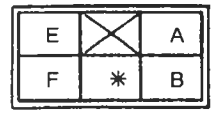
1. Remove the horn relay.
2. Check for continuity between the horn relay terminals by using an ohmmeter.
   - If not as specified, replace the horn relay.

○—○ : Continuity

Step	Terminal			
	A	F	B	E
1	○	○		
2	B+	GND	○	○

W6U922WA8





W6U922WA9

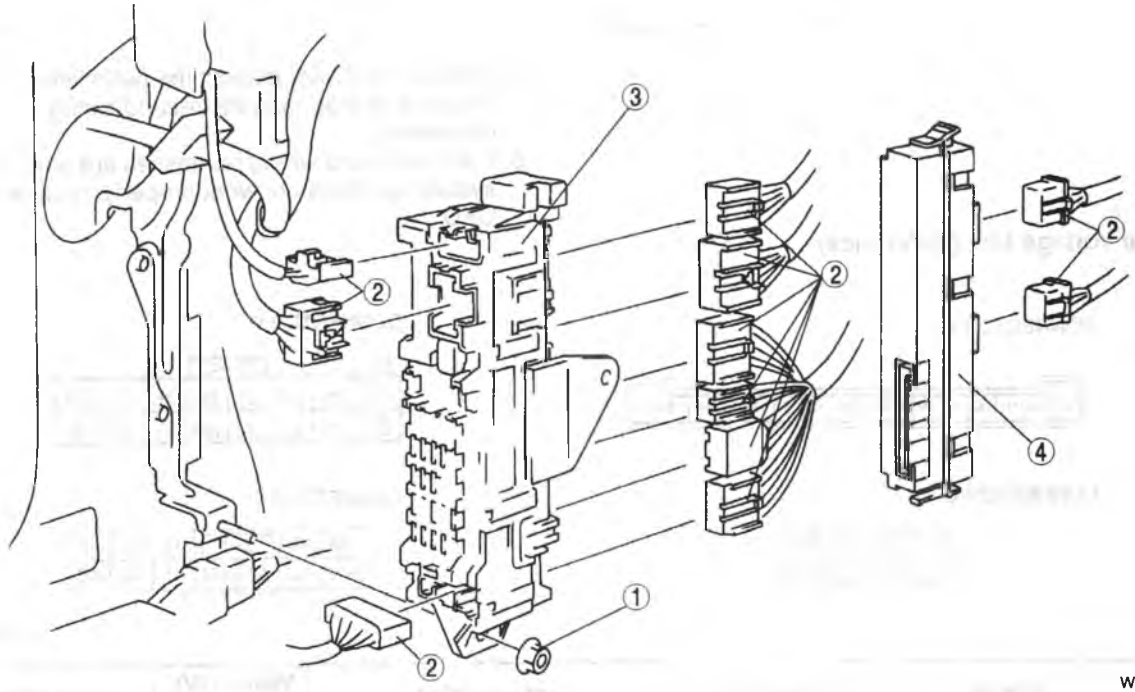
09-40 CONTROL SYSTEM

CPU REMOVAL/INSTALLATION **09-40-1**
CPU INSPECTION **09-40-1**
Terminal Voltage List (Reference) **09-40-2**

CPU REMOVAL/INSTALLATION

Z6U094067580W01

1. Disconnect the negative battery cable.
2. Remove the driver's side front scuff plate.
3. Remove the driver's side front side trim.
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.



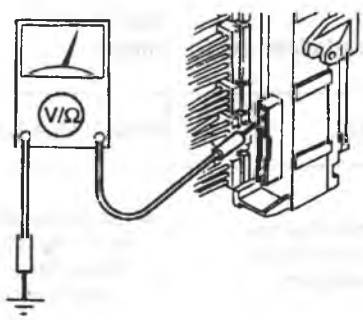
W6U940WA0

1	Nut	3	Joint box
2	Connector	4	CPU

CPU INSPECTION

Z6U094067580W02

1. Remove the driver's side front scuff plate.
2. Remove the driver's side front side trim.
3. Remove the nut fixed in the joint box.
4. Follow the appropriate procedure, referring to the terminal voltage list.
   All terminals of the connector A



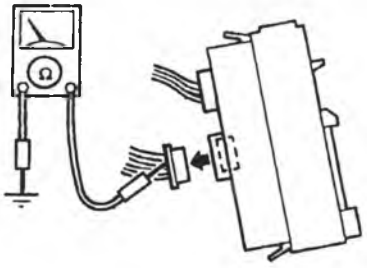
W6U940WA1

Note

- The voltage cannot be measured nor can a continuity to ground check be performed at the terminals of connector A with the connectors connected to the joint box.
- Remove the CPU from the joint box, then measure the voltage or check for continuity to ground at the CPU terminals from the joint box side with the joint box connectors connected.

Terminals 4B and 4D of connector D

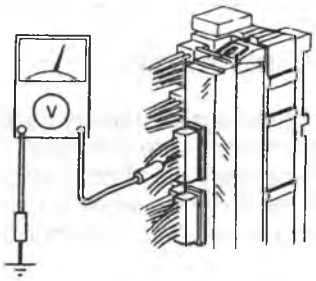
- Disconnect the CPU connector before checking for continuity at terminals 4B and 4D as shown in the figure.



W6U940WA2

Terminals except 4B and 4D of connector D

- Measure the voltage at the CPU connector while it is connected with the CPU as shown in the figure.

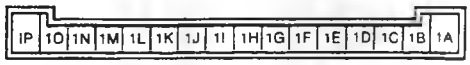


W6U940WA3

5. If not as specified, inspect the parts listed under "Inspection area" and the related wiring harnesses.
6. If the parts and wiring harnesses are okay but system still does not work properly, replace the CPU.

Terminal Voltage List (Reference)

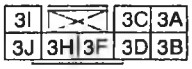
CONNECTOR A



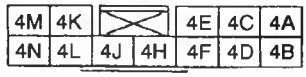
CONNECTOR B



CONNECTOR C



CONNECTOR D



W6U940WA4

Terminal	Signal	Connection	Test condition		Voltage (V)/ Continuity	Inspection area
1A	Trunk lid open/closed	• Trunk compartment light • Trunk compartment light switch	Trunk lid open		0	• ROOM 15 A fuse • Trunk compartment light • Trunk compartment light switch
			Trunk lid closed		B+	
1B	Key inserted/removed	Key reminder switch	Key inserted into steering lock		B+	• ROOM 15 A fuse • Key reminder switch
			Key removed from steering lock		0	
1C	ACC	RADIO 15 A fuse	Ignition switch at ACC or ON		B+	RADIO 15 A fuse
			Ignition switch at LOCK		0	
1D	Brake system warning light operation	• Brake system warning light • Brake fluid level sensor	Ignition switch at ON	Brake fluid level is below MIN.	0	• METER 10 A fuse • Instrument cluster • Brake fluid level sensor
				Brake fluid level is above MIN.	B+	
1E	Rear window defroster indicator light operation	Rear window defroster indicator light	Ignition switch at ON		B+	• METER 10 A fuse • Instrument cluster
			Ignition switch at LOCK or ACC		0	

Terminal	Signal	Connection	Test condition		Voltage (V)/ Continuity	Inspection area
1F	Interior light operation	• Interior light • Courtesy light	Interior light control system deactivated		B+	• ROOM 15 A fuse • Interior light • Courtesy light
			Interior light control system activated		0	
1G	CPU ground	GND	Constant: check for continuity to ground		Yes	GND
1H	Door ajar warning light operation	Door ajar warning light	Ignition switch at ON		B+	• METER 10 A fuse • Instrument cluster
			Ignition switch at LOCK or ACC		0	
1I	Door open/closed	Door switch	Any door open: check for continuity to ground		Yes	Door switch
			All doors closed: check for continuity to ground		No	
1J	Power supply	ROOM 15 A fuse	Constant		B+	ROOM 15 A fuse
1K	Power door lock one-touch system input	Door lock switch	Door lock switch (LOCK) pushed: measure resistance between terminal and ground		Yes (1 kΩ)	Door lock switch
			Door lock switch (UNLOCK) pushed: check for continuity to ground		Yes	
			Door lock switch released: check for continuity to ground		No	
1L	—	—	—		—	—
1M	IG1	METER 10 A fuse	Ignition switch at ON		B+	METER 10 A fuse
			Ignition switch at LOCK or ACC		0	
1N	Rear window defroster switch on/off	Rear window defroster switch	Rear window defroster switch pushed: check for continuity to ground		Yes	Rear window defroster switch
			Rear window defroster switch released: check for continuity to ground		No	
1O	Seat belt buckled/unbuckled	• Seat belt warning light • Buckle switch	Ignition switch at ON	Driver's side seat belt buckled	B+	• METER 10 A fuse • Instrument cluster • Buckle switch
				Driver's side seat belt unbuckled	0	
1P	Parking brake lever pulled/ released	Parking brake switch	Parking brake lever pulled: check for continuity to ground		Yes	Parking brake switch
			Parking brake lever released: check for continuity to ground		No	
2A	Horn pad pushed	• Horn relay • Horn switch	Horn switch on		0	• HORN 15 A fuse • Horn relay • Horn switch
			Horn switch off		B+	
2B	Power door lock system output (door lock)	Door lock control module 1	Door locked		B+ →0→B+	• D.LOCK 30 A fuse • Door lock control module 1
			Other		B+	
2C	Security light operation	Security light	Security light turns on		0	• ROOM 15 A fuse • Instrument cluster
			Security light turns off		B+	
2D	Power door lock system output (trunk unlock)	Door lock control module 2	Trunk lid unlocked		B+ →0→B+	• D.LOCK 30 A fuse • Door lock control module 2
			Other		B+	

Terminal	Signal	Connection	Test condition		Voltage (V)/ Continuity	Inspection area
2E	Flasher control module operation	• Flasher control module • Hazard warning switch	Hazard warning switch on		0	• HAZARD 15 A fuse • Flasher control module • Hazard warning switch
			Hazard warning switch off		B+	
2F	Power door lock system output (driver's side door unlock)	Door lock control module 2	Driver's side door unlocked		B+→0→B+	• D.LOCK 30 A fuse • Door lock control module 2
			Other		B+	
2G	—	—	—		—	—
2H	Power door lock system output (door unlock)	Door lock control module 1	Door unlocked		B+→0→B+	• D.LOCK 30 A fuse • Door lock control module 1
			Other		B+	
2I	—	—	—		—	—
2J	Trunk key cylinder switch unlock	Trunk key cylinder switch	Trunk key cylinder switch at unlock position		0	Trunk key cylinder switch
			Other		5	
2K	—	—	—		—	—
2L	—	—	—		—	—
2M	—	—	—		—	—
2N	—	—	—		—	—
2O	Power door lock system input	Keyless control module	Transmitter lock button pressed		5→approx. 3.5→5	• ROOM 15 A fuse • Keyless control module
			Transmitter unlock button pressed		5→approx. 1.7→5	
			Transmitter trunk button pressed		5→approx. 0→5	
			Other		5	
2P	Ignition key cylinder illumination operation	Ignition key cylinder illumination	Illuminated		0	• ROOM 15 A fuse • Ignition key cylinder illumination
			Not illuminated		B+	
3A	Headlight relay operation	Headlight relay	Headlight switch at 2nd position		0	• HEAD 30 A circuit breaker • Headlight relay
			Headlight switch at OFF or 1st position		B+	
3B	Headlight switch on/off	Headlight switch	Headlight switch at 2nd position		0	Light switch
			Headlight switch at OFF or 1st position		5	
3C	Hood open/closed	Hood switch	Hood open		0	Hood switch
			Hood closed		5	
3D	—	Not used	—		—	—
3F	Rear window defroster relay operation	Rear window defroster relay	Ignition switch at ON	Rear window defroster switch on	0	• DEFOG 40 A circuit breaker • Rear window defroster relay
				Other	B+	
3H	—	—	—		—	—
3I	TNS switch on/off	Headlight switch	Headlight switch at 1st or 2nd position		0	Light switch
			Headlight switch at OFF		5	
3J	TNS relay operation	TNS relay	Headlight switch at 1st or 2nd position		0	• TAIL 15 A fuse • TNS relay
			Headlight switch at OFF		B+	

Terminal	Signal	Connection	Test condition		Voltage (V)/ Continuity	Inspection area
4A	LH headlight operation (low beam)	LH headlight (low beam)	Headlight switch at 2nd position	Dimmer switch at LO	0	• H/L-L 15 A fuse • LH headlight
				Dimmer switch at HI	B+	
4B	CPU ground	GND	Constant: check for continuity to ground		Yes	GND
4C	RH headlight operation (low beam)	RH headlight (low beam)	Headlight switch at 2nd position	Dimmer switch at LO	0	• H/L-R 15 A fuse • RH headlight
				Dimmer switch at HI	B+	
4D	CPU ground	GND	Constant: check for continuity to ground		Yes	GND
4E	Headlight relay operation	Headlight relay	Headlight switch at 2nd position		0	• HEAD 30 A circuit breaker • Headlight relay
			Headlight switch at OFF or 1st position		B+	
4F	Headlight switch on/off	Headlight switch	Headlight switch at 2nd position		0	Light switch
			Headlight switch at OFF or 1st position		5	
4H	High beam on/off	Headlight switch	Dimmer switch at HI		0	Light switch
			Dimmer switch at LO		5	
4J	Rear window defroster relay operation	Rear window defroster relay	Ignition switch at ON	Rear window defroster switch on	0	• DEFOG 40 A circuit breaker • Rear window defroster relay
				Other	B+	
4K	Headlight high relay operation	Headlight high relay	Headlight switch at 2nd position	Dimmer switch at LO	B+	• TAIL 15 A fuse • Headlight high relay
				Dimmer switch at HI	0	
4L	—	—	—		—	—
4M	TNS switch on/off	Headlight switch	Headlight switch at 1st or 2nd position		0	Light switch
			Headlight switch at OFF		5	
4N	TNS relay operation	TNS relay	Headlight switch at 1st or 2nd position		0	• TAIL 15 A fuse • TNS relay
			Headlight switch at OFF		B+	

09-50 TECHNICAL DATA

BODY & ACCESSORIES TECHNICAL DATA 09-50-1
BODY & ACCESORIES TIGHTENING TORQUE 09-50-2

BODY & ACCESSORIES TECHNICAL DATA

Z6U095001047W01

Item		Specifications (W) × number
LIGHTING SYSTEMS		
Exterior lights	Headlight	60/55 × 2
	Parking light	8 × 2
	Front turn light	27 × 2
	Brake light/taillight	21/5 × 4
	Rear turn light	27 × 2
	Back-up light	18 × 2
	License plate light	5 × 2
	High-mount brake light	27 × 1
Interior lights	Map light	5 × 2
	Interior light	8 × 1
	Vanity mirror illumination	1.4 × 4
	Trunk compartment light	5 × 1
	Instrument cluster illumination	3.4 × 3, 1.4 × 1
	Ignition key cylinder illumination	1.4 × 1
	Glove compartment light	1.2 × 1
	Courtesy light	5 × 2
INSTRUMENTATION/DRIVER INFO.		
Warning and indicator lights	ABS warning light	1.4 × 1
	Air bag system warning light	1.4 × 1
	Brake system warning light	1.4 × 1
	Cruise set indicator light	1.4 × 1
	Door ajar warning light	1.4 × 1
	Fuel-level warning light	1.4 × 1
	Generator warning light	1.4 × 1
	High beam indicator light	1.4 × 1
	Malfunction indicator lamp	1.4 × 1
	O/D OFF indicator light	1.4 × 1
	Oil pressure warning light	1.4 × 1
	Rear window defroster indicator light	1.4 × 1
	Seat belt warning light	1.4 × 1
	Security light	1.4 × 1
	TCS indicator light	1.4 × 1
	TCS OFF light	1.4 × 1
	Turn indicator light	3.4 × 2
	Washer fluid-level warning light	1.4 × 1

BODY & ACCESORIES TIGHTENING TORQUE

Z6U095001047W02

Item			Tightening torque (N·m {kgf·m, ft·lbf})
BODY PANELS			
Hood hinge			19—25 {1.9—2.6, 14—18}
Trunk lid hinge			7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}
Front bumper	Screw		1.0—1.4 {10—15, 9—13}
	Nut A		5.0—7.8 N·m {50—80 kgf·cm, 44—69 in·lbf}
Rear bumper	Screw		1.0—1.4 {10—15, 9—13}
	Nut A		5.0—7.8 N·m {50—80 kgf·cm, 44—69 in·lbf}
	Nut B		16—22 {1.6—2.3, 12—16}
Front fender panel			7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}
DOORS AND LIFTGATE			
Front door	Hinge		22—30 {2.2—3.1, 16—22}
	Checker		8.9—12.7 N·m {90—130 kgf·cm, 79—112 in·lbf}
Rear door hinge	Hinge		22—30 {2.2—3.1, 16—22}
	Checker		8.9—12.7 N·m {90—130 kgf·cm, 79—112 in·lbf}
GLASS/WINDOWS/MIRRORS			
Front power window regulator	Bolt		6.87—9.80 N·m {70—100 kgf·cm, 60.8—86.7 in·lbf}
	Nut		
Front manual window regulator	Bolt		6.87—9.80 N·m {70—100 kgf·cm, 60.8—86.7 in·lbf}
	Nut		
Rear power window regulator	Bolt		6.87—9.80 N·m {70—100 kgf·cm, 60.8—86.7 in·lbf}
	Nut		
Rear manual window regulator	Bolt		6.87—9.80 N·m {70—100 kgf·cm, 60.8—86.7 in·lbf}
	Nut		
Power outside mirror			4.6—6.4 N·m {46—66 kgf·cm, 40—57 in·lbf}
SEATS			
Front seat	Bolt		37—53 {3.7—5.5, 27—39}
	Nut		
Front seat buckle	Power seat		39—78 {3.9—8.0, 29—57}
	Manual seat	Driver seat	
		Passenger seat	
Rear seat back hinge			18—26 {1.8—2.7, 14—19}
SECURITY AND LOCKS			
Front door lock			4.2—6.1 N·m {43—62 kgf·cm, 38—53 in·lbf}
Front door outer handle			4.2—6.5 N·m {43—66 kgf·cm, 38—57 in·lbf}
Front door lock striker			18—26 {1.8—2.7, 14—19}
Rear door lock			4.2—6.1 N·m {43—62 kgf·cm, 38—53 in·lbf}
Rear door outer handle			4.2—6.5 N·m {43—66 kgf·cm, 38—57 in·lbf}
Front door lock striker			18—26 {1.8—2.7, 14—19}
Fuel-filler lid opener lever			5.6—6.1 N·m {57—63 kgf·cm, 50—54 in·lbf}
Hood lock	Bolt		7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}
	Nut		
Hood release cable			3.0—3.9 N·m {30—40 kgf·cm, 27—34 in·lbf}

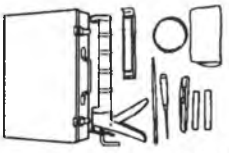
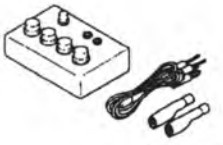
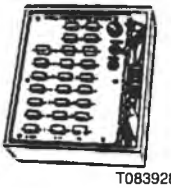
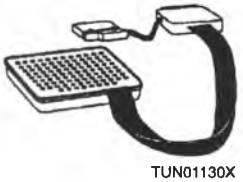
Item		Tightening torque (N·m {kgf·m, ft·lbf})
INTERIOR TRIM		
Dashboard	Side panel side	6.87—9.80 N·m {70—100 kgf·cm, 60.8—86.7 in·lbf}
	Lower	16—22 {1.6—2.3, 12—16}
	Steering shaft	
LIGHTNING SYSTEMS		
Rear combination light		4.6—6.4 N·m {46—66 kgf·cm, 40—57 in·lbf}
Back-up light switch		20—29 {2.0—3.0, 15—21}
WIPER/WASHER SYSTEM		
Windshield wiper arm		16—19 {1.6—2.0, 12—14}
Windshield wiper link		3.9—5.0 N·m {39—52 kgf·cm, 34—45 in·lbf}
Windshield wiper motor		3.9—5.0 N·m {39—52 kgf·cm, 34—45 in·lbf}
Windshield washer tank		6.87—9.80 N·m {70—100 kgf·cm, 60.8—86.7 in·lbf}
INSTRUMENTATION/DRIVER INFO.		
Water temperature sender unit	FS	11.8—17.6 N·m {120—180 kgf·cm, 105—156 in·lbf}
	KL	6.4—9.3 N·m {65—95 kgf·cm, 57—82 in·lbf}
CONTROL SYSTEM		
Joint box		4.8—6.8 N·m {40—70 kgf·cm, 35—60 in·lbf}

09-60 SERVICE TOOLS

BODY & ACCESSORIES SST 09-60-1

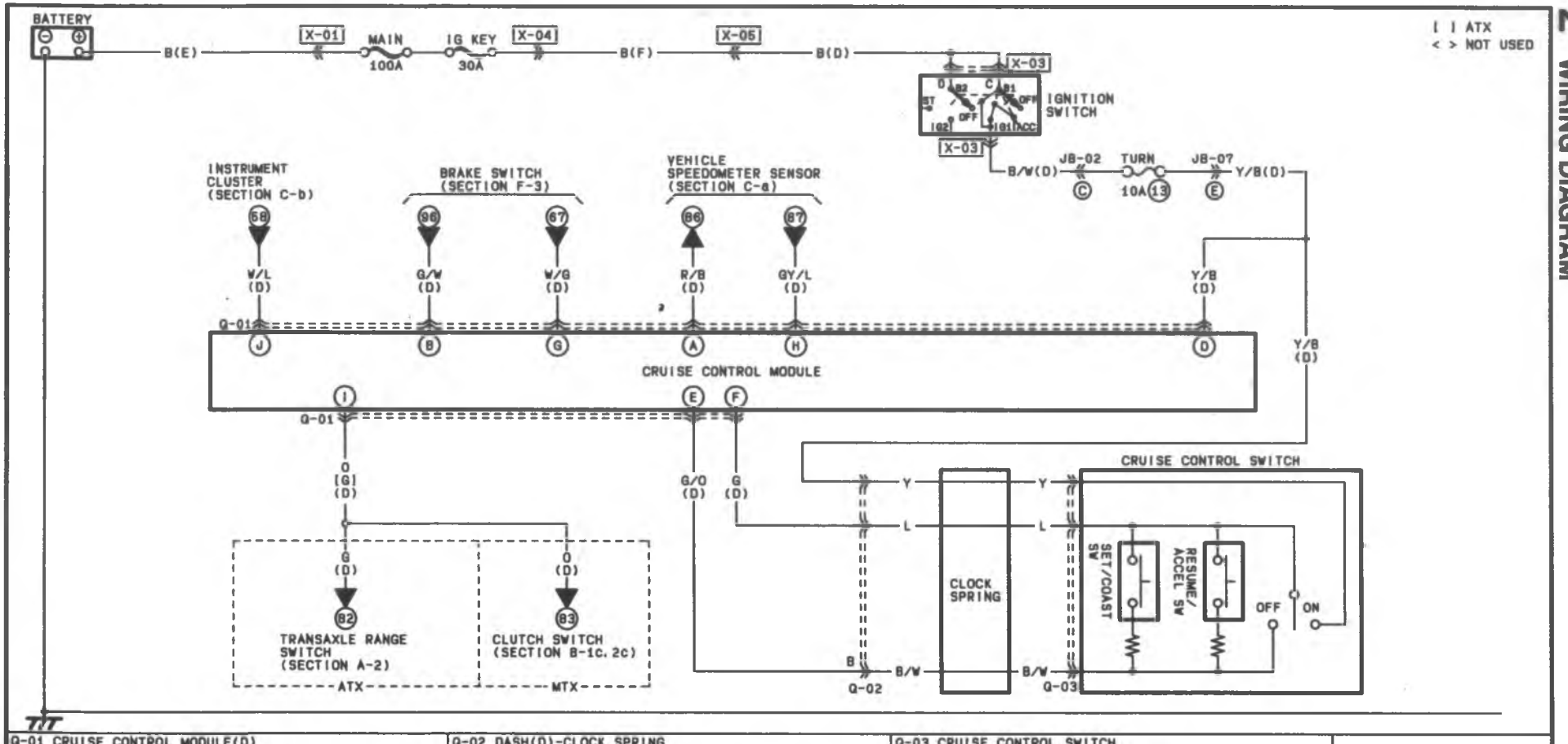
BODY & ACCESSORIES SST

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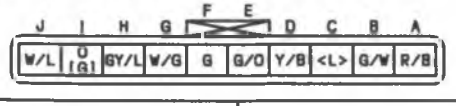
49 0305 870A Window tool set  T0305870A	49 T088 0A0 NGS set  TT0880A0X	49 N088 0A0 Fuel and thermometer checker(New)*  TN0880A0X
49 0839 285 Fuel and thermometer checker(Old)*  T0839285X	49 G050 1A0 Sealant remover  TG0501A0X	49 T088 010J or later Program card  TT088010E
49 UN01 050 Removing tool  TUN01050X	49 UN01 130 104 Pin Breakout Box  TUN01130X	—

* : Both checker can be used for 2001MY Mazda 626 model.

CRUISE CONTROL SYSTEM



Q-01 CRUISE CONTROL MODULE(D)

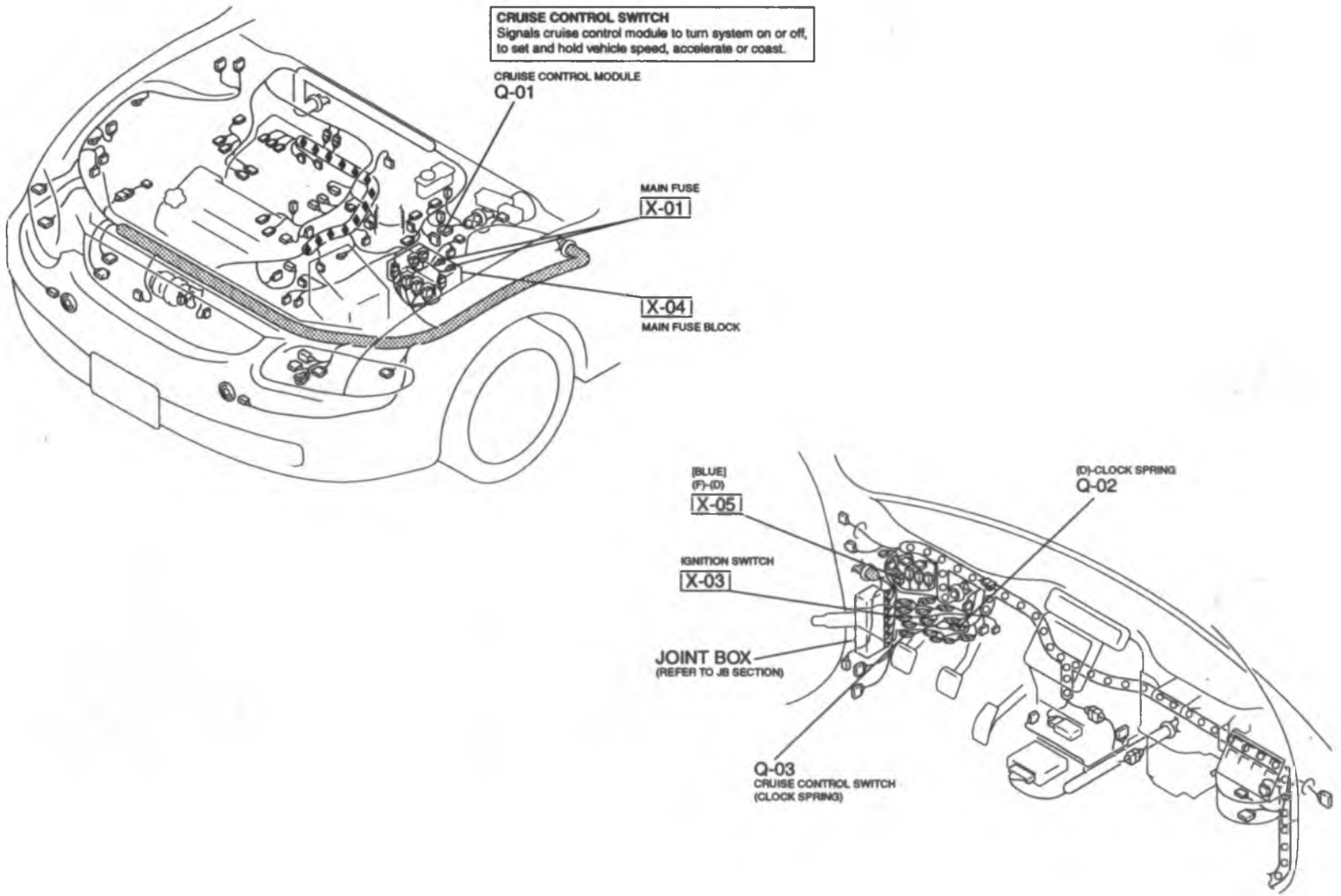


Q-02 DASH(D)-CLOCK SPRING



Q-03 CRUISE CONTROL SWITCH




CRUISE CONTROL SWITCH
Signals cruise control module to turn system on or off, to set and hold vehicle speed, accelerate or coast.
CRUISE CONTROL MODULE
Q-01
MAIN FUSE
X-01
X-04
MAIN FUSE BLOCK
[BLUE]
(F)-(D)
X-05
(D)-CLOCK SPRING
Q-02
IGNITION SWITCH
X-03
JOINT BOX
(REFER TO JB SECTION)
Q-03
CRUISE CONTROL SWITCH
(CLOCK SPRING)